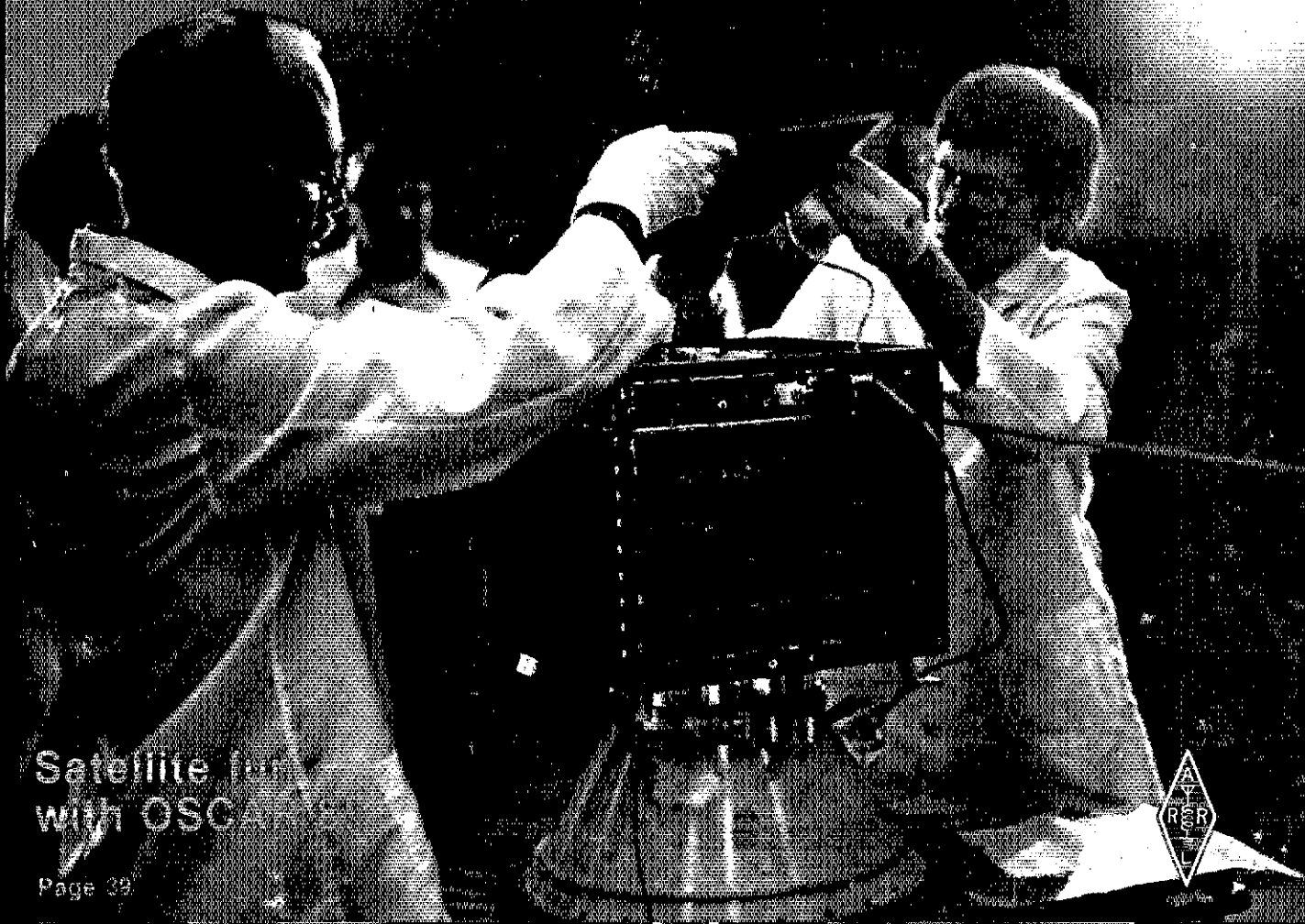


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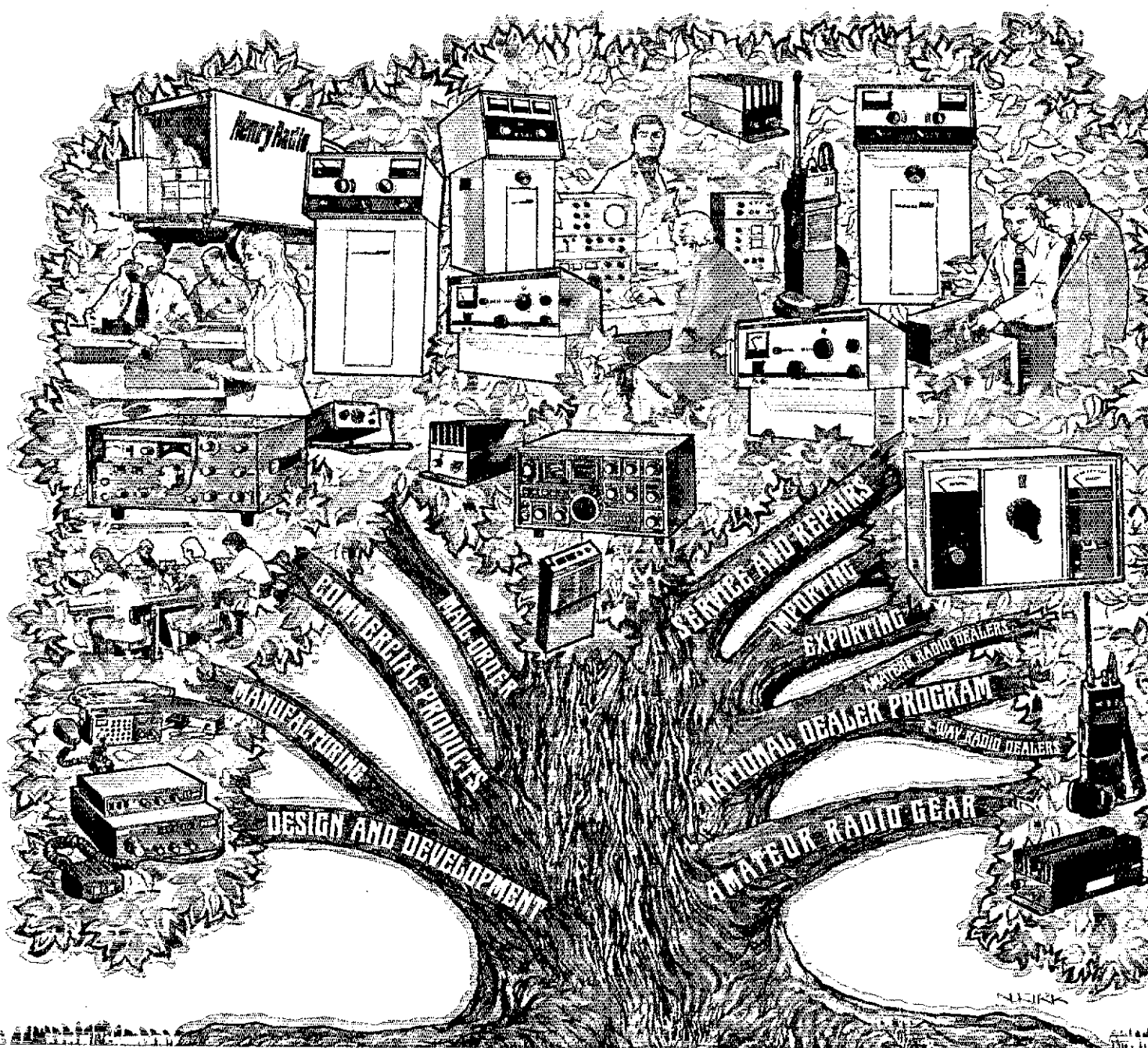
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Satellite link
with OSCAR

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Our tree has many branches

At Henry Radio, we are proud that amateurs not only in the United States but throughout the free world look to us as their pre-eminent supplier of fine communications equipment. For fifty years this has been our principal business and it still is.

Most amateurs don't fully understand, however, the manner in which we have grown and grown so that every year we are better equipped to provide a genuine service to the world amateur fraternity and at the same time extend our unique blend of responsible, expert service to many electronic services in addition to the amateurs.

Our tree has indeed grown many new and sturdy branches. Yes, as always we distribute all the available high quality amateur equipment. In addition, we manufacture a full line of linear amplifiers that have become world famous for quality and reliability. These have provided the standard of reference in amateur radio for many years and are widely employed by commercial and government users. More recently our tube amplifiers have been supplemented by a broad line of solid state amplifiers for the HF, VHF and UHF bands. Many of these amplifiers are type accepted by the FCC for business, Public service, RCC and marine two-way service.

Out of this program has grown an entire new operation providing high quality FM handhelds, mobiles and fixed station transceivers for all these services. Moreover, as an off-shoot of our vacuum tube amplifier program we now supply R.F. power generators to industry. These are used as plasma generators in thin film plating and other exotic scientific processes.

What does all this mean to our most important customers, the amateur radio operators of the world. Simply this. As Henry Radio grows these sturdy new branches on our tree of electronic expertise, we continually strengthen our ability to help the amateurs of the world satisfy their communications requirements. As always, we offer expert, responsible assistance, the kind amateurs need and want. Wherever you live in the world, we invite you to turn to Henry Radio, the pioneer in service to the amateur radio fraternity.

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CDR Ham-11
RG-8 100'
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Package Price: \$640

Package No. 3
Swan TB-3HA
Tristao CZ-454 FS or Triex W-51
5' mast
CDR Ham-11
RG-8 100'
Control Cable 100'
Retail Price: approximately \$1300
Package Price: \$1095

Package No. 4
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For many years Henry Radio has been providing a beam-antenna package program for amateurs who wanted an efficient but economical package. Thousands have benefited from this offer in the past. In recent years we have offered the customer the versatility of designing their own system with the components that they want. Our only requirement is the purchase of at least:

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- 1 Rotator
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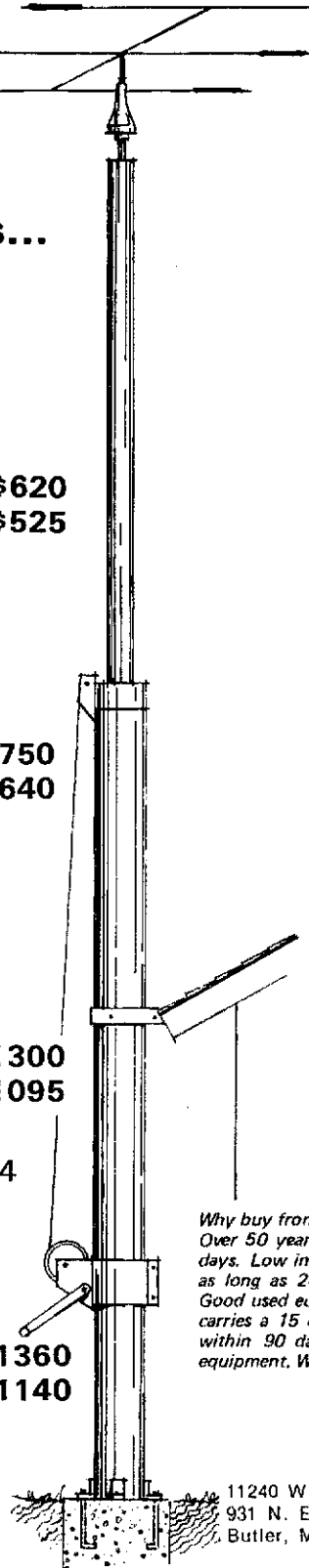
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Wilson Antennas
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New, Remotable 2meter Mobile!



ICOM's New IC-280

ICOM introduces its new 2 meter mobile radio with the detachable microprocessor control head, the **IC-280**. Bright, easy to read LED's and a new style meter grace the brushed aluminum "new look" front panel of the detachable control head, which provides memory and frequency control for the remotely mountable main section.

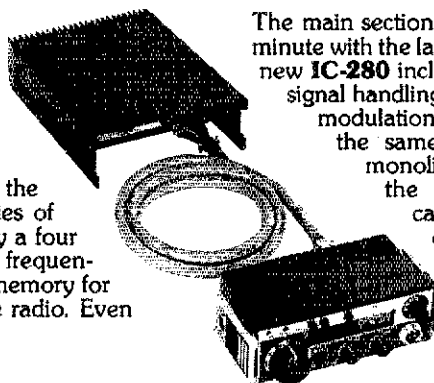
The **IC-280** comes as one radio to be mounted in the normal manner: but, as an option, the entire front one third of the radio detaches and mounts by its optional bracket and the main body tucks neatly away out of sight. Now you can mount your 2 meter mobile radio in places that seemed really tight before.

With the microprocessor head the **IC-280** can store three frequencies of your choice, which are selected by a four position front panel switch. These frequencies are retained in the **IC-280's** memory for as long as power is applied to the radio. Even

when power is turned off at the front panel switch, the **IC-280** retains its programmed memories; and when power is completely removed from the radio, the ± 600 KHz splits are still maintained!

Frequency coverage of the **IC-280** is in excess of the 2 meter band; and the new band plan (144.5-145.5 MHz repeaters) can easily be accommodated, since it was included in the **IC-280's** initial planning by the ICOM design team.

The main section of the **IC-280** puts you up to the minute with the latest state of the art engineering. The new **IC-280** includes the latest innovations in large signal handling FET front ends for excellent inter-modulation character and good sensitivity at the same time. The IF filters are crystal monolithics in the first IF and ceramic in the second, providing narrow band capacity for today and tomorrow's crowded operating conditions. Modular PA construction with broad band tuning provides full rated power across the full 2 meter band (plus a little).



All ICOM radios significantly exceed FCC specifications limiting spurious emissions.

Specifications subject to change without notice.

IC-280 Specifications: Frequency Coverage: 143.90 — 148.11 MHz Operating Conditions: Temperature: -10°C to 60°C (14°F to 140°F), Duty Factor: continuous Frequency Stability: ± 1.5 KHz Modulation Type: FM (F3) Antenna Impedance: 50 ohms unbalanced Power Requirement: DC 13.8V $\pm 15\%$ (negative ground) Current Drain: Transmitting: 2.5A Hi (10W), 1.2A Lo (1W), Receiving: 0.630A at max audio output, 0.450 at SQL ON with no signal Size: 58mm(h) x 156mm(w) x 228mm(d) Weight: approx. 2.2 Kg Power Output: 10W Hi, 1W Lo Modulation System: Phase Max. Frequency Deviation: ± 5 KHz Spurious Output: more than 60 dB below carrier Microphone Impedance: 600 ohms dynamic or electret condenser type, such as the SM-2 Receiving System: Double superheterodyne Intermediate Frequency: 1st: 10.695 MHz, 2nd: 455 KHz Sensitivity: 1 μv at 5 +N/N at 30 dB or better, Noise suppression sensitivity 20 dB, 0.6 μv or less Selectivity: less than ± 7.5 KHz at -6 dB, less than ± 15 KHz at -60 dB Audio Output: More than 1.5W Audio Output Impedance: 8 ohms

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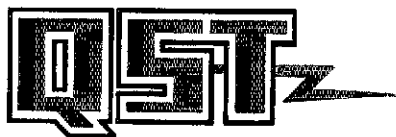


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July 1978
Volume LXII Number 7

Published monthly as its official journal by the American Radio Relay League, Newington, CT, U.S.A. Official organ of the International Amateur Radio Union.

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Subscription rate \$12.00 per year postpaid, U.S. funds, U.S. & Possessions; \$13.50 in Canada; \$14.50 elsewhere. Single copies \$2.00. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U.S. and for an equivalent amount in U.S. funds.

Second-class postage paid at Hartford, CT and at additional mailing offices. Postmaster: Form 3579 requested.

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QST is available to the blind and physically handicapped on magnetic tape from the Library of Congress, Division for the Blind and Handicapped, Washington, DC 20542.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No.: 21-9421. Microform editions available from Xerox University Microfilms, Ann Arbor, MI 48106.

THE COVER

Just before the first encounter of the eighth OSCAR with its launch vehicle, W9KDR caught Dick Daniels (l) and Jan King in a candid portrait. See page 39.



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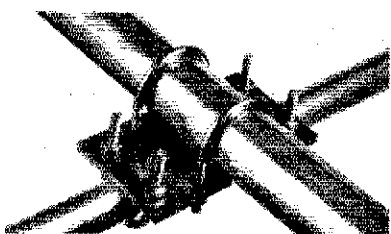
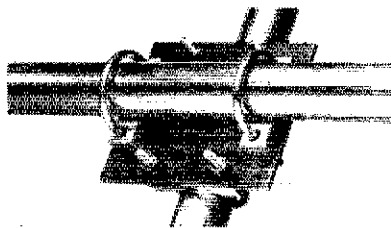
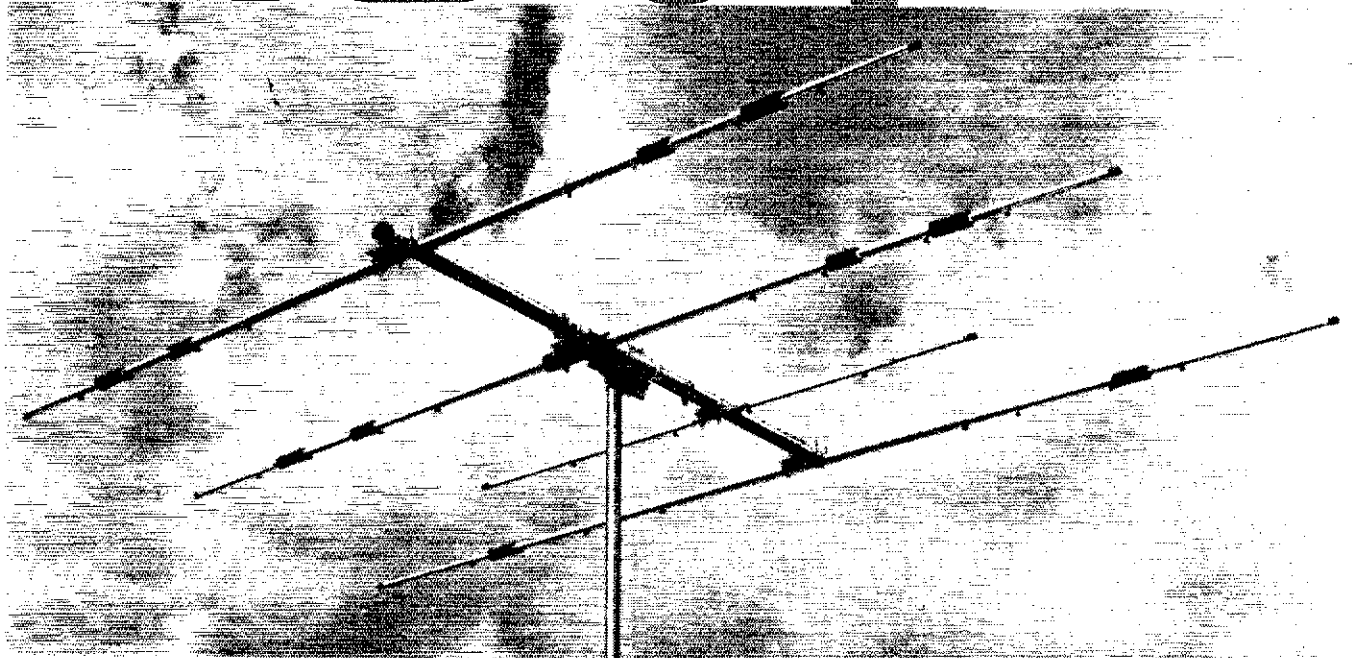
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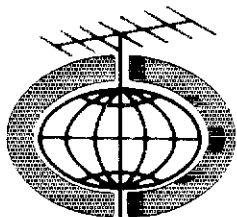
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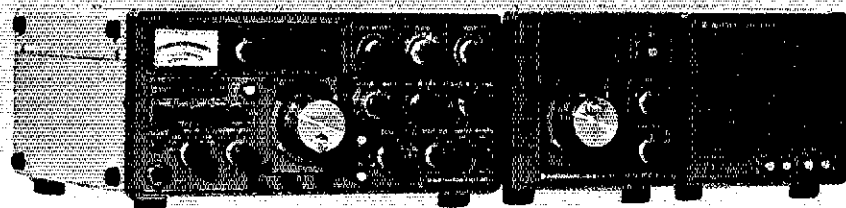
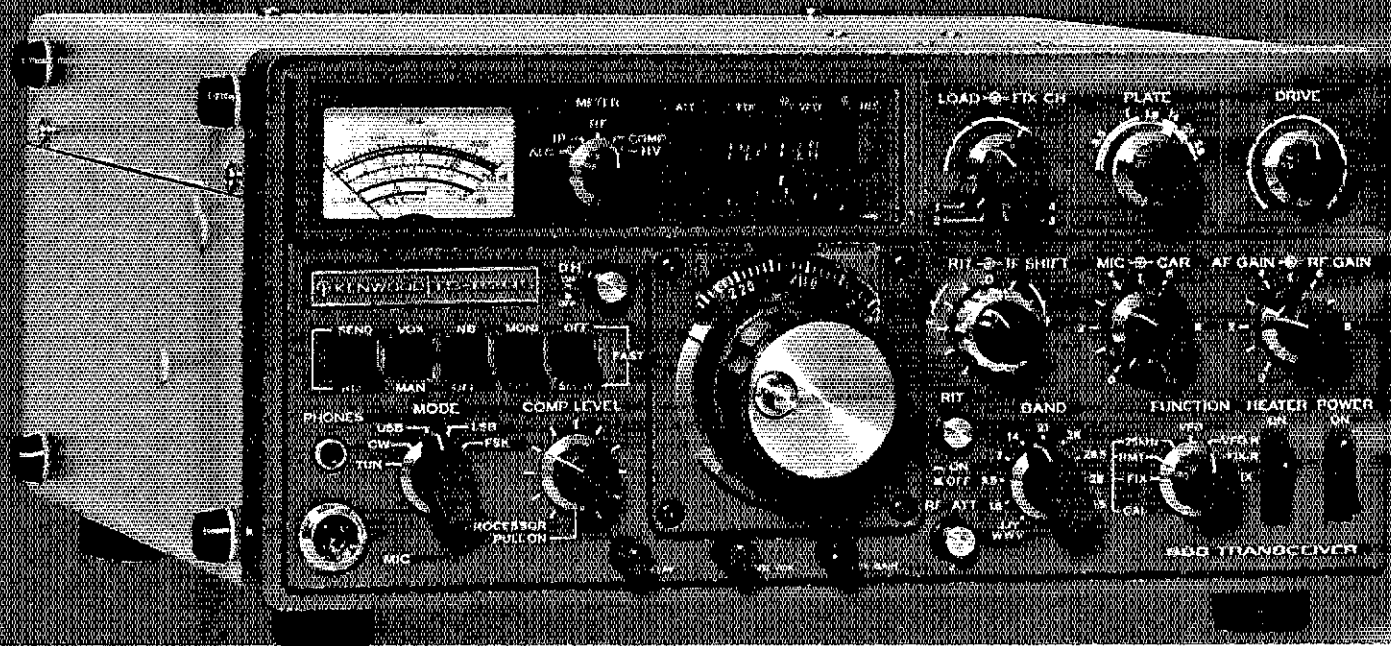
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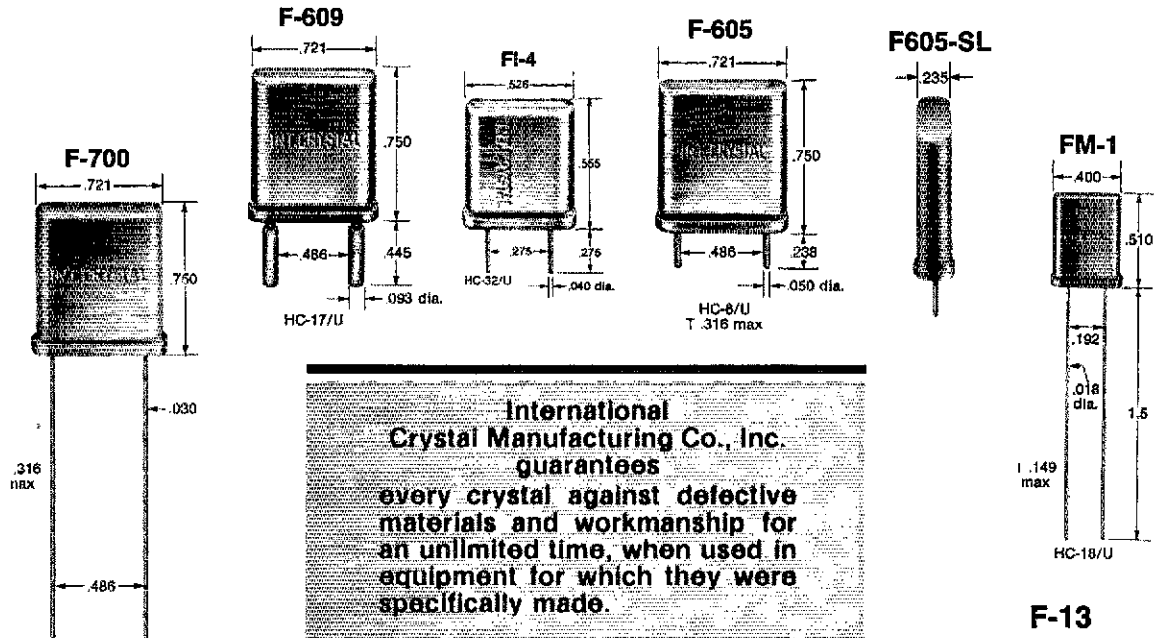
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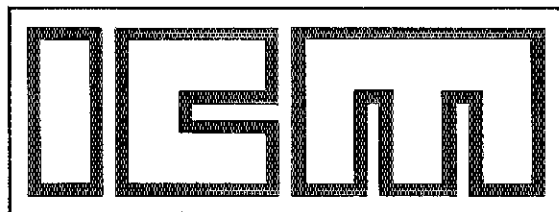
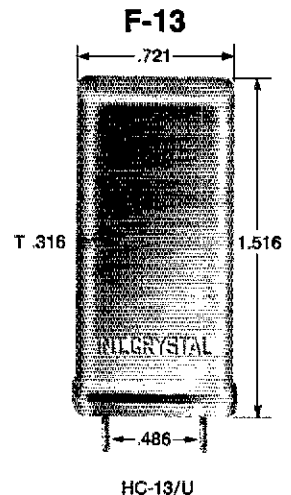
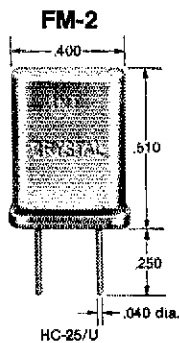
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"It Seems to Us . . ."

"Of, By and For . . ."

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

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

"Of, by and for the amateur," it numbers within its ranks practically every worthwhile amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

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

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Perhaps the greatest significance of these words, for many members, may be found in the strength of *QST's* advertising policies and the protection they afford.

Members benefit from these policies each time they purchase something from a *QST* advertiser; through advertising policies which have been established by the League for its official journal *QST*, and all for one very important reason — you. You own the League, and therefore *QST*, and these policies are designed solely for your protection. Acting for you, it is the object of these policies to present to members advertising which is responsible, factual and above all, honest.

A considerable amount of time and energy is devoted by the advertising staff to the review of prospective advertisers. *QST* has no obligation to carry a particular advertiser's message. For openers, every commercial advertiser is required to submit the following signed statement: "We will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in our advertising." This is just the kind of statement one would expect any worthwhile business to make, and stand by. Virtually all do, but just a few months ago a prospective advertiser balked at providing this statement of responsibility. Needless to say, he is not advertising in *QST*.

After an advertiser signs the statement, just what does it mean to you if a problem develops between you and the advertiser? *QST* has the means to open the door for you to negotiations, an explanation or an adjustment — with the president of the firm, if necessary. The statement is a promise that the company has made to you (the League) as a condition of their advertising being accepted in your journal. And why can *QST* (you) exercise this condition? Because your journal speaks with the strength of 165,000 voices — twice the number of members than the next-best-read magazine has subscribers, and very nearly equal to the combined circulation of all the other amateur radio magazines. You pack one heck of a clout in *QST*. So much for strength. Let's look at some of the other policies and what they mean.

A manufacturer who is a prospective advertiser, or one who changes his basic line of products, is required to submit a production sample of his product for advertising acceptance. This examination

is by no means as detailed as when the technical staff reviews a product for *QST*. Basically, we want to make a judgment to determine if the device is worth what the prospective advertiser is asking for it, if the instructions are adequate for the average amateur to successfully operate it, and if the device will fulfill the claims made for it. The commercial magazines have no such requirement. It's time-consuming, and it costs membership dollars, but we believe it's one of the great values your membership buys. Apparently many members do, too.

Some members, as well as advertisers, confuse the Code of Ethics, established earlier this year, with the League's basic advertising policies. The Code of Ethics is a program which involves *nonadvertisers*, as well as advertisers, and addresses itself solely to support of the retail sale of amateur transmitting gear only to amateurs. A total of 140 firms have now signed the Code. *QST's* extensive advertising policies, on the other hand, govern who may advertise in your journal and the quality of that advertising.

QST does not accept advertising for amateur antennas which contain gain figures and front-to-back ratios. Not that a manufacturer would deliberately misstate the performance of his antenna. Rather, since there is not an accepted standard for measuring such performance, each manufacturer may use a different standard, very likely his own.

All advertising policies aside, there is the occasional person whom no one can protect. He'll buy a thousand-dollar transceiver, which he may never have seen, from someone at the opposite end of the country, based *solely* on price and the specs in an advertisement. Buyer beware, however. There are other factors to consider, as well. There just isn't room in an ad for the manufacturer to tell it all. It is essential that one be thoroughly familiar with the equipment before making a purchase by mail. Ads are interest-whetters, and if an item in an ad interests you, ask for flyers and catalogs, first. Be careful about buying on price alone.

It's certain that *QST* could have many more advertisers if it weren't for its protective advertising policies. However, we're very proud of the many fine advertisers we do have, and we believe you should be, too. There are other *QST* advertising policies you should know about, and we'll try to treat them in a subsequent issue. — *WISE*

League Lines...

FLASH! On June 16 FCC began granting credit to applicants who pass the code but fail the theory. The credit is in the form of a certificate which can be used by the applicant any time he retakes the exam within one year, but only in the FCC District in which the certificate was issued.

Members holding ARRL insurance on their equipment should not be dismayed by some standard language (the "IMB form" adopted in 50 states) appearing in the policy. Our own "broad form" takes precedence over the IMB language, and you are insured, as promised, for the replacement value of your equipment.

Buying parts seems to be a growing problem for many would-be home constructors. But it needn't be. Beginning in this issue you'll find a section in the Product Review column which will be appearing regularly, "Parts Procurement Corner." Jay Rusgrove, W1VD, chief parts procurer for the ARRL lab, will be passing along some tips on where and how to go about finding what you need at reasonable cost. Watch for this information each month.

Amateurs visiting the United States and wishing to operate under a reciprocal operating agreement between their country and this one may obtain FCC form 610-A from any FCC office or from ARRL Hq. (self-addressed envelope, please). The completed form should be sent to FCC, P.O. Box 1020, Gettysburg, PA 17325 under a recent change in FCC rules. The language of 97.305 (b) requires that applications be filed at least 60 days prior to the proposed beginning date of the operation.

If you're sending QSLs to the Bureau of the Radio Society of Great Britain, please be sure they're being sent to the new manager and address: RSGB QSL Bureau, G3DRN, 30 Bodnant Gardens, London SW20 0UD, England. Thanks!

If you're interested in going "On the Road with Uncle Charlie," (see article of that name, page 45 June QST) as a career, why not contact the FCC, Military Circle, 870 North Military Highway, Norfolk, VA 23502? The Engineer-in-Charge, Jerry Freeman, W4JJ, notes that the Commission is looking for Electronics Engineers to be Field Inspectors, Enforcement. Norfolk is the location of the Field Operations Bureau's Training Center. Incidentally, the West Coast net mentioned in the article (top of page 46) was a formal traffic net, not WCARS!

A new series of public service announcements for broadcast radio is in preparation and should be available about the time you read this. Some of the announcements on the tape feature Joe Rudi, WA6PVA, left-fielder for the California Angels baseball team; others are by Daryl Dragon, who is the Captain of "The Captain and Tenille." Tnx to W6NAZ, WA2DHF and W4WHN for obtaining and processing these PSAs. If you can get a promise of air time from a local broadcast station, drop us a line and we'll send a tape: if you can dub it and return it to Hq. for reuse, so much the better!

Old amateur receivers -- those produced before 1960 -- have been exempted from the ban on sales which went into effect January 1, 1978 on CB sets and on CB receivers which have not been certificated under the current rules. Dust off that old Hammerlund or Hallicrafters: it's worth money again!

Iceland and U.S. sign reciprocal agreement. Effective on 26 April, according to U.S. State Department officials. For details, see International News, page 49.

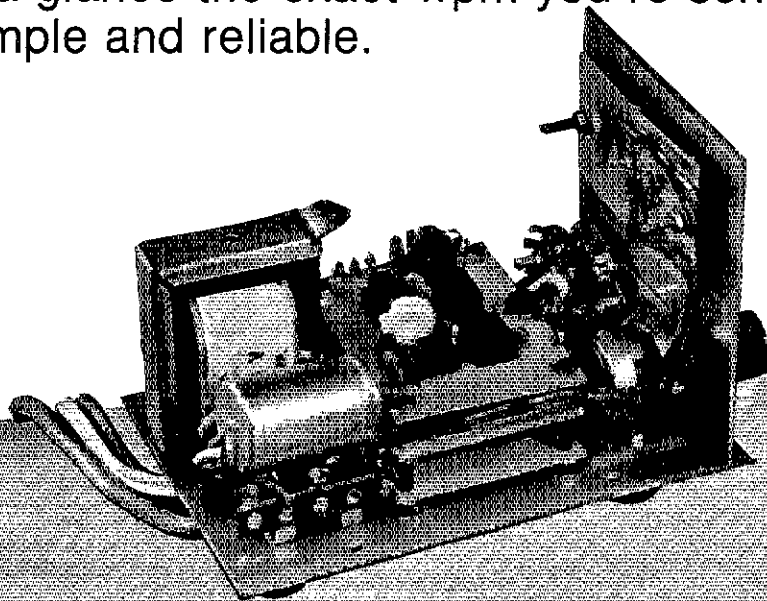
Noted pianist Lorin Hollander, WA1PGB, visited Hq. when performing recently with the Hartford Symphony Orchestra.

Have you been successful in stimulating interest in amateur radio through the mass media? Let the Public Information Office know the particulars. Perhaps we can add to your "wallpaper collection"!

A Digital Speed Readout for the Electronic Keyer

Say good-bye to guessing code speeds. This nifty digital counter tells at a glance the exact wpm you're sending. The circuit is simple and reliable.

By William B. Jones,* W7KGZ



Since incentive licensing was revived a few years ago, many amateurs have been working to upgrade their tickets. Upgrading often means another code test. Another code test means lots of practice at the correct speed if you are to get a shot at the written part of the exam. Until now determining the speed of transmitted code has been mainly a matter of guesswork. But with this simple digital speed readout for an electronic keyer, the guesswork can be cast aside; with a glance you know the precise speed at which characters are formed.

What's Inside Counts

Converting clock pulses of a keyer into a numerical display is a very simple process. *The Radio Amateur's Handbook* tells us that most modern electronic keyers use a clock circuit which feeds a flip-flop dot generator and the code speed in wpm can be determined directly from the formula: $wpm = 1.2 \times \text{clock frequency (Hz)}$. To put it another way, if we count the number of clock pulses in exactly 1.2 seconds, the readouts will show the code speed directly in words per minute.

The schematic diagram in Fig. 1 clearly indicates the simplicity of the system. The three ICs (7490, 7475 and 7447) associated with the DL-747 readouts perform the necessary counting, storage and decoding functions. The series of articles in *QST*

about working with integrated circuits will give the reader an understanding of how this part of the circuit works.

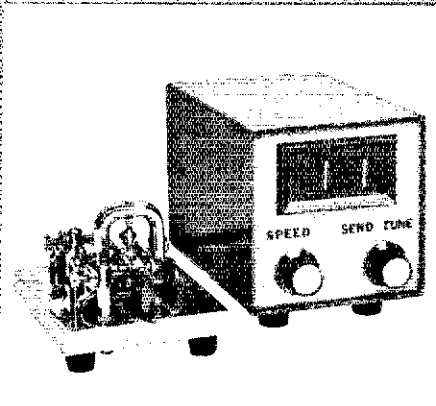
The three remaining ICs establish the 1.2-second time base as well as generate the latch and reset pulses necessary to update the readouts. The 555 timer (U9) is wired as an astable multivibrator. The time interval between each negative-going transition is set by means of the 100-k Ω potentiometer calibration control. More about this later.

Latch and reset pulses are derived from the 7474 edge-triggered D-type flip-flop. This part of the circuit is taken from the *TTL Cookbook*.¹ As the 555 switches from a logic one to a logic zero, a pulse is

generated from pin 5 of the 7474. The pulse is differentiated and fed to one section of the 7400 quad NAND gate. The NAND gate inverts the pulse which is then fed to the 7475 quad latches. Bringing the 7475 enable lines from low to high allows the display to update.

Reset pulses are derived the same way as the latch pulses except that now the low-to-high transition from the 555 is used to generate an output from the Q pin of the 7474. Again, the pulse is differentiated, inverted and fed to the zero-reset inputs of the 7490 decade counter. This system is simple and most reliable.

If you have followed the logic to this point, then the need for a continuous series of pulses to count should seem obvious. Some electronic keyers use a keyed clock; in other words the clock is only running while a character is being generated. The keyer used with the prototype digital speed readout performed this way but an alternative was to construct a copy of the keyer clock and wire it so that it ran continuously. The output from this clock is actually the one being counted. To arrange for the two clocks to run at the same speed, identical timing components are used and the speed control is a dual pot with identical values and tapers. Naturally, the accuracy of the readout is dependent upon the matching of the speed-control components. Tantalum capacitors and quality potentiometers are recommended. Tracking



The W7KGZ digital readout code speed counter that provides a positive check on the speed of character formation. This compact unit has instant eye appeal.

*12104 N.E. 76th St., Vancouver, WA 98662.
References appear on page 13.

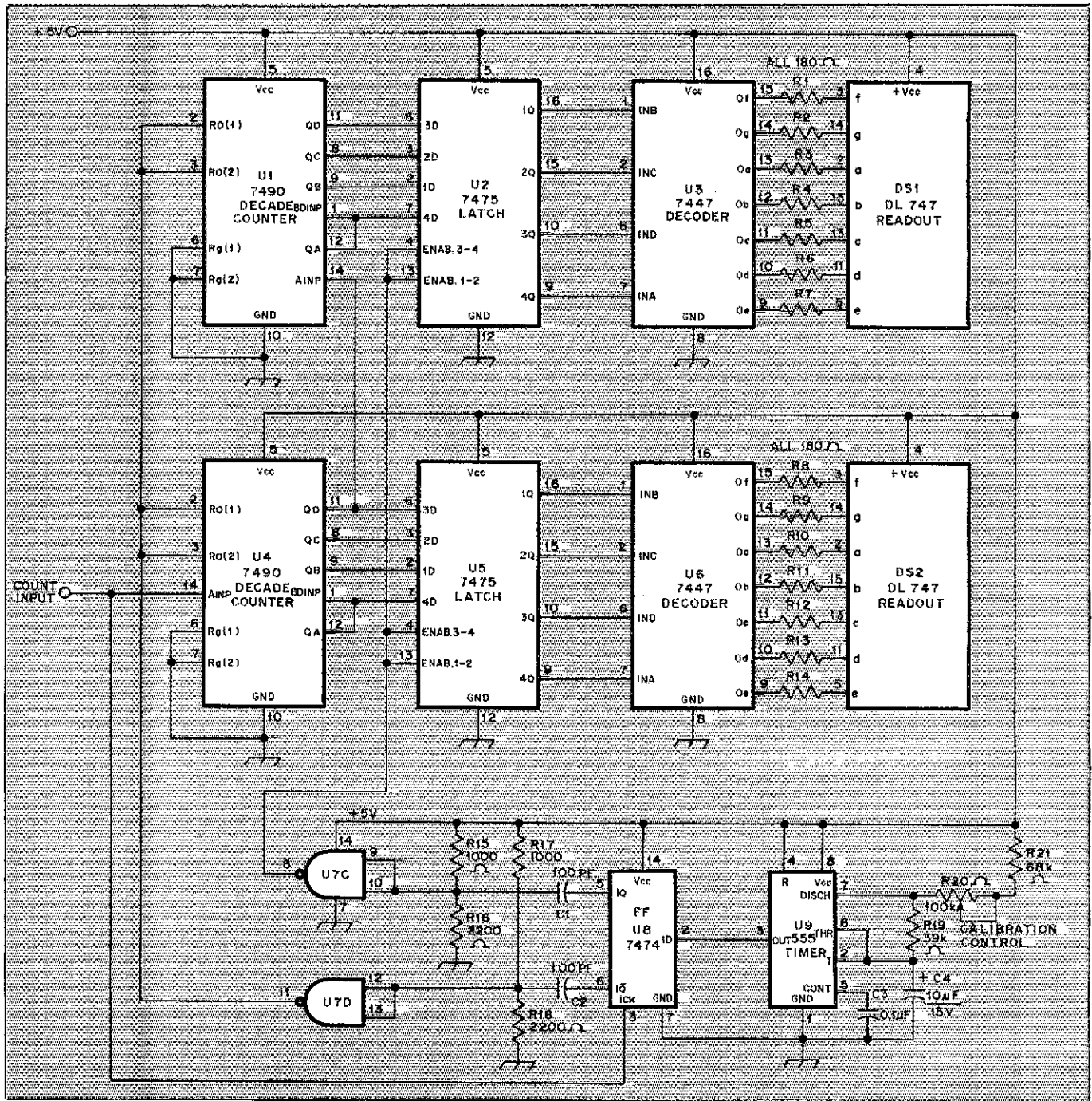


Fig. 1 — Schematic diagram for the digital speed readout. The three ICs associated with each DL-747 LED perform the counting, storage and decoding functions. Resistance values are in ohms and all fixed resistors are 1/4 watt. R1-R14, incl., are 180 ohms. R20 is a 100-k Ω miniature linear-taper potentiometer. The 555 is wired as an astable multivibrator. No connections are made to IC pin numbers not shown. Capacitors with polarity indicated are electrolytic.

DS1, DS2 — Seven-segment common anode LED digital display readout, Litronix type DL-747 or equiv.
 U1, U4 — TTL decade counter, type 7490.

U2, U5 — TTL 4-bit bistable latch, type 7475.
 U3, U6 — TTL BCD to seven-segment decoder/driver, type 7447.
 U7 — TTL quadruple 2-input positive NAND

gate, type 7400; two sections unused.
 U8 — TTL dual D-type positive edge-triggered flip-flop with preset and clear, type 7474.
 U9 — Timer IC, 555.

was within one word per minute throughout the entire speed range on the prototype. The readout has since been adapted for use with the author's keyboard keyer which has a continuously running clock. Of course it was not necessary to build a duplicate clock in that case.

In the version shown in the photograph,

the actual keyer is built into the same case as the digital display. The keyer was described in *QST* for January, 1975.³ It is a superb performer, the third in a series built by the author. All worked perfectly upon initial testing.

Perfboard construction was used throughout as a means of saving time and also for the sake of neatness. Because

troubleshooting a defective IC can be difficult, the installation of IC sockets in the circuit seems well worth the small investment. Teflon insulated wire interconnects the various pins of the sockets and other components.

The prototype was constructed on three separate pieces of perfboard cut to the same size for stacking. The keyer was built

first. After testing, it was set aside while assembly of the display part of the project took place. The third board contains the 555 timer, 7474 flip-flop and the 7400 gates. After each module had performed properly, they were all stacked, using long machine screws and metal spacers or nuts to hold the boards in position. Small loops of tinned no. 16 wire inserted in the perfboard serve as terminal connections. Common connections for each board, such as ground and Vcc, are positioned directly over each other in order to provide the shortest possible connection. Although not shown in the schematic diagram, each module has a 0.01- μ F disk ceramic capacitor connected directly between the ground bus and the +5-volt supply line. In addition, the cable to the paddles and the power supply wires are similarly bypassed to prevent rf from entering the cabinet.

Calibration

After all the boards are interconnected and working correctly, calibrating the unit is the next task. Probably the simplest and most accurate method of calibration is to sample the 60-hertz line frequency. The circuit of Fig. 2 is taken from Calectro's *Digital Handbook*.⁴ It serves to square the sine wave and clip the negative part in order to assure TTL compatibility. With the "count input" lead of the display temporarily connected to the output of the calibrator, the 100-k Ω calibration control is adjusted for a reading of 72 on the readouts. This corresponds to exactly 1.2

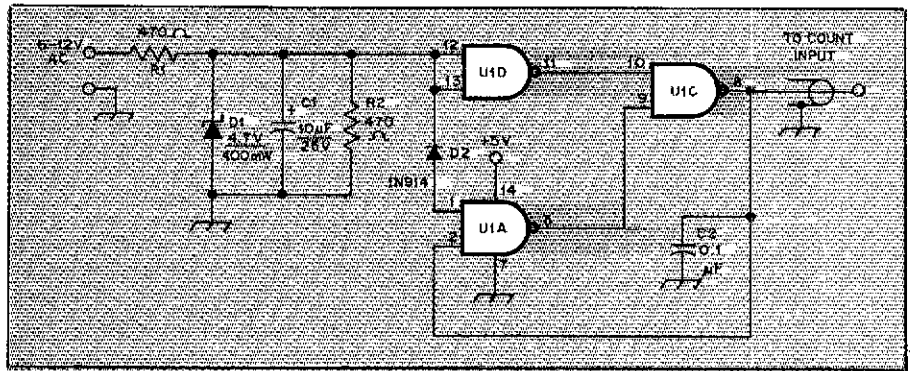


Fig. 2 — This circuit provides a means of obtaining a calibration signal for the digital speed readout unit. It squares the sine wave from the 60-Hz ac line, clipping the negative part and is therefore TTL compatible.

- D1 — Zener diode, 4.7 V, 400 mW, 1N750 or equiv.
- D2 — Silicon diode, 1N914 or equiv.

- R1, R2 — 470 ohm, 1/4-watt resistors.
- U1 — TTL quadruple 2-input positive NAND gate, type 7400; one section unused.

seconds for the time base. The calibrator can be made a permanent part of the unit if so desired. The 555 is quite stable over long periods of time although recalibration can be accomplished every few months for the sake of the purist. An spdt toggle switch can be used to connect either the calibrator or keyer to the readout.

The digital speed readout has been in use at W7KGZ for many months, becoming a most valuable addition to the station. When sending at the higher speeds, as with a keyboard keyer, there is reassurance in knowing exactly at what speed the characters are being formed.

Progress in code speed can be measured directly in wpm and when the guy on the other end of a QSO says he can copy 40, you can find out for sure!

References

- ¹Hall and Watts, "Learning to Work with Integrated Circuits," *QST* for January through July and November, 1976, and June, 1977. The series has also been published in booklet form (ARRL Publication no. 32) and is available for \$2 per copy (in USA) from ARRL Headquarters, 225 Main St., Newington, CT 06111.
- ²Lancaster, *TTL Cookbook*, First Edition, Howard W. Sams and Co., Inc. 1974, p. 212.
- ³Fox, "An Integrated Keyer/TR Switch," *QST* for January, 1975.
- ⁴*Digital Handbook*, Catalog no. FR 169, G. C. Electronics, 400 S. Wyman St., Rockford, IL 61101.

Feedback

□ The feedback information which appeared on page 85 of May 1978 *QST* shows the solid black etching pattern for the 20-Meter High-Performance Direct-Conversion Receiver (Rusgrove, April 1978 *QST*, page 11) inverted from the way it should appear. The shaded pattern with the parts information overprinted in orange is correctly shown from the foil side of the board. No big problem if you make a transparency for exposing a circuit board, though. Simply invert the transparency before making the board exposure.

□ Are you duplicating the DoppleScAnt (Rogers, page 24 of May 1978 *QST*)? If so, you should know that a number of errors appear in the schematic diagram, Fig. 4. The nature of the errors makes it difficult to describe corrections adequately in words, and limited space prevents us from republishing the diagram in *QST*. A corrected schematic is available upon request

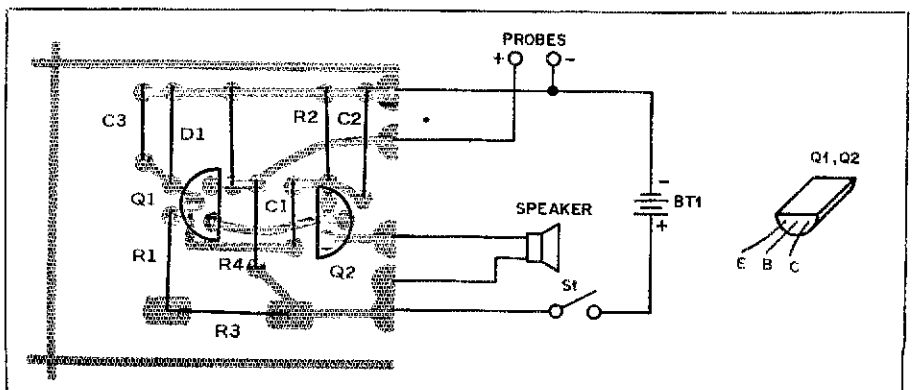
(no charge) from ARRL, Dept. TDSC, 225 Main St., Newington, CT 06111. A stamped return envelope will expedite the handling. The corrected diagram contains component numbers, required if you're working with the etching templates. (We'll be including the corrected diagram with future template orders.) See the footnote on page 28 of May *QST* regarding template availability.

□ In "An Audio Continuity Tester"

(May 1978 *QST*, page 21), author K1TX advises that the transistor shown in Fig. 1 should be diagrammed as shown below.

□ In the "Modular Control Unit — Just for Repeaters" (Shriner, May 1978 *QST*, page 11), the presentation of the etching patterns in Fig. 3 requires clarification. The board is *double-sided*; each pattern correctly shows the foil. Components are mounted on the side with the lettering, REPEATER CONTROL.

Parts placement guide for the Audio Continuity Tester with corrected transistor-basing diagram.



Series-Section Transmission-Line Impedance Matching

Nearly everyone who's worked with antennas knows about stub matching. But series-section matching has a number of advantages over stub tuning. Here's how it's done.

By Frank A. Regier,* OD5CG

Series-section matching may be a strange term to you, but the principle is probably a familiar one. Let's say you have put together a 35- Ω antenna system, perhaps an array of elements for a repeater, and you want to feed it with 75- Ω hardline. How would you make the impedance transformation from 35 to 75 ohms? There are a number of ways, of course — an rf impedance transformer and stub matching, to name two. But in this case perhaps the simplest would be to use a quarter-wavelength line transformer at the antenna. The impedance required for the matching-line section may be calculated from the equation

$$Z_1 = \sqrt{Z_{\text{load}} \times Z_{\text{line}}}$$

where Z_1 is the impedance needed for the $1/4\lambda$ matching section and Z_{load} is the purely resistive impedance to be matched to Z_{line} . In this example the value for Z_1 conveniently works out to be 51.2 Ω , and a line having a nominal impedance of 50 to 53 ohms may be used. But what happens when the load is not purely resistive, or when the required impedance for Z_1 is some uncommon value? In these cases it may be necessary to use another form of matching.

This article introduces a new impedance-matching system called the series-section transformer. It has worthwhile advantages over either stub tuning or the $1/4\lambda$ transformer. The series-section transformer is illustrated in Fig. 1 and bears considerable resemblance to the $1/4\lambda$ transformer. (Actually the $1/4\lambda$ transformer is a special case of the series-section transformer.) The important differences are, first, that the matching section may not be located exactly at the load, second, that it may be less than a quarter wavelength long, and third and

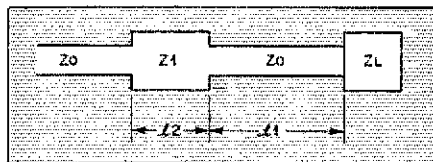


Fig. 1 — Series-section transformer, Z_1 , for matching transmission-line Z_0 to load, Z_L .

most important, that there is great freedom in the choice of the characteristic impedance of the matching section.

In fact, the matching section can have *any* characteristic impedance that is not too close to that of the main line. Because of this freedom, it is almost always possible to find a length of commercially available line that will be suitable as a matching section. As an example, consider a 75- Ω line, a 300- Ω matching section, and a pure-resistance load (example only; complex loads can also be matched). It can be shown that such a section may be used to match *any* resistance between 5 Ω and 1200 Ω to the main line.

The design of a series-section transformer consists of determining the length l_2 of the series or matching section and the distance l_1 from the load to the point where the section should be inserted into the main line. Three quantities must be known. These are the characteristic impedances of the main line and of the matching section, both assumed purely resistive, and the complex-load impedance. Either of two design methods may be used. One is algebraic, and the other is a graphical method using the Smith Chart. You can take your choice.

Algebraic Design Method

The two lengths l_1 and l_2 are to be determined from the characteristic impedances of the main line and the matching

section, Z_0 and Z_1 respectively, and the load impedance $Z_L = R_L + jX_L$. The derivation may be found elsewhere.^{1,2} Only the essential results are presented here.

The first step is to determine the normalized impedances.

$$n = \frac{Z_1}{Z_0} \quad (\text{Eq. 1a})$$

$$r = \frac{R_L}{Z_0} \quad (\text{Eq. 1b})$$

$$x = \frac{X_L}{Z_0} \quad (\text{Eq. 1c})$$

Next, l_2 and l_1 are determined from the relations

$$\begin{aligned} \tan l_2 &= B \\ &= \pm \sqrt{\frac{(r-1)^2 + x^2}{r \left(n - \frac{1}{n} \right)^2 - (r-1)^2 - x^2}} \end{aligned} \quad (\text{Eq. 2})$$

$$\tan l_1 = A = \frac{\left(n - \frac{r}{n} \right) B + x}{r + xnB - 1} \quad (\text{Eq. 3})$$

Lengths l_2 and l_1 thus determined are electrical lengths in degrees. Actual lengths are obtained by dividing by 360° and multiplying by the wavelength measured along the line (main line or matching section, as the case may be), taking the velocity factor of the line into account.

In Eq. 2 the sign of B may be chosen either positive or negative, but the positive sign is preferred because it results in a shorter matching section. In Eq. 3 the sign of A may not be chosen but can turn out to be either positive or negative. If a negative sign occurs and an electronic calculator is then used to determine l_1 , a negative electrical length will result. If this happens, add 180° . The resultant electrical length will be correct both physically and mathematically.

¹References appear on page 16.

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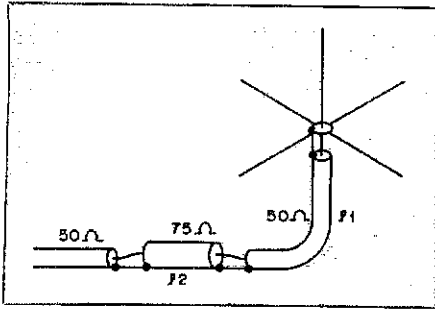


Fig. 2 — Example of series-section matching. A 38-ohm antenna is matched to 50-ohm coax by means of a length of 75-ohm cable.

In calculating B from Eq. 2, it can happen that the quantity under the radical is negative, leading to an imaginary value for B. This would mean that Z1, the impedance of the matching section, is too close to Zo and should be changed.

Limits on the characteristic impedance of Z1 may be calculated in terms of the standing-wave ratio produced by the load on the main line without matching. For matching to occur, Z1 should either be greater than $Z_o\sqrt{SWR}$ or less than Z_o/\sqrt{SWR} .

An Example

As an example, suppose we want to feed a 29-MHz groundplane vertical antenna with RG-58-type foam-dielectric coax (Fig. 2). We'll assume the antenna impedance to be 38 ohms, pure resistance, and use a length of RG-59/U foam-dielectric coax as the series section.

Zo is 50 ohms, Z1 is 75 ohms, and both cables have a velocity factor of 0.79. (From above, Z1 must have an impedance greater than 57.4 ohms or less than 43.6 ohms.) The design steps are as follows.

From Eqs. 1a through 1c, $n = 1.5$, $r = 0.76$, and $x = 0$.

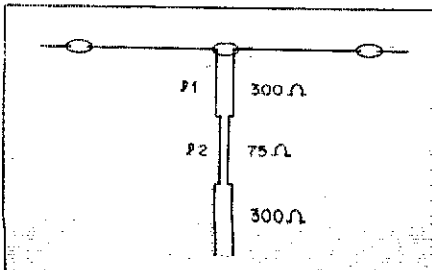
From Eq. 2, $B = 0.3500$ (positive sign chosen) and $\ell_2 = 19.29^\circ$.

From Eq. 3, $A = -1.4486$. Calculating ℓ_1 yields -55.38° . Adding 180° to obtain a positive result gives $\ell_1 = 124.62^\circ$.

To find the physical lengths ℓ_1' and ℓ_2' we first find the free-space wavelength.

$$\lambda_o = \frac{984}{f_{\text{MHz}}} \text{ feet}$$

Fig. 3 — Another example of series-section matching.



and the transmission-line wavelength

$$\lambda = \lambda_o \times \text{velocity factor}$$

In the present case we find $\lambda = 26.81$ ft. Finally we have

$$\ell_1' = \frac{\ell_1 \times \lambda}{360} = 9.28 \text{ ft, and}$$

$$\ell_2' = \frac{\ell_2 \times \lambda}{360} = 1.44 \text{ ft}$$

This completes the calculations. Construction consists of cutting the main coax at a point 9.28 ft from the antenna and adding a 1.44-ft length of the 75-ohm cable.

The Quarter-Wave Transformer

The antenna in the preceding example could have been matched by a 1/4- λ transformer at the load. Such a transformer would have a characteristic impedance of 43.6 ohms (from the equation at the beginning of this article). It is interesting to see what happens in the design of a series-section transformer if this value is chosen as the characteristic impedance of the series section.

Following the same steps as before, we find $n = 0.872$, $r = 0.76$, and $x = 0$.

From these values and Eq. 2 we find $B = \infty$ and $\ell_2 = 90^\circ$. Further, $A = 0$ and $\ell_1 = 0^\circ$. These results represent a quarter-wave section at the load, and indicate that, as stated earlier, the quarter-wave transformer is indeed a special case of the series-section transformer.

Another Example

Fig. 3 shows another example, in which a series-section of 75-ohm twin lead is used to match the 75-ohm center impedance of a resonant dipole to a 300-ohm line. Following the same steps once again, we find $n = 0.25$, $r = 0.25$, and $x = 0$.

From Eq. 2, $B = 0.4364$ and $\ell_2 = 23.58^\circ$ and from Eq. 3,

$$A = 0.4364 \text{ and } \ell_1 = 23.58^\circ.$$

Note that $\ell_1 = \ell_2$. This always occurs when $n = r$ and $x = 0$, and characterizes the *alternated-line transformer*,³ used for matching two cables of different impedance (the antenna could just as well have been a 75-ohm cable), using displaced sections of the two cables being matched.

Lengths ℓ_1 and ℓ_2 in this case can be determined either in the usual way, or from the simplified relationship:

$$\ell_1 = \ell_2 = \tan^{-1} \sqrt{\frac{n(n-1)}{n^3-1}}$$

Smith-Chart Solution

A series-section transformer can be designed graphically with the aid of a Smith Chart, but this requires the use of the chart in its unfamiliar off-center mode. This mode is described in the next two paragraphs.

Fig. 4 shows the Smith Chart used in its familiar centered mode, with all im-

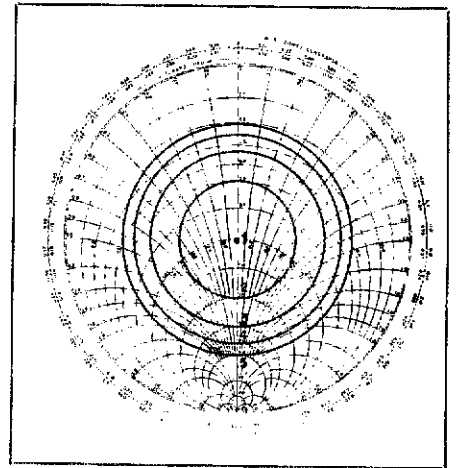


Fig. 4 — Constant-SWR circles for SWR = 2, 3, 4 and 5, showing impedance variation along 75-ohm line, normalized to 75 ohms. Actual impedance is obtained by multiplying chart reading by 75 ohms.

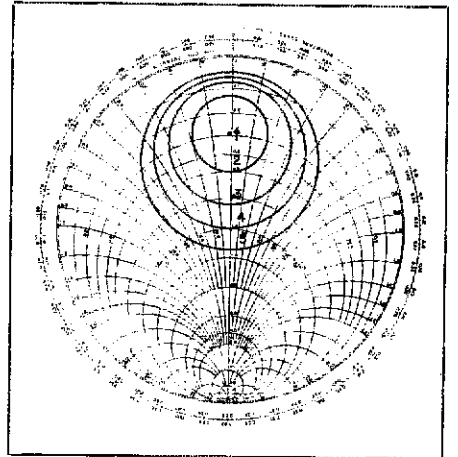


Fig. 5 — Paths of constant SWR for SWR = 2, 3, 4 and 5, showing impedance variation along 75-ohm line, normalized to 300 ohms. Normalized impedances differ from those in Fig. 4, but actual impedances are obtained by multiplying chart readings by 300 ohms and are the same as those corresponding in Fig. 4. Paths remain circles but are no longer concentric. One, the matching circle, SWR = 4 in this case, passes through the chart center and is thus the locus of all impedances which can be matched to a 300-ohm line.

pedances normalized to that of the transmission line, in this case 75 ohms, and all constant-SWR circles concentric with the normalized value $r = 1$ at the chart center. An actual impedance is recovered by multiplying a chart reading by the normalizing impedance of 75 ohms. If the actual (unnormalized) impedances represented by a constant-SWR circle in Fig. 4 are instead divided by a normalizing impedance of 300 ohms, a different picture results. A Smith Chart shows all possible impedances, and so a closed path such as a constant-SWR circle in Fig. 4 must again be represented by a closed path. In fact, it can be shown that the path remains a circle, but that the

constant-SWR circles are no longer concentric. Fig. 5 shows the circles which result when the impedances along a mismatched 75-Ω line are normalized by dividing by 300 ohms instead of 75. The constant-SWR circles still surround the point corresponding to the characteristic impedance of the line ($r = 0.25$) but are no longer concentric with it. Note that the normalized impedances read from corresponding points on Figs. 4 and 5 are different but that the actual, unnormalized, impedances are exactly the same.

Let's turn now to the example shown in Fig. 6. A complex load of $Z_L = 600 + j900$ ohms is to be fed with 300-Ω line, and a 75-Ω series section is to be used. These characteristic impedances agree with those used in Fig. 5, and thus Fig. 5 can be used to find the impedance variation along the 75-Ω series section. In particular, the constant-SWR circle which passes through the chart center, $SWR = 4$ in this case, passes through all the impedances (normalized to 300 ohms) which the 75-Ω series section is able to match to the 300-Ω main line. The length l_1 of 300-Ω line has the job of transforming the load impedance to some impedance on this matching circle.

Fig. 7 shows the whole process more clearly, with all impedances normalized to 300 Ω. Here the normalized load impedance $z_L = 2 + j3$ is shown at R, and the matching circle appears centered on the real axis and passing through the points $r = 1$ and $r = n^2 = 0.0625$. A constant-SWR circle is drawn from R to an intersection with the matching circle at Q or Q' and the corresponding length l_1 (or l_1') can be read directly from the Smith Chart.

Although the impedance locus from Q to P is shown in Fig. 7, the length l_2 cannot be determined directly from this chart. This is because the matching circle is not concentric with the chart center, as it must be if the length indications on the periphery of the Smith Chart are to be used. This problem is overcome by forming Fig. 8, which is the same as Fig. 7 except that all impedances have been divided by $n = 0.25$, resulting in a Smith Chart normalized to 75 ohms instead of 300. The matching circle and the chart center are now concentric, and the series-section length l_2 , the distance between Q and P, can be taken directly from the chart.

In fact it is not necessary to construct

Fig. 6 — Example for solution by Smith Chart. All impedances are normalized to 300 ohms.

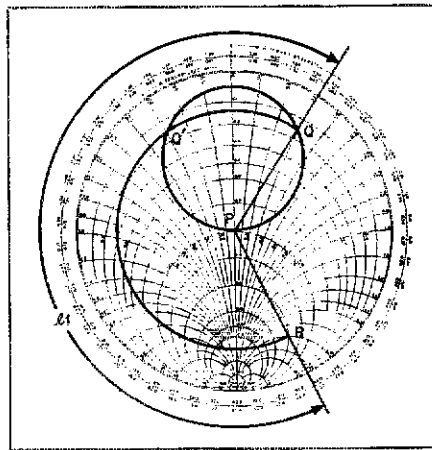
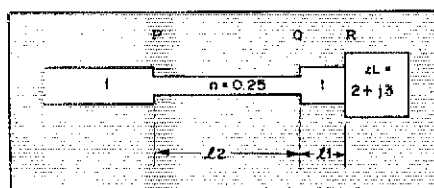


Fig. 7 — Smith Chart representation of example shown in Fig. 6. Impedance locus always has clockwise direction from load to generator, first along constant-SWR circle from load at R to intersection with matching circle at Q or Q', then along matching circle to chart center at P. Length l_1 can be determined directly from chart.

the entire impedance locus shown in Fig. 8. It is sufficient to plot Z_Q/n (Z_Q is read from Fig. 7) and $Z_P/n = 1/n$, connect them by a circular arc centered on the chart center, and to determine the arc length l_2 from the Smith Chart.

The steps necessary to design a series-section transformer by means of the Smith Chart can now be listed:

- 1) Normalize all impedances by dividing by the characteristic impedance of the main line.
- 2) On a Smith Chart plot the normalized load impedance z_L at R and construct the matching circle so that its center is on the real axis and it passes through the points $r = 1$ and $r = n^2$.
- 3) Construct a constant-SWR circle centered on the chart center through point R. This circle should intersect the matching circle at two points. One of these points, normally the one resulting in the shorter clockwise distance along the matching circle to the chart center, is chosen as point Q, and the clockwise distance from R to Q is read from the chart and taken to be l_1 .
- 4) Read the impedance Z_Q from the chart, calculate Z_Q/n and plot it as point Q on a second Smith Chart. Also plot $r = 1/n$ as point P.
- 5) On this second chart construct a circular arc, centered on the chart center, clockwise from Q to P. The length of this arc, read from the chart, represents l_2 . The design of the transformer is now complete.

On this second chart construct a circular arc, centered on the chart center, clockwise from Q to P. The length of this arc, read from the chart, represents l_2 . The design of the transformer is now complete.

The Smith Chart construction shows that two design solutions are usually possible, corresponding to the two intersections of the load constant-SWR circle with the matching circle, and also corresponding to positive and negative values of the square-root radical in Eq. 2. It may happen, however, that the load circle misses the matching circle completely, in

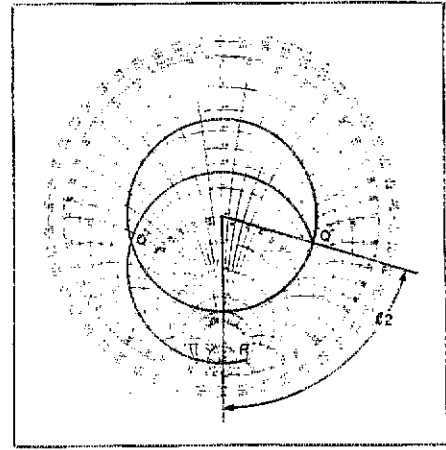


Fig. 8 — Same impedance locus as shown in Fig. 7 except normalized to 75 ohms instead of 300. The matching circle is now concentric with chart center, and l_2 can be determined directly from chart. In this example, $l_1 = 0.332 \lambda$ and $l_2 = 0.102 \lambda$.

which case no solution is possible. The cure is to enlarge the matching circle by choosing a series section whose impedance departs more from that of the main line.

A final possibility is that, rather than intersecting the matching circle, the load circle is tangent to it. There is then but one solution — that of the $1/4\lambda$ transformer.

In conclusion, the series-section transformer is a convenient form of matching. It consists of a line section of not over a quarter-wavelength inserted into the main line at some point within a half-wavelength of the load. The characteristic impedance of the series section, Z_1 , can be either greater than or less than Z_0 , the characteristic impedance of the main line. The only restriction on the choice of Z_1 is that it should not be too near Z_0 .

For a given Z_L it can be shown that a $1/4\lambda$ matching section can handle the greatest mismatch. Lesser mismatches require shorter matching sections.

Several well-known matching arrangements turn out to be special cases of series-section matching. In addition to the quarter-wave transformer and the alternated-line transformer, it can be shown,² by allowing Z_1 to approach zero, that stub-matching, too, is a special form of the series-section transformer.

Of the two design methods presented, the algebraic method is probably the easier if an electronic calculator is available. The Smith Chart method is a practical alternative and does provide additional insight into the operation of the series-section transformer.

References

- ¹Regier, "Impedance Matching with a Series Transmission Line Section," *Proc. IEEE*, Vol. 59, No. 7, July 1971, pp. 1133-1134.
- ²Regier, "The Series-Section Transformer," *Electronic Eng.*, Vol. 45, August 1973, pp. 33-34.
- ³Bramham, "A Convenient Transformer for Matching Coaxial Lines," *Electronic Eng.*, Vol. 33, Jan. 1961, pp. 42-44.

Put Your All-Mode 2-Meter Rig on 220!

Tired of crystal-controlled, fm-only, 220 rigs? This transceiving converter will make your "do-everything," 2-meter rig do it on 220!

By Wayne Overbeck,* K6YNB/N6NB

Of all our vhf bands, 220 MHz may be the most promising. For fm enthusiasts, it offers the same reliable mobile communications possibilities as 2 meters, but without the crowds. And for ssb/cw enthusiasts, it's an exciting new world of DX possibilities. Veteran 220-MHz DXers say the tropospheric propagation is often much better than it is on 2 meters — and yet the high-gain antennas needed for serious DXing are fully a third smaller than on 2 meters!

This article describes a self-contained unit that will put any of the popular 2-meter fm or ssb/cw rigs on 220. It will deliver about 30 watts of power output on 220. The receiver section offers a noise figure about 2 dB — better than most commercial 2-meter units. By itself, this transverter is ideal for local and medium-range work on fm, ssb or cw. For serious DXing, it offers sufficient output to drive an external amplifier to the legal limit.

Design Approach

In this transverter the main goal was to keep things as simple as possible by staying with proven conventional circuits. In most stages tubes are used instead of solid-state devices. The dual tetrode specified here is self-neutralized, which makes it suitable for stable circuits that are somewhat forgiving of inexact construction methods and incorrect tuning. Also, these tube types are often found in surplus uhf-fm equipment, which means "pullouts" can often be bought at low prices. Moreover, the high-Q circuits built around these tubes are much less prone to have objectionable spurs than would be true in a solid-state design using the same conversion scheme.

Circuit and Construction Details

A 7-1/2 x 11 x 8-inch (190 x 280 x 200-mm) cabinet houses the whole works, although a slightly larger enclosure may

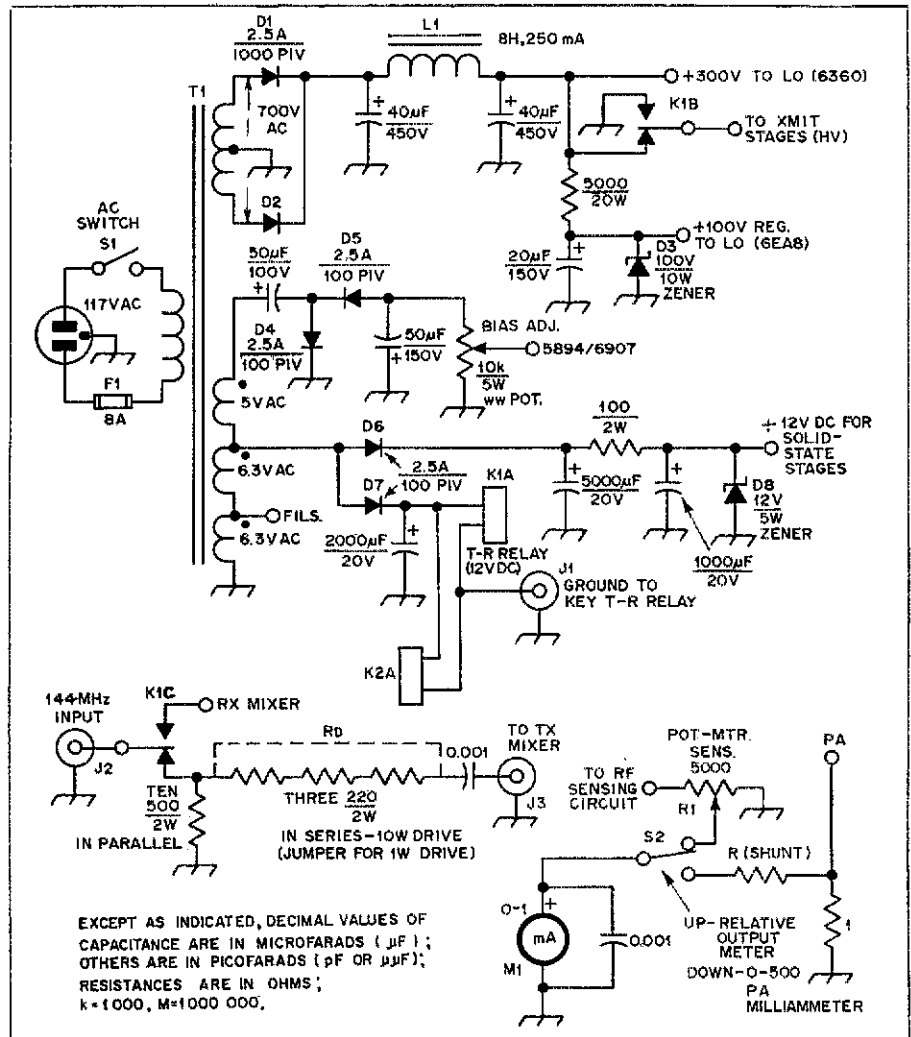


Fig. 1 — Power supply, control and metering circuits. T1 may be a TV-receiver power transformer or equivalent, provided the secondary can handle 450 to 500 mA. The shunt resistor (R shunt) in the metering circuit has a value determined by $R_s = 500$ ohms less the internal resistance of the meter. The series-drive resistor, R_{dr} , consists of three 220-ohm 2-watt resistors in series for a 10-watt drive. A jumper across these resistors is used for 1-watt drive. Placing S2 in the up position permits the meter to read relative output. In the down position the meter serves as a 0- to 500-mA meter for the PA. See Fig. 3 for other connections for K2.

D1, D2 — Diode rectifier, 2.5 A, 1000 PIV.
D3 — Zener diode, 100 V, 10 W.
D4-D7, incl. — Diode rectifier, 3A, 100 PIV.
D8 — Zener diode, 12 V, 5 W.
J1-J3, incl. — BNC connector.

L1 — Filter choke, 8 H, 250 mA.
M1 — 0.1 milliammeter.
R1 — 5000-ohm, linear taper, carbon potentiometer.

*Contributing Editor, QST

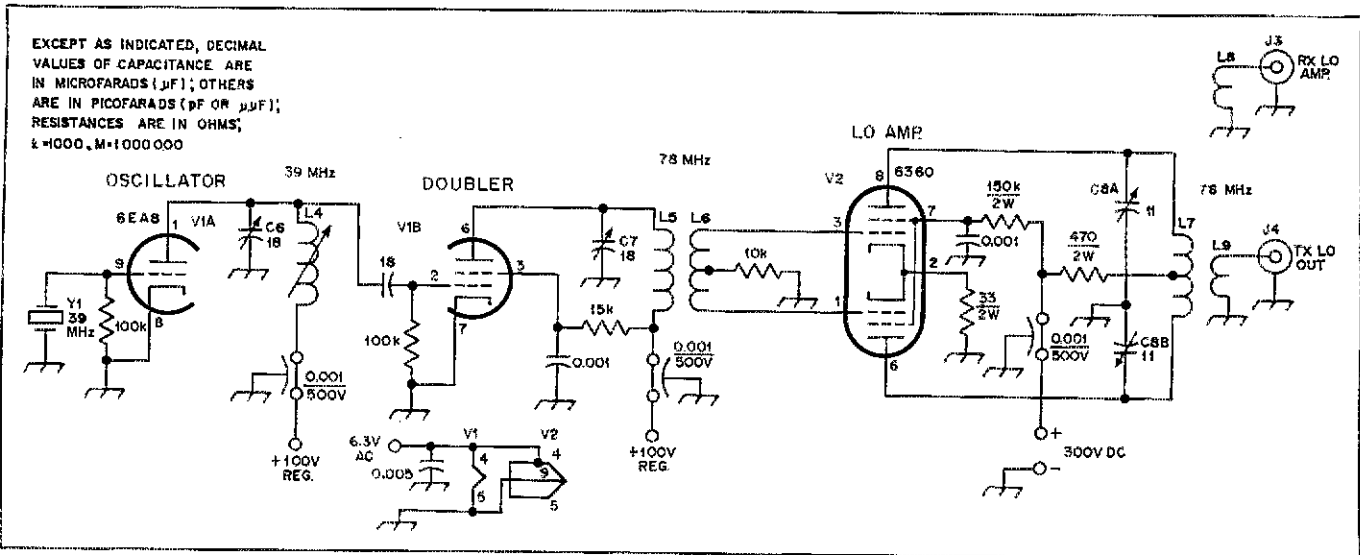


Fig. 2 — The transceiver local-oscillator chain. The 39-MHz crystal may be obtained from sources appearing in the QST Ham-Ads. C6, C7 — 2- to 18-pF variable capacitor (E. F. Johnson type 160-110 or equiv.). C8 — 2- to 11-pF butterfly variable capacitor (E. F. Johnson type 160-211 or equiv.). J3, J4 — BNC connector. L4 — 7 turns, no. 28 enam. on 3/8-inch dia form, ceramic, iron core. L5 — 3 turns, no. 18 solid-covered, 5/8-inch dia, air wound. L6 — 5 turns, no. 18, solid covered, 5/8-inch dia, center tapped. L7 — 8 turns, no. 18, solid covered, air wound, 5/8-inch dia, center tapped. L8 — 1 turn, no. 18, solid covered, 3/4-inch from either end of L7. L9 — 2 turns, no. 18, solid covered, 3/4-inch dia around L7. Y1 — 39-MHz crystal.

simplify the packaging job. The power-supply components are the dominant influence on the cabinet dimensions.

A good place to start in a project such as this is to build the power supply and relay circuitry as a foundation for the more critical rf work to follow. As Fig. 1 shows, the power supply uses a television-replacement power transformer that has two 6-volt filament windings along with its 5-volt winding. These windings should be connected in series to derive 12 and 17 volts ac. These voltages are rectified (and the 17 volts is doubled) for the relay, receiver and bias supplies. A simple ground-to-transmit T-R switching arrangement is used which is compatible with most multimode transceivers. When the T-R relay is energized, high voltage is applied to the transmit stages, the 2-meter input is switched, and a coaxial relay switches for antenna changeover.

The input swamping network shown in Fig. 1 is suitable for 10 to 15 watts of drive. The three 200-ohm resistors in series may be jumpered for use with 1-watt rigs.

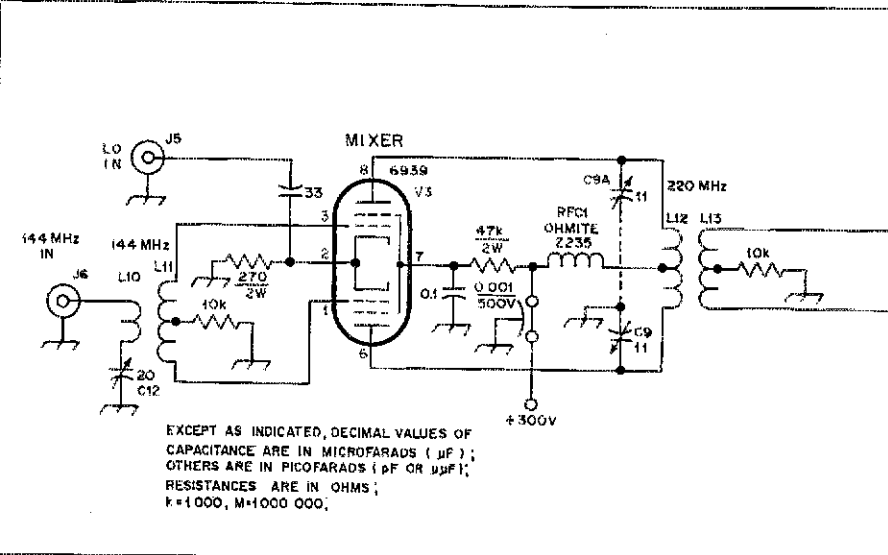
Once the power supply and relay systems are working, build the local oscillator chain, as shown in Fig. 2. Select a suitable crystal frequency from Table 1 and build the chain in a small box. The author made all the boxes for his subassemblies by soldering together pieces of double-sided pc board. The LO circuitry is generally noncritical, except that the 6360 output should be isolated from the input with a shield across the tube socket — just as is done in the transmitter stages shown in the accompanying photograph.

Table 1
Local Oscillator Crystal Plan

For output on:	With an i-f of:	Use xtal for:
220.0 MHz ¹	144.0 MHz	38.0 MHz
224.0	148.0	38.0
222.0	144.0	39.0
225.0	147.0	39.0
223.5 ²	146.52	38.49

Note 1: Most ssb/cw activity is at 220 MHz on the East Coast, but at 222 MHz on the West Coast.
Note 2: 223.5 is the national simplex frequency.

Fig. 3 — Transmitting stages of the 220-MHz converter. The screen resistor may be adjusted to keep the screen voltage for the 6907/5894 at the rated level. All plate rf chokes are Ohmite type Z235. See Fig. 1 for other connections for K2. C9, C10 — 2-11 pF per section butterfly variable capacitor (E. F. Johnson type 160-211 or equiv.). C11 — 2-10 pF per section butterfly variable capacitor (E. F. Johnson type 167-201 or equiv.). C12, C13 — 2-20 pF single-section variable capacitor (E. F. Johnson type 160-110).



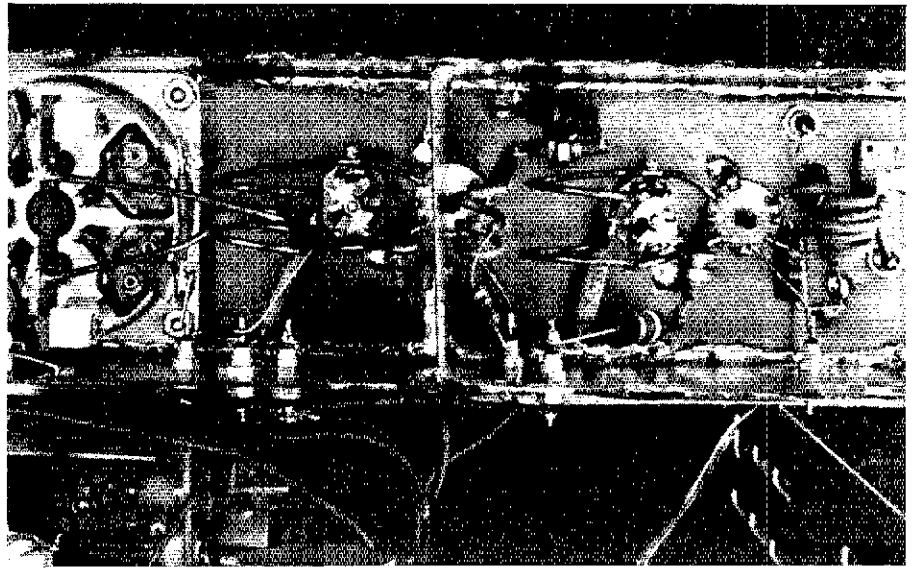
In building the entire transverter, follow normal vhf construction practices. Keep all leads as short as possible and separate input and output tuned circuits as much as possible in each stage. There are two output loops for the 6360 LO amplifier stage — a tightly coupled one for the transmit mixer and one loosely coupled for the receive mixer.

The receiving mixer is a prepackaged broadbanded unit. One suitable model is the SRA-1, sold by Mini-Circuits Laboratory, 2625 East 14th Street, Brooklyn, NY 11235, at \$9.95 each (at the time of this printing) in single quantities. The receiving preamplifier consists of two WB6NMT grounded-source JFET stages.¹

The transmitter section should be built with a layout similar to that shown in the photograph, using a shield across each tube. If this layout is followed, there should be no instability problems. The author used a 3 × 3 × 11-inch (76 × 76 × 280-mm) sub-chassis for the transmitter section with a small enclosure on top for the final amplifier plate circuitry.

In the transmit mixer stage, it is important to inject the LO signal at the cathode and not at the more sensitive control grid. This is to help suppress the third harmonic of the LO, which falls near 234 MHz. Care must also be exercised in the tune-up process to avoid the false peak at that frequency. With proper tune-up, the spur is attenuated sufficiently to satisfy the "good engineering practice" requirement.

A 5894 tube with 600 volts on the plates can be used in the PA instead of the 6907



Construction of the transmit mixer (left), and driver circuitry. Note the manner in which the i-f signal is coupled into the mixer grids. The LO signal is capacitively coupled to the cathode of the 6939. Several feedthrough capacitors are soldered to the pc board to provide low inductance rf ground paths. The 6939 driver stage is loosely coupled to the mixer plate circuit.

shown here. About 75 watts output is attainable with this configuration, although the PA enclosure will have to be enlarged to accommodate the taller tube.

The metering circuitry uses a 0- to 1-mA meter as a final amplifier cathode current monitor and a relative output indicator. Meter shunt values are determined from information given in the measurements section of *The Radio Amateur's Handbook*.

Tune-up and Initial Testing

As soon as the power supply and local oscillator chain are built, testing can begin. With a dip meter, set the tuned cir-

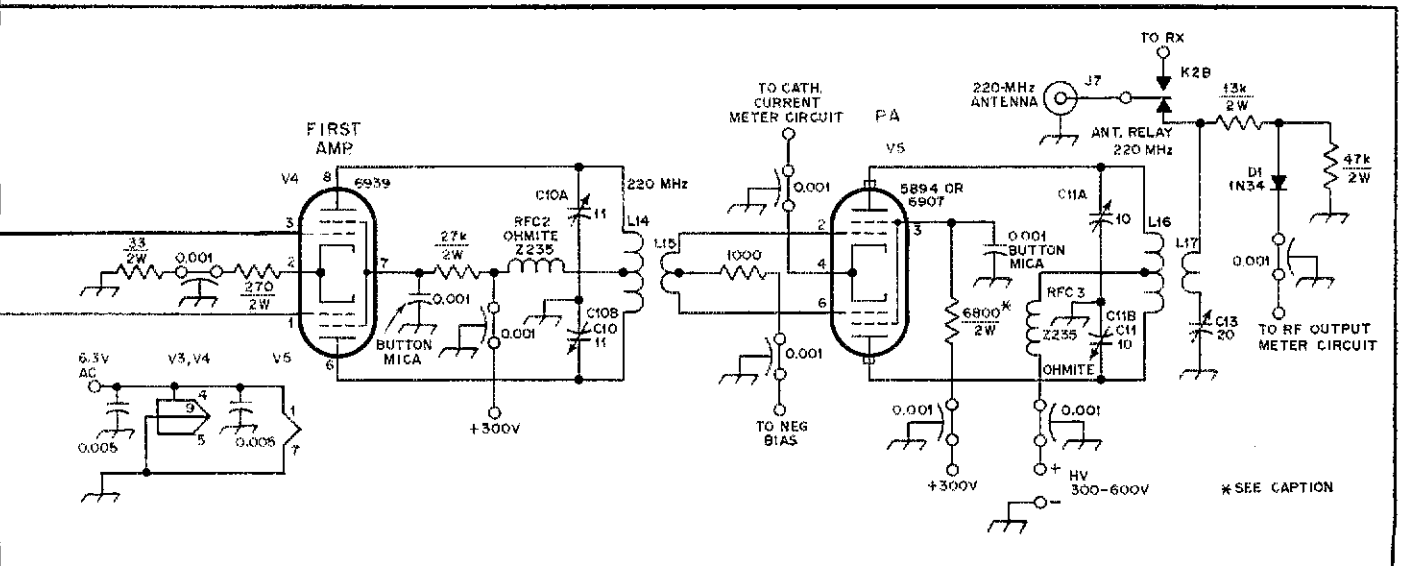
cuits to the correct frequency and apply dc power. Place the meter in the diode-detector mode. Check for the 38-MHz oscillator signal. Adjust C6 and L4 for the point of maximum output that does not cause the stage to stop oscillating. Next, peak C7 and C8 for maximum indicated output at 78 MHz. The 6360 LO amplifier should deliver 1-3 watts for the transmit mixer and about 5 mW (+7 dBm) for the receive mixer. It may be necessary to adjust the output links to obtain these output levels. If in doubt, couple the LO output very loosely to the receive mixer at first, and only increase the coupling if the LO injection is clearly inadequate. The

¹"WB6NMT Low-Noise 220-MHz Preamplifier," *The World Above 50 Mc.*, QST, March, 1972, page 100.

- D1 — Signal diode, 1N34.
- J5, J6 — BNC connector.
- L10 — 1 turn, no. 18, 1/2-inch dia, closely coupled to L11.
- L11 — 4 turns, no. 18, 3/8-inch dia, center

- tapped.
- L12, L14, L16 — 2 turns, no. 12 solid copper, 1-1/8-inch dia, spaced 1/2 inch, center tapped.
- L13 — 3 turns, no. 18, 3/8-inch dia, center

- tapped.
- L15 — 1 turn no. 12, 1-inch dia.
- L17 — 1 turn, no. 18, 7/8-inch dia, closely coupled to L16.
- RFC1-RFC3, incl. — Ohmite no. Z235.



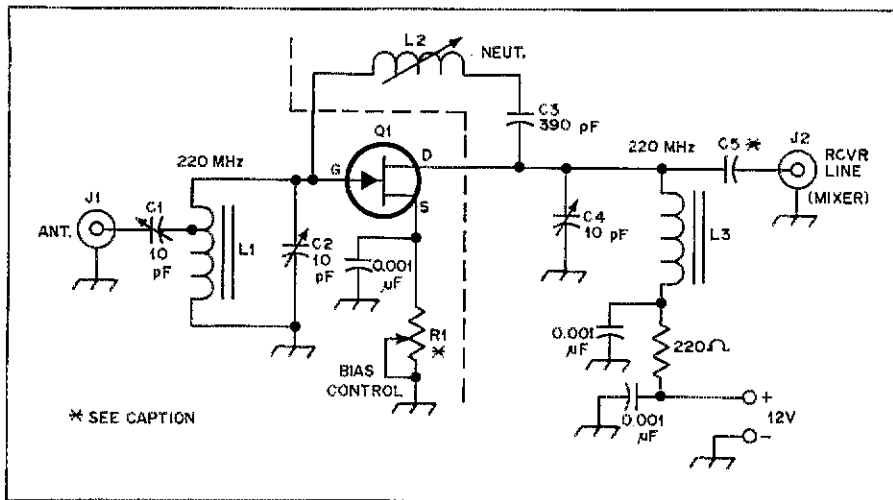


Fig. 4 — The WB6NMT low-noise 220-MHz preamplifier (March 1972 QST). Two of these are required, as shown in the block diagram.

- C1 — 0.8 or 1- to 10-pF glass trimmer (Johnson 2950 or JFD VAM or MVM series).
- C2 — Like C1, or Corning Direct Traverse CGW, 0.8 to 10 pF.
- C3 — 390-pF, silver mica.
- C4 — Like C1, C2 or less-expensive type with 1- to 10-pF range.
- C5 — Experiment with values 1 to 5 pF, for maximum gain in system as it will be used.
- J1, J2 — BNC connector.
- L1 — 4 turns no. 22 enam. wire on Micro-

- metals T-30-0 toroid core (Amidon Associates). Tap one turn from top, subject to adjustment for lowest NF. (Air-wound coils also usable, but toroids preferred.)
- L2 — 9 turns no. 28 enam. wire on 1/4-inch, (6 mm) slug-tuned form (Miller 4500, brass slug). Do not ground the slug.
- L3 — Like L1, but no tap.
- Q1 — 2N5245, 2N5486, MPF107 or TIS-88.
- R1 — 200- or 250-ohm control, linear taper potentiometer, 1 watt.

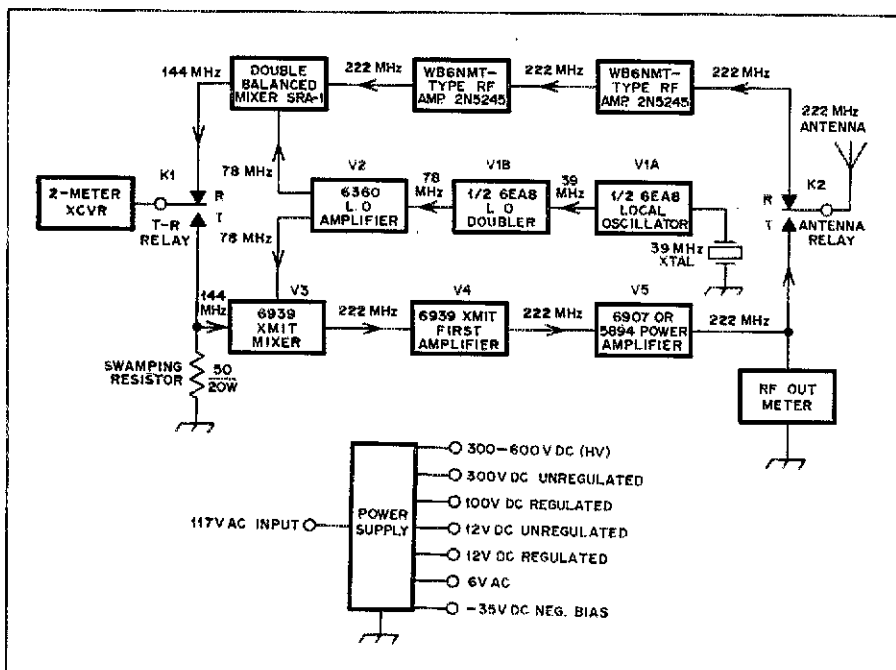


Fig. 5 — This block diagram of the 144- to 220-MHz transverter is a fourth-generation design, the latest in a series of transverters the author has built over a number of years. High-Q circuits reduce the possibility of objectionable spurs.

mixer can be destroyed by excessive LO input. As a final check of the LO chain, unplug the crystal. The output should disappear completely, indicating freedom from spurious oscillations.

When the transmitter section has been constructed and the tubes plugged in,

resonate each tuned circuit to 220 MHz while observing the dip meter. Then connect the LO and i-f injection cables and a dummy load. Now key the T-R relay with no drive present and quickly adjust the final amplifier bias to produce 50 mA of idling current. Apply a 144-MHz signal

and tune the mixer plate circuit for maximum indicated signal at 220 MHz, again using the dip meter as a detector. Peak each transmitter stage in succession for maximum output at 220 MHz, varying the interstage coupling if necessary. Once a wattmeter indicates substantial power output, remove the drive and be sure there is no indicated output. If there is, you have probably tuned up on the third harmonic of the LO. If this has happened, increase the capacitance in all LC circuits and go through the tuning process again.

Operating and Application Notes

After it is properly tuned up on the desired frequency, the transverter may be moved up or down about 500 kHz without retuning the transmit or receive stages. Those wishing broadband coverage at the expense of maximum power output and receiver sensitivity may want to stagger-tune the transmit and receive rf stages.

If the unit is to be used primarily to work through fm repeaters, it may be desirable to peak the transmit stages around 223 MHz while peaking the receive stages 1.6 MHz higher. To access repeaters using the 1.6-MHz split, there are two approaches with this unit. One is to add a second local oscillator at a frequency 1.6 MHz higher than the one used for transmitting. For occasional repeater users, a simpler method is to set the 2-meter rig for a 600-kHz offset and then switch the megahertz dial on the transceiver one position when going from transmit to receive.

For DX work, most operators will probably prefer to mount the receiving preamplifier at the antenna relay of a kilowatt final and disable the antenna changeover relay in the transverter. This avoids the losses inherent in the additional cabling and relays.

Conclusion

Should someone offer you an all-mode all-frequency 220-MHz rig with the performance range of your new 2-meter pride and joy, you most assuredly would not turn the offer down. The likelihood of such a generous proposition becoming a reality in your amateur radio life, in all probability, may be rather remote. Nevertheless, if the concept of having your "do everything" 2-meter rig do its thing on 220 MHz appeals to you, then begin your equipment building plans now. The rewards justify the effort. In fairness, however, I must caution that this is not an endeavor for the beginner.

What has been described here is not a one-evening project, but neither should it be overwhelming if the builder attacks one section at a time. As 220-MHz DX enthusiasts and those who have discovered the quiet world of 220 fm will tell you, building such a system is well worth the effort!

Power Relations and the Decibel Made Painless

For those of you who just walked in, those numbers over S9 on your S meter are not really called pounds.

By Eufemio S. Flores,* G2IEF/DU6ESF/9M2CS

On the amateur bands hardly a contact is made where there is not mention made of the decibel. It may be used as a signal report (you are coming in here 10 dB above S9), as a figure for signal-strength changes (your signal has gone up 2 dB), or as a figure of merit for antenna gain performance (8-dB-gain antenna). It may be worthwhile to review the *decibel* and its relationship to power ratios, voltage ratios, and circuit losses. Let's also examine its derivation and its proper usage. We'll use an approach that will be practical and eliminate confusion in its use and interpretation.

The author does not claim full originality in this presentation. This is actually only a summary and adaptation of notes gathered from experience as a student of electronics and communications, and as an active amateur. In this presentation a minimal reference to mathematical methods is made. However, practical knowledge in the use and interpretation of simple logarithmic equations will be an asset to the new ham as he studies antennas, amplifiers, transmission lines, etc.

The *decibel* is probably the most widely used unit in communications engineering. This is one tenth (deci) of the original international transmission unit which is the *bel*, adapted in honor of Alexander Graham Bell, the inventor of the telephone. The abbreviation for decibel is dB.

In audio and communications work, it is quite logical to relate power ratios to the inherent response of the human ear to sound-intensity variations. It has been determined that the ear is much more sensitive to changes in volume at low sound

levels than at high sound intensities or levels. The human ear responds logarithmically to variations in sound intensity, and a difference of one decibel between two sound levels is just about the least a person can hear. (It is interesting to note that Dr. Alexander Bell was reported to be hard of hearing due to an ear ailment.)

The Logarithmic System

What is a logarithm? The logarithm of a number has been defined as that power to which another number, called the base, must be raised in order to equal the first number. For example, if we use as a base the number 2, the logarithm of number 4 to the base 2 is 2, i.e., $4 = 2^2$. It is standard practice to use the number 10 as a base in logarithmic work for calculations with sound and power relationships. A logarithm to the base 10 is referred to as a *common logarithm*. For example, it is necessary to raise 10 to the second power, or to square it (10^2), to get 100.

By definition, therefore, the logarithm (abbreviated *log*) of 100 is 2. Similarly the logarithm of 1000 is 3. We will not get much more involved in logarithms. Just be aware that the log of any number *between* 100 and 1000 must be a value between 2 and 3 — 2 plus a decimal fraction. And the log of numbers between 10 and 100 would be 1 plus a decimal. For example, the log of 250 (common logarithm) is 2.39794; of 25 is 1.39794; of 2.5 is 0.39794. Note that in each case the value to the right of the decimal point is the same. (This is because we are using the base 10, and the numbers used in the example are related to each other by a factor of 10.) These decimal values can all be

taken from a log table.

You can see that as the numbers get smaller, their logarithms also get smaller. The logarithm of 1 is 0, because 10 raised to the 0 power equals $1 - 10^0 = 1$. What about the logarithms of positive values less than one? Here it gets complicated, because the logarithms must assume a negative value.

The decibel (one tenth of a bel) has been set by definition as:

$$\text{dB} = 10 \log \frac{P_2}{P_1}$$

where P_2/P_1 is the ratio of the two powers being compared. In decibel computations, it is convenient to place the larger power value on top of the ratio as the numerator (P_2 the larger power and P_1 the smaller power). This way, the result will always be greater than one and the logarithm of the ratio P_2/P_1 will always be a positive value. Thus the use of complicated negative logarithms is avoided. It will be obvious in each of the power relationship problems that either a gain (+) or a loss (-) in decibels will result. The negative sign can be inserted before the decibel value if a loss is indicated. This will become quite apparent as power-relationship problems or exercises are worked out.

Table 1 illustrates the relationships between power, voltage and current ratios, and the decibel. In this table, reference of course is made to the elementary relationship that power (P) is equal to I times E (current multiplied by voltage), and also that in the computation of decibels involving voltage or current ratios, it is usual to assume a *common impedance*. You may wish to check on the figures indicated in

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Table 1 as an exercise, by referring to a table of common logarithms (base 10).

A brief analysis of Table 1 will show the following approximate observations in values:

1) A 1-dB gain or loss is equal to a power ratio of 1.259, which we can round off to 1.26 without affecting relative values appreciably and for practical application.

2) A 2-dB change is equal to a power ratio of 1.585.

3) It will be noted that 1.585 is the result of raising 1.26 to the second power ($1.26 \times 1.26 \approx 1.58$).

4) A 3-dB gain or loss represents a power ratio of about 2.00, or 1.26 raised to the third power.

5) A very simple and approximate rule therefore to convert decibels to equivalent power ratios is to raise the figure 1.26 to the power (exponent) equal to the number of decibels involved.

As mentioned earlier, in working with decibel computations, gain (+) or loss (-) can be indicated in an analysis of overall system performance. Decibels can be added arithmetically, while the ratios will multiply. Let us consider as an example the problem of converting 25 decibels to its equivalent power ratio, namely $25 \text{ dB} = 10 \text{ dB} + 10 \text{ dB} + 5 \text{ dB}$. Converting to equivalent power ratios we have $10 \times 10 \times 3.162 = 316.2$. Since decibels represent ratios only, a positive 25 dB would imply a gain ratio of 316 to 1, while a negative 25 dB would represent a value 1/316 of the original.

Let us take another example and con-

vert 12 dB to its equivalent power ratio: $12 \text{ dB} = 3 \text{ dB} + 3 \text{ dB} + 3 \text{ dB} + 3 \text{ dB}$. Converting to equivalent power ratios, $2 \times 2 \times 2 \times 2 = 16$. Therefore 12 dB represents a power ratio of about 16 to 1.

Some Practical Examples

Expressing gains or losses of various circuits or components in terms of decibels eliminates the computing of gains or losses by laborious multiplication or division. The total gain or loss of a circuit can be calculated by adding the individual decibel gains and losses of the various circuit components (using a plus sign to indicate gain and a negative sign to indicate loss). Let's try this example. A high-impedance dynamic microphone with an output of +2 dB (we'll take up reference levels later) is connected to a speech processor with a gain of 40 dB. The output of the speech processor is connected to an audio-control pad with a loss of 10 dB, and from there to the equipment speech amplifier with a gain of 80 dB. What is the total gain? In this example, all dB values were assumed from a common reference level of 0 dB. As the microphone output is 2 dB above the reference level, the speech processor brings the combined level up to $+2 \text{ dB} + 40 \text{ dB} = +42 \text{ dB}$. The audio-control pad brings down the level to $+42 - 10 = +32 \text{ dB}$. And finally the speech amplifier effects a gain of 80 dB, and $+32 + 80 = +112 \text{ dB}$. The overall gain of the system is therefore simply the algebraic sum of the decibel gains and losses of the individual circuit components.

Let us take another example. A receiver utilizes a power transistor in a final audio stage that delivers 4 watts to an audio-output transformer. You are considering modifying the circuit in order to substitute a larger audio power transistor that will deliver 6 watts to the audio transformer. You ask yourself, "Is the expected power gain sufficient to warrant the expense of making this change?" Changing the audio-output transistor causes a ratio increase of 1.5, or a 50 percent increase in audio power. At first this would appear to be a very substantial increase. But let us express the power ratio in terms of decibels as we find it in our log tables and formula:

$$\begin{aligned} \text{dB} &= 10 \log \frac{P_2}{P_1} = 10 \log \frac{6}{4} \\ &= 10 \log 1.5 = 10 \times 0.17609 \\ &= 1.76 \text{ dB} \end{aligned}$$

Such an increase in audio power would hardly be noticeable, as far as the ear is concerned. Hence, the audio gain expected is actually very minimal.

Reference Levels

Now let's discuss reference levels. In as much as the decibel is an expression of power ratio, it would be meaningless to

say that an amplifier or an antenna has an output or gain of so many decibels unless that output or gain is referred to some standard or predetermined level. Several decibel reference levels are in use in communications. In telephone and audio amplifiers, 0.006 watts or 6 milliwatts is used as the reference or 0-dB level. This means that if an audio amplifier is rated at 40 dB, its power-output capability is 40 dB above a reference level of 6 milliwatts. The amplifier therefore has an audio power output of 60 watts. (You can check this very quickly by referring to Table 1.)

Gain is often used as a figure of merit for an antenna, especially a directional type, and is usually expressed in decibels. What is really meant when we say, "My beam has a gain of 8 dB," or, "A 2-element beam is rated at 6 dB"? Here the idea of a reference level becomes readily apparent. Say that we supply a specific amount of power to the antenna and observe the received signal strength at some distant point in the desired direction. The gain of the antenna in dB is determined from the ratio of this specific power to that which must be supplied to a standard-comparison antenna in order to produce the same signal strength at the distant point. It follows that the gain of one antenna over another could be taken as the ratio of their respective radiated fields. Here again, the stipulations of the reference-level condition is important, because if conditions are not the same the analysis is meaningless.

In amateur antenna analysis, the generally accepted reference or standard is a half-wavelength dipole. Suppose 100 watts is supplied to a Yagi beam, resulting in an rf voltage at the terminals of a distant receiving antenna of 20 microvolts. And suppose that with a simple half-wave dipole used instead of the Yagi, a power of 300 watts must be used to produce the same reading (20 microvolts) at the receiving location. It will be noted that in as much as the same antenna is used for receiving and that the voltage delivered by the antenna to the receiver is the same in each case, the same amount of power is delivered to the receiver for both transmissions. Therefore the gain of the Yagi may be found from the ratio of the transmitted powers.

$$\begin{aligned} \text{Gain} &= 10 \log \frac{P_2}{P_1} = 10 \log \frac{300}{100} \\ &= 10 \log 3 \approx 5 \text{ dB} \end{aligned}$$

Or, if you prefer, Table 1 may be used to get the same approximate result.


A practical approach and an understanding of power relationships and the decibel can be used to replace fancy mathematics and involved logarithms, as has been shown. We hope that by reading this article and trying a few problems of your own that you will have a better understanding of the decibel. 

Table 1
Relationships of Ratios to Decibels

Power Ratios	Transmission Units In Decibels (dB)
1	0 (= 10 log 1)
1.259 (= 10 ^{0.1})	1 (= 10 log 1.259)
1.585 (= 10 ^{0.2})	2 (= 10 log 1.585)
1.995 (= 10 ^{0.3})	3 (= 10 log 1.995)
3.162 (= 10 ^{0.5})	5 (= 10 log 3.162)
10 (= 10 ¹)	10 (= 10 log 10)
100 (= 10 ²)	20 (= 10 log 100)
1,000 (= 10 ³)	30 (= 10 log 1000)
10,000 (= 10 ⁴)	40 (= 10 log 10,000)

Voltage or Current Ratios	Transmission Units In Decibels (dB)
0.001	-60.00
0.005	-46.02
0.01	-40.00
0.05	-26.02
0.1	-20.00
0.2	-13.98
0.5	-6.02
1.0	0.00
2.0	+6.02
5.0	+13.98
10	+20.00
20	+26.02
50	+33.98
100	+40.00
500	+53.98
1000	+60.00

Transmitter Design — Emphasis on Anatomy

Part 3: Broadband power amplifiers eliminate the need for complicated band-switching circuits. Some amateurs believe that they are mysterious and hard to build. 'Tain't so!†

By Doug DeMaw,* W1FB

It's unlikely that Freddie would have been able to design the broadband amplifier we are describing here, but he certainly should have enjoyed success in duplicating it and making it perform correctly. However, had something malfunctioned in his assembled module his chances of locating the anomaly would have been enhanced greatly by an understanding of how a broadband amplifier functions. Let's consider the subject of how one of these critters does its particular "thing."

A broadband amplifier is intended to do precisely the job its name implies — amplify signal energy over a broad slice of the frequency spectrum. In meeting this requirement the amplifier should provide reasonably uniform output power across the band of frequencies it is designed to accommodate. Thus, if the circuit was designed to cover from, say, 3.5 to 14 MHz, and deliver 5 watts of output, there should be 5 watts of output available (no more and no less) at any discrete frequency within that range. In practice it is difficult to obtain that kind of precision, but a variation in power no greater than ± 10 percent can be realized in a carefully designed amateur circuit.

Solid-state amplifiers tend to supply increasing amounts of output power as the operating frequency is decreased. That is, a given transistor will exhibit more gain at 1.8 MHz than it will at 7 or 14 MHz. Therefore, in order to obtain a relatively flat frequency response from a solid-state, broadband amplifier it is necessary to use certain compensating elements to "taper" the overall gain downward toward the

lower end of the amplifier operating range. The inclusion of feedback networks is the most common approach to this design criterion. The mathematical solutions to feedback design problems are beyond the scope of this article, but in-depth data on the subject are given in the ARRL book, *Solid State Design for the Radio Amateur*.

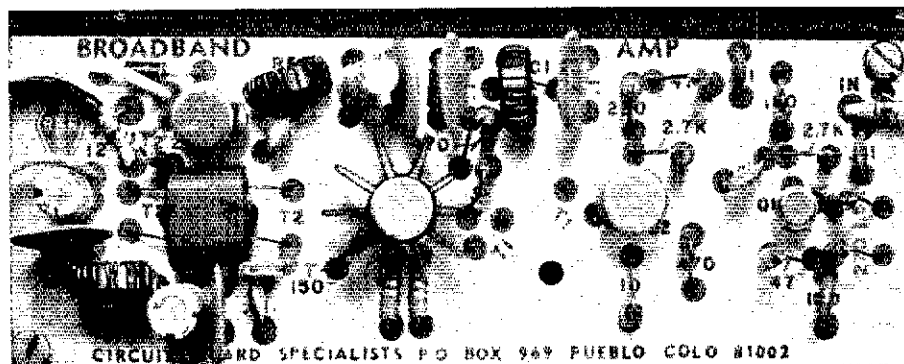
The required feedback for a broadband amplifier is usually introduced by means of R and C components between the collector and base of the transistor (negative feedback), and through the inclusion of degenerative feedback in the emitter circuit. Concerning the latter, the emitter bias resistor is bypassed for rf at the higher end of the amplifier frequency range (low-value capacitor), but is bypassed less effectively as the operating frequency is lowered. At the lowest end of the amplifier range the emitter may function as if no bypass capacitor was there at all. In ordinary language we are saying that the less effective the bypassing the

lower will be the stage gain. This kind of frequency-response shaping can be further enhanced by selecting specific values of coupling capacitance between amplifier stages. That is, a low value of capacitance will be less effective as a coupling device at the low-frequency end of the range than it will at the high-frequency end of the range.

The feedback resistors and capacitors used between the collector and base of a broadband amplifier are chosen with the same design philosophy in mind. In this case the lower the operating frequency the greater the feedback voltage through a given value of base-to-collector resistor: The greater the feedback, the lower the stage gain. In cases where the feedback resistor is so low in value that excessive forward bias would reach the transistor base, a blocking capacitor is added in series with the resistor and forward bias is obtained by means of a separate resistive divider.

Broadband transformers are also used

Closeup view of the broadband linear amplifier.



†Parts 1 and 2 appeared in *QST* for May and June, 1978.

*Senior Technical Editor, ARRL

developed across D8, which regulates the bias by virtue of its barrier voltage (0.7 volt for a silicon diode). A 470-ohm dropping resistor is used between D8 and the 12-volt supply line to prevent the diode from consuming excessive current.

Decoupling networks are used in the 12-volt line between stages. This aids in preventing feedback (positive) from one stage to another. An excessive amount of feedback will cause self-oscillation of one or more of the stages. At Q8 a 47-ohm resistor and 0.01- μ F capacitor comprise the decoupling circuit. RFC5, RFC6 and the two 0.1- μ F bypass capacitors are used for this purpose at Q9. RFC7 and the related bypass capacitors are employed at Q10 to decouple the stage from the 12-volt line. High, medium and low values of capacitance are used at Q9 and Q10 to assure adequate decoupling at lf, hf and vhf. (The stages could self-oscillate at any of those frequencies.) Who needs or wants to be haunted by the "Freddie syndrome?"

A pnp bipolar switch (Q11) is shown in Fig. 7. It operates in the same manner as Q6 of Fig. 6. When the key is closed, Q11 conducts and permits +12 volts to reach Q9 and the bias network for Q10. A one-second oscillation occurred in the breadboard version of the transmitter, caused by the decoupling capacitors at Q9 and Q10. This formed a timing circuit which

was triggered by a self-oscillation at Q11. The decoupling capacitors at Q9 and Q10 acted as a tuned-collector/tuned-emitter circuit for Q11. The oscillation caused the break-in-delay circuit to cycle at a one-second rate. This resulted in a repetitive cycling of the relay, K1. Insertion of D9 at Q11 cured the problem by providing a one-way gate in the feedback path. A crown type of heat sink is needed at Q10 to prevent damage to the transistor.

Amplifier Testing

Following completion of the assembly procedures given in Fig. 8, amplifier testing can be done. Tests can be performed first by connecting the VFO directly to the input of Q8 of Fig. 7 (40 meters). A 5-ohm, 2-watt load resistor should be attached across the secondary of T3. Apply operating voltage and short the keying line to ground. A VTVM and an rf probe can be used to compare the circuit voltages with those of Fig. 7. Approximately 2.6 volts rms will appear across the 5-ohm load resistor if the circuit is working correctly. If the overall amplifier gain is too low, increase the value of C10 experimentally. Although 100 pF was right for the circuits built by W1FB and WA0UZO, variations in transistor gain may require that less feedback be used at Q8. These tests can now be repeated at 20 meters, using the push-push doubler be-

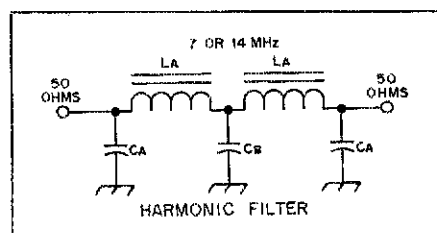



Fig. 9 — Diagram of the half-wave harmonic filter discussed in the text. For 7-MHz use, L_a is 1.1 μ H (15 turns no. 26 enam. wire on a T50-2 toroid core). C_a is 470 pF and C_b is 910 pF. For 20-meter operation L_a is 0.55 μ H (10 turns no. 26 enam. wire on a T50-2 toroid core). C_a is 240 pF and C_b is 470 pF.

tween the VFO and broadband amplifier.

This much of the transmitter can be put on the air if the builder likes true QRP work, but it should *not* be connected to an antenna unless a harmonic filter is placed in the output line from T3. Furthermore, the turns ratio for T3 will need to be changed to provide a match to a 50-ohm filter and antenna. The secondary winding of T3 will require 15 turns rather than four turns if this is done. Fig. 9 gives the details for half-wave filters which can be used at 7 and 14 MHz, respectively. 

50 Years Ago

July, 1928

□ The new 10-meter band is producing surprising DX, contrary to established theory; Editor Warner speculates on reasons, but doesn't mention sunspots.

□ Ross Hull visited the Naval Research Laboratory and brings back a mouth-watering description of the equipment and techniques.

□ In a brilliant treatise on radio law, General Counsel Segal concludes that an amateur can handle a message of *any* content only so long as he receives no valuable consideration for the task (a principle accepted even by the federal regulatory agency until it was scuttled a few years ago).

□ Considerable propagation research is underway at the Massachusetts Institute of Technology's installation on the estate of Col. E. H. R. Green, on the Massachusetts coast.

□ 8CMU says an oscillator-amplifier system, carefully neutralized and adjusted, can be modulated to produce a good phone signal and not one of those under heavy criticism for overmodulation and instability heard so often today.

□ W. J. Halligan (pre-Hallicrafters) describes a new 4000- μ fd. capacitor and associated choke to remove annoying hum from the filament supply.

□ You can be sure each circuit of your gang-tuned receiver is in resonance if you use the testing system 1JJ outlines.

□ W. H. Christie says his parallel-line circuit of copper tubing works fine on five meters, having stability without tricky adjustments.

□ 6AM taught his Mrs. how to operate his rig in only 15 minutes.

□ 8ZZ's cover cartoon shows an automatic CQ machine — left running so long it put the operator to sleep!

25 Years Ago

July, 1953

□ You can be sure not only of getting the best signal-to-noise ratio in your v.h.f. receiver, but also can make comparative measurements on h.f. gear, with the simple noise generators described by WIHDQ.

□ The Hq. has produced a sample script for use by a local club in presenting a

television program explaining to the public the reasons for interference to TV reception.

□ Sideband is still sufficiently new that many of us are not wholly certain of its principles, so W1PNB leads us by the hand through basic voice-transmission fundamentals.

□ Also in down-to-earth style, but useful for the old-timer as well, is W1ICP's compilation of varied practical applications for the simple neon bulb.

□ W4TKL folds his 75-meter mobile whip forward and feeds its tip (base end grounded) through a tuning setup which permits resonance changes.

□ W2PAT obliges a number of requests by providing a frequency-shift keyer circuit we can use on the sub-bands recently opened to that mode.

□ W2ZGP and W2TTU built a 420-Mc. control link to avoid daily winter treks to their snowbound hilltop primary station.

□ WIHDA's formal paper in the professional *Proceedings* gives plenty of credit to amateur accomplishments in studies of ionospheric propagation.

□ FCC had proposed to delete special call-sign provisions (two-letter calls, club calls in memoriam, etc.) but finally relented under heavy League protest and let the rules stand. — W1RW

CB to Ten Meters

Ten meters is alive and kicking! It's buzzing, too, with 5-watt voices from modified CB sets. Is yours one?

By Dennis Mudge,* WB6PGJ

A bevy of newer amateurs and oldsters may be tacitly giving the nod to a new lease on life for a less than "in" mode of amateur communication; "ancient modulation," some call it. Like a spot that won't go away, that name was dubbed on amplitude modulation soon after single sideband swung into popularity, and this somewhat disparaging epithet seems destined to last. A new lease on life, however, could be in the offing for a-m as the result of a bonus stemming from CB radio. So think a bit more kindly toward ancient modulation. You could be back in the act!

The death knell for the sale of 23-channel CB radios came at the end of 1977.† Manufacturers and dealers dumped their 23-channel equipment on the market in a bargain bonanza that dazzled the eyes not only of CBers, but also licensed radio amateurs who sensed a golden opportunity. Ways of converting CB equipment for 10-meter operation surely were no guarded secrets and at those giveaway prices, amateurs from coast to coast rationalized by asking, "How can we go wrong?" And so into the homes of these hams came CB transceivers destined for the modifications, often simple, that would convert them for 10 meters. Along with the bargain, however, came the amplitude-modulation systems with which a vast number of CB rigs had been equipped.

Curiosity

With the 10-meter band having opened up again, curiosity stirred me to see what it was offering. On the shelf was that

faithful old Johnson Ranger. As I dusted it off and played around with it for a few minutes to see if it still worked, I thought "Would a CQ on 10 be in vain?" Only way to find out, I reasoned, was to give it a whirl. The response was immediate and rewarding. Not only was I enjoying the experience but I also discovered that late morning to midafternoon proved ideal for a-m activity. What, perhaps, was a greater surprise to me was the number of new amateurs using converted CB sets that produced signals with plenty of punch. Under favorable conditions, many of those little 5-watt transceivers were being received Q5, peaking at times S8 to S9. That's armchair copy in my book!

Renewing my acquaintance with 10 meters, as I did, kindled my enthusiasm not only to become active again on this

segment, but also to convert my own CB transceiver. With considerable band space and seemingly little QRM, conditions on 10 appeared to be ideal for working with low power.

About Modifications

Converting my Lafayette 525F synthesized CB rig mainly involved changing two crystals and retuning the stages for the 23 channels. Of course there were those tasks of using the signal generator, frequency counter and the VTVM for final adjustments. The tune-up and alignment instructions furnished by the manufacturer were of much help in performing those adjustments.

Not all CB sets, however, are that easily modified. Older CB rigs that operate with two crystals (transmit and receive) for each frequency would involve a much costlier conversion, provided the operator wanted many different channels. The newer type CB transceivers employ phase-locked-loop circuits. Converting these sets, likewise, is not a simple task.

A Band Plan

Anyone considering the conversion of a CB set for 10-meter operation will do well to arrange a band plan for channelized operation. Beside one's individual preference for specific operational frequencies, thought should be given to such uses as cw, ssb, a-m and OSCAR communications. Table I furnishes a plan that is currently employed by some equipment manufacturers. The frequencies selected are 2 MHz above the equivalent CB channels. Such a plan should be prepared before ordering crystals. Incidentally, I chose to refrain from operating in the lower portion of the 10-meter band where competition with the heavy amount of ssb activity would be rather futile for anyone

Table 1

Channel Frequency Chart. This table may serve as a guide for converting a CB set for 10-meter operation. Each frequency is 2.0 MHz above the corresponding CB channel.

Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	28.965	21	29.215
2	28.975	22	29.225
3	28.985	23	29.255
4	29.005	24	29.235
5	29.015	25	29.245
6	29.025	26	29.265
7	29.035	27	29.275
8	29.055	28	29.285
9	29.065	29	29.295
10	29.075	30	29.305
11	29.085	31	29.315
12	29.105	32	29.325
13	29.115	33	29.335
14	29.125	34	29.345
15	29.135	35	29.355
16	29.155	36	29.365
17	29.165	37	29.375
18	29.175	38	29.385
19	29.185	39	29.395
20	29.205	40	29.405

*16001 P St., Mojave, CA 93501

†[Editor's Note: Since January 1, 1978, no 23-channel rigs may legally be sold in the U.S., either by dealers or by individuals. This ban applies to both new and used equipment. Similar restrictions apply to dealers (but not individual amateurs) in Canada.]

operating with a low-power a-m transceiver.

Because many crystal manufacturers have technical specifications for various makes of CB equipment, they may, in some instances, be able to assist amateurs with correct crystal calculation and correlation. Therefore, when placing an order for crystals, include a note specifying the make and model set to be converted. Do furnish ample information.¹

Other Angles

Naturally, with channelized operation of CB transceivers, tuning is restricted in comparison to a normal ham-band receiver. Most of these transceivers, however, do have a "delta" tuning adjustment that permits the operator to fine tune ± 2 kHz. That amount of variation may not seem sufficient at times. For instance, let's say your set can transmit on channel 1 (28.965 MHz) and also on channel 2 (28.975 MHz) but a station is calling you on 28.970 MHz. What to do? In anticipation of a situation like this, one may install a multiple-deck, crystal-switch

¹Bartlett, "Crystals Inside Out," January 1978 *QST*.

socket assembly to allow more coverage over the 10-meter band to include such off-frequency channels.


The Lafayette 525F, the B and K Cobra, model 19-21-29, and the Robyn T123-B may be converted to 10 meters by changing the original 11.275- and 11.730-MHz crystals. Substitute a 9.275-MHz crystal for the transmitting 11.275-MHz crystal. Replace the 11.730-MHz receiver crystal with one cut for 9.730 MHz. After alignment, the transceiver will perform with channel 1 at 28.965 MHz and channel 23 at 29.255 MHz.

For operation in the Novice segment of the 10-meter band (channel 9 through 16), replace the 11.275-MHz transmitting crystal with one cut for 10.235 MHz. Change the 11.730-MHz crystal for one cut to 10.690 MHz. As a result, channel 1 will be on 28.005 MHz and channel 23 will be set for 28.295 MHz.

Because a-m operated CB sets do not have a BFO, some external means of beat-frequency oscillation will have to be provided if the operator prefers to work cw. Keying can be accomplished by adapting the microphone push-button control circuit for cw operation.

Conversion of ssb sets such as the Pace models 1000B and 1000M, the Cobra Models 138 and 139, and the Midland 13-895 require changing only one crystal, provided that the crystal filter is also changed. The 7.8025-MHz crystal and filter are replaced by one for 9.8025 MHz. The stages are then retuned. With this conversion, channel 1 will be at 28.965 MHz and channel 23 will be set for 29.255 MHz.

A final step in modifying a CB set for 10-meter operation is correcting the antenna for the new band. In general, because the 10-meter band has a range of frequencies that are higher than the 11-meter CB band, the CB antenna should be made electrically shorter. For base-loaded antennas this may simply mean an adjustment for minimum SWR. A whip antenna may be shortened by removing the base spring, thus avoiding a need to cut the antenna itself.

While many amateurs may have feelings of reservation about CB operations as such, these same amateurs may wind up thankful for the bonus of equipment made available as a consequence of the events in the world of citizens band radio. And as for a-m, well, who knows? 

Strays



INSTRUCTOR OF THE YEAR AWARD

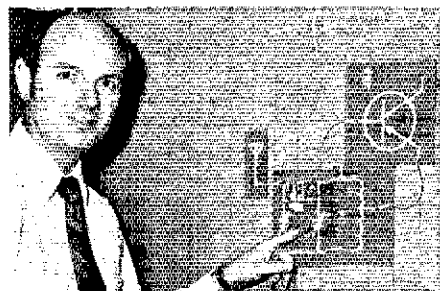
The Lake County (IN) Amateur Radio Club, in cooperation with the ARRL Club and Training Department, is sponsoring the Herb S. Brier, W9AD, Memorial Award, to be given to an outstanding amateur radio instructor.

The longtime Novice editor for *CQ* magazine, Herb was often bedridden with arthritis from the age of 13. He devoted his life to amateur radio: tutoring students, writing articles, building equipment and operating. His dedication to helping newcomers enjoy amateur radio inspired the Lake County ARC award.

To apply for the award, send ARRL hq. a summary of your amateur radio instructional activities for the period September 1, 1977 to September 1, 1978. Include comments on publicity, dropout and success rates, percentage of students remaining active and upgrading, your own amateur radio activities (the good instructor is well-rounded in amateur radio) and a statement about your efforts from your sponsoring organization (if any). Also, encourage your students and graduates to send us letters supporting your application. Closing date is October 1, 1978.

The professional staff of the Club and Training Department will review the ap-

plications, and select the most outstanding amateur radio instructor of the year. The winner will receive a handsome plaque, donated by the Lake County ARC, and an announcement will be made in *QST*. Runners-up will also be announced. An application form is available from ARRL hq. We will also send one to your nominee for this award. — **WB2CHO**



Who will be the next "Herb Brier" Instructor of the Year? You? Your club member? Your instructor? Write Club and Training Department, ARRL hq. for full details.

YOU'RE BEING HEARD!

Been on OSCARs 7 or 8 lately? If so, the chances are good that some of the thousands of students around the country

who have had the opportunity to listen to OSCAR have heard you! The excitement in a classroom during a first OSCAR pass is hard to beat. It is often the first step a youngster takes on the road to becoming a ham operator. If you get an OSCAR SWL/QSL card request from a student or a class, please respond quickly with a brief personal note describing yourself and your activity. Many of you, knowingly or not, have already contributed immeasurably to the educational experiences of a lot of kids. — **WB1EYI**

VHF ANTENNA-GAIN CONTEST

The 12th annual UHF Antenna-Gain Measuring Contest, sponsored by the East Coast VHF Society, will be held on July 23 at 10 A.M., at Trenton (NJ) State College, Ewing Township, NJ. Antennas for 432, 1296 and 2304 MHz will be measured at no charge. A flea market will also be held at no charge to buyers or sellers. Contact K2UYH or WA2ZZF for more information.

PLANNING TO UPGRADE?

Let us know. The ARRL Club and Training Department will match your ZIP code to our instructor list to find a class or instructor in your area to help you upgrade. — **KICD**

Product Review

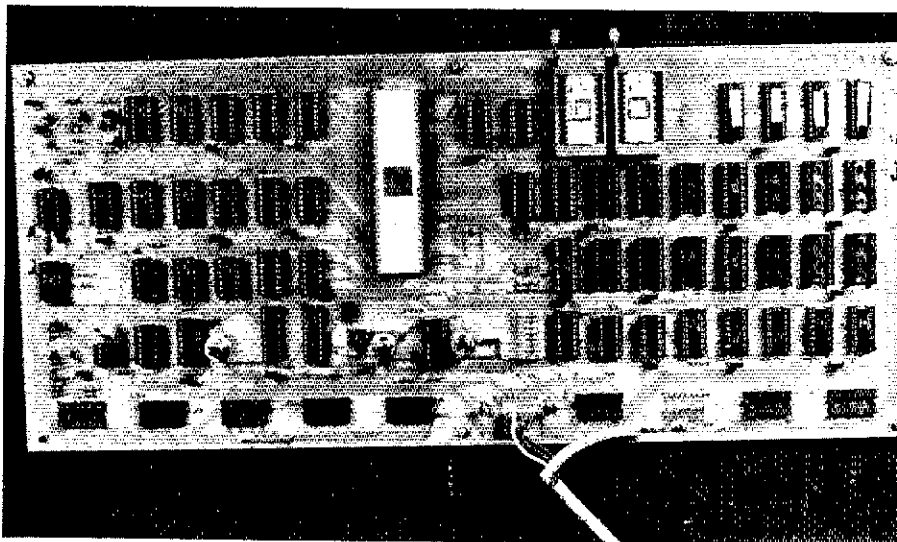
The Technico TEC-9900-SS Computer Kit

The reader will find that this review is somewhat different than the normal one. Jim Schueckler, WB2YZL, is a pretty savvy ham when it comes to computers, so we asked him to review the Technico computer, a 16-bit unit. Most microprocessors are 8-bit units. We asked Jim to provide a little dissertation on the pros and cons of 16 versus 8 before the actual review. We hope you like this approach.

Is a 16-Bit Computer Inherently Better Than an 8-Bit Computer?

Which is better, an 8-bit or a 16-bit computer? Minicomputer and microcomputer experts will argue about this question, but they will agree that the answer depends on the application. You wouldn't rent a bus when you really wanted to take a taxi, but the bus sure can carry more people. No pun on the word "bus," but the comparison is strikingly similar. An 8-bit computer often has to use several cycles to perform the same function that a 16-bit computer can perform in one cycle.

There are many factors to consider when comparing microcomputers or microprocessors. The most obvious factor is the "data word size" of the CPU (central processing unit). An 8-bit CPU performs operations on 8 binary digits (bits) at one time. A 16-bit CPU handles 16. The memory configuration and external data bus will have a corresponding 8 or 16 data lines (wires). An 8-bit register can represent 2 to the power of 8, or 256, combinations, usually representing numbers from 0 to 255. A 16-bit register can represent 2 to the power of 16, or 65,536 combinations (commonly called 64 k, where $k = 1024$). Therefore, two 8-bit registers must be combined to represent the same quantity as a 16-bit register. For an 8-bit computer to add two 16-bit numbers together, it must first add the two low 8-bit bytes together, store the result,



The wired TEC-9900-SS microcomputer ready to be connected to peripherals. That big white 64-pin IC near the center of the board is the Texas Instruments 16-bit TMS-9900 central processing unit.

then add the two high 8-bit bytes together, plus the carry, if any, from the first addition. The 16-bit computer can do this in one simple step.

If an 8- and 16-bit computer had the same architecture (structure of connections), the 8-bit computer would take 3 or 4 times as many clock cycles, and instructions, as the 16-bit computer to perform simple math operations. And since a 16-bit number can represent 256 times as many combinations as an 8-bit number, a 16-bit computer can have many more instructions. These additional instructions usually can take the place of several 8-bit instructions, such as indirect memory references and auto increment. Taking advantage of these instructions, and the faster math, a 16-bit computer can usually perform a complicated program more than 4 times faster. Such application as real-time SSTV image processing, digital signal filtering, or some real-time experiments where a lot of math is used, may require a 16-bit computer because of the speed.

But what if you really want a taxi? An 8-bit computer may be very sufficient for your application. Most amateur radio applications only need an 8-bit computer. Many hams' computers are used as controllers, turning single bits on and off, and moving ASCII characters around. Most human-to-computer and computer-to-computer communications are done with ASCII (American Standard Code for Information Interchange, the modern teleprinter code). The 7-bit ASCII code is very well suited

to 8-bit computers. The 8-bit computer also does a very efficient job of Morse code reception, RTTY station control, controlling repeaters or antenna rotators, or decoding SSTV signals. A 16-bit computer would be overkill. Thousands of hobbyists are even using high-level languages, such as BASIC or FORTRAN on their 8-bit computers, and don't mind the few extra seconds a long program may require.

There are many factors to consider when selecting a microcomputer. A 16-bit computer is usually faster, more powerful, and more expensive than an 8-bit computer. The choice depends on the needs of the application.

The Technico TEC-9900-SS Computer Kit

At last, a 16-bit microcomputer is available at a price comparable to 8-bit computers! (Actually less than most 8-bit computers.) The TEC-9900-SS is a complete microcomputer kit which uses the Texas Instruments (TI) TMS-9900 CPU, considered by many to be the most powerful microprocessor available today. (It has on-chip multiply and divide.) With this kit, power supplies, and a teleprinter, you have a working computer system.

The TMS-9900 is very different from other microprocessors. Besides having a 16-bit data-word size, the architecture and instruction set are memory oriented, more like a minicomputer. The use of a "workspace pointer" allows any 16 consecutive memory locations to be used as registers by the program, but these

Technico TEC-9900-SS Computer Kit

Central Processing Unit: TI TMS 9900.

Memory: 1 k byte ROM, 512 bytes RAM.

Inputs: 16 input lines, one input bit for serial.

Outputs: 16 output lines, one output bit for serial; 8 vectored interrupts. Requires ASCII teleprinter for terminal.

Power Requirements: +5 volts at 1.5 A, -5 volts at 0.5 A, +12 volts at 0.5 A.

Programming Power: +28 volts at 40 mA.

Price Class: \$300.

Programs Available: Instant input assembler, text editor.

Also Available (accessories): 32 k byte memory board, color TV terminal, tape cassette.

can be changed quickly to handle an interrupt. The TMS-9900 can use many different addressing modes including indexed, indirect, and indirect auto increment, which help make the instruction set "powerful." Input/output operations can be performed with several special I/O instructions. Single bits or groups of bits can be set, reset or tested, or the I/O devices could be memory mapped as with any other CPU. Sixteen vectored interrupts (directions the program may go after an interrupt request is received from peripheral equipment) are available, with on-chip logic that automatically handles some prioritizing (changeable by the program). Other instructions of the TMS-9900 also help make it powerful. Arithmetic and circular shifts (moving the individual bits of a word to the right or left and putting the displaced end digits at the opposite end of the word) can be performed with a variable shift count. Many instructions can perform 8-bit operations to store and manipulate ASCII characters or small numbers efficiently. The most powerful instructions are multiply and divide. They are done with "firmware" or a program loop. The CPU will multiply two 16-bit numbers together to give a 32-bit product with a single instruction, at a worst-case time of 17 microseconds. The longest time for a divide instruction is 44 microseconds. Both are about 10 times faster than the same operations on 8-bit computers.

The TEC-9900-SS is a complete computer kit, including sockets for all ICs. The on-board hardware provides 16 input lines, 16 output lines, 8 prioritized interrupts, and serial interface for a teleprinter or RS-232 terminal. All data and address buses are buffered in and out, and the on-board memory has its own buffers for flexibility and expansion. The computer comes with 256 words (256 by 16) of read/write memory (RAM), with sockets and decoding for 1024 words. Sockets for four fusible-link read-only memory (ROM) chips are provided (1024 words), two of them occupied by a powerful monitor program for program development, and an optional "instant input assembler" may be purchased which plugs into the other two sockets. There are sockets for two 2708 type, ultra-violet erasable, electrically programmable ROMs. In the normal mode, the 2708s that you plug in will appear as computer memory, but just connect +28 volts and turn on a special switch, and you can program those PROMs right in the same socket. No other computer presently has this feature.

The monitor program is extremely powerful and useful for debugging programs. Some of the functions are change memory, write tape, read tape, breakpoints, move data, input, output and others. The power of 16-bit instructions is apparent when such a powerful program uses only 512 words of ROM. The "instant input assembler" (an extra cost option) is also invaluable. As you type in each assembly language mnemonic, this program looks up the proper bit pattern, combines it with the bits for the addressing modes you are using, prints the result and puts it in memory. This can save hours of hand assembly or patching.

The computer was designed in a very professional manner. The thick epoxy circuit board itself is a work of art. The use of low-power Schottky TTL, extra buffering, fully decoded memory addressing, and properly documented schematics and manual are marks of excellence which place this kit far above the usual hobby computer, and above some commercial equipment too.

A very important part of any electronic system is the users manual, and Technico did a fine job here, also. There are 16 sections in a big notebook that comes with the kit, including step by step assembly and checkout instructions, a complete monitor listing, a TI manual on the TMS-9900 CPU, explanations of the hardware and instruction set, game program listings, and others. The monitor and assembler programs are well documented with explanations given so that the user can call many subroutines from his own programs. The section on programming has several examples, including a routine to calculate sine and cosine that uses only 43 program words! Technico uses the exact Texas Instruments instructions mnemonics. Most hobby computer companies like to make up their own, which is very confusing.

All is not gold, however. Technico used an R-C oscillator for the system clock, where the reviewer thinks they should have used a crystal, and they let the CPU time each serial input/output bit, where they could have used a UART. Technico has informed the reviewer that they now have a matching video display board and memory expansion board, so they do not need a UART on the CPU board.

The kit is not meant for a beginner in either hardware or programming. Anyone with experience on an 8-bit computer will find the Technico TEC-9900-SS microcomputer kit to be a very big, powerful, but inexpensive step above their 8-bit machine. The TEC-9900-SS Super Starter kit is available, as of this writing, at a price class of \$300 from Technico, Incorporated, 9130 Red Branch Rd., Columbia, MD 21045, tel. 800-638-2893. The price class of the optional "Instant Input Assembler" is \$50. — WB2YZL

HAMTRONICS CONVERTER KITS

Rochester, NY, has long been known as vhf heaven. With TV channels 8, 10 and 13 serving the area, the chance of TV interference from 6- and 2-meter rigs is small. The Rochester VHF Group has taken good advantage of this happy situation to engineer a hotbed of vhf activity in the area. The famed Rochester Converter is a product of this group, as is a fine showing year

after year in the ARRL VHF Sweepstakes. And soon Rochester will be even more widely recognized as the home of a very fine set of vhf and uhf converter kits and other accessories, from the amateur-owned Hamtronics, Inc.

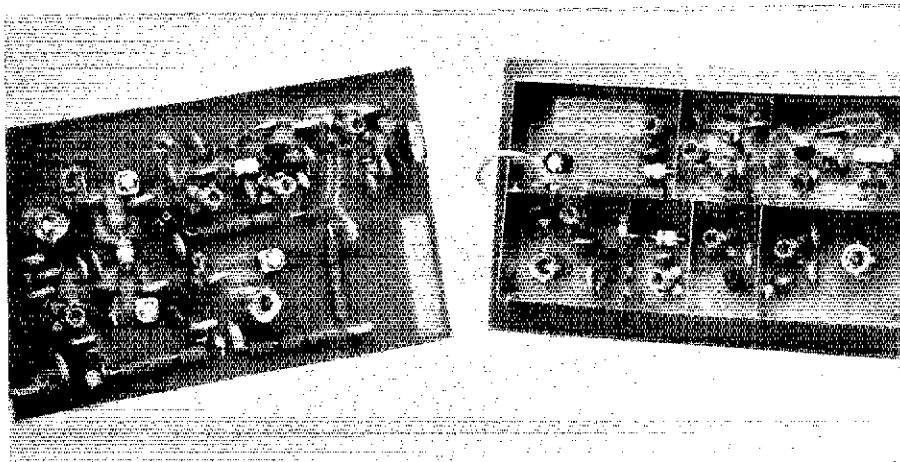
Heading the list of new Hamtronics products of special interest to amateur satellite enthusiasts is a hot uhf converter kit, the C432. It comes in several models, including a 435-MHz version with a 28- to 30-MHz i-f, especially for OSCAR 8. The straightforward circuit features 2N3563s in the oscillator-tripler chain and J308s in the rf and mixer stages. The design emphasizes stability, ease of construction and alignment, and trouble-free operation in every aspect. The junction field-effect transistors (JFETs) are wired in a grounded-gate configuration. Printed-circuit coils are used. Liberal use of decoupling ferrite beads eliminates troublesome interstage interaction while keeping gain and sensitivity high.

The Hamtronics kits are not the *step-by-step* type. The catalog explains, "Our kits are more like building a project from a magazine article than conventional kits, so you get more satisfaction and knowledge from building them." Yet construction is simple and direct. The high-Q, slug-tuned coils can be wound in minutes, and complete assembly should not take more than one hour. Alignment is facilitated by multiple "test points," complete with diode detectors. In fact, the most difficult part of the alignment is finding a signal source which is more stable than the converter. A strong, on-the-air signal is probably the best bet for amateurs without access to good test equipment. The only other equipment needed for the alignment is an electronic voltmeter. The procedure itself takes only a few minutes.

Sensitivity of the converter we built, using a standard transceiver as an i-f, far exceeded the 0.5- μ V specification. In fact, the stray leakage from the signal generator, well below the 0.1- μ V level, was fully copyable! Hamtronics also has a complete line of preamplifier kits, if this is not adequate!

The C432 converter is also available in 432- and 439.25-MHz versions, or for any other frequency in the 380- to 520-MHz range. Hamtronics has a similar vhf converter for the lower vhf amateur bands. Compartment shielding provides excellent isolation between stages, while maintaining the better-than-0.1- μ V sen-

Hamtronics uhf (l) and vhf (r) converters, with outputs to left. Note extensive ferrite decoupling and shielding.



sitivity figure. A wide range of frequency combinations is available, as is a custom case with BNC connectors.

High performance, simplicity of construction and alignment and very low cost: it's tough to beat a combination like that! Satellite users can get a complete line of OSCAR accessories for their hf rig, including a new 2-meter transverter, vhf and uhf converters and 10-meter preamps, all from the same source.

All Hamtronics vhf/uhf units are available from Hamtronics, Inc., 182 Belmont Road, Rochester, NY 14612. Price class of the 432-2 kit is \$35, also available wired and tested for \$55. — *WB2CHO*

Hamtronics C432-2 UHF Receive Converter Kit Manufacturer Specifications:

Gain: 10 dB.

Sensitivity: Less than 0.5 μ V with average receiver.

Bandwidth: Greater than 2 MHz without retuning.

Impedance: 50 ohms.

Input/Output Terminations: RCA type connectors.

Power Requirements: 13.6 V dc at 30 mA.

Size (HWD): 2-3/4 x 4-1/2 x 1 inch (70 x 114 x 25 mm).

THE BEARCAT 210 SCANNER

The Bearcat 210 scanning receiver is what may be called the third generation of public-service-band receivers. The first of the receivers to cover these frequencies were manually tuned, although you had to be quick on the knob or you missed that transmission. Some of these had a few crystal-controlled positions available. This was nice if you wanted to listen to your volunteer fire department, but what if something else of interest was going on? The next generation was predominately crystal controlled. By knowing what was going on, and on what frequency, you could outfit one of these to eavesdrop on 'most anything in your community. And miracle of miracles, they even sampled a bit of what was happening on each channel and stopped whenever an active one was tuned. This was the birth of the scanner, and there are many scanning receivers still being sold today. The only major disadvantage is the high cost of outfitting this type of unit with crystals.

Enter the programmable-synthesized scanner, or in this case the Bearcat 210. The model 210 covers the range of 32 to 512 MHz in three distinct bands: 32-50 MHz, 146-174 MHz and 416-512 MHz. Any 10 channels within these ranges can be programmed into the scanner memory from the front-panel keyboard. The scanner will then either scan or bypass any of these programmed frequencies, again as directed from the keyboard. A two-second delay can also be programmed in so that the response to a transmission will not be missed. Also included is a search function. In this mode the scanner can be programmed to check every 5 kHz between an upper and lower frequency limit for active channels. Obviously, this is nice for locating unpublished repeater frequencies on the amateur 144- or 450-MHz bands, for ex-



The compact Bearcat 210 makes a nice addition to any ham shack, home or office. It can even be used mobile with the mobile mount accompanying it.

ample. As with most things in life there is no such thing as a free lunch, and the Bearcat 210 is no exception to this unwritten rule. The receiver does generate a number of spurious signals, or birdies, and will stop the search function whenever it receives one of them. The owners manual lists most of these frequencies so that you can program around them. Of particular annoyance was a birdie at 146.5 MHz which made it difficult to search the whole 2-meter band.

Another difficulty, which affects primarily the early production units, is radiation of LO energy (although within FCC limits). The LO leakage was high enough to cause interference with other services. The manufacturer has assured us that steps have been taken to reduce LO leakage by 10 dB. Production of the modified units began in late February, 1978. (The date of manufacture is printed on the back of the scanner.)

The appearance of the Bearcat 210 is aesthetically pleasing. It is housed in a small vinyl-clad steel cabinet with a sloping front panel, which contains the keyboard and a large LED display for indicating the programmed channel and frequency. Also on the front panel is a speaker grille and controls for volume and squelch. A telescoping antenna is built-in and there is provision on the rear of the unit for an external antenna. The external antenna connector is a Motorola type, probably to facilitate mobile installation. To this end a bracket to permit under-dash mounting is also included.

The Bearcat 210 has provided me with many

very interesting hours of listening on the vhf and uhf public-service and amateur fm frequencies. The 210 is manufactured by the Electra Company, a division of Masco Corporation of Indiana, Cumberland, IN, 46229. The price class is \$350. — *KITHP*

Bearcat 210 Scanner

Power Requirements: 117 V, 50/60 Hz ac, 11 W, or 13.8 V dc, 6 W.

Input Impedance: 50-70 ohms.

Scanning Rate: Approximately 20 channels per second.

Sensitivity: 0.6 μ V/12 dB SINAD.

Frequency Coverage: 32-50 MHz, 146-174 MHz, 416-512 MHz.

Dimensions (HWD): 3.5 x 9 x 7 inches (89 x 229 x 178 mm).

Weight: 4.5 lbs (2.05 kg).

PARTS-PROCUREMENT CORNER

This month's writing represents the first of what we hope will become a short monthly piece on how and where to obtain radio components. Our ARRL Technical Information Service personnel answer some 7000 letters per year and the number is on the increase. Many

of these letters are simple — tell me where I can buy such and such a component. Through this short column we hope to give you the benefit of several years' collective experience in the parts-procurement game. Since we could not possibly know each and every manufacturer or supplier of every component, we invite your input. Should you own a business that caters to hams, drop us a line. (See League Lines in this issue.)

While ordering components for the IARU receiver and transmitter program outlined in an editorial several months ago we became aware of the power of quantity buying. In the past we would stock our laboratory with a few parts from here, a few from there, parts from flea markets, etc. Some suppliers acted as though they were doing us a favor selling a handful of capacitors, diodes, coils or whatever. Sound familiar? As soon as we started buying in 100- or 200-lot quantities not only did the sales people become more friendly and helpful (seems proportional to commission) but the prices took a nose dive. One part in single-lot quantities might cost 75 cents, but as soon as you're talking 100 pieces the price might drop to 30 cents per copy. The higher the single-lot price, the more impressive the savings.

We are not suggesting that every individual buy in 100-lot quantities, as that would be absurd. However, with a group purchase from a club with a number of members interested in stocking up on the same components the savings can be spectacular. Let's take an example. Say your club is average in size and has about 40 members. Half of these people are interested in stocking their junk boxes with 1/4-watt resistors, 10 of each standard value. There are 56 standard values from 10 ohms to 10 megohms so each person would want 560 resistors. If you check out your local Radio Shack store these resistors are selling for approximately 8 cents apiece. The 560 resistors would require an outlay of \$44.80. Ouch — not particularly appealing! On the other hand, if you were making a group purchase of 11,200 resistors (560 × 20 members) from a good supply house these resistors would cost 2 cents apiece, in that quantity. These are first-run, brand-name resistors. The cost for 560 resistors purchased in this manner would be \$11.20, exactly one-fourth the price you would pay at Radio Shack!

Savings of this sort can be had on practically any item you wish to buy, and by the way, the parts are available. Variable capacitors, coil stock, vernier dials, toroid cores, coaxial cable and fittings, sheet aluminum, chassis, switches, polystyrene, mica and tantalum capacitors, knobs and relays are all available at reasonable prices. You just need a little patience and need to know where to look. In the next few months we are going to print the names and addresses of suppliers for various components. The exact method of doing this hasn't been decided yet — perhaps we'll highlight a certain component each month and list a number of suppliers. This is bound to get us into some hot water because no doubt we'll leave off the name of some manufacturer or supplier. If so, let us know and we'll include it in a subsequent listing.

The individual purchaser need not fret. We'll also be supplying the names and addresses of companies that sell in single-lot quantities. Of course, this method will be more expensive than group buys, however, the parts are available. Maybe it's time to elect someone in your club to the office of "Chief Parts Procurer"? — *WIVD*

New Books

The Design of Active Filters With Experiments, by Howard M. Berlin, W3HB, is published by E & L Instruments, Inc., Derby, CT. Soft-bound edition, 6 × 9 inches, 285 pages. Price: \$8.50.

If you're like most hams, you've learned a lot about electronics by just reading. But sometimes it takes a little hands-on experience before the concepts take full meaning — that's why we go to school, right? You know, lab experiments and all that stuff! What we really need is a combination of theory and practical application.

This is the approach taken by *The Design of Active Filters With Experiments*. A recent addition to the "Bugbook" series published by E & L Instruments, Inc., this book provides the student with introduction to theory, implementation, and design of active filters using the 741 operational amplifier. The text is divided into nine chapters, each dealing with op amps in a different filter application. The first three chapters introduce the student to filters and explain the op amp's role in active-filter design. As each experiment is introduced, the author lists the procedure step by step. Even a person with extremely limited electronics background can easily follow the fast-moving theory/application mixture provided by Mr. Berlin.

All experiments are designed so as to require only a very modest investment in parts and tools. Accompanying schematics and scope patterns clearly illustrate points mentioned in the text. At the onset, the author suggests that construction of all experimental circuits be made on a breadboard of the spring-loaded type. Compliance with this advice should make completion of the "course" enjoyable, as well as economically feasible, since parts can be reused over and over, and no soldering is required. When one project is completed and it is time to begin another, all parts can be swiftly yanked from the breadboard, and a new circuit assembled.

The Design of Active Filters With Experiments is an excellent book for beginners as well as experts. With its unique style of presentation, it provides the reader with not only sample schematics and design formulas, but practical applications and component values as well. After serving as a teaching tool, this book can continue to benefit the owner by furnishing "just the circuit I was looking for" in the years to come — a welcome addition to any ham's electronics library. — *KITX*

Solid State Basics, by Doug DeMaw and Jay Rusgrove. Published by ARRL, Newington, CT. Paperback edition, 8-1/2 × 11 inches, 160 pages. Price: \$5 U.S. and \$5.50 elsewhere. A new addition to the ARRL technical library, *Solid State Basics* is a revised anthology of material which has appeared in *QST*.

Here is a welcome and useful contribution to the working literature available to the radio amateur. As its title suggests, *Solid State Basics* is a comprehensive treatment in one handy volume of what amateurs need to know about solid-state technology and its practical applications to amateur radio today.

The book is arranged in six sections for convenient reference and use. The first, entitled "Let's Talk Transistors," covers basic semiconductor theory and related electronic

principles. "Learning to Work with Semiconductors" deals with solid-state receivers and transmitters. The receiver section covers principles and applications, circuit evaluation and testing, the transistor as an oscillator, the solid-state mixer, solid-state i-f amplifiers, and the design and application of a solid-state BFO for a superheterodyne receiver for 80 meters.

The transmitter section includes a discussion of a 10-watt, 80-meter transmitter, rf power amplifier design, selecting the right transistor for a particular application, rf power amplifiers, power amplifier design and a solid-state VFO. Section 4, "Understanding Linear ICs," reviews theory and principles and provides an inside look at integrated circuitry. It describes building a 40-dB audio amplifier.

"Learning to Work with Integrated Circuits" deals with theory and provides a practical exercise in constructing an instrument which doubles as a digital voltmeter and a frequency counter. The final section discusses instructions on how to use Zener diodes, solid-state design fundamentals and how to debug a solid-state transmitter. — *WB1CUJ*

Radio Frequency Interference, by Bill Lowry, Doug DeMaw, Jay Rusgrove and Hal Steinman. Published by ARRL, Newington, CT. Paperback edition 8-1/2 × 11 inches, 64 pages. Price: \$3 U.S. and \$3.50 elsewhere.

A perennial problem in "good neighbor" relations for many amateurs, and a significant public relations problem for all amateurs, RFI has become a major issue on a number of fronts. It is just beginning to be recognized that hams are in reality victims rather than perpetrators of the problem. Attempts to put the responsibility where it logically belongs — on the manufacturers of RFI-susceptible electronic devices — have focused on legislative action in the form of the Vanik Bill which narrowly failed to come to the floor in the last session of the Congress and has been reintroduced in the current session.

In the meantime, hams have had to deal with the problem all too personally on the local scene, and how to do so effectively has sometimes been frustrating and baffling. Now there is practical help at the fingertip level. *Radio Frequency Interference* brings together in one convenient, practical source, just about everything needed to cope with the problem. Six nuts-and-bolts chapters cover every aspect of RFI from definition to solution. Chapter 1 explains in detail what RFI is and cites examples of effects ranging from the classic case of television interference to exotic instances such as hair dryers or even false teeth! Some of the background history is cited to establish the dimensions of the problem. Chapter 2 takes up the search for solutions, starting with making sure the ham station is "clean," how to zero in on the real problem, and what club-sponsored RFI committees can do. CBers have also become victims and occasional perpetrators of RFI, and Chapter 3 discusses the problem from the CB vantage point. Chapter 4 deals with transmitter-caused interference and what to do about it, including practical troubleshooting tips. Chapter 5 identifies a long list of non-amateur related sources of interference — sewing machines, electric lawn mowers, vacuum cleaners, neon signs and many more and provides ways of reducing or eliminating the effects in each case. Chapter 6 is a reprint of an FCC booklet that presents a step-by-step procedure to identify, localize and resolve specific radio-TV interference. — *WB1CUJ*

Hints and Kinks

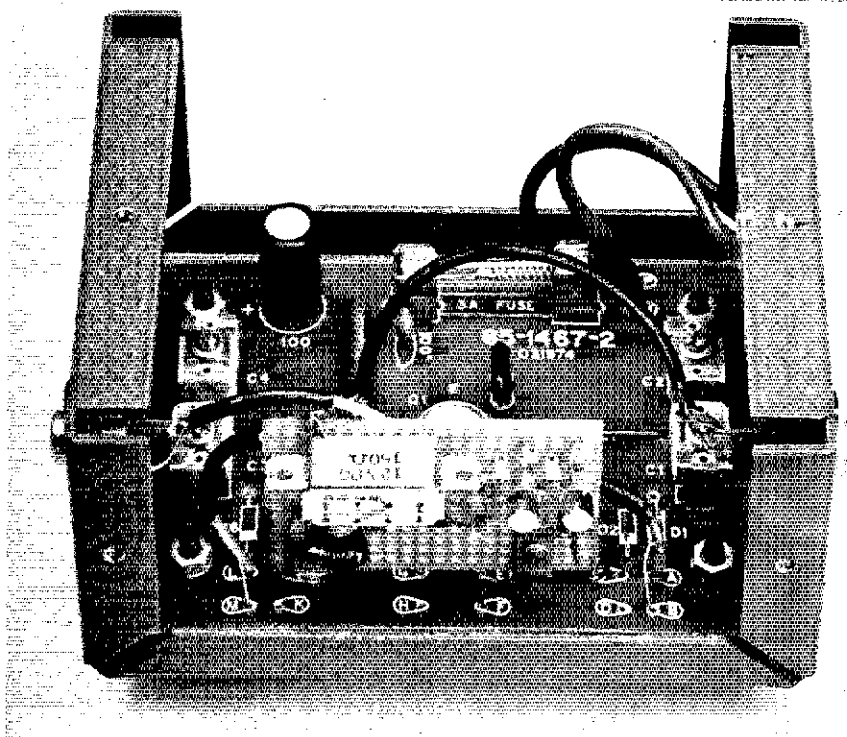
A COR FOR THE HA-201 AMPLIFIER

Interfacing our Drake TR-22C with a Heath HA-201 amplifier introduced several difficulties including a noticeable loss of output power, excursions in amplifier stability and a decline in receiver sensitivity. Insertion of a carrier-operated relay resolved these problems. The accompanying diagram illustrates the simple circuit we use.

The COR circuit, mounted on G-10 Vectorboard, fits conveniently in the space formerly containing T1 and T2. These coaxial-cable transformers are removed from the HA-201 along with the 1N4149 diodes D1 through D6 and capacitor C5. Three of the diodes may be used in construction of the COR. The removed coaxial cable (RG-174/U) may be reinstalled to link relay K1 to the HA-201. Cable shields are tied to a single point (one of the flea clips) close to K1. The +12-V lead from the COR is wired to the fused side of the 12-V supply line. A switch, S1, may be added to the line for the purpose of engaging or disengaging the HA-201.

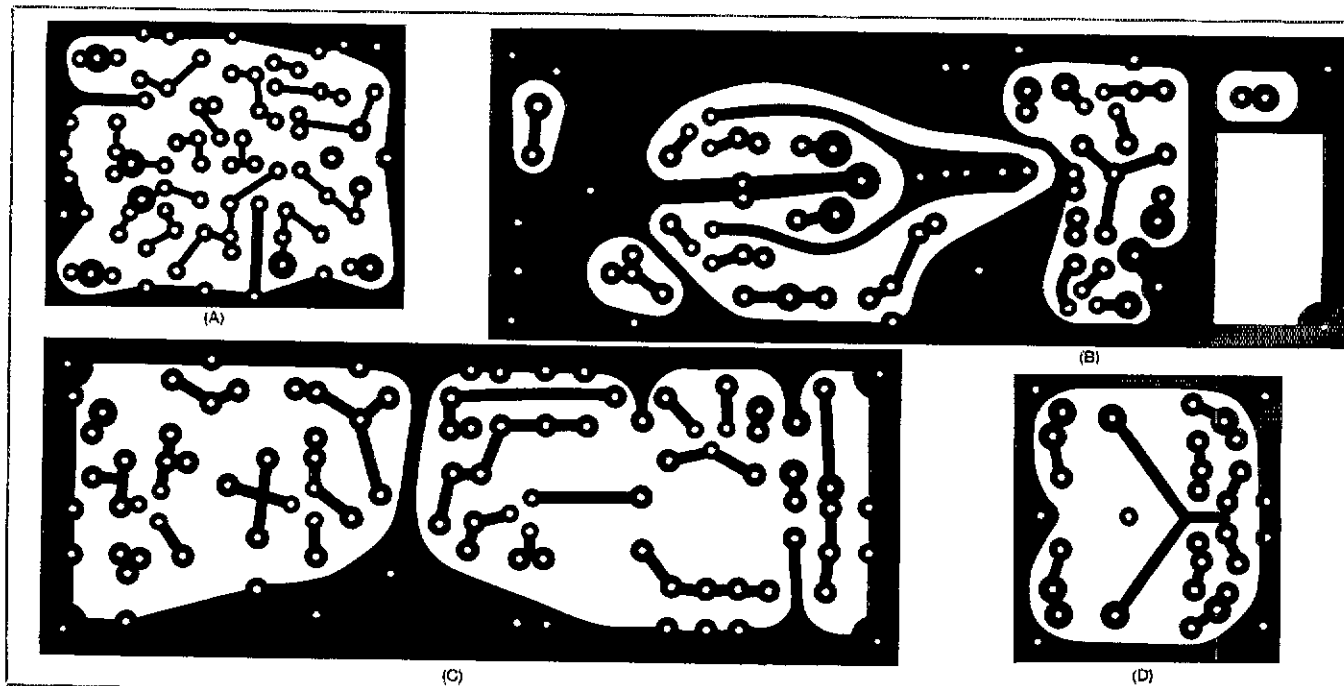
To accommodate the no. 6-32 spade bolts that support the COR board, mounting holes are drilled in the amplifier board at the right of hole J and hole E. One must be sure, however, that no live traces are shorted to the ground bus trace. If necessary, the traces may be trimmed with an Exacto knife.

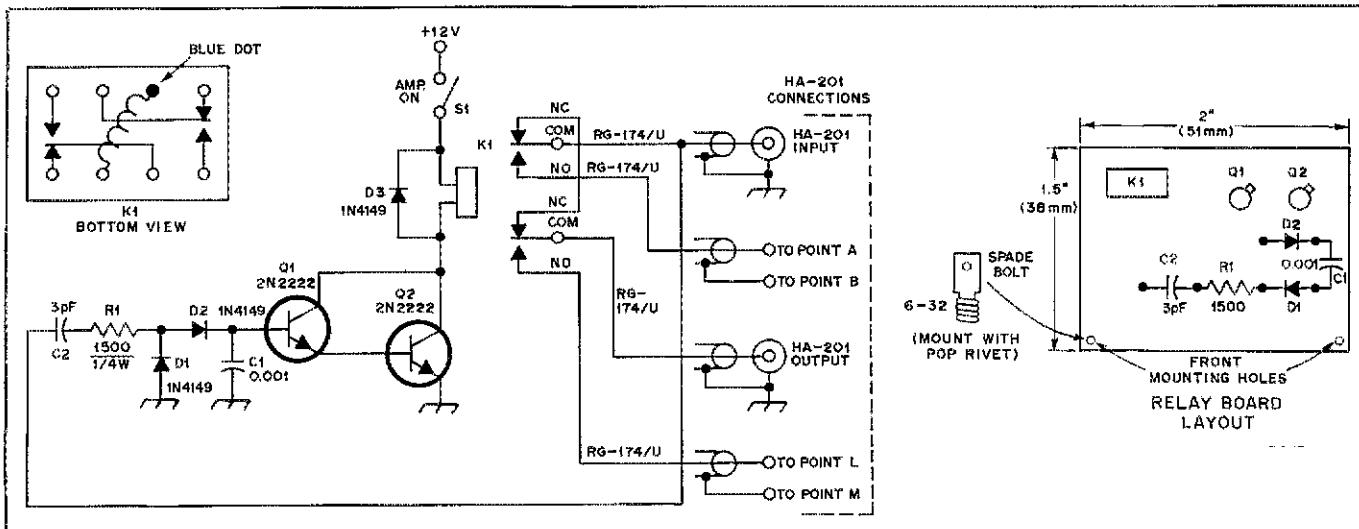
Final adjustments are made after connecting the HA-201 to any exciter delivering from 1- to 3-watts drive power. The amplifier supply



This Heath HA-201 amplifier has been modified to employ the carrier-operated relay circuit mounted on the vertical Vectorboard. Use of the COR simplifies interfacing the HA-201 with such equipment as the Drake TR-22C and other non-Heath sets.

Circuit-board etching patterns for the 7- and 14-MHz cw transmitter (DeMaw, "Transmitter Design — Emphasis on Anatomy," in four parts). Black represents copper. All patterns are shown at actual size from the foil side of the circuit board. See the drawings referenced below for parts-layout information. At A, the VFO circuit board (Fig. 3, p. 19, May 1978 QST). At B, the doubler/break-in delay board (Fig. 5, p. 26, June 1978 QST). At C, the broadband-amplifier board (Fig. 8, p. 21, this issue). At D, the SWR sensor (Fig. 13, Part 4, in a subsequent QST issue).





A carrier-operated relay circuit designed for interfacing the Drake TR-22C and the Heath HA-201. Terminal connections are shown for the Potter Brumfield HC-11D relay. The COR board layout is also illustrated.

C1 — 3-pF silver mica capacitor.
C2 — 0.001- μ F disk ceramic capacitor.
D1-D3 — Signal diode, type 1N4149.

K1 — Potter and Brumfield HC-11D relay, 24 V dc, 814 ohm.

Q1, Q2 — Npn silicon transistor, 2N2222.
R1 — 1500 ohm, 1/4 watt.

voltage should be 13.8 V dc. Feed the amplifier rf output into a 50-ohm load and wattmeter. When the mic switch is pressed, the COR relay is activated and normally there will be an indication on the wattmeter. C1 through C4 are adjusted for maximum output. Stable operation of the amplifier from 146 to 148 MHz, with an output of 10 to 12 watts should result. Some loss of output may be expected near the band edges.

For optimum results a wattmeter of known accuracy is recommended. Perform all tune-

ups on 146.94 MHz and into a dummy load. — *Dave Karpiej, K1THP and Mark Starin, WAITZK*

BALL-BEARING PROBLEM SOLVED

Recently, while I was reassembling my antenna rotator, the ball bearings and the bearing holder kept dropping out of the dome each time I turned the mechanism upside down. To remedy this problem I bedded the bearing holder and the bearings in place with white

lithium grease. Then I placed the dome in the deep freeze for about two hours. This stiffened the grease and held the bearings and holder in place while I lowered the dome and fastened it down. — *Phillip Wainwright, K2GV*

PIN TERMINALS FOR CRYSTAL BOARD

Waldom pin terminals enabled me to make a nice mounting board for FT-243 crystals to be used in my sideband filter. They snap into place, holding firmly when installed in 1/8-inch stock. One might also secure them in place with epoxy cement.

These terminals are sold in packages containing 10 male and 10 female components and are available in either 0.093-inch (2.3-mm) or 0.062-inch (1.6-mm) diameter. The builder may select either a crimping type (to be used with a Waldom crimping tool HT-1919 or HT-1031-C) or a soldering type. I selected the larger diameter pin terminals. By pinching the 0.062-inch terminals, an HC6 (0.050-inch/1.3-mm pin) crystal may be accommodated.

Although I have not used pin terminals on circuit-board projects, they should be equally useful. — *Daniel G. Mackintosh, W6SPC*

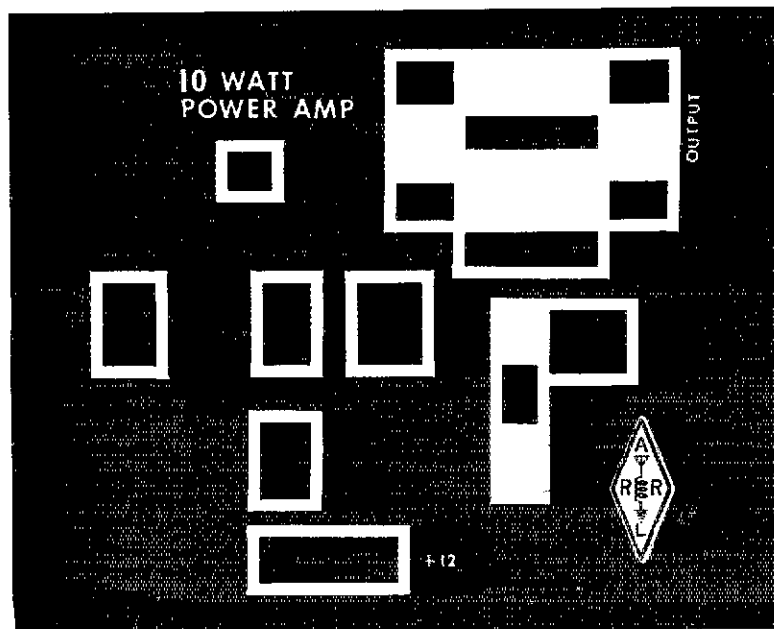
NEOPRENE WASHERS FOR CABINET FEET

An easy way to provide feet for an experimenter's small chassis box is to use neoprene faucet washers. The size may be 0, 1/4 or 3/8. You must countersink the washer to accommodate the head of the screw in order to avoid marring the desk top after mounting. To countersink the washers use a pocketknife, or a hobbyist's drill with an appropriate accessory. I use 8-32 hardware to secure the washers to the cabinet. — *Kathleen M. Freeman, KL7IFF*

AMIDON PART IDENTIFICATIONS

After being off the air for some 20 years, I have recently become active again but find I'm drag-

Circuit-board etching patterns for the 7- and 14-MHz cw transmitter (continued). Shown here is the power-amplifier circuit board, which will appear in Fig. 11, Part 4 of the series. This circuit board is double sided, the component-side foil being used only as a groundplane. That pattern is not shown, as it contains only clearance holes for the component leads.



ging myself (scratching, not kicking!) into the semiconductor age. The *QST* articles are of great interest and assistance to me. My current projects, a VFO with output on 40 and 80 meters, and a small transmitter are being constructed along the lines outlined in articles by Doug DeMaw.

My plans included the use of Amidon beads and toroids but the manufacturer's sizes and mixes of the devices puzzled me. William Amidon was kind enough to provide me with the following information which clarified the matter and it may be helpful to others. He said, "At first, our ferrite-bead stock consisted of only one material and two different sizes, the larger of which was known as the Husky or Jumbo size. Later a part number was assigned to this bead and it is now known as the FB-43-801.

"Some time ago, the original part numbers for the ferrite toroids were changed for easier identification. For instance, the original part number FT-75-601 was changed to FT-82-75. FT for ferrite toroid, 82 for the 0.825-inch (21-mm) OD, and 75 for the type material.

"In any event, the proper core will be sent to the customer even though an older part number appears on the order."

The response from Mr. Amidon was received through the assistance of Sandy Gerli of the ARRL Technical Information Service. — Paul Binstock, WØDXG

POSITIVE KEY LINE AND THE HD-10 KEYS

The HD-10 keyer was originally designed for negative-line keying. Such grid-block keying was used in the HW-16 cw transceiver. The newer solid-state transceivers use a positive-to-ground key line. The HD-10 cannot be operated with these sets without modification.

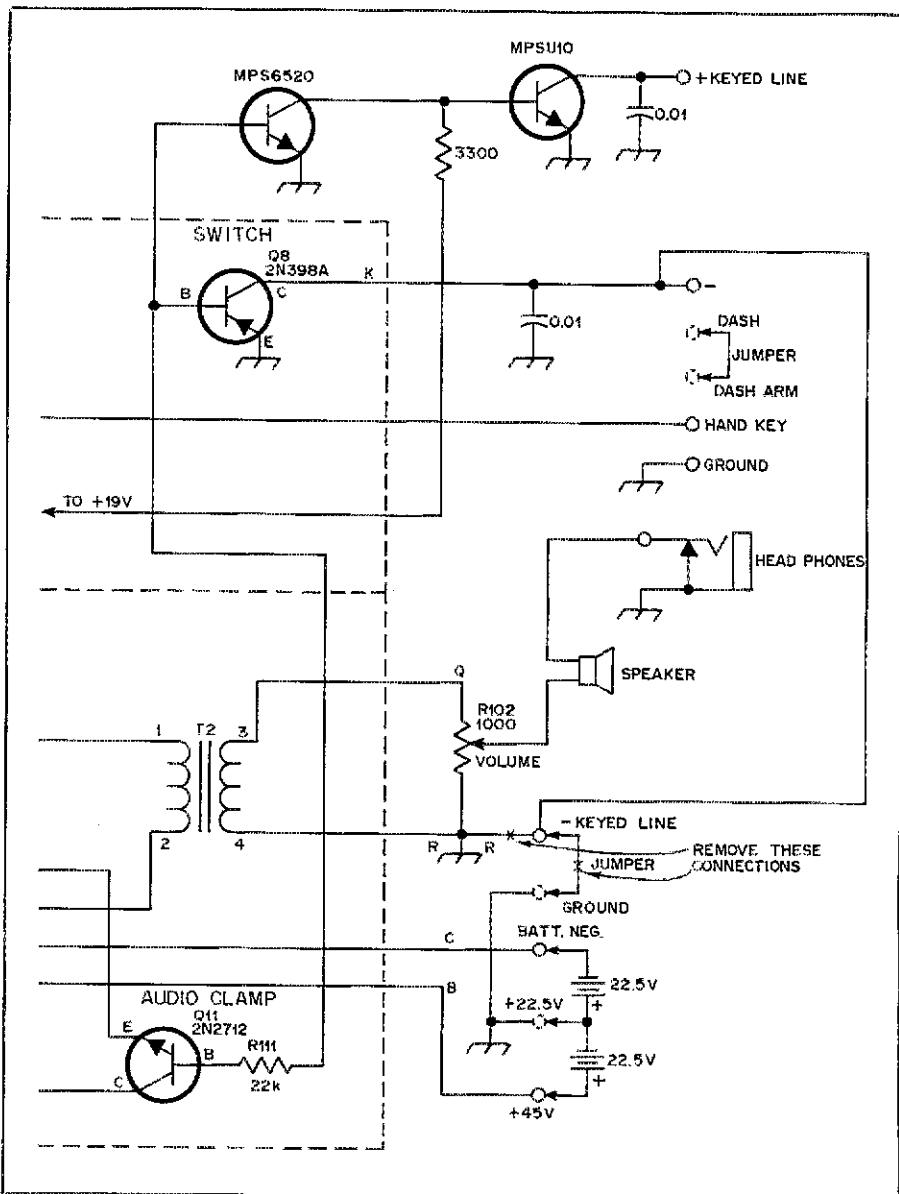
With the addition of two transistors, one resistor, and two bypass capacitors, one may have the choice of either positive or negative keying capability. The partial drawing of the HD-10 diagram indicates the additional components which may be mounted on a piece of Vectorbord or may be "flown" above the existing pc board. The transistors shown in the diagram were of junk box variety but almost any npn type may be used. The criteria for the MPSU10 replacement are (1) adequate voltage rating; (2) sufficient current rating for the keyed line.

Parts placement is not critical. The 0.01- μ F bypass capacitors were added to prevent rf from entering the keyed line. The modified keyer is now being used with an HW-104 Heath transceiver. It performs very well with this set. — Norman Bradshaw, W8EEF

ELIMINATING THE TRAILING DOT

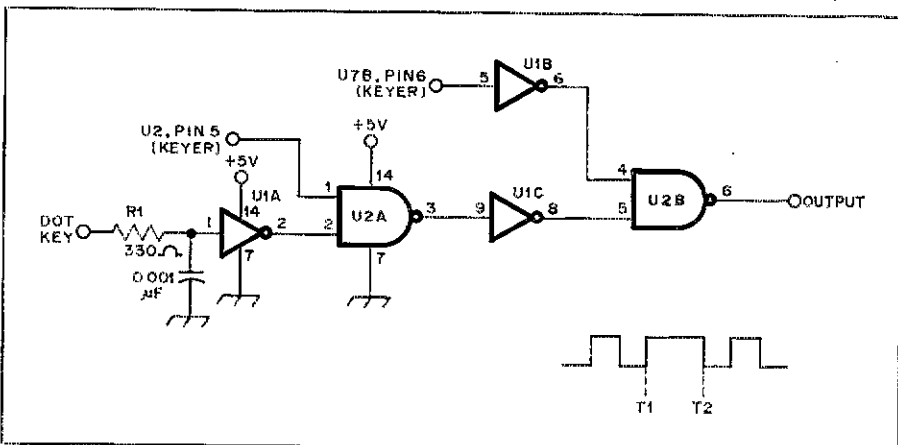
I am now well pleased with my WB4VVF Accu-Keyer after making this modification which eliminates the trailing dot. Prior to making the change, if the dot paddle was held past time T1 (see drawing) another dot would be sent. An A, for instance, became an R.

With the two-chip addition shown in the illustration, the trailing-dot problem is cured (unless the dot paddle is held past T2). Dot insertion between dashes for letters like K is maintained. I also find that with this modification the keyer is much more forgiving of errors in timing. — Ronald Hanthorn, K8AW



Modification of the HD-10 keyer for use with a positive-voltage key line. Disconnect jumper and lead between ground and volume control as indicated by X. Connect keyed-line transistor circuit to Q8 as shown. Insert a 0.01- μ F capacitor from Q8 collector to ground. Ground R at low end of volume control.

This modification of the WB4VVF Accu-Keyer is designed by K8AW to eliminate the trailing dot but maintain dot insertion for such letters as K. U1 is a TTL 7404 hex inverter. U2 is a 7400 quad dual-input positive NAND gate. R1 is 1/4 watt. The dot-input lead of the keyer should be disconnected from the key jack and wired to the output (pin 6) of U2B.



West to Macao

If it's CQ WW weekend, this must be Macao.

By Dave Bell,* W6AQ

Planning a DXpedition is like running a red light: Sometimes you're lucky.

As I stood in Los Angeles International Airport with two carry-on bags which would have wearied Arnold Schwarzenegger, I wondered if I was crazy. In one bag was an Atlas 210x and a Heath HA-14 amplifier. In the other was another 210x with its power supply and a rat's nest of coax, antenna wire, tuner, mic cords, relays, foot pedal, etc. My wife carried the passports and airplane tickets. She figured it was a fair division of labor.

Somewhere in the bowels of the airport, Pan Am personnel were struggling with four bags which contained all kinds of motion-picture gear, a couple of power supplies which wouldn't fit into the carry-on baggage, clothes and all the ointments, powders, pills, potions and instant coffee needed for a three-week trip to the Orient.

"Let's Go to China"

The insanity had begun innocently enough only eight months earlier when I mentioned to my pal Bernie, W6PJK, that I was considering going on a DXpedition. Bernie said, "Great! Let's go to China." His QSL card is a picture of him and John Wayne, their arms around each other,

guzzling champagne — which should tell you something about Bernie.

Another nudge to go came at SAROC in early January, 1977, where I ran into Dick, who was then either W6DGH or N6AA, and just back from a DXpedition to the Caribbean, where he had "borrowed" a shack from a local. He convinced me that was the only way to go. No struggling with antennas, no fish-eyes from hotel clerks, no last-minute shortages, denials or reneges. He also suggested I hand-carry whatever equipment I decided to take since his Signal One had just been dropped on the runway, which did it very little good.

Another decision came to me on March 21 while recuperating from the cw ARRL DX Competition. I decided that I'd better stick to phone contests and leave cw to those ambidextrous folks with the glassy-eyed stares. So, the next opportunity would be the CQ WW DX Phone Contest on October 29 and 30.

March 27: Remembering N6AA's advice, I searched through my QSL cards for a DX station to "borrow," and picked out CR9AJ and VS6DR as innocents abroad.

March 30: Called ARRL for advice. Bruce Johnson, WA6IDN, their international expert, told me Macao might be difficult but that we had a reciprocal licens-

ing agreement with Hong Kong, and if all else failed there were lots of islands in the Pacific.

April 2: Attended Fresno DX convention. Most of the attendees didn't need any countries which could be reached by anything more comfortable than a burro.

April 19: After two weeks of head scratching, indecision and staring (that's called research in some circles), I wrote to Torres, CR9AJ and as subtly as possible attempted to thrust myself upon him for the last weekend in October. People who know me will tell you that subtlety is not my long suit. The sledgehammer was about to drop on Macao.

May 6: Having heard nothing from CR9AJ, I wrote another letter with a copy of the first, since several QSL-hungry DXers had expressed skepticism about mail delivery to Macao.

July 7: At a pizza meeting of the Southern California DX Club I was urged to forget about Macao since I hadn't heard from Torres. Try Hong Kong, I was told. One inebriate suggested that Tibet would be a fun stop even though he already had it confirmed.

July 8: Wrote Phil, VS6DR, with the same sort of "borrow your shack" letter I'd written to Torres.

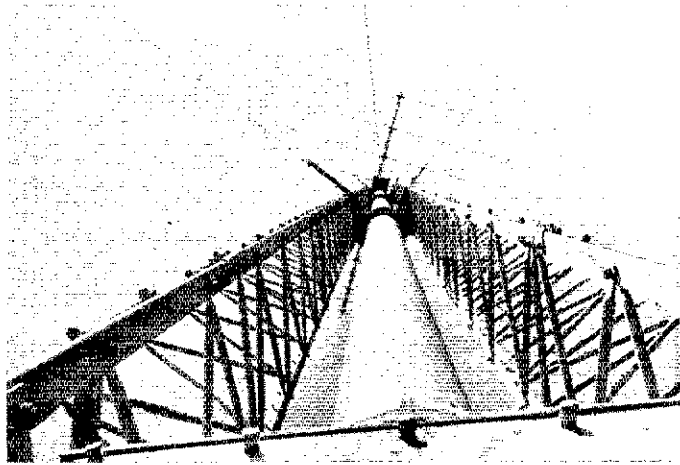
July 9: Radiosport contest rewhetted my enthusiasm for a DXpedition and

*3211 Cahuenga Blvd. West, Hollywood, CA 90068

Almost every photograph of Macao ends up with a picture of the CR9AJ antenna farm somewhere near the top of the frame. The walled-in area is called Guia Fortress. Its walls, built in 1637, have repelled all manner of invaders, except visiting DXers.



After using the log periodic (borrowed from the adjacent government station), I decided it's an antenna which works poorly over a wide range of frequencies. A TH3JR at 20 feet rounded out the antenna farm.



focused my frustration over the silence from the inscrutable East, which is west for me.

July 12: At ARRL's suggestion, I wrote David, 9V1RH, for advice and assistance since he knows everything about everything in his part of the world. Specifically, I wanted help with Macao since I had zeroed in on that as my prime prospect.

"I Don't Like Your Chances"

July 19: Heard from 9V1RH, proving that it's possible to send and receive transpacific mail in less than an eternity. David's first paragraph said, "... concerning a license in Macao ... frankly, I don't like your chances." If that weren't enough, he let me know that in Singapore one must have a permanent address to obtain a 9V1 call and he suspected that Hong Kong, even with a reciprocal agreement, might be the same. The way it was going, I might end up operating the contest from JA, which is only slightly more congested than W6.

August 2: A letter from Phil, VS6DR, who had been out of town, reported that his antennas were down and he was temporarily QRT.

August 3: Sent letter to Hong Kong version of the FCC enclosing all the required information to obtain a reciprocal license. Licenses there are handled by the post office. I was beginning to see the handwriting on the wall (it's for certain I wasn't seeing handwriting on anything delivered by any post office).

September 6: This day after Labor Day shall go down as the day that I take back almost everything I ever said about post offices. I heard from CR9AJ. It had taken Torres just slightly over four months to find out that I couldn't get my own CR9 call, but it would be okay for me to use his call and his station. His letter was like a sea breeze on a snoggy day. He described his QTH (110 meters above the level of the sea), his equipment (not very strong), and his home (at your service). His letter was generous and welcoming. While I didn't know it at the time, the letter was but a shadow of the generosity and hospitality awaiting us in Macao.

September 7: Call to Les Johnson, K6PUR, at Atlas Radio. How about donating a 210x to the only active ham on Macao? Les, a DXer at heart, thought about it for a minute or so and agreed that Torres ought to have a dependable rig.

September 30: Picked up the transceivers and toured the Oceanside, CA, facility which puts the little rig together.

October 3: One last letter to Hong Kong FCC, in case Macao washes out at the last minute.

October 13: Letter from the Hong Kong FCC stated that I can get a license if I stay for more than three months. However (like Macao), they have no objection to my operating an existing station if it's



I keep the rig from falling while my host describes the panoramic view.

okay with the licensee. Maybe next time.

October 17: Bernie gets tied up doing a Movie of the Week or TV series pilot or something and can't go. You'd never guess from looking at him that he's a victim of the Puritan work ethic.

October 26: Leave LA International, Pan Am flight 3 on a 747SP.

October 27: Arrive Tokyo, 12 hours and one day later. Wait two hours in a customs-less holding tank and take Pan Am flight 1 to Hong Kong. Good flight. Call Torres. Talk to his daughter, Madelena. They are ready for us to arrive on the five o'clock jetfoil, tomorrow.

Round Shoulders

October 28: Tour Hong Kong. Get ticket for 5 P.M. jetfoil to Macao. We should have taken the three o'clock boat. At 4:45, the five o'clock was cancelled. And it was the last one of the day. Dragging our bags behind us (and kicking them along ahead of us) we struggled to get ourselves onto the ferry. About 9 P.M. the casino lights of Macao came into view and the ferry slid into its dock, about a quarter-mile from the nearest public transportation. No porters in sight. This contest might not get me a trophy, but it sure was getting me round shoulders.

After paying an entry tax of about \$5 U.S. to get off the pier and onto land, I borrowed a phone from a souvenir shop and called Torres. Again I talked to Madelena. They'd be right down to get me. As I was struggling to get the last of the bags to the street entrance, a cherubic policeman came trotting up to me pointing his finger as if I had just sneaked through customs (What customs? I hadn't opened a bag in Tokyo, Hong Kong or Macao). "Bella?" he questioned. My hair-trigger mind reacted instantly. "Bell," I said. "Torres," he said. Communications were established. I was the overdue visitor. He dashed off to a phone before I could even attempt to let him know that Torres was on his way to pick me up. I got a warm feeling about Macao.

I was expected. Recognized. Bella! My wife thought I'd lost what few marbles I had left.

The next two hours were spent socializing and eating. Torres' wife has made cooking an art. At about 11 P.M. on the night before the contest (which started at 8 A.M. on Saturday local time) I felt I could excuse myself from the amenities and hook up the station. By 11:30 I had tuned all the bands, heard practically nothing except for an incredible blanket of what sounded like jamming on 40 meters, and discovered that the 80-meter antenna had fallen some months before. Since that band was as noisy as 40, the antenna hadn't been resurrected.

October 29: Standing on Guia Hill at 5 A.M. and watching the ancient junks heading out to sea was an incredible experience which will hang in my memory forever. But enough of aesthetics. First things first. To the contest! 10-15-20, here I come!

The Contest

October 31: Nearly 500,000 points later I had learned a thing or two. I knew what it was like to be on the far side of JA. I discovered it was impossible to create a W pileup with an S5 signal. I found out what separates the good contest ops from the also-rans. The top stateside operators could detect a "foreign" call in the midst of a JA pileup, for instance, and stand by for a "non-JA only please." Contrast that with the big-time W DXer who was very loud and had a big JA pileup just as I tuned across him.

"Is there a JA7?" he asks.

"CR9AJ," I say.

"JA7 only," says he.

"CR9AJ," I say.

"CR9 stand by, JA7 come again," says he.

"See ya," says I as I QSY. After all, I'd traveled too far to stand by. There is a certain amount of arrogance that comes with knowing you're the only ham in your country and one of the few in your zone. Some big DXers don't seem to distinguish between multiplication and addition.

But then there were the bright spots; like when after failing utterly to find a frequency on 20 clear enough to be heard in the states, I called W9LT and after exchanging reports I told him my problem, and he offered me his frequency. Who says the good guys are all gone?

After shooting some movies and stills of the CR9AJ layout, we left Torres and both of his Madelenas with fondness and warm memories.

Macao is like nowhere I've ever been before. Sometime I'll go back and see what it's like. From November 1st for two weeks, my XYI and I toured Japan, visited some pals, spent all our money and then some, and met some really terrific JAs. Will we do it again? What time does the next burro leave?

How Safe Is Your Ham Shack?

Part 2: Move over, volts and amps. Here are a couple of chemical hazards to contend with — beryllium and the fiberglass catalyst MEKP. Here's how to clean up their act.

By Steve Maas,* W5VHJ

Do you have sitting around in your shack a fan-free compact amplifier, or a ceramic/metal high-power tube, or an expensive ceramic insulator? If you do, the chances are you also have in your shack one of the most toxic substances on earth — beryllium! Fortunately, it does not pose a threat to anyone touching or handling a solid piece, or working in the room where it is stored. However, the fine dust of metallic beryllium or almost all beryllium salts, inhaled into the lungs is deadly.

If beryllium oxide (BeO) is so poisonous, why is it sold over the counter, and used so casually? Good question. If solid beryllium oxide insulators were as dangerous as the dust generated by grinding them, they wouldn't be sold at all. There wouldn't be enough people left alive, after handling them, to sell or use them. But the oxide must be pulverized in some way and then breathed to be harmful. Solid, dust-free pieces can be handled with no more care than subsequent hand-washing.

What Is Beryllium?

Beryllium is a metal, an element, number 4 in the periodic table. Beryllium oxide, which sometimes is called beryllia, beryl or bromellite, is a ceramic with some remarkable properties that make it very useful in electronics. Like all ceramics, it is an excellent insulator and has a high dielectric coefficient, about 7. Most remarkable, it has extremely high thermal conductivity, even greater than that of aluminum, and it is used primarily as an insulator where effective heat-sinking is necessary.

Beryllium oxide is used between the anode and heat sink in conduction-cooled amplifier tubes, in metal/ceramic power tubes, and in Gunn and IMPATT

oscillators and amplifiers to mount semiconductor devices. As an added advantage, the use of beryllium oxide insulators results in low parasitic capacitance between the device and the heat sink because a fairly thick insulator can be used.

Beryllium Poisoning

In the late 1930s and 1940s, the great majority of cases of beryllium poisoning came from smelting operations and manufacturing of fluorescent lights. Early fluorescent tubes used beryllium salts, all of which are poisonous, in their phosphors. The role of beryllium in these poisonings was not clear until late in 1948, but by June of 1949 all use of beryllium in fluorescent lights had ceased. However, many such lights were made and were in use well into the 1950s. Many people remember the strict admonition, 30 years ago, never to break a fluorescent light. The author remembers hearing it as a child in the late 1950s, even when the reason for it had largely disappeared.

There are three kinds of beryllium poisoning: the acute disease; the chronic disease, sometimes called *berylliosis*; and certain kinds of skin reactions. Acute disease is caused by short-term exposure to *relatively* high concentrations. Atmospheric concentrations of beryllium of one milligram per cubic meter will produce toxic effects in almost all persons exposed; four milligrams per cubic meter causes death to most subjects exposed. However, concentrations as low as 50 micrograms per cubic meter have caused death. The symptoms are severe chest pain, cough, and difficulty breathing. Lung damage is plainly visible on X-rays. Death may occur within a few weeks of the onset of symptoms; if the victim survives, remission is almost invariably complete.

Chronic beryllium poisoning is the disease which affected most of the in-

dustrial workers mentioned earlier. It results from long-term exposure to extremely low atmospheric concentrations of beryllium and is far more insidious than the acute disease because symptoms may not develop for years. One victim first experienced disease symptoms 11 years after his last exposure to beryllium, and a five-year lapse is not uncommon.

The chronic disease, like the acute, is caused by inhalation of the toxic substances. The symptoms include chest pains, a dry, hacking cough, loss of appetite, and serious loss of weight. There may be a low-grade fever, about 101 degrees; a lowering of the tolerance for exercise may be so gradual that the victim may not notice it for a long time. He may then find that he uses all his strength climbing a flight of stairs, and his breathing is as labored as that of a healthy person at very high altitudes.

The amount of beryllium required to produce chronic disease is incredibly small: In one case two people living 3/4 mile from a fluorescent tube factory were poisoned and died. (Many others were made ill.) The air contained between 0.1 and 0.01 micrograms per cubic meter in the vicinity of their homes. In some cases, on autopsy, victims were found to have less than 0.1 micrograms of beryllium in their entire lungs. That is less than 2 parts per *billion*, by weight. Generally, however, atmospheric concentrations of a few micrograms per cubic meter are required to produce illness, and, at that level, exposures of a few months.

Because such low levels of beryllium can be dangerous, poisoning has occurred through bizarre mechanisms. Wives and friends of people whose clothing was contaminated have been poisoned, sometimes by laundering or handling the clothing, sometimes simply by visiting in the contaminated homes. Tests of contaminated clothing have shown that shaking a lightly soiled laboratory apron can give rise to

Fiberglass Catalyst Can Blind You

Making a fiberglass repair to your wind-damaged quad? Be careful. It is not generally known, but the catalyst you are using may be a health hazard.

At a recent safety conference in Vancouver, BC, an eye specialist described an experience that ended with disastrous results. "The victim had both eyes contaminated while fiberglassing a chair at home. Though he did make an effort to wash his eyes out, several minutes apparently elapsed before he found water. One eye was lost immediately; the other was lost gradually over a period of about eight years. Its deterioration was described as resembling that resulting from WW I mustard gas burns."

The catalyst added to fiberglass resin (to accelerate hardening) before the resin is applied to the work is usually MEKP (methyl-ethyl-ketone-peroxide) which can completely destroy eyesight. Once MEKP starts to destroy eye

tissue, there is no known way to stop or repair the damage.

In tests using laboratory animals, MEKP in solutions of varying concentrations was found to cause eye problems ranging from "irritation" to "severe damage." The maximum concentration producing no appreciable irritation was a solution containing only 0.6-percent MEKP. Material published on the subject indicates that washing an effected eye within four seconds after contamination prevented injuries in all cases, but no known chemical neutralizer has been reported.

When you are working with a fiberglass hardener, wear safety goggles and have on hand an adequate supply of water to wash out your eyes in case an accident occurs. Remember four seconds is your time limit. It is also a good practice before using any catalyst to check the chemical composition and take appropriate safety measures. — William G. Welsh, W6DDB

atmospheric concentrations of 10 micrograms per cubic meter.

Even the most careless reader is probably convinced by now, not to file open his defective ceramic/metal power tubes to see what the insides look like. However, even the most cautious reader may still see no harm in using beryllium oxide, as long as it is handled properly. After all, the substance is safe as long as it is not abraded, burned, or chemically cleaned or etched. Nevertheless, I would like to suggest that beryllium oxide be eliminated from amateur use. My primary reason is that continued uncontrolled use will in-

evitably lead to accidents. As more of the ceramic is distributed among the public, the chances that it will be misused, or not recognized as beryllium oxide, either through careless storage, mislabeling or ignorance, will increase. Warning material supplied with the oxide may not be taken seriously by people who have read may such dire warnings on substances which are far less toxic. Moreover, disposal and identification problems will result: How can the original builder of an amplifier be certain that a subsequent string of owners will all be adequately warned about the material? How can he be certain that the

last owner will dispose of it properly, if he does know it is toxic? What do you suppose that nice ceramic washer you found in the local salvage yard is made of?

Sensible Precautions

Nevertheless, some people will find the attraction of a fan-free, compact amplifier too much to resist, or will want to use ceramic/metal high-power tubes. They should use the following precautions:

1) Think again. Conduction cooling with a convection-cooled heat dissipator is far less efficient than forced-air cooling. Note that the 8874 and 8875 tubes, identical to the conduction-cooled 8873 except for integral cooling fins, dissipate up to twice the heat of the 8873. Moreover, alignment of the conduction-cooled tube and radiator is critical; the result of poor alignment is a destroyed tube. Quite a price to pay for an amplifier that doesn't hum.

2) Never, under any circumstances, attempt to file, drill, grind, polish, cut, break, etch or otherwise modify a piece of beryllium oxide. Use it as it is, or don't use it at all. Anyone who attempts to machine a piece of beryllium oxide without extensive safety equipment is literally risking his life.

3) Store beryllium oxide insulators in such a way that there can be no chance that they will be mistaken for something else. Store the manufacturer's warning material with them, and clearly label each piece.

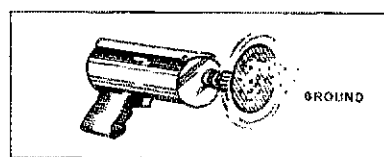
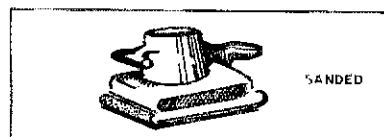
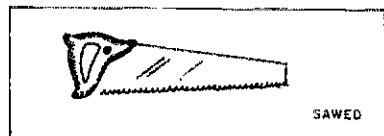
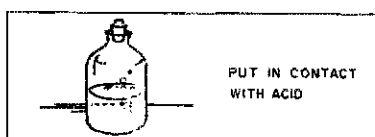
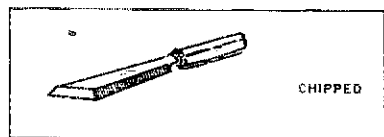
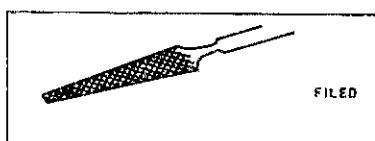
4) When a tube using beryllium oxide becomes defective, or if a piece of equipment using beryllium oxide is scrapped, send the tube or oxide pieces back to the manufacturer with written authorization for disposal. If the tube or equipment is sold, be sure that the buyer knows about the hazards, and what parts of the equipment are or contain beryllium oxide. Keep the manufacturer's warning material and give it to the buyer.

The author wishes to thank several of his co-workers for sharing their thoughts and experiences, especially Garey Barrell and Ted Neubauer of NRAO, and members of the Safety and Health Division of Los Alamos Scientific Labs.

References

- Christiansen (ed.), *The Toxic Substances List*, U.S. Department of Health, Education and Welfare, 1972.
- Hamilton and Johnstone, *Industrial Toxicology*, Oxford University Press, NY, 1945.
- Handbook of Toxicology*, CRC Press, Cleveland, OH, 1973.
- Handbook of Tables for Applied Engineering Science*, CRC Press, Cleveland, OH, 1973, p. 766.
- Occupational Exposure to Beryllium*, National Institute of Occupational Safety and Health, pub. no. TR-03-72, U.S. Department of Health, Education and Welfare, Rockville, MD.
- Sax, *Dangerous Properties of Industrial Materials*, 3rd edition, Reinhold, NY, 1968.
- Tepper, Hardy and Chamberlin, *The Toxicity of Beryllium Compounds*, Elsevier Pub. Co., NY, 1961.
- White and Burke, *The Metal Beryllium*, American Society for Metals, Cleveland, OH, 1955.

UNDER NO CIRCUMSTANCES SHOULD BERYLLIUM OXIDE (BeO) BE



OSCAR 8 Has a Message for You

Decoding telemetry reports, working DX, conducting space experiments or just reading the mail — these hints will help you enjoy the new amateur satellite.

By Bernie Glassmeyer,* W9KDR and Charles J. Harris,** WB2CHO

Congratulations on a job well done! Have been copying telemetry and amateurs on OSCAR 8 since orbit no. 6. Signals are excellent on nearly all passes. (W5FYZ) 599 report on OSCAR 8. Telemetry was very clean. I was very pleased to copy the new OSCAR and will be working through it as soon as I get some 2-meter equipment. (WD5FXP) Good signals on TR-4 and vertical. Accessing OSCAR 8 with fm transmitter, keying cw. (WA9LRI) WA4JID was great on 10 watts and fair on 1 watt! That's a great receiver on this bird. Congratulations to all! Now, if I can get my 432 receiver working, I can work on Mode J. (W1JSM) Downlink very busy on orbit 397. 29.45 sounds like 20 meters! (W7LSV) I was able to monitor the beacon for about 20 minutes, at S7 levels. Working satellites gives me immense pleasure and a feeling of great achievement. Please keep up the good work. (VU2OZ)

Enthusiasm for OSCAR 8 has been building rapidly since the successful launch on March 5. Many first-time users and listeners have been pleasantly surprised to discover you don't have to be an aerospace engineer to enjoy the latest amateur satellite. Two people even reported OSCAR 8 telemetry with a public service scanner. Want to try your hand at space-age amateur radio?!

How to Read Telemetry

OSCAR 8 continuously transmits important data about its temperature and power systems by keying the satellite beacons with 20-wpm cw. Decoding these data helps you determine a great deal of information about where the spacecraft is and what it is doing.

*Satellite Coordinator, ARRL
**32 Walker Ln., Bloomfield, CT 06002

References appear on page 42.

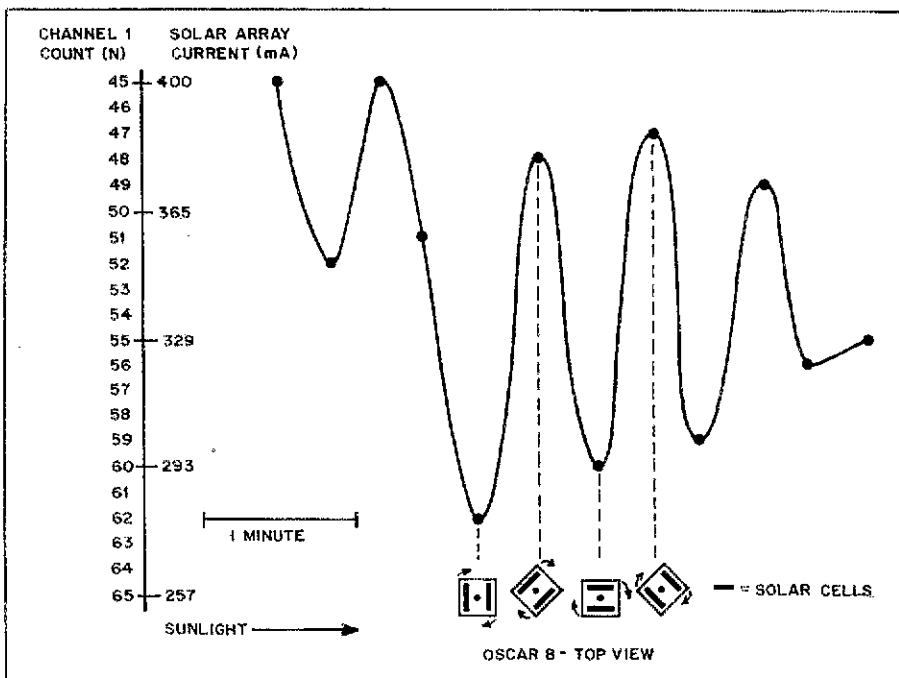
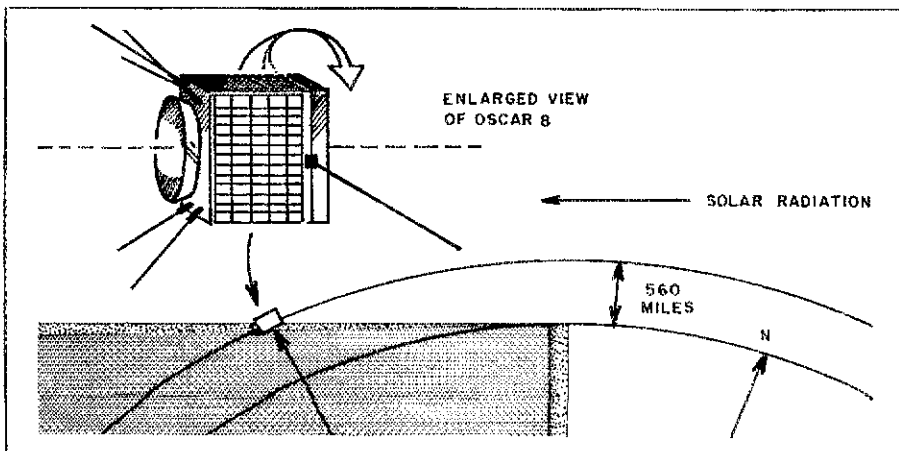


Fig. 1 — The output of the solar cells on OSCAR 8 varies with the angle to the sun, as the satellite revolves. Peak current occurs when the sun illuminates two solar cell-covered sides, simultaneously. On this orbit, number 57, the satellite is revolving once every two minutes.

The solar cell current, charging rate, and battery voltage change as OSCAR 8 spins into sunlight.



Is OSCAR 8 in the sunlight or in the shadow of the earth? How fast is it spinning? The current generated in the solar panels which power the spacecraft answers these questions and others.

On ascending (local morning) passes, the satellite is overhead, and the spacecraft is in full sunlight. There is no "partly cloudy sky" 560 miles (900 km) up! The solar cells generate power, and channel 1 gives relatively high counts, in the 90-40 range. Note from Fig. 1 that the lower the count, the higher the total solar-array current.

But on descending (local evening) passes, the satellite comes into range in the shadow of the earth, and then passes into sunlight as it moves north. While in the earth's shadow, the solar cells do not generate any current, and channel 1 reads 00 (instead of 99), or zero current. The slight voltage offset in this channel may also give counts of 01 or 02, but these are the same as 00, or no current.

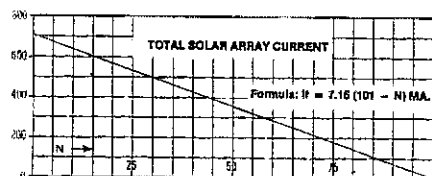
Pinpoint OSCAR's Position

Watch channel 1 carefully as the spacecraft moves overhead toward the north pole. Suddenly it will leave the shadow of the earth, and channel 1 will jump to a high-current count (90-40)!

The tilt of the earth's axis puts this moment of entering full sunlight as low as 40°N latitude (about the latitude of Baltimore, MD) on June 22, the summer solstice. In the winter, the satellite crosses this light/darkness terminator too far north for most listeners. By comparing the time channel 1 telemetry suddenly changes with the OSCARLOCATOR track of the satellite, you can determine the exact position of OSCAR 8 as it crosses the terminator!

Careful observers might spot another interesting aspect of this orbit. Just before the spacecraft enters the sun, channel 1 might give a count in the high 90s, indicating a very low current. John Fox, WØLER, suggests this might be due to "earthshine," light reflected from the surface of the earth. This low current could also be generated by light refracted through the atmosphere below the terminator. What is your interpretation?

Channel 1



Channel 1 also reveals the rate at which OSCAR 8 is spinning. The satellite is

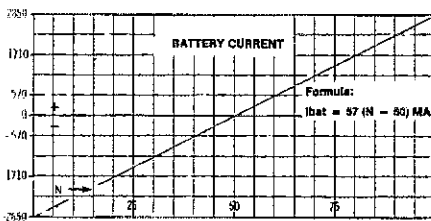
stabilized by rotating around its vertical axis (see Fig. 1). John Fox explains how to calculate the spin rate:

"The spin rate can be accurately determined only when the spacecraft battery voltage is low enough to assure that all the power produced by the solar panels is going into the power system. In other words, when channel 3 is showing counts below 90. This happens now in Mode J, because of the greater current drain in that mode, but the batteries are too new for accurate results in Mode A.

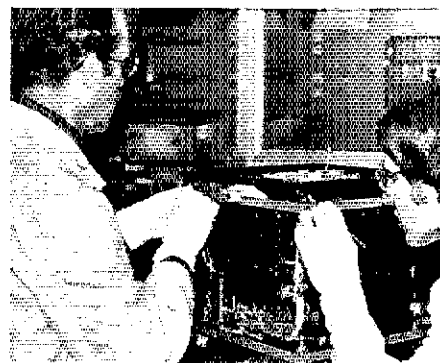
"Simply copy the channel 1 telemetry for as much of the pass as possible. The satellite takes the better part of a complete pass (at least 10 minutes) to make one revolution, so the longer you can copy the telemetry, the more accurate your results. Plot these data against time, as shown in Fig. 2. Remember that each telemetry frame takes 20 seconds.

"There are four maximums, or peaks, per revolution. Maximum current occurs when two panels are illuminated simultaneously, when the sun is shining on the corner between two panels. So determine the length of time for four peaks, and that's the time of a complete revolution. If you can only get enough data for two or three peaks, extrapolate out to four peaks. In April, OSCAR 8 was making one revolution every 10 minutes."

Channel 2

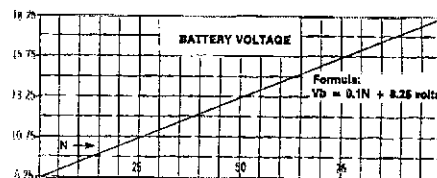


Channel 2 is very similar to the ammeter on your automobile; it indicates whether the spacecraft NiCad batteries are charging or discharging and by how much. When OSCAR 8 is in the earth's shadow, the batteries supply the power for the transponders and other electronics, and channel 2 shows a discharge, counts below 50. After the satellite crosses the terminator into sunlight, the current reverses and the power from the solar cells recharges the batteries, as well as operating the transponders. Channel 2 counts are above 50, when the battery is charging. The heart of OSCAR 8 is its battery, hand-constructed of 12 individually selected NiCad cells. Each of the 12 cells had to have the same voltage to qualify for the package, which was assembled and placed in the exact center of the spacecraft.



Dick Daniels, WA4DGU (left), and Jan King, W3GEY, run OSCAR 8 through final tests and cleaning at Vandenberg just before launch.

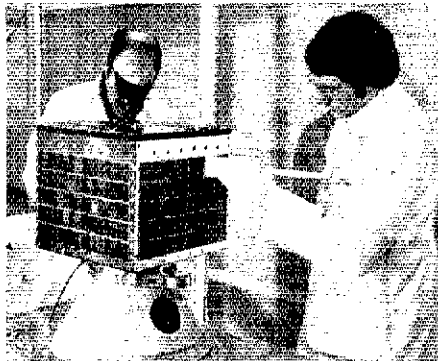
Channel 3



OSCAR command station operators such as Randy Smith, VE3SAT (see April 1978 QST, page 45), pay particular attention to channel 3. Temperature and voltage are the factors which limit the useful life of the NiCad batteries and therefore of the entire spacecraft. NiCads will endure hundreds and even thousands of charge/discharge cycles under proper conditions, but can deteriorate rapidly at high temperatures or very high voltages.

High battery voltage combined with excessive battery temperature (see below) are warning signs to the OSCAR command stations. If conditions warrant, the command station might immediately put the satellite in a mode that draws more current, to lower the battery voltage. This would be Mode B in OSCAR 7 or Mode J in OSCAR 8. This happened, for example, in early 1978 with OSCAR 7.

As the satellite nears the end of its useful life, the command station pays even more attention to the battery voltage, this time watching for low voltage readings. As the NiCads age, individual cells will begin to fail, lowering the overall voltage of the battery. Again, the command station might alter the operating schedule of the satellite to reduce current consumption and increase recharging time. Vigilance pays off; AMSAT command stations added many months to OSCAR 6's life by tailoring the operating schedule to the health of the spacecraft. It



They did much of the work in Daniels' basement. King is AMSAT vice president of engineering.

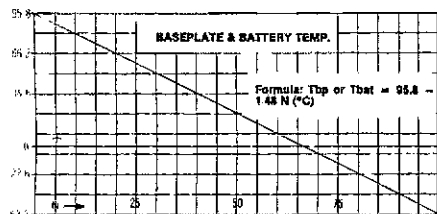


High above the launch pad, enclosed inside the humidity-controlled gantry, man and spacecraft are together for the last time. (W9KDR photos)

wasn't pure luck that AMSAT-OSCAR 6 outlived its projected one-year lifetime by nearly four years!

command stations might take action to reduce the battery temperature.

Channels 4 and 5

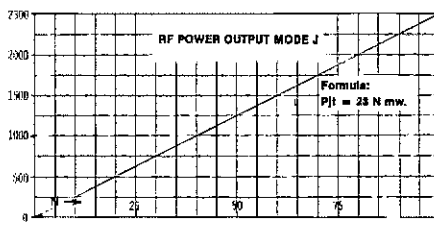


Why do we care about the temperature of a satellite 900 km above our heads? Because all its components are designed to work in a particular temperature range. The extreme cold of outer space and the extreme heat of solar radiation unfiltered by the earth's atmosphere might destroy an important part of the satellite, and repair is obviously difficult.

OSCAR 8 spins to help equalize these competing factors; the satellite rests comfortably at about 20°C, or 68°F — room temperature! Its temperature does not change rapidly, but you might notice a gradual warming after the spacecraft enters full sunlight. This depends on the angle between the sun and the satellite base, and thus on the time of year. Also, the satellite will show a slow change in temperature, again depending on the time of year, as it spends more or less of each orbit in the earth's shadow.

The battery temperature, on the other hand, might change more abruptly. The NiCads heat up when overcharged, and the combination of overcharging and high cell temperature shortens cell life. If there is a significant difference between the counts of channels 4 and 5, the OSCAR

Channel 6



When OSCAR 8 is in Mode A (2 meters up, 10 meters down), on weekdays, the Mode J transponder (2 meters up, 435 MHz down) is off and its power output is zero. Like channel 1, channel 6 will also show a count of 00 or 01, as there is an error of approximately one count in every parameter. When Mode J is on, usually during the weekends, you can determine the effective use of the satellite by watching channel 6. This power output reading is integrated, or averaged over about two minutes, to eliminate the rapid fluctuations caused by use of the transponder.

Mode A Power Output

While there is no telemetry channel giving Mode A input power, you can easily compute this as well. When OSCAR 8 is in darkness, as indicated by a channel 1 count of 00, 01 or 02, check the battery voltage (channel 3) and current (channel 2). Since input power is voltage multiplied by current, the total power consumption of OSCAR 8 is the product of these two parameters. Subtract about 3 watts (the resting power consumption), and the result is the approximate power input to the Mode A power-amplifier stages.

This cannot be done when the satellite is in sunlight, as current flows directly from



Pacific Ocean surf sets the launch scene for OSCAR 8. At 1754 UTC on March 5, 1978, the launch crew at Vandenberg AFB, CA, started the Delta launch vehicle on its journey to deliver into earth orbit the primary mission payload, Landsat C Earth Resources Satellite, and a smaller passenger, OSCAR 8. (NASA/USAF photo)

the solar panels to the transponder, distorting the channel 2 reading. It is interesting to note that the entire 60-pound (27-kg) satellite draws less current than a tiny Christmas tree bulb!

Build This OSCAR 8 Antenna

The critical question with any antenna is, "Does it work?" Everyone who has used the horizontal, full-wave loop for Mode A downlink answers with an enthusiastic "Yes!"

A loop attached to the ceiling of a second-story ham shack in New England pulled OSCAR out of the noise, while an outdoor multiband dipole was worthless. A similar loop suspended eight feet above the ARRL lab roof outperformed an 80-meter inverted V in both signal strength and noise reduction.

Satellite users have argued about the 10-meter antenna for five years. Dipoles

suffer from fading, beams are usually too low angle, and verticals have an overhead null. Today, users are turning to the horizontal, full-wavelength loop as an answer to these objections.

The loop is basically a single quad element tipped over. It features a theoretical gain of about 2 dB, straight up. The loop shares very broadband characteristics with its quad cousin, and can be used for other 10-meter operation.

The *ARRL Antenna Book* gives the formula:

$$L_{\text{feet}} = \frac{1005}{f_{\text{MHz}}}$$

for a full-wavelength loop. This works out to 34.1 feet (10.4 m) for 29.45 MHz. The loop can be mounted in almost any configuration — square, triangular or circular, depending on your method of mounting. It works best at least $1/4 \lambda$ above ground, or about 8 feet (2.4 m). Feed the loop with a $1/4 \lambda$ (5.5 feet, 1.7 m) matching stub of 72-ohm coaxial cable and as much 52-ohm coax as needed.

The horizontal loop helps counter the deep fades due to changing polarization, and its essentially omnidirectional pattern eliminates antenna tracking. The cost is very low, and it works indoors as well as out. What more can you ask for in an OSCAR antenna?

How to Find OSCAR 8

A wide variety of tracking aids now provides any satellite enthusiast with precise data for locating and using OSCAR 8. Do-it-yourselfers can construct their own tracking computers, programs and visual aids using the Thompson article² and the updated orbital parameters in Table 1. For those who would

Table 1
OSCAR 8 Orbital Parameters

Period — 103.2314 minutes
Increment — 25.8086 degrees
Inclination — 98.99 degrees
Altitude — 910.372 km (apogee)
898.259 km (perigee)
Eccentricity — 0.00083

Monitoring OSCAR's Heartbeat

HI 120 255. . . . Every 20 seconds OSCAR 8 transmits its heartbeat to amateur radio operators and others throughout the world. This "heartbeat" is the Morse-coded telemetry data describing such important functions as the satellite's voltage, current flow, temperature and power output. These data help us on the ground keep close tabs on the health of the OSCAR (Orbiting Satellite Carrying Amateur Radio) as it circles the earth hundreds of miles overhead. OSCAR 8, for example, continued to function for years beyond its expected lifetime, because the telemetry from the satellite allowed amateur ground-based command stations to keep the satellite's

rather not duplicate efforts, several tracking programs are available at low cost:

OSCARLOCATOR — This simple tracking device has been modified for OSCAR 8.³ The complete locator, with 1978 reference orbits, is available for \$1 postpaid from ARRL hq.

Computer and Calculator Programs — The Club and Training Department staff has written a Level 1 BASIC program for the Radio Shack TRS-80 computer. The program (two pages) gives both equator crossing (EQX) and antenna pointing (az-el) data. We also have a FORTRAN IV program (three pages) developed by John Monague.

Hq. also offers a selection of satellite programs for programmable calculators. These include a one-page EQX program for the Hewlett-Packard HP-29C and az-el programs (two pages) for the models HP-29C, 25, 65, 67 and 97. Copies are 25 cents per page; please include a business-sized, self-addressed, stamped envelope with your request.

Roy Welch, WØSL, has an az-el program for OSCARs 7 and 8, as well as the planned Phase III satellites.⁴ The program fits HP-67/97 calculators, and is free for a large s.a.s.e. and plenty of postage. Roy, AMSAT area coordinator for Missouri, will program a user-supplied card as well. Contact him at 908 Dutch Mill Drive, Manchester, MO 63011.

Finally, we have an 8-page az-el program, produced by Earl Skelton, N3ES, for the Texas Instruments SR-52.

Reference Orbits — EQX data are included in regular W1AW bulletins, and are printed every month in *QST*. A complete 1978 calendar is available from Skip Reymann, W6PAJ, P. O. Box 374, San Dimas, CA 91773, for \$5 (\$3 to AMSAT members). Proceeds benefit AMSAT.

Eliminating Desense

Some satellite users have complained of desense difficulties with Mode J. In most cases, the user's 435-MHz preamp is the culprit, and proper shielding or a different preamplifier can cure the problem. You can also try separating the up- and downlink feed lines, and checking for third-

temperature and current flow within tolerable limits. You can help this important aspect of amateur satellite operations by copying the telemetry from OSCAR 8 and sending it promptly to ARRL hq. We'll acknowledge your first such report with a handsome OSCAR 8 QSL card.

To receive the telemetry you will need some radio equipment and orbital information. January and February 1978 *QST* contain articles on receiving OSCAR 8. The orbital information is provided daily by W1AW and monthly by *QST*. Listen for the telemetry on the OSCAR 8 beacon frequencies: Mode A, 29.400 MHz; Mode J, 435.095 MHz.

The OSCAR 8 telemetry is in the form of:

harmonic radiation from the uplink transmitter. Remember, Phase III birds are scheduled to use the same frequency combination as Mode J, so pruning and tweaking your 435-MHz station will be good preparation for worldwide satellite activity late in 1979.

Which Is Which?

How can you tell OSCAR 8 from OSCAR 7 on Mode A? OSCAR 8, with its lower and faster orbit, catches up to its predecessor about every three days. Fortunately, the downlink frequencies of the two Mode A transponders are slightly offset.

Table 2
OSCAR Frequency Translation

OSCAR 7		OSCAR 8	
Uplink	Downlink	Uplink	Downlink
145.880 =	29.430	145.880 =	29.422
890 =	440	890 =	432
900 =	450	900 =	442
910 =	460	910 =	452
920 =	470	920 =	462
930 =	480	930 =	472
940 =	490	940 =	482
950 =	500	950 =	492
± Doppler		± Doppler	

Satellite-to-Satellite Links

When OSCAR 7 is in Mode B and OSCAR 8 is overtaking it, signals from the output of A-O 7 Mode B can be picked up and relayed by the newer spacecraft. Thus, your 432-MHz uplink will appear on 145 MHz and on 29.5 MHz. On weekends, when OSCAR 8 is in Mode J, you may be able to relay signals from 432 MHz to 145 on A-O 7, then back to 435 MHz on A-O 8. Please send reports of all such links to ARRL hq. immediately.

References

- ¹For more information about OSCAR 8 see the following articles: Kicinman, "A Brand-New OSCAR, Part 1," *QST*, January, 1978; Harris, "Tracking the Next OSCAR, Part 2," *QST*, February, 1978; Place, "OSCAR in the Classroom," *QST*, May, 1978.
²Thompson, "A General Technique for Satellite Tracking," *QST*, November, 1975.
³Kleinman, ed., *Getting to Know OSCAR — from the Ground Up*, p. 30.

HI 1(N) 2(N) 3(N) 4(N) 5(N) 6(N). HI is the satellite identification and N is a two-digit number. A sample frame is HI 120 255 380 451 551 620. These data are sent in Morse code at about 20 words per minute and repeated every 20 seconds. You can copy and decode the telemetry even if you are unable to copy the Morse code by recording the telemetry at the highest speed of the recorder, and playing it back at a slower speed. You can also decode this information yourself using the graphs and equations on pages 40 and 41. The information you obtain from the satellite telemetry is like a doctor's EKG, so keep in tune to what's happening now in the "heartbeat" of OSCAR 8.

The "Worst" Form of Government

Winston Churchill is reported to have remarked that democracy is the worst form of government, except for all other forms which have been tried. No government (or organization) can be all things to all people; in the long run the democratic form seems to do a better job of setting policies than any other. ARRL is a representative democracy of sorts. Through a Board of Directors, which you elect on a geographical basis, you the members control the League's destiny, you help decide what services it will perform, what priorities it will set and what goals it will pursue.

The 16 directors serve for two-year terms, with half standing for election in the even numbered years, half in the odd. Just as in national, provincial or state politics, the voters/members have the privilege and the responsibility either to decide they like the actions of their incumbent representatives and thus support them actively for reelection, or to decide that other representatives could do a better job, and work for the election of those persons. At the same time that directors are elected, vice directors are also chosen, who can fill in when the director is unable to serve.

The quality of future League decisions will depend on the care with which ARRL members choose their leaders — apathy can be deadly! So onward to the Election Notice . . .

Nominations Are Open

It is time for ARRL Full Members in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions to begin picking a director and a vice director in each division for the two-year term which will begin January 1, 1979. From now until September 11, at noon, nominations will be accepted at League headquarters bearing the signatures of 10 (or preferably more) Full Members of a division naming a Full Member of the division as a candidate for director or vice director. The nominee must be the holder of at least a General class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full Member of the League for a continuous term of at least four years at the time of the election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communication. Neither is a person eligible who is commercially or governmentally engaged in frequency-allocation planning or implementation. Finally, no one can run who is commercially engaged in the publication of radio literature intended in whole or in part for the consumption by radio amateurs. The idea behind these rules is to in-

sure lasting interest in amateur radio and the League, legal capacity to make decisions for ARRL, and freedom from conflicts of interest.

Balloting Later

Wherever there is more than one candidate for either office, ballots will be sent to all Full Members of the League in that division who were in good standing on September 11. The ballots will be mailed not later than October 2 and, to be valid, must be returned to Headquarters by noon, November 20. A group of nominators can name a candidate for director, for vice director, or both, but there are no "slates" as such — each candidate appears on the ballot in alphabetical order. If a person is nominated for both director and vice director, the nomination for director will stand and that for vice director will be void. A person nominated for both offices does have the option, however, of declining the higher nomination and running for vice director if he wishes.

Since all the powers of the director are transferred to the vice director in the event of the director's death, resignation, removal outside the division, or inability to serve, careful selection of candidates for vice director is just as important as for director.

Nominating Form

The following form for nomination is suggested; it may be copied onto any paper, or a blank following this form can be obtained from Headquarters on request:

*Executive Committee,
The American Radio Relay League,
Newington, CT 06111*

We, the undersigned Full Members of the ARRL residing in the . . . Division, hereby nominate . . . of . . . as a candidate for director; and we also nominate . . . of . . . as a candidate for vice director from this division for the 1979-1980 term.

(Signature . . . Call . . . City . . . ZIP . . . Date)

Nominees or, indeed, any member may obtain a copy of the Articles of Association and Bylaws, along with a pamphlet outlining the duties and responsibilities of elected League officials.

"Absentee Ballots"

All ARRL members who are licensed by FCC or DOC but are temporarily residing outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 11 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily residing outside the ARRL division they consider home may now notify the secretary prior to September 11, giving the current QST address and the reason why another

division is considered home (as for instance, holding an amateur call appropriate to the division). So if your home division is the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf, but your QST goes elsewhere, please let the ARRL secretary know, as soon as possible but no later than September 11, so you'll receive a ballot for your home division.

The Incumbents

Presently these persons hold the office of director and vice director in the divisions conducting elections this year: *Central* — Don C. Miller, W9NTP and Edmond A. Metzger, W9PRN; *Hudson* — Stan Zak, K2SJO and George A. Diehl, W2IHA; *New England* — John C. Sullivan, W1HHR and Fred E. Evans, W1JFF; *Northwestern* — Robert B. Thurston, W7PGY and Ronald D. Mayer, K7BT; *Roanoke* — L. Phil Wicker, W4ACY and Gay E. Milius, Jr., W4UG; *Rocky Mountain* — Charles M. Cotterell, W0SIN and Maurice O. Carpenter, K0HRZ; *Southwestern* — Jay A. Holladay, W6EJJ and Peter F. Matthews, WB6UIA (see page 45 for the announcement of the retirement of Director John R. Griggs, W6KW); *West Gulf* — Jack D. Gant, W5GM and Thomas W. Chance, Jr., K5YM.

In summary: Petitions need 10 or more signatures of Full Members and are due at Headquarters by noon, September 11. If there is only one candidate for an office, he'll be declared elected by the Executive Committee; otherwise, ballots will be mailed not later than October 2 to Full Members of record September 10. To be valid, ballots must reach Headquarters before noon, November 20. The new term will begin at noon, January 1, 1979.

For the Board of Directors:
June 1, 1978

R. L. Baldwin, W1RU
Secretary

HAMS WIN DOGFIGHT — REAL WORLD POLITICS NO PLACE FOR POLLYANNAS

Amateurs in Charleston, WV, learned on Thursday, April 27, that the city council would be voting on a very restrictive antenna ordinance the following Monday, May 1. This "surprise" bill had been secretly substituted for one that had been worked out in compromise with a committee of local amateurs, broadcasters and other interested parties. To further complicate matters, the Dayton Hamvention was being held that weekend; most of the amateurs on the committee would be attending the Hamvention.

Tally Simpson, W4BUA/WB8WUQ, who is on the staff of WCHS-TV in Charleston, was one of the hams who stayed behind to fight.

*Public Information Officer, ARRL

Overnight he and a few others put together an effective political force which won a surprising upset victory. The following is W4BUA's eyewitness account of how the hams organized for this last-ditch effort.

"It's Pearl Harbor all over again!" Bob Adams, K8PAE, was saying as I struggled to get the phone to my ear.

"What are you talking about?" I asked, still half asleep.

Torpedoed

"The antenna ordinance. The city council has torpedoed us with a substitute antenna bill which exempts CBers but will cost the amateur \$50 for a construction permit and will require a hearing plus a survey of the neighbors. That goes for each antenna or modification! Do you know what weekend this is?"

Before I could answer, he answered for me, "This is the Dayton Hamvention weekend. I think everybody on the committee is either out of town or will be by morning."

Suddenly I realized that I had not been paying close attention to what the club's special antenna committee had been working on. I had a vague idea that they were trying to exempt the amateur and CB operators from the ordinance and that they had drafted a new bill which was supposed to be acceptable to a majority of the city council. Now, suddenly, we were faced with the fight and the "army" was out of town.

"Who besides yourself will be staying in town this weekend?" I asked Bob.

"Dave Hill, W8PKJ, is the only one I know of at the moment. Why don't you see if you can get in touch with Cal Basham, W8NR, in the morning before he leaves town? He is on the committee."

Early the next morning I called Cal who said that he had just acquired a copy of the new bill and that he would bring a copy to me before he left for Dayton. I didn't know what to look for in it, but I thought that I would feel better if I had at least read it. The bill was short but cluttered with technical things limiting the height of the supporting structure and stating that the structures had to be "comparable to existing structures in the area." I am still not sure what that means.

The one thing that came through loud and clear was the section that proclaimed that no provisions of this act would pertain to or require a special permit for CB. The other thing that caught my attention was that the bill was titled "Broadcasting or Communications Towers." I took this to mean that this ordinance would apply to MARS, CAP and the multitude of other radio services around.

Changed at the Last Minute

To make things more bizarre, this whole thing sprang from a councilman who lived next door to a CBer with a giant monstrosity of a quad (I suspect being fed with more than legal power). Through some process which we have yet to figure out, the ordinance was changed at the last minute so that it totally exempted the CBer and nailed the ham!

I called Pete O'Dell at ARRL and received some encouraging words and advice on possible methods for attacking the problem. Then I called some of the other affected services such as the State Office of Emergency Services. [Editor's Note: In some states, state and national government agencies are exempted from zoning ordinances. Therefore, this tactic may not always be effective.] The director's reac-

tion was one of surprise followed by a commitment to be at the Monday night council meeting. He promised to give us support in our fight.

I then called the city attorney and asked him some hypothetical questions about the ordinance to make certain that I had a clear understanding of exactly what this bill would do to us if it passed in its present form. Unfortunately, I had a better understanding than I thought; the bill was a *disaster* for amateur radio.

Bob Adams and I got together to assess the situation at noon Friday. Bob had done some preliminary calling to other amateurs while I had been calling city councilmen and officials. He had gotten some encouraging suggestions and commitments. Almost everyone he spoke to had promised to attend Monday's meeting.

"Remember the old pyramid sales gimmick that the government outlawed several years ago?" Bob asked.

"Yeah, what about it?" I asked, puzzled.

"Well, legal or illegal, it produced a great volume of participants. You call two people and ask them to call two, and so on until you have an enormous number involved in no time. That is what we should do. Dave Hill has agreed to help."

"A Fine Way to Thank Us"

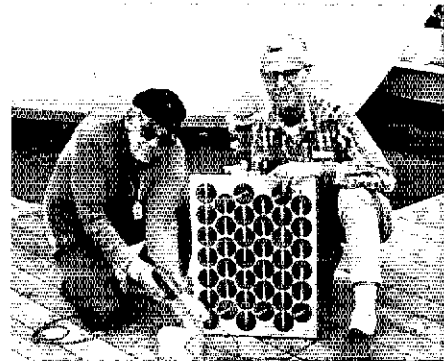
"Great!" I said. "I understand that one of the local 'instructors' is calling all the new Novices from his classes and asking them to attend Monday's meeting. I suspect that after working hard for the first ticket, they will be pretty upset at the prospects of this ordinance. I want to continue calling the city council members on the list I got from the Mayor's office. After that I am going to write the council an open letter detailing what is wrong with the proposed ordinance. Then, I will distribute copies to the local TV stations and newspapers. My angle will be that this is a fine way for the city to thank the hams for the years of public service work that have been donated. The media gave us a lot of coverage last year on the Williamson (WV) flood. I think they will pick up on this."

Bob and I made it a point to touch base twice a day both Saturday and Sunday. Lovell Webb, N8LW, had some ideas about which city officials to contact. He also went down a list of state officials who might be willing to speak on our behalf at the council meeting.

Monday evening came; the calling, arm twisting and any other tactic we could think up had been done. I had managed a three-page letter to the city council and had gotten a positive commitment from two of the three local TV stations. Bob had over 70 amateurs firmly committed to come to the council meeting to dazzle them with our "strength in numbers." He had also managed to ferret out the councilman who was the ringleader behind this whole mess. He persuaded this antagonistic councilman to visit him and see amateur radio in action. Bob felt that he had made some inroads.

The members of the antenna committee were back in town from Dayton; Bob briefed them on our panic-filled weekend. They had done what they could from Dayton. This dedicated group had spent all day Monday trying to work out some sort of compromise bill.

The turnout Monday night at the city council meeting was gratifying, to say the least. I had learned from our news crew that a group protesting public housing planned to be at the



Amon Dolde, W6HOE, solders a solar panel to a battery which ran a 2-meter transceiver during "Sun Day" demonstrations in Los Angeles. Assisting is Smith Russell, Jr., WB8IPY. (W6VQG photo)

meeting. We spread the word on the local repeaters that the hams should be there 45 minutes early. Fortunately, most of the hams arrived before the housing protestors. Only a few seats in the back were left for this angry, noisy group; they spilled over into the hallways.

Bob, Cal, Lovell and I, along with the other committee members, took front row seats before the meeting started. We had decided that Bob would be our spokesman. Our councilman had agreed to introduce him just prior to the vote and give him the floor for a one-shot statement which would be limited to five minutes.

Bob was armed with a *License Manual*, a *Handbook* and a multitude of other props to hold up to the council to help convince them that hams had to work pretty hard to earn their licenses. We agreed that Bob would keep it a soft sell, extol the virtues of the amateur, convince them of all the public service we had done and then leave them with this question, "With all the service that has been done for this community, gentlemen, wouldn't it be a pity if it had to stop simply because this ordinance would make it impossible for many amateurs to afford to put up antennas?" It was beautiful and the media would eat it up.

Finally, our bill came to the floor; each time a councilman said something a TV news camera zoomed in on him. On cue, the councilman who was sympathetic introduced the compromise features recommended by the committee. Everything was set for the vote. Bob was on the floor giving his heart-rending speech while the TV cameras cut back and forth from Bob to the councilmen's reactions. Bob finished and sat down to await the roll call vote. The Mayor broke the silence with an unorthodox action, "Mr. Adams, that was a moving speech. Is this ordinance on which we are about to vote one that will be satisfactory to your group?"

Bob answered that it was and the voting began. Would we get a majority? I stopped checking them off when it was obvious that we had our needed majority. But the "ayes" kept coming until we had a unanimous vote (except for one absentee).

We couldn't believe it. We sat there stunned, looking at each other. Could this be the same council, which less than 24 hours earlier was so hostile toward amateurs and their antennas? While we were in the hallway, pounding backs and shaking hands, the TV crews crowded

around Bob to get interviews playing up the human-interest angle (i.e., sometimes the little guy can beat city hall).

What if we had given up when it became obvious that city hall was out to do us in? — *W4BUA*

U.S. SUPREME COURT LETS SCHROEDER DECISION STAND

The United States Supreme Court has *declined* to hear argument from a California radio amateur that the city of Cerritos violated his rights under the U.S. Constitution. John Schroeder, W6UFJ, asked the High Court to review a decision in which he lost some arguments about the constitutionality of a zoning ordinance. For more background about the facts of the Schroeder case, see "Happenings" in April 1978 *QST*, page 56.

By declining to hear the appeal, the U.S. Supreme Court let stand a California Appellate decision affirmed by the California Supreme Court. The California decision has its good and bad points.

On the positive side, the decision recognized that a local government may not regulate antenna height on the basis of radiocommunication interference. According to the California Appellate Court, "Unquestionably, federal legislation has preempted local regulation of radio transmission, including assignment of frequencies, interference phenomena, and the content of broadcast material."

However, the California Appellate Court did not agree with John that the ordinance violated his freedom of speech. It also turned down the argument that the ordinance was an invalid exercise of the state's police power. On this point the California court stated, "Economic and aesthetic grounds are permissible considerations for exercise of the police power." The California Supreme Court, and now the U.S. Supreme Court, appear to agree, since both courts declined to review the case.

How will this case affect future litigation involving radio amateurs? The Schroeder case can be cited as legal precedent for throwing out RFI/TVI cases brought to court under state and local laws. Only the federal government may regulate these matters. However, it did not change the well-established legal principle that a local government may regulate antennas for

reasons of safety. The decision also held that a local government may give economic and aesthetic reasons for regulation.

Did John Schroeder lose his long and costly battle with the city of Cerritos? No. It is not over yet. Many courts have recognized that economics and aesthetics are closely interwoven. John can still win if he can show that the antenna is safe and will not have a diminutive effect on adjacent property values. Though the ordinance may be valid on its face for safety and economic reasons, John hopes to show that the city applied the law unfairly to his situation. Now that the appellate courts have established the ordinance's constitutionality, the matter is expected to be resubmitted for trial in the near future. — *WA3NLO*

NATIONAL WEATHER ASSOCIATION CALLS FOR NOMINATIONS

Amateur radio operators and organizations may qualify for awards that will be presented by the National Weather Association (NWA) this fall. NWA is seeking nominations for the organization making the greatest contribution to meteorological operations. This award is not open to any group which is directly a part of the professional meteorological community.

Nominations are also being accepted for the individual making the greatest contribution to the meteorological operations. Again, this award is not available to a member of the professional meteorological community.

Inquiries or narrative nominations, with comments or endorsements by a recognized appropriate authority should be sent to Mr. Charles Pierce, 42 Brunswick Road, Arlington, MA 02174 by September 30, 1978.

GRIGGS RETIRES

On June 1, 1978, John R. Griggs, W6KW, retired as Southwestern Division director. Extended health problems regrettably forced his early retirement from League duties. Vice Director Jay A. Holladay, WE6JJ, assumed the duties of division director for the remainder of Griggs's term.

Continuously licensed since 1922, John

began his association with ARRL as "city manager" (the forerunner of SCM) of San Diego. He had the distinction of serving as director, vice director, and assistant director at one time or another from 1949 to 1978. Griggs was also a member of the ARRL Executive Committee between 1972 and 1976. Additionally, he acted as board liaison to the VHF Repeater Advisory Committee from 1968 until 1972. In recent years, John was active, both as chairman and member, on the Membership Affairs Committee.

John did not always confine his interests to ARRL boards and committees. He is a past president of the San Diego ARC, past chairman of the San Diego Council of Radio Clubs, a life member of the OOTC and a Charter Life Member of ARRL. He received W6KW in 1930, and has also held call signs 6CDV, 6CGC, 6EZE and 6EYZ.

John is a retired electronics engineer. He and his wife Roxanna, K6ELO, live in Los Osos, CA. — *WAITZK*

HIGGINBOTHAM STEPS DOWN

Charles A. Higginbotham, WB3DLT, chief of the Safety and Special Radio Services announced his retirement from the Federal Communications Commission on April 7. He will be succeeded by Carlos V. Roberts, chief of the Office of Plans and Policy. Higginbotham retires after 36 years of federal service, 30 of them with the FCC.

In a letter to Higginbotham, Chairman Charles D. Ferris wrote: "Your leadership as Bureau Chief has contributed significantly to the modernization of Commission regulatory programs, enabling us to meet the technological challenges associated with this growth. You spearheaded deregulation in the Safety and Special Radio Services, most notably revision of the CB rules in plain English, simplification of the amateur regulations, and consolidation of the land mobile rules into a single part."

Higginbotham, a native of Martinsville, WV, served in the U.S. Navy and as a radio technician for United Air Lines. He also attended American University in Washington, DC, before joining the Commission as an electronics engineer in 1948. Higginbotham was named to the post of chief of Industrial and Public Safety Rules Division in 1971 after serving in numerous capacities within the Safety and Special Radio Services Bureau. He was named chief of that bureau in 1974. — *WAITZK*

MATTHEWS NEW SOUTHWESTERN DIVISION VICE DIRECTOR

Peter F. Matthews, WB6UIA, has been appointed vice director for the Southwestern Division, replacing Jay A. Holladay, W6EJJ, effective June 1, 1978.

Matthews is a past president of the United Radio Amateur Club of San Pedro and past chairman of the Los Angeles Area Council of Amateur Radio Clubs. Originally from New York, Pete was first licensed in 1966. He now holds the Advanced class license. His ham activities include chasing DX and homebrew construction. He and his wife, Susie, have three children. They reside in San Pedro, CA. — *WAITZK*

Table B
Initial assignment of call-sign prefixes will conform to Table B outside the contiguous 48 states:

Prefix				Location
AH1, KH1, NH1, WH1				Baker, Canton, Enderbury, Howland Is.
AH2, KH2, NH2, WH2				Guam
AH3, KH3, NH3, WH3				Johnston Is.
AH4, KH4, NH4, WH4				Midway Is.
AH5K, KH5K, NH5K, WH5K				Kingman Reef
AH5, KH5, NH5, WH5				(except K suffix) Palmyra, Jarvis Is.
AH6, KH6, NH6, WH6				Hawaii
AH7, KH7, NH7, WH7				Kure Is.
AH8, KH8, NH8, WH8				American Samoa
AH9, KH9, NH9, WH9				Wake, Wilkes, Peale Is.
AL7, KL7, NL7, WL7				Alaska
KP1, NP1, WP1				Navassa Is.
KP2, NP2, WP2				Virgin Is.
KP3, NP3, WP3				Rancador Key, Quita Sueno Bank, Serrana Bank, Serranilla Bank
KP4, NP4, WP4				Puerto Rico

In May *QST*, pages 49 and 50, we ran an article about FCC's new call-sign assignment system. Call prefixes for areas outside the contiguous states were omitted from the article for lack of space. Here they are.

Moved and Seconded...

MINUTES OF EXECUTIVE COMMITTEE MEETING
No. 369
May 20, 1978

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 9:01 A.M. on May 20, 1978, at the Marriott Hotel, Rochester, NY. Present: President Harry J. Dannals, W2HD, in the Chair; First Vice President Victor C. Clark, W4KFC; Directors: Max Arnold, W4WHN, Richard A. Egbert, W8ETU, and Robert B. Thurston, W7PGY; and General Manager Richard L. Baldwin, W1RU. Also present were General Counsel Robert M. Booth, Jr., W3PS; Second Vice President Noel B. Eaton, VE3CJ; Directors Harry A. McConaghy, W3SW, and Stan Zak, K2SJO; and Vice Director George Diehl, W2IHA.

On motion of Mr. Egbert, the Committee recognized the names of 182 newly-elected Life Members, and directed the General Manager to list their names separately in QST.

On motion of Mr. Arnold, voted unanimously to approve affiliation of the following amateur radio societies: Apple Valley Amateur Radio Club, Johnston, RI; Azalea Coast Amateur Radio Club, Wilmington, NC; Bell Amateur Radio Club, Atlanta, GA; Big Bear Amateur Radio Club, Big Bear Lake, CA; Big Island Amateur Radio Club, Hilo, HI; Brandon Amateur Radio Society, Brandon, FL; Buckhorn Repeater Association, Ft. Collins, CO; Chesterfield County Amateur Radio Society, Cheraw, SC; Clover Leaf Farms Amateur Radio Club, Brooksville, FL; Fraser Valley DX Club, Langley, BC; Genesee Repeater Association, North Chili, NY; Gunnison Valley Amateur Radio Club, Gunnison, CO; Indiana University Amateur Radio Club (K9IU), Bloomington, IN; Island County Amateur Radio Club, Oak Harbor, WA; Jacksonville Amateur Radio Club, Jacksonville, AR; Kansas City DX Club, Kansas City, MO; Litton Amateur Radio Society, Woodland Hills, CA; Massena Amateur Radio Club, Massena, NY; McDowell Amateur Radio Club, Welch, WV; Mid-Michigan Amateur Radio Club, Farwell, MI; Moab Amateur Radio Club, Moab, UT; Montebello School Amateur Radio Club, Suffern, NY; Nashua Area Radio Club, Nashua, NH; Nassau County Amateur Radio Club, East Meadow, NY; New Bern Amateur Radio Club, New Bern, NC; Olympia Amateur Radio Society, Tumwater, WA; Polytechnic Radio Club, Brooklyn, NY; Quad County Amateur Radio Club, Dubois, PA; Rancho Palos Verdes Amateur Radio Association, Rancho Palos Verdes, CA; Saint Andrews Bay Amateur Radio Society, Panama City, FL; Saint Jude Hospital & Rehabilitation Center ARA, Fullerton, CA; Saline County Radio Club, Harisburg, IL; Selkirk Amateur Radio Club, Selkirk, Manitoba; Society for the Advancement of Amateur Communications, Tiffin, OH; Stillwater High School Amateur Radio Club, Stillwater, NY; Supelco Park Amateur Radio Club, Bellefonte, PA; Sussex County Amateur Radio Club, Newton, NJ; Tri-County Amateur Radio Club, Hollister, FL; University of Saskatchewan Amateur Radio Club, Saskatoon, SK; University of Tennessee Amateur Radio Club, Knoxville, TN; Waldo County Amateur Radio Association, Northport, ME; Webster Junior High School Amateur Radio Club, Los Angeles, CA.

On motion of Mr. Thurston, voted unanimously to grant approval of the following ARRL convention: Oklahoma State, July 28-30, 1978, Oklahoma City, OK.

The General Manager, in response to a directive adopted at the January Board meeting, reviewed in detail the current status of action being taken in response to motions adopted by the Board at its January meeting.

On motion of Mr. Thurston, the staff was directed to prepare a further response to the proceedings in Docket 21135 in line with recommendations made by the General Manager to the Executive Committee.

On motion of Mr. Clark, the General Manager was directed to prepare a vigorous and forceful response to the Eighth Notice of Inquiry in Docket 20271 (WARC-79 preparation).

After discussion, on motion of Mr. Thurston, voted unanimously that the matter of Washington representation (Minute 40 of the January Board meeting) be referred back to the July Board meeting for reconsideration.

On motion of Mr. Clark, voted unanimously to support the election to the International Amateur Radio Union of amateur societies in Grenada, Haiti, the

Senegal, British Virgin Islands, and Antigua.

On motion of Mr. Egbert, voted unanimously that the General Manager is directed to file comment with the Canadian government concerning their proposal to establish so-called packet communications in the 220-MHz band.

The Committee examined in detail actions taken and pending in recent FCC dockets, with all directors present being afforded the opportunity of expressing the views of their constituents.

The President reported on a recent presentation made by him and members of the staff to Dr. Froesch, NASA Administrator.

The General Counsel reported extensively on various amateur legal problems, the requests for financial assistance from individual amateurs, and the status of the Personal Communications Foundation. It was agreed informally that the Legal & Regulatory Committee should investigate whether more definitive guidelines could be established, and the chairman of that Committee accepted the assignment.

During the course of the meeting, the Committee discussed, without formal action, liaison with the Chief, Safety and Special Services Bureau of the Commission, satellites built by amateurs in the Soviet Union awaiting launch availability, the ARRL Code of Ethics, the status of QST on tape for the blind, the Mary Lewis suit, the various petitions for stay in Dockets 21116 and 21117, the rumored invitation to the June 5th meeting of the Advisory Committee for Amateur Radio of non-U.S. citizens, a proposed congressional hearing on the Goldwater RFI bill on June 14th, a rewrite of the Communications Act, and trade press reports of a spectrum use fee.

The next meeting of the Executive Committee will be held in Hartford on July 19, 1978.

There being no further business, the meeting was adjourned at 11:55 A.M.

Respectfully submitted,
Richard L. Baldwin, W1RU,
Secretary

LIFE MEMBER APPLICANTS May 20, 1978

Richard A. Abbott, WA3WTC; William J. Adams, WB3HBH; Martin Creel Admire, WB0LRH; Daniel P. Altenberger, WB9QYS; Herbert L. Atkinson, WB4UWD; Patrick J. Atkinson, Jr., W5CRN; Paul Allan Bahr, K8DU; Patricia June Baker, VE2XS; Lawrence A. Bates, K0LB; Norman A. Beaton, VE5NF; John D. Belenski, W7NEJ; Johnny F. Bell, WB5PNR; William L. Bingham, WB9YAT; William E. Bowser, WB3JCQ; M. H. Bragas, WD8AHS; Ralph Brannan, KL7IXZ; James R. Branstetter, WA8WMB; James G. Brown, WA9PKL; Lloyd L. Burks, WB0NGD; John Cantrell, WB6QEV; Richard A. Carbine, WB6UDS; John H. Carswell, VE1AFC; Nelson E. Catron, WB4G0I; Derek Peter Chai, VE3FWO; Leo G. Cipriani, WB3CMB; Thomas A. Clemente, Jr., WA2POD; Mark H. Cohen, K6ZGI; John L. Conley, K7DMM; L. H. Connelly, WD4HAL; Lon W. Cottingham, K5LQZ/KH6JDF; Joseph C. Craig, VO1FB; Steve G. Crofoot, WD0FDD; Ken Deaton, WB8NFL; Robert B. Degrafe, Jr., K6KXR; Albert Deines, W7VAZ; Mark Endorf, WA0MHJ; Robert J. Glandsburg, III, WA6HJV; Joseph E. Flynn; Frederick T. Forkner, WB3JTK; Robert E. Forsee, WA4IGS; Francis J. Fournier, Jr., WA4KFP; Frank L. Friedrichs, WB6BUZ; Egon Gadeberg, OZ3SK/OZ7AO; Charles W. Gainey, Jr., K2NW; Paul J. Garvin, WB9TOU; Jim Gasaway, K4XQ; Paul M. Gauvin, WA1FNI; Jay S. Gerber, N3AW; Robert Goldberg, WB6OFO; Paul A. Goldman, WA2LZV; Carl A. Goldner, W4ERA; Wilbert O. Haney, Steve Hay, WB0PVQ; Leland Helgeson, WB0MLL; Reese P. Helmer, Jr., WA5WIX; Arne A. Henden, K9II; Charles W. Hershey, WB9PID; John A. Hesse, WA2ZIW; John S. Hill II, K4QJZ; Richard Hirschfeld, WB8CBP; Terry A. Holcomb, WA6KAH; Curtis Hopper, W0ELW; Robert D. Hoster, WB5VRJ; Thomas A. Howard, N5TH; Charles W. Howrey, WB5QZU; W. G. Hull, WA4COR; William C. Hunter, K8BS; Anthony C. Iaccio, WA2EMD; Ronald H. Ignowski, W0IF; Garth Brian Innocenti, WA8NPY; Everett H. Jackson, Jr., WA8CZS; Allen E. Jehle, N5UR; Richard J. Jewett, WB0VFR; Edward Lee Johnson, K5FSM; Robert E. Johnson, WA7ZWG; Joe J. Kallina, Jr., WB5LTV; William B. Katz, W9PPH; Opal A. Kay, WD5BHE; Sidney L. Kirtley, WB9QJV; Mark Kohlenberg;

Hiram E. Koonce, WD0EQJ; John C. Kroll, K8LJG; Robert LaLande; Martin L. Lafferty, Jr., W4PNY; Edwin F. Laker, W3TM; Thomas F. Laszynski, K8JRM/KH6IJZ; James H. Latimer, WB9OOE; Jane V. Lilly, WA4ZJL; Richard G. Linck, WB5JFP; William P. Lutts, WB5LSR; Dean Maddern, WB4GUH; Thomas J. Maher, WD8IHH; Stephen Maier, Jr., WA2EHD; Bruce Makas, W4PAK; Larry A. Mallek, K6YUI; Stephen R. Mann, WB9PRU; James A. Maricle, W7DQM; Leonard G. Marks; Diehl H. Martin, N5AQ; Scott A. Martin, WA7ZPT; William H. May, WA4KOJ; Rolland S. McGinnis, W5PZP; Charles Lee Meiningner, W4VOL; Jay W. Melvin, WA6SBO/WB6ULN; Carl M. Miller; Jay L. Mowrey, K7BNN; Charles A. Munro, VE1AJZ/VE1SAT; James A. Nance, WB5PDP; Bill Neville, WA7KMF; Stephen H. Pierce, Sr., W5BIV; James B. Post, WB3JUK; Loren H. Postma, K7GGN; Omar A. Pupo, WA6FON; Lino P. Queirolo, WB2WUL; Michael D. Rathbun, W0XB; Robert L. Ray, WA6UTZ; Daryl R. Reichelderfer, WB8RVF; William R. Reiter, K3WRO/KL7I; Howard M. Reisin, W3ECN; Robert D. Rhodes, WA7VDH; Larry R. Rich, WB6NRL; Mercer B. Richardson, K0VIF; Edwin M. Robertson, Jr., WA4MXA; Frank B. Robertson, K5OHO; Joseph A. Robichaud, W4ADM; Robert E. Ryals, WB5SCB; Edward C. Saffich, WA7SLB; Ivar Sanders, W6JDA; John A. Saullich, W4LQT; Thomas H. Schiller, N6BT; C. Wayne Schuler, K9JZO; Charles W. Seelig, W8CLN; Norman A. Sheldon, K0JUP; Raymond A. Shoop, N1CW; Johnny R. Sible, WA8RIV; Alfred F. Siebel, W0DYI; Stanley Siegel, W6TJS; Leonard C. Silvern, K6RXU; David M. Strahley, K8AUH; Roy F. Stanchfield, Jr., WD8BXO; Joseph A. Stauhs, Jr., WA2IUV; Thomas C. Stevens, Jr., WB2AZQ; R. E. Stevenson, WB2MZV; Walter L. Stinson, W0CP; David H. Stoddart, K6INY; Keith A. Storm, WB8LUI; David E. Tabbutt, WA3UZD; Michael Terry, WB7CZJ; Bruce G. Thompson, WA7DNA; Raymond L. Thompson, K3IGA; Richard F. Thompson, W3ODJ; Ronald A. Titus, WA6LDU; Howard O. Townsend, WA5MLT; Robert Thomas Treptow, WB9SMP; Gerald C. Trussell, K9RDY; C. Mark Tyler, K5GQ; Robert J. Van Den Berg, KL7IJI; David G. Verinde, WB8AXP; Edward J. Vine, WA8WEN; Donald F. Von Hagel, W3HYW; Frank H. Wakefield, K4GAX; Willi E. B. Wald; Charles W. Walters, W4HMO; Duane L. Walters, WA4CFI; John Webber, WA7ZMC; Donnie R. Weems, K5BJN; C. P. West, W7EA; Donald A. West, WD4AHX; William E. Whitaker, WB0BLJ; Lance A. Wilken, KN0USQ; Ronald K. Willoughby, WA4DCP; Verle D. Winningham, K8YW; Gerald A. Wolford, WB4AJS; Roy H. Woodin, KL7IHH; Richard Worntstaff, WB9SIT; William E. Yates, K4BPE; Arthur Zavarella, W1KK; Leonard M. Ziemba, WB2AFL; John L. Zimmerman, WA9AWW; Steven J. Zimmerman, WB9YWN; Alexander H. Zogheib III, WB5YGV; Roy C. Zukerman, WA6FAP.



"You don't *rahily* mean to tell me that that thing actually works!" Shown at the Radio Society of Great Britain's convention in Alexandra Palace are (l-r) RSGB General Manager D. A. Evans, G3OUF; IARU President N. B. Eaton, VE3CJ, and RSGB President Dr. Dain Evans, G3RPE. (Photo courtesy RSGB)

CRRL Responds to Experimenter License Proposals

When the League was informed of the DOC Experimenter license proposals, it immediately took action to ensure that its official position would not only be democratically represented, but technically well qualified, consistent with state-of-the-art techniques. Vice President Eaton, Director Hesler and Counsel Benson thereupon arranged a meeting with Dr. deMendoza, director general of DOC's Regulatory Service, in order to discuss and familiarize themselves with the government proposals.

Following this meeting, an ad-hoc committee was formed, under the chairmanship of Vice Director Loucks, in order to fully investigate the intent and ramifications of the proposal and to formulate the official League response. In the formation of this committee, special pains were taken to ensure that the members would not only be individually well qualified, but also representative of the major special interest groups of our community. Committee members are, in addition to Chairman Loucks: Ed Beary, VE3KHA (digital techniques);

Randy Smith, VE3SAT (amateur satellite); Les Weir, VE3AIB (Canadian member of the ARRL VHF/UHF Advisory Committee); Al Thurber, VE1AKT (Canadian member of the ARRL VHF Repeater Advisory Committee); George Davis, VE3BBW (amateur television) and, befitting the League's bi-national aspect, Dave Sumner, K1ZZ (ARRL assistant general manager).

At the same time, an opportunity presented itself, courtesy of Jack Reed, VE3GMT, of VE Amateur Radio Sales, to briefly highlight the proposals to every Canadian radio amateur, in a mailing his company was about to make. In this presentation, every Canadian amateur was requested to make his or her feelings known to the Department and, additionally, all were requested to complete a brief questionnaire for the guidance of CRRL insofar as the basic individual feelings of the Canadian amateur were concerned.

Amateurs were also polled on their current opinion concerning the CRRL proposed

Novice license, inasmuch as it has been alleged by DOC and some other amateur organizations that the affirmative CRRL membership poll of 1976 was outdated and not truly meaningful at this point in time. This current poll therefore will not only be fully up-to-date, insofar as our membership is concerned, but in addition should represent the opinion consensus of all Canadian amateurs. Future League efforts, in support of the possible future creation of a Canadian Novice license will therefore be guided by the results of this referendum.

As this report is being written, the League's official position in regard to the proposed Experimenter license remains, pending the completion of the special committee report; however, a resume of this report and the League submission will be detailed next month.

The League has requested an additional 30-day extension to the consultation period which was to end on June 1st. Indications are that this extension, to July 1st, will be granted by the Department.

CW/PHONE SUBBAND UPDATE

In April 1978 "Canadian NewsFronts," we advised that a recommendation had been made to DOC "to consider the elimination of Canadian cw/phone subband frequency allocations." We have been in receipt of a communication from CARF alleging that this was "an erroneous statement." As we certainly have no wish, at any time, to publish erroneous and/or misleading information, further clarification, at this time, is indicated.

To quote from the CARF communication: "CARF in its 'Codified and Amended Regulations' recommends that subband allocations be removed (italics ours) from the 'Radio Regulations Act' and be made a 'Ministerial Guideline.'"

Our initial published information therefore cannot be considered "erroneous," inasmuch as the recommendation has been made to remove the subbands from the Radio Regulations Act. If remiss at all, it has only been in the interest of brevity vis-a-vis available page space.

The League cannot agree to this CARF proposal and therefore has made a formal presentation to DOC in support of retaining the subbands in the Radio Regulation Act. If these subbands were to be removed and made only "Ministerial Guidelines," it is considered that future subband changes could conceivably be made without any reference for comment to the amateur community. Or, changes could be affected based solely upon representation by one or more amateur organizations, without reference to others.

CANADIAN AMATEUR LICENSING STATISTICS

Effective April 30th, the Canadian amateur community had increased to a total of 18015,

*Director, Canadian Division

as compared to 16357 in 1977 and 15346 in 1976. Altogether an increase of 23.57 percent since 1975. DOC Region totals are Pacific 2847, Central 2940, Ontario 6958, Quebec 3179 and Atlantic 2091.

LARC HOSTS 10TH ANNUAL RSO CONVENTION

As indicated on this page last month, the London Amateur Radio Club is this year hosting Canada's largest amateur radio convention, October 13th to 15th. A Friday night Oktoberfest promises to be a gala affair and — best of all — admission will be free to all registrants. Saturday's program includes a veritable smorgasbord of topics: Contesting, antennas, DXing and modes of fm, RTTY, ATV, ssb and cw, will all have special prominence. Additionally, there will be forums on computers, AMSAT, RSO, CARF, CRRL and DOC. Plan now to attend this RSO event . . .

Senior Assistant Director, Gord Steane, VE3BMG, presented the Scarborough ARC Amateur of the Year Award to Audrey Cuthbert, VE3ILT and the Technical Achievement Award to Tony Fegan, VE3BUL.



"The Convention Will Be Great . . . in 1978." Additional information can be obtained from either the Radio Society of Ontario or the London Amateur Radio Club.

AMENDMENTS TO GRS RADIO ACT REQUIREMENTS

DOC has proposed the following amendments to the Radio Act insofar as the GRS is concerned: a) To prohibit the "possession" of linear amplifiers by GRS licensees, b) authorize the inspection of radio stations and require that licensees or persons in charge of radio stations permit such inspections, and c) revoke some paragraphs and substitute others to clarify those provisions that cause a problem of interpretation and enforcement.

POTPOURRI

□ DOC has released two revised Telecommunications Regulation Circulars: TRC-20, Information for the Guidance of Examiners conducting Examinations and Issuing Restricted Radiotelephone Operators' Certificates and TRC-25, Information and Extracts from the Radio Regulations for the Amateur Experimental Service.

□ We welcome the University of Saskatchewan Amateur Radio Club as a new affiliate.

□ Newly appointed CRRL officials are Harry MacLean, VE3GRO and Gil Frederick, VE4AG, as public relations assistants.

□ DOC has changed the prefix of all amateurs in the Yukon to VY1. Amateurs in the Northwest Territories will retain their VE8 calls.

□ Congratulations to Toronto FM Communications Society, operators of VE3RPT, for establishing the "open line" net every evening to receive traffic for the National Traffic System.

A Journey Through Part 97

Last month we took you through approximately half of the Commission's rules and regulations governing amateur radio. Before running out of space, we covered Subparts A through D of Part 97 of the FCC's rules. This month we pick up where we left off.

Q. What does Subpart E cover?

A. Subpart E has the forbidding title of "Prohibited Practices and Administrative Sanctions." To paraphrase, this section tells you what you cannot do, and what the FCC can do to you if you are caught doing what you cannot do.

Q. What sort of things can I not do as a radio amateur?

A. First and foremost, a radio amateur cannot accept any form of compensation for the operation of his station. The specific rule that applies is 97.112(a):

An amateur station shall not be used to transmit or receive messages for hire; nor for communication for material compensation, direct or indirect, paid or promised.

This is what separates the Amateur Radio Service from commercial services: An amateur engages in amateur radio communications simply for the love of the radio art without any material compensation at all. Often, an interest in amateur radio in one's youth will lead to a profitable career in electronics or some related field. But this would not be considered receiving material compensation for the use of one's amateur radio station.

Q. Do you mean that the operators of the ARRL's official station, WIAW, do not receive any compensation, that they are volunteers?

A. That's a very interesting question. Yes, the operators of WIAW do get paid for operating the station, and this would definitely be considered material compensation. However, it's also true that WIAW provides a valuable service to the amateur community through its informational bulletins and code practice schedules. WIAW does not operate under any exception to the rules; rather, the following rule applies: -

97.112(b): Control operators of a club station may be compensated when the club station is operated primarily for the purpose of conducting amateur radio communication to provide telegraphy practice transmissions intended for persons learning or improving proficiency in the international Morse code, or to disseminate information bulletins consisting solely of subject matter having direct interest to the Amateur Radio Service provided:

1) The station conducts telegraphy practice and bulletin transmissions for at least 40 hours per week;

2) The station schedules operations on all allocated medium and high frequency amateur bands using reasonable measures to maximize

coverage;

3) The schedule of normal operating times and frequencies is published at least 30 days in advance of the actual transmissions. Control operators may accept compensation only for such periods of time during which the station is transmitting telegraphy practice or bulletins. A control operator shall not accept any direct or indirect compensation for periods during which the station is transmitting material other than telegraphy practice or bulletins.

This rule applies, of course, to any station providing code practice and informational bulletins to the extent provided for.

Q. What else can I not do as a radio amateur.

A. You cannot broadcast.

Q. Please define broadcasting.

A. Broadcasting is the dissemination of radio communications intended to be received by the public directly or by the intermediary of relay stations. Another way of looking at this is that the Amateur Radio Service is intended for two-way communications between amateurs, not between amateurs and the public.

Q. But recently my local amateur radio club provided communications for the high-school regatta. The local broadcast station was rebroadcasting some of the communications over the air. Wouldn't this be considered broadcasting on the part of the amateurs?

A. Provided that all the amateurs involved consented to the retransmission of their signals by the broadcasting station, the operation was legal. While broadcasting by amateurs is prohibited, section 97.113 of the rules states:

The foregoing provisions shall not be construed to prohibit amateur operators from giving their consent to the rebroadcast by broadcast stations of the transmissions of their amateur stations, provided that the transmissions of the amateur stations shall not contain any direct or indirect reference to the rebroadcast.

Section 97.113 also says that an amateur station shall not be used "for the retransmission by automatic means of programs or signals from any class of station other than amateur." The key words here are "other than amateur." A station in repeater operation, for example, is used to automatically retransmit the signals of other amateur radio stations, but could not be used for automatically retransmitting NOAA weather bulletins.

Q. What else is prohibited by the rules?

A. Certain types of third-party traffic are prohibited. Third-party traffic is any amateur radio communication by or under the supervision of a control operator on behalf of anyone other than the control operator 97.3(v).

Section 97.114 of the Commission's rules prohibits the handling by amateurs of third-party traffic involving any form of material compensation to a third party, a station licensee, a control operator, or any other per-

son. It also prohibits (except in an emergency which involves the immediate safety of life or property) the handling by amateurs of any third-party traffic consisting of business communications. Business communication is defined as any transmission or communication the purpose of which is to facilitate the regular business or commercial affairs of any party.

There is a very specific reason for having a rule such as this. It actually serves to protect the Amateur Radio Service from infringement by outside interests. Consider what would happen if business communications were allowed on the amateur bands. Most business people would likely seize the opportunity to obtain low-cost, relatively efficient communications for their companies. Not only would the QRM increase; but, more importantly, the Amateur Radio Service would no longer be a voluntary noncommercial communication service, thereby losing one of its prime reasons for being.

Q. Are there any other prohibitions?

A. The following are prohibited in the Amateur Radio Service: the transmission of music, transmissions made for any illegal purpose, the use of codes and ciphers, the use of obscenity, indecency or profanity, the transmission of false or deceptive signals, failing to identify transmissions, creating malicious interference, intentionally damaging radio apparatus, and attempting to obtain an amateur radio license fraudulently (97.115, 97.116, 97.117, 97.119, 97.121, 97.123, 97.125, 97.127, 97.129).

Q. What should I do if I receive a notice of violation for some rules infraction from the FCC?

A. Section 97.137 of Subpart E discusses notices of violation. If you receive one, you are required to reply within 10 days. Some amateurs have had their licenses revoked merely for failing to reply to FCC communications. So be sure the FCC has your current mailing address on file.

The FCC will want to know what steps you are taking to eliminate the condition for which the notice of violation was sent. Simply write a clear and concise explanation of why the rule infraction took place. Do not try to cover up or make excuses. Do state what steps are being taken to prevent a recurrence. If the violation was not intentional, and you take measures to eliminate the problem, that often is the end of it.

Q. What if I fail to reply within 10 days? What if I'm on vacation or ill at the time?

A. The Commission is merciful. If, through unavoidable circumstances, you cannot respond within 10 days, respond to the notice as soon as practicable, and be sure to state the reason for the delay in responding.

[Editor's Note: The complete text of the FCC rules is contained in the *Radio Amateur's License Manual*, available for \$3 from your dealer or ARRL hq.]

*Deputy Manager, Membership Services, ARRL

International News

Conducted By Bruce Alan Johnson,* WA6IDN

South America and WARC-79

IARU Vice President Victor C. Clark, W4KFC (who also serves as president of IARU Region 2), and Region 2 Secretary Gustavo Reusens, OA4AV, paid visits to several South American member-societies in late January and early February. Their goal: to encourage societies to press on in their work of gaining governmental support for the Amateur Service's needs at WARC-79. It's no easy task to sell one's government on the need for voting in favor of increased frequency allocations to the Amateur Service next year — when one considers that many other telecommunications services are promoting their positions, too!

The journey began with a meeting in Lima with Radio Club Peruano's board of directors. Peru's society was the first South American society to submit a formal position paper to a

national administration, and a copy was presented to Messrs. Clark and Reusens. La Paz was the next stop, where they met with Radio Club Boliviano officers. Hopping next to Santiago, the travelers found that the Radio Club de Chile had provided television news coverage of the visit, affording OA4AV the opportunity to explain to Chileans the importance of amateur radio and our concerns for the results of WARC-79.

Next on their itinerary was Montevideo, for talks with officers and members of the Radio Club Uruguayo. A short flight soon found them in Asuncion, Paraguay, where the new headquarters of the Radio Club Paraguayo served as the site of useful WARC discussions.

The final stop on their tour was Buenos

Aires, for meetings with the Radio Club Argentino. A trip down the Lujan River with several Argentine amateurs on LU6DBP's motor launch gave the travelers a welcome opportunity to relax at the end of a busy two weeks.

"Each of these visits," reported W4KFC, "provided the opportunity for useful exchanges of views and ideas regarding preparations to be made for the 1979 World Administrative Radio Conference, as well as for discussions of the variety of other current matters of concern to international amateur radio." President Clark and Secretary Reusens were enthusiastic in their expression of appreciation for hospitality accorded them during their trip, and for the support given to the Amateur Radio Service by the officers and members of the six societies visited.

HUNGARY: IARU REGION 1 CONFERENCE HAILED AS OUTSTANDING SUCCESS

This writer attended the IARU Region 1 Division Conference in Miskolc-Tapolca, Hungary in April, serving as observer and representative from IARU headquarters along with IARU President Noel Eaton, VE3CJ. Nearly 150 delegates from 45 countries attended this vitally important conference. Full details will be reported separately in an upcoming issue of *QST*.

ICELAND AND U.S. SIGN RECIPROCAL AGREEMENT

The governments of the U.S. and the Republic of Iceland formally agreed to permit the

amateurs of each country to operate in one another's countries upon application to the appropriate telecommunications authorities. The agreement became effective on 26 April 1978, according to the U.S. Department of State. U.S. amateurs interested in operating in Iceland can obtain full details on the application procedure by sending an s.a.s.c. to International Services Officer, ARRL Hq., Newington, CT 06111.

SOME NEW PREFIXES ALLOCATED

The International Telecommunication Union in Geneva has allocated the prefix block J4A-J4Z to Greece, and J5A-J5Z to Guinea-Bissau, effective immediately. This does *not* mean that amateur call signs in these two countries will necessarily reflect this change; it *does* mean that the national administrations may choose to assign these to amateurs if they wish.



During W4KFC's and OA4AV's WARC-related trip to South America, visits were paid in some of the countries to interested officials of national administrations. Shown left to right: CX1BBR; OA4AV; CX2AAT; General Juan Miguez, Chairman of the Board of Directors, Administracion Nacional de Telecomunicaciones; CX9CO, president of Radio Club Uruguayo.

W4KFC; CP1FP (back to camera); Sub-Secretario Manuel Daza Valda of the Bolivian Ministry of Transportation, Communication and Civil Aviation; OA4AV; CP1CZ, president of Radio Club Paraguayo; Rene G. Ossorio Beltran, Director General de Telecomunicaciones. (CP1CQ is partially shown at left.)



W4KFC; LU5AEN, president of Radio Club Argentino; OA4AV; General Alberto Nieto, Argentine Secretary of State of Communications; LU8BF. (W4KFC photos)



Correspondence

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

AMATEUR RADIO PUBLIC SERVICE — A MANY-SIDED STORY

I was disturbed to read "Two Sides of the Public Service Story" (April QST). I am the unnamed coordinator for St. Catharines referred to in the article. The writers of that article leave the strong impression that Peninsula amateurs played no useful role during the storm. Let me put this whole affair in chronological perspective. In the fall of 1976 I suggested to VE3CZL that we work together to provide better medical emergency communications for the Niagara Peninsula. Together we planned the 1977 SET. He made the arrangements to have the staff of St. Catharines General Hospital install our 2-meter and hf antennas on top of the hospital. I prepared my ARES group. He contacted the local media in a well-intentioned public relations move. Then Murphy struck. The hospital men never installed our antennas and on the day before the SET, January 28, the worst blizzard on record struck the Niagara Peninsula. On January 29 the winds were still blowing fiercely, in excess of 60 mph. All road transportation was at a complete standstill. VE3CZL contacted me requesting amateur assistance to install the antennas. The hospital roof was ice-covered, 12 stories above ground level, with no protective railings. I advised my ARES group not to risk the danger. He proceeded to install the antennas with the aid of his teen-aged sons and after considerable risk, put an hf station on the air. By himself he conducted the SET, linking up with stations on the MARCO net. The ARES group, using 2-meter fm provided the only reliable communications link to Niagara College for more than a day. Regular status reports radioed from the president of Niagara College were phoned to area broadcast stations, including statements squashing several vicious rumors. Telephone overloads in Welland rendered the college switchboard inoperative. Amateur radio provided the only link between stranded students and anxious parents. This traffic was more important to the image of amateur radio than all the SETs in the world. The blizzard has taught us many lessons. — *N. David Flarity, VE3DVE, Ontario, Canada*

The hobby of amateur radio has a public service dimension which has heretofore been undefined. I am talking about the psychological benefits of communications and communicating. Most of us enjoy hearing a response to our reaching out to others of our kind whether that response is 100 or 10,000 miles away. In this teeming sea of humanity our radio allows us to mentally and electronically embrace others and some of our sense of isolation is lost. Amateur radio is a friendly, nonideological, noneconomic communications medium on an international scale which stimulates the imagination of those involved. I use my radio hobby to wash away the cares and concerns of each workday. If used by a large number of people, this dimension of amateur radio is most certainly a public service. Many hobbies provide a release from everyday trials but few, if any, say "Hello, world" or "Thank you, Hiro." Only amateur radio catches this aspect of our imagination and turns it into reality. I propose that a study of the psychological benefits of our hobby be initiated. Here's another angle: amateur radio as a mirror of the degree of personal freedom allowed in a particular society. There is a psychological basis for the current interest in citizens band radio. We amateurs will be missing a new aspect of the public service nature of our hobby if we fail to recognize this fact. Let us be among the first to explain and take charge of this new wave of public interest. — *Philip Barros, K5OGX, Albuquerque, NM*

On Sunday, April 16, over 16,000 dedicated Memphians took to the streets to assist the March of

Dimes. This year as in the past six years, a complete communications network was established providing instant contact with all areas of the walk route. The coordination with medical personnel and police provided greatly reduced response time. The local American Radio Relay Group did an excellent job and performed in a most professional manner. We are extremely proud to have them work with us and want you to know of their proficiency. — *J. H. Foreman, Executive Director, March of Dimes, Memphis, TN*

TRAVEL TIP

A suggestion for the traveling ham. The AAA (Automobile Association) makes available to members strip maps called Trip Tics. These can be easily marked for repeater frequencies. They are much easier to use en route than the normal road map. — *Kenneth Price, XEITIS, Irapuato, Gto., Mexico*

FOX CONTROL INDEED

The Fox Control Committee boo-boos indeed! Wait until you hear about "incentive" licensing! — *B. A. Thunman, W8ISG, Augusta, MI*

I enjoyed Dave Bell's guest editorial! In conversations on the air since the arrival of May QST I am amazed at the number of hams who have missed the point. I have known Dave as a ham for a good many years and was aware of his ability in the movie field. His ability in the field of satirical allegory is outstanding. There was a reference to the "Emperor" in our local paper re his visit to Portland, OR, and his reading a bedtime story to his host's children. Title of the story: "The Emperor's New Clothes." It's got to be a coincidence. — *Roger Brackney, K6ZTK, Long Beach, CA*

FCC FINDS CABLE COMPANY

A point often ignored in the broad criticism that we have all heard leveled against the Federal Communications Commission is the fact that within that organization there are many fine and dedicated men and women. I recently had the privilege of being assisted by two such people. Several weeks ago a local cable television company began offering the "Home Box Office" programs to cable subscribers. At that time I began receiving strong interference on my television receiver which is not connected to the cable system. My efforts to obtain help locally were to no avail. As a last frantic effort I wrote to the San Francisco FCC office. I expected some kind of form letter reply after a considerable wait. Instead I received an immediate personal reply from the Field Operations Engineer-in-charge, Mr. Marti Volkoff. Following a phone conversation with him and his assistant Mr. David Ericson, we concluded that the problem was most likely cable radiation in excess of the legal limit. After pinpointing the offending cable company, these very helpful and responsive FCC officials contacted the company. Within days a cable company technician was in my home checking the problem. The diagnosis was radiation from a broken shield in their cable system. The problem was corrected and I am again enjoying the public television airways. — *C. J. Wade, W6GFM, S. Tahoe, CA*

PCA FOR COLLINS PATCH

I rent a protective connecting arrangement (PCA) from Mountain Bell for my station control 312 B4. Mountain Bell recently wrote me saying that as a result of the FCC's registration program it is possible that a telephone-company-provided PCA will no longer be required. They further stated that if my equipment was registered or grandfathered under the terms of the Registration Program it would no longer be necessary to rent the PCA. I wrote to Rockwell International and asked if my Collins patch was registered. They replied that the FCC had informally commented that the phone patch in the Collins 312-4/B5 meets all criteria of their registration program but Collins hadn't proved this to the telephone company. In his letter, Arnie Verdow of the Collins Government Telecommunications Division of Rockwell International, Cedar Rapids, IA 52406, says that if enough

hams are interested, the formal procedures for registering the patch can be overcome quickly. I suggest that anyone renting the PCA for their Collins patch write and make a request that the 312-4/B5 be registered. Any amateur requesting that the rental charge for this device on a registered patch be discontinued should request that the phone company retire the PCA in place and save the disconnect charge. — *Donald Middleton, W0NIT, Pueblo, CO*

CLOSED REPEATERS

While in a large city on business recently, I attempted (unsuccessfully) to access several 2-meter fm repeaters. Based on incoming signal strength I should have been able to raise at least two repeaters I heard. I have since learned that many of this city's area repeaters are either on guard or operators intentionally exclude nonmembers. Even so, I would have assumed someone hearing an out-of-area call would have responded. Every repeater organization has the right to exclude nonmember stations, but for a city as large as that one not to have at least one or two open repeaters for assistance and emergency traffic makes me question the commitment of that city's amateurs to public service. Perhaps we are spoiled here in Cleveland. — *Randy Gold, WA8NNR, Garfield Heights, OH*

FCC CALL-SIGN CHANGES

In response to the "Happenings" column of QST, April, 1978, I call your attention to paragraph three. You seem to have raised eyebrows about the thought that an amateur call sign will prevail even though the operator no longer maintains a residence or station in the district to which the original call sign was issued. As an amateur operator for 17 years I am very happy with this ruling. It means that I will be able to maintain the call sign that I have learned to be so proud of. In these times when other operators think so little of identifying their transmissions, this operator is pleased and proud to continue to sign K3PGX. — *David Weston, Coconut Grove, FL*

2 FOR 160

For about the past 10 years I have been rather active on 160-meter cw and found the April QST report of the 160-Meter Contest interesting. Interesting too was the statement, "but most of the old regulars couldn't be heard." Small wonder. Who wants to operate when a normally fun band is filled with contest hot dogs? Actually, I'm not against contests, but there are two of them in one season on this band. May I suggest that they be held on successive weekends so that the whole thing is wrapped up in about 10 days? In this fashion the contesters would have their fun and the rest of us who like the band for what it is would be free of twin madnasses. — *Walt Bufe, W7BNZ, Phoenix, AZ*

PASSING THE PLATE

There has been much controversy about the new Pennsylvania law which supposedly excludes amateur call-sign license plates. I feel that the opponents of this law are overreacting. The facts are as follows: There is a \$20 fee for a vanity plate as opposed to a \$3 annual fee for the old amateur plate. The \$20 amount is for the five-year duration of the plate, an average of \$4 annually. Certainly someone who cannot afford \$4 a year cannot afford \$3. The vanity-plate application form clearly states the "Radio Stations licensed by the FCC will be given their call signs on their license plates." The only word missing here is "amateur." The limit to six letters or numerals excludes CB call plates. Under the old law the car registration had to be either in the name of the licensee or in the names of the licensee and spouse. Persons with automobiles registered in any other way (e.g., in wife's name for insurance purposes) were actually excluded from the privilege of having an amateur call-sign plate. The fact that all amateurs may now get plates offsets the disadvantage of the \$1-per-year increase and the exclusion of the word amateur. — *Anthony Parise, WA3HRL, Reading, PA*

YL News and Views

Conducted By Louise Moreau,* W3WRE



YL Clubs — Eastern United States

For the newly licensed YLs in the eastern part of the United States, and for the many who may be vacationing in that part of the country, there is much club activity. In the central section the LARKS welcome the gals in Illinois, while the HAWKS are open to the women in the Hoosier State. Michigan's statewide club, TASYLS, was organized as "The Automobile State YLs." In Ohio there are two very active organizations, the Buckeye Belles for all Ohio women, and the Chix-on-Six are extremely active on 6 meters. The Laurel Lassies operate the only all-YL repeater for those who are working that method in western Pennsylvania. In the Philadelphia area the PJ-YL Club's membership includes women from eastern Pennsylvania and New Jersey. For the gals in New England, WRONE has a long history of YL activity, and in New York the NYC YLRL, the oldest of all our clubs, includes northern New

Jersey, as well as New York City and Long Island women.

WAYLARC is the club for the gals in the vicinity of Washington, DC, for women of Maryland and Virginia, while farther south there are the Georgia Peaches, Florida's Floridoras, and in Alabama the HAYLARCS in Huntsville.

Of course in eastern Canada the YL clubs are the Ontario Trilliums, and the Maritime Sparkettes. Both of these clubs are affiliated with CLARA, the national club.

For the YLs who are unable to attend formal club meetings there are many on-the-air clubs that have been set up to help these gals to participate without the problems of distance. This is true, too, of the many club nets that are on most of the bands where the membership welcomes newcomers and is anxious to give information to prospective members.



IARU Region 2 Secretary Gustavo Reusens, OA4AV, and his wife Ena, OA4ER. Ena is quite active handling emergency communications. (W4KFC photo)

YLRL CERTIFICATE CUSTODIANS

YLRL offers certificates for proof of contact with woman amateur radio operators in five categories. The custodians are YLCC Onie Woodward, WIZEN, 14 Emmett St., Marlborough, MA 01752; WAS-YL Agnes Helinski, WA3GBJ, RD 4, McLain/Timms Lane, Belle Vernon, PA 15012; WAC-YL Miriam Blackburn, W3UUG, Box 2, Ingomar, PA 15127; DX-YLCC Phyllis Shanks, W2GLB, 3 Honey Lane West, Miller Place, NY 11764. The DX-YL award is for YL operators only, custodian Emma Berg, W0JUV, RFD 2, Box 171, Lawrence, KS 66044.

"33" THE YL SIGNATURE

YL News and Views has recently received mail regarding the YL signature "33." There seems to be some misunderstanding that this numeral, that is completely optional for YL use, has been adopted from the police and the later citizen's band "10 code."

"33" has been in use for over 40 years by women amateur radio operators. Originated by Clara Reger, W2RUF, in the early 1930s when there were fewer

women on the air, it was later adopted by YLRL in 1939 as a signature between woman operators and has spread worldwide with the membership. Far from copying the more recent "10 code," "33" is now well on its way to celebrating a half century of YL use.

YL SSTV OPERATORS

For a number of years the SSTV directory listed only three women active in this phase of amateur radio. During the past year the YL picture has increased to include women in six of the 10 call areas in this country. Betty Clay, W1NHL; Judy Clay, W1NHM; Constance Owens, W1NKR; Eva Pataki, WA2BAV; Helena d'Avino, WA2LKC; Mabel Banks, W4LAS; Emily Vaughn, WA4YRG; Shirley Lee, WA6BLJ; Barbara Clasan, K6OPX; Barbara Hargis, W6WDL; Margaret Noblet, WB8CLG; Gloria McDaniel, W9GHO; Roberta Olson, WB9VFW.

Because of the use of first initials or names that are not identifiable we are not able to list accurately the DX women who may be using this mode.



Eleanor and Rick Kimitsuka, KH6YL and KH6OM, have the distinction of being the only married couple in this country, possibly the world, having the YL and OM suffixes in their calls. Eleanor is interested in traffic. She also may be found in the YL "Open House Net." Information courtesy K7DDY (W1YL photo)

THE YL SUFFIX — A NEW LOOK

With the new FCC prefixes there is a new look to that distinctive YL call. Joan King, formerly K6HEY, has been assigned AA6YL as her new call. Joan also holds

First Class Radiotelephone and Second Class Radiotelegraph licenses in addition to her Amateur Extra Class license.

Strays

A SMALL WORLD

□ The Lansing (MI) *State Journal* recently recounted a story of two surprised amateurs. During the area's biggest blizzard of the year, the neighbor of Howard Hawkins, WB8IGU, suffered a gall bladder attack and had to be rushed to the hospital. When the ambulance crew became hopelessly stuck in tremendous drifts, Hawkins and his son went out to push. Coincidentally, an NBC-TV camera crew was on hand and the incident was reported on the "NBC Evening News."

A few days later, Hawkins contacted a ham in Ashby, England, who mentioned that he had seen Michigan's terrible storm on the English TV news. It seems an ambulance crew was trying to rescue a woman who had had a gall bladder attack! — Submitted by WA8AEG

W1BFK reports that Russian hams he contacted told him they had seen the record snowstorm on TV as well!

TWO IN ONE DAY

□ One day, a couple of months back, Tom Finney, WB6EGQ, spent a productive couple of hours on the air completing the contacts for two of the most difficult awards. In the morning, he contacted a Nebraska station on 10 meters, making him eligible for 5BWAS. That afternoon, he contacted a mobile station in Brunswick County, NC, the only one he needed for CQ's USA-CA "All Counties" award.

WALA CERTIFICATE OFFERED

□ Norgessertifikatet-WALA. Worked All LA/LBs, is available to amateurs and SWLs worldwide from the Norwegian Radio Relay League. Applicants outside

Scandinavia (OZ, OH, SM, LA and LB) must produce evidence of contacts with 20 different LA/LB stations on any amateur bands. At least six of those must be located north of the Arctic Circle. A list with standard log information, the QSLs, and a fee of 10 Kroners (Crowns) Norwegian or 10 IRCs should be sent to the NRRL Awards Manager, Hans E. Kinck, LA4YF, N-3800 BO 1 Telemark, Norway.

PONY EXPRESS CERTIFICATE RIDES AGAIN

□ The Missouri Valley Amateur Radio Club has brought back their Pony Express Certificate. U.S. amateurs qualify by working five MVARC members on hf, then sending the QSL cards and 24 cents return postage to Earnest V. Early, WB0LVW, 2995 Blackwell Rd., St. Joseph, MO 64506. The requirements for foreign hams are submission of three confirmations and one IRC.

Coming Conventions

July 1-2
West Virginia State, Jackson's Mill, WV
July 28-30
Oklahoma State, Oklahoma City, OK
August 12-13
Pacific Division, Reno, NV
August 18-19
Saskatchewan Prov., Regina, SK
August 26-27
Alaska State, Anchorage, AK
September 1-3
West Gulf Division, El Paso, TX
September 10
Illinois State, Rockford, IL
September 22-24
ARRL National, San Diego, CA
October 13-15
Midwest Division, Kansas City, MO
October 14-15
New England Division, Boxboro, MA
November 11-12
Hudson Division, McAfee, NJ
November 25-26*
South Florida Section, Clearwater, FL
*Date Change

PACIFIC DIVISION CONVENTION

August 12-13, 1978, Reno, NV

The 1978 ARRL Pacific Division Convention and Sierra hamfest will be sponsored by the Nevada Amateur Radio Association on August 12-13, at the Holiday Inn Reno Downtown, in beautiful, exciting, Reno, NV. There has not been a Pacific Division convention in Reno since 1949 and we've had these 29 years to more than plan a fun-filled weekend for you. Even though our convention will be during the busy touring season the kind folks at the Holiday Inn Reno Downtown have consented to special room rates.

The program will include a Pacific Division Director's meeting and an FCC forum, as well as vhf, Novice, traffic and public service, DX, contest and 160-meter forums. In addition, we will have a manufacturers display rivaled by few. The manufacturers will have the large convention hall all to themselves, all day Saturday and Sunday until 3 P.M. Security guards will be provided. Also available will be a separate indoor flea market. Be sure to bring that old station and turn it into cash. (If you wish, we'll also have an outdoor flea market available. Be sure to let us know beforehand.)

FCC exams will be given. Send a completed FCC form 610 to the FCC Engineer-in-Charge, 323A Custom House, 555 Battery Street, San Francisco, CA 94111, by July 30 for your appointment. The form must be marked on item 19, "for examination at Reno ARRL Convention." FCC will send confirmation and exam times. (You do not have to be registered at the convention to take the FCC exams.) Note: Novice exams also available, both code and

theory. Write to Ralph E. Covington, Sr., W7SK, P. O. Box 11874, Reno, NV 89510, for details.

The ladies program will guarantee that the entire family will enjoy a visit to our fair city. We will have an all-day Saturday bus tour to Carson City and beautiful historic Virginia City. There may also be a Saturday morning tour to one of the more famous "Gold Rush" mansions, but we will have to wait and see. For ladies wishing to stay in Reno, there will be the whole city to enjoy at their leisure. To top it off, we will have both a general hospitality room and a ladies hospitality room, gambling classes, and a *grand banquet Saturday evening*. (A limited number of show tickets will be available — let us know as soon as possible what you want. Information about the shows will be sent on request.)

Late Saturday evening the Royal Order of the Wouff Hong initiation will take place. You will *not* want to miss this!

Advance registration is \$15 per person — *deadline is July 30*. Registration after that is \$17.50 per person. This includes the banquet and everything except ladies tour. (The banquet alone will be worth the cost of the ticket.) Registration without banquet is \$8. The ladies tour will be on a *reserved* basis at an additional cost of \$5 per person. Send your registration to NARA, Box 2534, Reno, NV 89505.

Please make your hotel reservations directly with the Holiday Inn Reno Downtown, 1000 East 6th Street, Reno, NV 89512. Room rates are \$26 per day single, \$35 per day double. There is a July 15 deadline for room reservations. Be sure to specify "Nevada Amateur Radio" to get group rates. If you wish other accommodations, be sure to reserve early — remember, this is the peak of the touring season for Reno. Camper spaces will be available; names and addresses of campgrounds available upon request.

Looking forward to seeing you here! 73, Nevada Amateur Radio Association.

OKLAHOMA STATE CONVENTION

July 28-30, 1978, Oklahoma City, OK

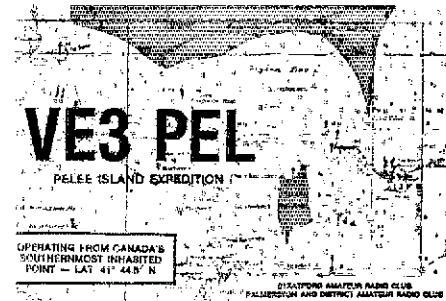
Central Oklahoma Radio Amateurs, Inc., will present the Oklahoma State ARRL Convention/Ham Holiday '78 at the Lincoln Plaza Forum, 4345 North Lincoln Blvd., Oklahoma City, on July 28-30, 1978.

Non-commercial flea market tables will be free in the 10,000-square foot flea market area. Commercial exhibitors should contact Marshall Williams, K5MB; phone 405-787-9545 or 787-9292.

Technical programs are scheduled throughout the convention. Many prizes, including a special preregistration prize.

Preregistration closes July 14, with a fee of \$3. Tickets at the door are \$4. Mail preregistrations to Ham Holiday '78, P. O. Box 14604, Oklahoma City, OK 73113.

Strays



The QSL card showing the location of Pelee Island in the western part of Lake Erie.

PELEE ISLAND DXPEDITION

□ "Why couldn't a ham just set up a station on any old island and have his own DXpedition?" As I contemplated this thought a picture of Pelee Island came to mind. It wasn't exactly a coral atoll set in a turquoise sea, but it was the southernmost inhabited point in Canada. I had sailed there the previous year in my 21-foot Danish folkboat, *Cherie*.

Our "poor man's DXpedition" was a joint operation of the Stratford Amateur Radio Club and the Palmerston and District Amateur Radio Club. In order to make it worthwhile for other stations to contact "the most southerly radio station in Canada" we came up with the call sign VE3PEL and an unusual QSL card. The background of the card was the Great Lakes navigational chart covering Pelee Island.

For equipment, we used my old, but reliable, Drake T4X, my Drake 2C receiver, and VE3HOM's FT-2000. For a multiband antenna we settled on the ancient but versatile "Windom," and added folded dipoles. It was run to the boat's masthead, with the other end thrown over an unused pole on shore. A second station was set up by Murray MacFadden, VE3HOM, at the foot of the wharf where there were lots of tall trees to support the folded dipoles.

Wendy Wilker, VE3DYL, was our other main operator. Garry Hammond, VE3GCO, and his wife Marlene, plus Elwood Rogers, VE3FTN, and his wife Gene, VE3HYZ, also operated.

The first few hours on the air were hectic, as we tried to clear the initial surge of people who had been looking for us, but after that we settled down to some nice ragchewing. To give the U.S. Novices a fair chance, I stayed on until 1:30 A.M. on two successive nights and worked nothing but slow cw. A particular thrill was working VE8RCS, Canada's northernmost amateur station at Alert in the Canadian Arctic. Other contacts of interest were CG1CR, the Girl Guide International Camp, Cape Breton, NS; K4DQ at Expo '77, Greensboro, NC; and K2BSA, the Boy Scouts of America Jamboree, Butler, PA. — Brian Reis, VE3FOK

CANTERBURY AERO CLUB AWARD

□ To celebrate CAC's 50th anniversary, NZART Branch 05 (Christchurch) is sponsoring an award.

Contact any station during July, 1978 and use the last letter of the call sign to make up the words *canterbury aero club*. All stations to contact at least one ZL3. Additional ZL3s are a bonus and can be used to fill any gaps.

All bands, all modes. Available to listeners. No QSLs required. Send certified list only to CAC Award, P. O. Box 1733, Christchurch, NZ. (Award airmailed.) Overseas cost \$1. ZL cost 50 cents. Overseas applications must be received before November 1, and ZLs before September 1. Overseas stations receive award at no cost by contacting five ZL3 (Christchurch) stations. VKs must contact 10.

QST congratulates . . .

□ Beverly Nash, K4RJS, who has been appointed Camden County (GA) Juvenile Court Judge.

Hamfest Calendar

Strays

***Arizona:** The Amateur Radio Council of Arizona's annual Ft. Tuthill hamfest is July 28-30 at the Coconino County Fairgrounds in Flagstaff. Western barbecue, tech sessions and prizes. Preregistration forms from ARCA, P. O. Box 11642, Phoenix, AZ 85061, or call Howard Schmidt, WB7NUV, at 602-849-1622 after 6 P.M. MST.

***Arkansas:** The Central Arkansas Radio Emergency Net hamfest is August 5 and 6 at the Arkansas Building in Little Rock. Further details from Don Gephardt, 5 Donaghey Ct., N. Little Rock, AR 72116.

***Florida:** The fifth annual Jacksonville hamfest is August 5 and 6 in the Jacksonville Beach Municipal Auditorium. Features include a Haiti DXpedition talk by the North Florida DXA, microprocessor seminar, QLF contest, transmitter hunt and ARRL meeting. Swap tables \$5. Prizes. Tickets \$2.50 advance, \$3 at the door. Sponsorship by RANGE, NOFARS, NFDXA, OPARC, QCWA and BARS. Inquiries to Billy Williams, N4UF, Hamfest Chairman, 911 Rio St. Johns Dr., Jacksonville, FL 32211. Tel. 904-744-9501.

Illinois: The Quad-Co. Amateur Radio Club sponsors the 21st annual "Breakfast Club" hamfest on July 15 and 16 at Terry Park, 3/4 mile east of Palmyra. Flea market, games, golfing, contests and fishing. Dancing and movies Saturday night. Camping available from Friday to Monday. Other groups invited, with prior notice. Talk-in on 3973 and 52. Preregistration \$1.50 until July 7, \$2 at the gate. Write Hamfest, c/o Quad-Co. ARC, P. O. Box 81, Chatham, IL 62629.

Illinois: The Big Thunder Amateur Radio Club hosts the Belvidere hamfest on July 30 at the Boone County Fairgrounds, Belvidere, from 8 to 3. Tickets \$1.50 advance, \$2 at the gate, campers \$2 additional. Talk-in on 94 simplex. Write to Mike George, K9ORU, 6159 Broadview Ave., Belvidere, IL 61008.

***Louisiana:** The Shreveport Amateur Radio Association hamfest is July 8 and 9 at the American Legion Club on Cross Lake. Admission \$2. Further information from S. T. Losey, Jr., K5TL, 172 Moor Rd., Shreveport, LA 71106.

Maryland: The Baltimore Radio Amateur Television Society holds its annual Maryland hamfest on July 30, from 8 to 4, at the Howard County Fairgrounds, off I-70, 12 miles west of I-695 exit 16. Talk-in on 52, 63/03, 16/76 and 52.76/52.525. Admission \$2, XYLs and kids under 12 free. Tables under cover \$3 advance, \$4 at the door. Tailgating \$2. Door prizes, refreshments, ATV and computer demonstrations. For tables and info contact Mayer Zimmerman, W3GKX, c/o BRATS, P. O. Box 5915, Baltimore, MD 21208.

Massachusetts: The Northern Berkshire Amateur Radio Club hamfest is July 8 and 9 at the Cummington Fairgrounds. Free overnight camping. Tech talks, demonstrations and dealers. Flea market \$1; advance admission \$3, with spouse \$5; at the gate \$4 and \$6. Info from Hildy Sheerin, WA1ZNE, 89 Greylock Terrace, Pittsfield, MA 01201.

***Michigan:** The 30th annual Upper Peninsula of Michigan hamfest is July 29 and 30 at the Dickinson County Armory, Rte. M-95, Kingsford. Registration at 9; tickets \$2.50 advance, \$3 at the door. Banquet Saturday, \$6.50. Complete activities program, including swap and shop. For info write U. P. Hamfest, P. O. Box 2056, Kingsford, MI 49801.

Michigan: The third annual Straits Area Radio Club Swap and Shop is August 5 at the Emmet County Fairgrounds, Charlevoix Ave., Petoskey, from 9 to 3. Talk-in on 52. Food services. Prizes. Tickets \$1.50 at door. Campsites nearby. Write SARC, c/o Thomas M. Sorrick, W8IZS, P. O. Box 416, Pellston, MI 49769.

Missouri: The third annual Indian Hills Amateur Radio Club hamfest is July 23 in the Multipurpose Building, Sabine County Fairgrounds, Marshall. Old and new equipment displays. Prizes. Flea markets for OMs and XYLs — \$2 first table, \$1 each additional. Registration at 8 A.M. Tickets \$2 advance, \$2.50 at the door. Talk-in on 52 and 28/88. Information and tickets from James H. Little, WD0BPG, 405 E. Rosehill, Marshall, MO 65340.

Montana: The International Glacier-Waterton hamfest is July 15 and 16 at the Three Forks Camp-
*ARRL Hamfest

ground, 10 miles east of Essex on U.S. 2, in the West Glacier area. Registration at 9 A.M. More info from International-Glacier-Waterton Hamfest, P. O. Box 2225, Missoula, MT 59806.

North Carolina: The sixth annual Cary Amateur Radio Club Mid-Summer Swapfest is July 15 from 10 to 3 at the Cary Lions Club Shelter near Raleigh. No selling or buying commission. Prizes. Talk-in on 52 and 28/88. Write to Cary ARC, P. O. Box 53, Cary, NC 27511.

***Ohio:** The Northern Ohio Amateur Radio Society hamfest is July 8 at the Lorain County Fairgrounds, Wellington. Tickets \$1.50 advance, \$2 at gate. Further info from Donald J. Havlicek, 1020 Chippewa, Grafton, OH 44044.

Ohio: The 14th annual Wood County Ham-a-Rama is July 16 at the Bowling Green Fairgrounds. Gates open at 10 A.M., with free admission and parking. Dealer tables and space available. Trunk-sale space and food also available. Prizes. K8TIF talk-in on 52. Tickets \$1.50 advance, \$2 at the door. Write to Wood County ARC, c/o Eric Willman, 14118 Bishop Rd., Bowling Green, OH 43402.

Pennsylvania: The Tri-Club hamfest of GYE, Lehigh Valley ARC and Delaware-Lehigh ARC is July 16 at the Allentown Police Academy, Lehigh Parkway South. Bring your own table and power. Donations: \$2 lookers, \$3 sellers. Prizes. Talk-in on 52 and 34/94. Accommodation info from Tourist Bureau, 462 Walnut St., Allentown, PA 18105. Full details: s.a.s.e. to F. J. Hermann, K3AI, Rte. 1, Box 104 Emmaus, PA 18049.

Pennsylvania: The Two Rivers Amateur Radio Club of McKeesport holds its 14th annual hamfest at the Green Valley Volunteer Fire Company grounds, just off Rte. 30, on July 23. Home-style food and drink. Talk-in on 22/82. For further info write to Andrew Salitres, W3OFM, 2901 Stewart St., McKeesport, PA 15132.

Pennsylvania: The 41st annual hamfest of the South Hills Brass Pounders and Modulators is August 6, from noon to dusk, at St. Clair Beach, five miles south of Mt. Lebanon on Rte. 19. Swap and shop, picnic area and swimming for the family. Mobile check-in on 29.0 and 146.52. Preregistration \$1.50, at the door \$2. Tickets and info from Bruce Banister, 5954 Leprechaun Dr., Bethel Park, PA 15102.

Texas: The Houston Echo Society hosts the annual Texas VHF-FM Society summer convention from August 4-6 at the Galleria Plaza Hotel, just off I-610 at Westheimer Rd. Activities include microprocessors, Texas hidden transmitter hunt, OSCAR, FCC and ARRL, as well as vhf. Many major exhibitors and prizes. W3XO, QST vhf columnist, is the Saturday night banquet speaker. Full activities for all the family, too. More info from FM Society Summer Convention, P. O. Box 717, Tomball, TX 77375.

Virginia: AMRAD's Amateur Computing '78 is July 22 and 23 at the Sheraton National Motor Hotel, Columbia Pike and Washington Blvd., Arlington. Featured are commercial exhibits, personal computer displays, seminars and club activities. Advance two-day tickets \$4, banquet Saturday \$12; at the door \$5 and \$14. Write to AMRAD, P. O. Box 682, McLean, VA 22101.

Virginia: The Shenandoah Valley Amateur Radio Club hamfest is August 6 at the Ruritan Fairgrounds, Berryville. Details from SVARC, P. O. Box 139, Winchester, VA 22601.

Washington: The Okanogan Valley International Hamfest Association holds their 29th annual event on July 22 and 23 at Conconully State Park, about 17 miles northwest of the Omak-Okanogan area. Overnight camper and trailer parking on a first-come basis; private parks, with hookups, are nearby. Lodging also available. Monitor WARTS at 6 P.M. on 3970 and CBN at 7 P.M. on 3960, starting July 1. Write to OKIHA, Frank M. Cotton, K7USG, Secretary/Treasurer, Rte. 1, Box 122K, Omak, WA 98841.

***West Virginia:** The Jackson County Amateur Radio Club hamfest is August 13 at the West Virginia FFA-FHA Conference Center in Ripley. Advance tickets are \$1.50 each or four for \$5; at the gate \$2 each or three for \$5. Further details from James E. Bartlett, WD8AYN, Activities Manager, 328 3rd Ave., Ripley, WV 25271.

THE DX'ER GETS SHORT HAUL

□ Cruising back from Bermuda in our 30-foot sailboat, *The DX'er*, we ran into a storm which badly damaged our mainsail. Then about 60 miles off Long Island's Montauk Point we ran out of gas. On board were my OM, Jerry, WB2QHE; Paul, WA2OOM, his XYL, Diana, and myself.

Although our ship-to-shore radio was not working, we did have Jerry's ham rig, an RDF and an emergency beacon. Paul put the rig on the air and raised Jim, WB4QWM, in South Carolina. Jim, a retired navy man, understood our problem, and immediately contacted the Coast Guard. However, due to the weather it was impossible for the cutter *Point Wells* to get a fix, so they sent out a patrol plane to pinpoint our position.

The pilot, Lt. Chris Burns, came on frequency and asked us to activate our emergency beacon so he could find us. Finally we heard his engines and sent up a flare. On the first pass Chris dropped a beacon for the cutter to home-in on, and on the second pass he dropped a radio to enable us to contact the cutter.

After the plane left, the boys thanked one and all for their help in keeping the frequency clear, and signed with Jim. Seven hours later the *Point Wells* arrived and took us in tow. — *Joan Tell*



MARS equipment recently installed on board the guided missile destroyer USS *Benjamin Stoddert* lets the crew talk to families and friends while the ship is at sea. MARS operator Chief Harley Huntemann, KH6HGP/N7HJ (left), says, "The crew's response has been overwhelming." It was only recently that the commander-in-chief, Pacific Fleet, authorized the establishment of MARS facilities on Pacific Fleet ships. Chief Dave Kirby, KH6JBT, is the *Stoddert's* main MARS operator.

WHAT WOULD YOUR XYL SAY?

□ You wouldn't believe the response from this \$8 ad in my hometown paper:

"Do you have any old junk radios or electronic equipment that you would like to throw away? If so I would like to have it for parts in hobby experiments."

So far . . . one Knight kit pre-amp, one Heathkit AR-3, one new Royce CB (someone robbed the final for spare parts), one "10-meter" amplifier, two SWR meters, many boxes of tubes, several TVs, two tube-type CBs and several old fm receivers.

People even apologized, because the items they gave me didn't "work so good." Only one big problem — my XYL blew a fuse! — *WA4PVV*

TEACHING HAM RADIO?

□ Let us know. The ARRL Club and Training Department is compiling a list of instructors and classes to refer to potential students.

We also have materials to assist the amateur radio instructor. Write to Club and Training Department, ARRL, Newington, CT 06111. — *KICD*

FM Repeater News

Conducted By Lew McCoy,* W1ICPWR1ABH

20-kHz Channel Spacing — Pros and Cons

By press time, action will be completed on Docket 21033, the one that has to do with the repeater sub-bands, including 144.5 to 145.5 MHz. The effective date of docket is May 15, 1978. ARRL has already come up with its band plan — based on 20-kHz channel spacing — for this new segment. There are no splits. The plan is described in this column for November, 1977.

Why 20-kHz spacing, and not 30 with 15-kHz splits? Without going into all the details, and with considerable hindsight, U.S. repeater councils generally agree that there are many advantages in 20 over 30. In any event, it

appears that amateur radio 2-meter fm may be heading for a problem in spectrum management. The councils of Western Washington and Oregon have already voted overwhelmingly to use 20-kHz channel spacing on *both* 2-meter subbands, 144.5 to 145.5 and 146 to 148 MHz. In their case, only a few repeaters have to move to conform to the new plan. This subject was recently brought up at the meeting of the Northern (CA) Amateur Relay Council, and while it wasn't rejected, it *is being studied*. The Colorado council just voted to stay with 30 kHz above 146, but 20 kHz on the new sub-band.

The important point we must not overlook is that it is possible to reassign repeater channels when only a few repeaters will be affected. But, for example, look at New England where there are about 170 repeaters operating on 2 meters on the 146- to 148-MHz band. The New York, Long Island, and New Jersey numbers are even greater. A great deal of very careful thought is involved before any changes of this magnitude could be made on the 146- to 148-MHz range. This is exactly what the ARRL VHF Repeater Advisory Committee (VRAC) will be doing — and by all means, let your representative know your views.

FREQUENCY ASSIGNMENTS

Under Docket 21033, repeater calls (WR) will no longer be assigned. Any amateur above the Technician grade can put a repeater on the air, using his own call. And a Technician licensee can put a repeater on *any* band above 10 meters. (We still don't have permission for Techs on 10.) Just recently we have started to receive letters from amateurs who wish to put repeaters on the air and have written to their local frequency coordinator asking for assignments. They have been getting letters back stating that no assignments can be made without a repeater call. It should be made clear that regardless of our personal feelings about the removal of WR calls, it is incumbent on a frequency coordinator to honor a request for repeater channels (assuming, of course, there are channels available for assignment).

BAND PLANS

As far as League band plans are concerned, the ARRL Board of Directors made the recommendation that both the VRAC and the VHF/UHF advisory committee (VUAC) study present plans and make recommendations. Bear in mind that these two committees comprise 22 individuals, one for each U.S. call area and VRAC Liaison, ARRL Hq.

Canada, so any agreements reached will take considerable time.

In any event, the VRAC has been asked to vote on two band plans. One consists of modifying the 10-meter plan to 20-kHz channel spacing instead of 15 kHz. The present 15-kHz spacing has proven to be a problem, but such is not the case with 20 kHz.

The other band plan is one for the 1215-MHz band. ARRL continues to get requests for guidance concerning this band. SCRBA (Southern California Remote Base and Repeater Association), has come up with a plan for this band, and we are printing it for your information. *Don't misunderstand*; this is by no means a final band plan, as we still must have input from the VUAC before any action can be taken. But most important, it shows you that amateurs are concerned and working in your interests.

AN UNBEATABLE COMBINATION . . .

. . . Fm repeaters and the Kansas City-area March of Dimes Superwalk. Forty-eight 2-meter fm-ers helped make the 1978 Walk-a-Thon a real success. Seven of the hams walked (with pledges of \$800) and four were bicycle mobile. Some 3000 local young and not-so-young trekked the 20 miles, raising an estimated \$125,000 for the fight against birth defects.

March of Dimes officials will quickly admit that the hams really made the difference between success and pandemonium. Three repeaters were used this year — 34/94, 22/82 and 31/91 autopatch. Did the hams enjoy the Walk? Almost without exception, as each completed his duties, they asked, "Will you ask me to help next year?"



If the communications from Tom Hyatt, WBØRHR, seemed garbled during the KC March of Dimes Superwalk — you can see why! (WØGJG photo)

Table 1
SCRBA 1215-MHz Band Plan

Segment	Use	Pairs with	Notes
1215-1220 MHz	Data Communications	1230-1235 MHz	
1220-1224 MHz	Modulated oscillators	—	APX-6
1224-1230 MHz	ATV Repeater/translator output (auxiliary)	1264-1270 MHz	Video carrier 1225 MHz
1230-1235 MHz	Data communications	1215-1220 MHz	
1235-1238 MHz	FM Repeater output (auxiliary)	1251-1254 MHz	
1238-1240 MHz	Point-to-point voice links	—	Simplex, aux. links, etc.
1240-1249 MHz	ATV Repeater/translator output (inband)	1280-1290 MHz	Video carrier at 1241 MHz
1249-1251 MHz	Weak signal guard band	—	1250 MHz weak signal window
1251-1254 MHz	FM Repeater input (auxiliary)	1235-1238 MHz	
1254-1264 MHz	FM Repeater input	1270-1280 MHz	36F3 emissions; 40 kHz channels
1264-1270 MHz	ATV Repeater/translator output (cross-band)	1224-1230 MHz	Video carrier at 1265 MHz
1270-1280 MHz	FM Repeater output	434 MHz	
		1254-1264 MHz	36F3 emissions; 40 kHz channels
1280-1290 MHz	ATV repeater/translator input (inband) and simplex	1240-1249 MHz	Video carrier at 1282 MHz
1290-1295 MHz	Satellite	—	
1295-1297 MHz	Weak signal guard band	—	1296 MHz weak signal window
1297-1300 MHz	Satellite	—	





KV4AA — 100,000 QSOs in Three Years

If you don't have a QSL card from the U.S. Virgin Islands, it's not Dick Spenceley's fault. Although he has been providing QSOs from there since 1927, beginning with our Bicentennial his output greatly increased. In 1976 using the exotic call of AJ3AA, he cranked out 35,335 contacts plus 1200 more using his familiar KV4AA call sign. In fact, in the first nine hours of the Bicentennial he qualified for CQ's USA-WPX-76 award, which required contacts with 200 of the new U.S. prefixes, plus 35 different ones, and was subsequently awarded the magazine's DX Certificate no. 1.

Habits are hard to break. In 1977, returning to steady use of KV4AA, Dick made 30,700 QSOs. In 1978, averaging better than 100 per day to date, he stands a good chance of surpassing last year's output, and could possibly have a three-year total of 100,000.

In order to give a Virgin Islands contact to as many hams as possible, Dick keeps his QSOs short and to the point. This rules out ragchewing, which would defeat his purpose. About 90 percent of his contacts are by cw. As he puts it, cw is "the most reliable, vastly superior in QRM conditions, and a sure cure for the language barrier." One of his favorite operating spots is around 14.025-14.030 MHz.

Highlights of Dick's Career

Dick was born in West Newton, MA, in 1905, and lived in the Northeast until 1924 when he joined the U.S. Navy. In mid-1925 he was transferred to Navy Radio Station NBB in *c/o ARRL, 225 Main St., Newington, CT 06111

St. Thomas, U.S. Virgin Islands, where he was a Radioman, 3rd Class. Stimulated by periodicals such as *QST*, Dick developed an interest in ham radio, and in 1927 became licensed as K4AAN. (At that time, the K4 prefix was used for stations in Puerto Rico and the Virgin Islands.) But lured by a fondness for the benign climate and the opportunity to play tennis every day, he left the Navy in St. Thomas in early 1928 after a four-year hitch.

Hurricane Duty

Dick didn't enjoy his retirement for long. In the fall of 1928, a raging hurricane nudged St. Thomas but hit Puerto Rico head-on, knocking out the Naval radio station in Cayey and its communications with the mainland. Urgently needed, K4AAN was called back to NBB to help establish contact with Washington. After a station was set up using two 210s and 440 volts dc, a contact was quickly made with W2BS in New Jersey, who telephoned NAA with the news that NBB was on the air. NAA was contacted a few minutes later, just below the 40-meter band. Dick wanted to use his K4AAN call, but was ordered to use NBB. In any case, the unexpected shortwave signals from St. Thomas surprised the staff at NAA, which included many high-ranking officers on hand for the emergency.

Honors and Service

Dick caught the DX contest bug in 1932, when he took part in the week-long ARRL DX CW Contest, placing third after EAR96 and

HC2FG. The experience gained by frequent participation in subsequent contests enabled KV4AA to make the world's top score in the ARRL DX CW Contests of 1951, 1954 and 1956.

In addition to contesting, Dick became a serious DX operator after receiving his KV4AA call sign in 1947, and in 1962 briefly held the top spot on the Honor Roll. After reaching that pinnacle, he continued to work DX, but has not submitted any further QSLs to maintain a ranking.

Dick also served as DX editor of *CQ* from 1952 to 1958 and fashioned the popular WPX awards during the latter part of his stint with the magazine. He played an important role in creating the 1955 YASME DXpedition of the intrepid Danny Weil, who activated 31 rare DX spots while attempting to sail around the world single-handedly.

His Station Today

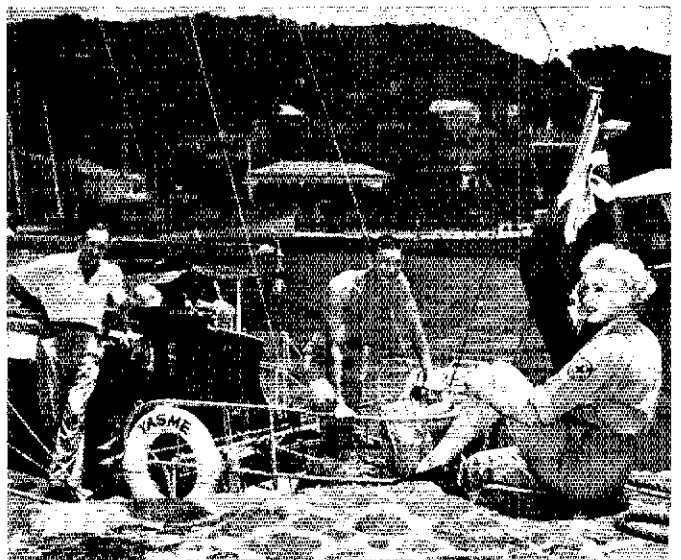
A variety of receivers, exciters and amplifiers are used at KV4AA, including Collins, Hallicrafters and Heath. Dick's favorite piece of equipment, however, is a vintage 23-year-old Viking kW amplifier. For antennas, he uses a Telorex three-element monobander, up 70 feet, and an 80-meter Zepp for all the other bands, 10 through 160 meters.

As far as the future is concerned, if KV4AA should run out of stations to work on the hf bands, with tongue in cheek Dick says, "There are always the untouched riches of RTTY, slow-scan TV, 2 meters, and OSCAR!"

KV4AA today, still going strong after 50 years of operating from the U.S. Virgin Islands.



From left to right, Dick Spenceley, Danny Weil and actress Deborah Kerr in St. Thomas in 1956 before Danny shoved off on his first YASME DXpedition.



THE DX SCENE

C3I, Andorra, will be activated by two different groups. An ssb operation is planned for July 15 to August 5, and a cw operation for August 1-18. (VERON)

F0CH/FC is the call to be used by HB9TL on Corsica from July 16 to August 3. On cw he expects to be 19 kHz up from the bottom edge of the bands. He will also operate ssb.

FB8WF is expected to be on Crozet now. LIDXA suggests looking for him on 14.220 MHz at 1300 UTC, long path.

FB8ZM will be active until late this year. Henri's usual schedule is 1300 UTC daily, plus 2300 UTC on weekends, around 14.225 MHz. (Long Skip)

FO0JRM, FO0PHM and FO0PJM will be operated by WB0RBU, W0KUF and K2GMV/6 from the Tahiti area from June 10-29. (W0KUF)

GU4CHY, very active from Guernsey on 20 cw, is expecting a new antenna for 15 and 10 meters. Dick's brother Mike, GU4EON, is active on both cw and ssb. (GU4CHY)

GJ2CNC reports that the GC2 prefix has not existed since January 1, 1977, but a pirate is still using his old call, GC2CNC. Monty's operation at VP2GEB is cw only.

KL7FB1 on Shemya AFB, Aleutian Islands, is active on 75 through 2 meters. Present operators are WB4TNV, WA8FAO and WB0WDY. (WA8FAO)

KM6BI, the radio club station on Midway, is heavily operated by Mike, WD8KLN. He favors cw, usually about 35 to 40 kHz up from the band edges. KM6FC, Len and KM6FD, Barb, continue their steady activity.

KV4KV, barely back from a short DXpedition to VP2EET, plans to operate from Tahiti from July through September.

Navassa Island DXpedition. Plans continue to solidify for the period November 26 through December 4. There has been no activity there for four years. Opera-

tion will include cw. (N0TG)

PA0TC/A is being operated from June 24 to July 1 in honor of the 900th Anniversary of the village of Hellendoorn. For details about an award certificate, write to P. O. Box 250, Nijverdal, Netherlands. (PA0TC)

S9, Sao Thome, may be activated by Angelo, D4CBS, for three months starting in July.

Special Tivoli Award 1978, International Passport of Fraternity, is being presented in behalf of UNICEF. A special expedition will operate from various countries in Europe from July 24 through August 14, using the calls I0ONU/ and OZ1ONU. For details write to A.R.I. Sezione di Tivoli, S.T.A. 78 Award Manager, P. O. Box 6, 00019 Tivoli (Roma), Italy.

TF6, a rare prefix, will be used July 20-23, both cw and ssb, by a group of Icelandic amateurs. (TF3CW)

TG9ML, active again on cw, says not to send him IRCs, as he can't use them. He will QSL on receipt of your card, if it arrives within two or three months of the QSO.

VK9NI, Norfolk Island, is often found on 14.260 MHz after 0600 UTC, on 14.220 after 0700 UTC, and also near 3.500 during the early morning hours. (LIDXA)

VR9O, expected to be on Tuvalu for some time, is often found around 14.202-14.210 MHz from 0800-1200 UTC. (LIDXA)

VU2CP looks for U.S. stations on 14.025-14.030 MHz around 1200-1300 UTC, on 21.025-21.030 around 1600-1730 UTC, and on 14.240 around 1100-1200 UTC. Leela seeks donations of surplus equipment to help develop more hams in India. (W2QHH)

VY1 is the prefix now used in Canada for Yukon. The Northwest Territories remain VE8.

W6IRT 10-meter beacon will operate at least through September 30 for propagation study purposes on 28.888 MHz, running 7 watts in the A-1 mode. (W6IRT)

WA3WAQ/TJ, in Yaounda, Cameroun, on a long-

term assignment, likes clear spots around 14.205 or 14.300 MHz from 2100 UTC. (LIDXA)

WA4YVG/VQ9 says he will operate from Chagos until March, 1979.

YJ8JH may be found on 14.240 MHz at 0700 UTC.

YJ8KM likes 28.520-28.540 MHz from 1200-1400 UTC. (LIDXA)

YV1BTG and YV1DG are busy training prospective amateurs in Machiques, Venezuela, reports John, KP4EAZ, a recent visitor there.

ZB2CS will be active July 21-24 on 10, 15 and 20 meters, both ssb and cw. Anyone wanting a QSL for old QSOs with ZB2CS or ZB2USA, or skeds with ZB2CS, write to Ronald C. Williams, W9JVF/ZB2CS, 1147 N. Emerson St., Indianapolis, IN 46219.

ZD8W. Only QSOs made during the 1976 CQWW DX Contest are valid. The call is occasionally bootlegged, reports Long Skip for QSL manager WA4TLB.

ZL1AM0 has joined the group going to Chatham in late October. (WA6YQW)

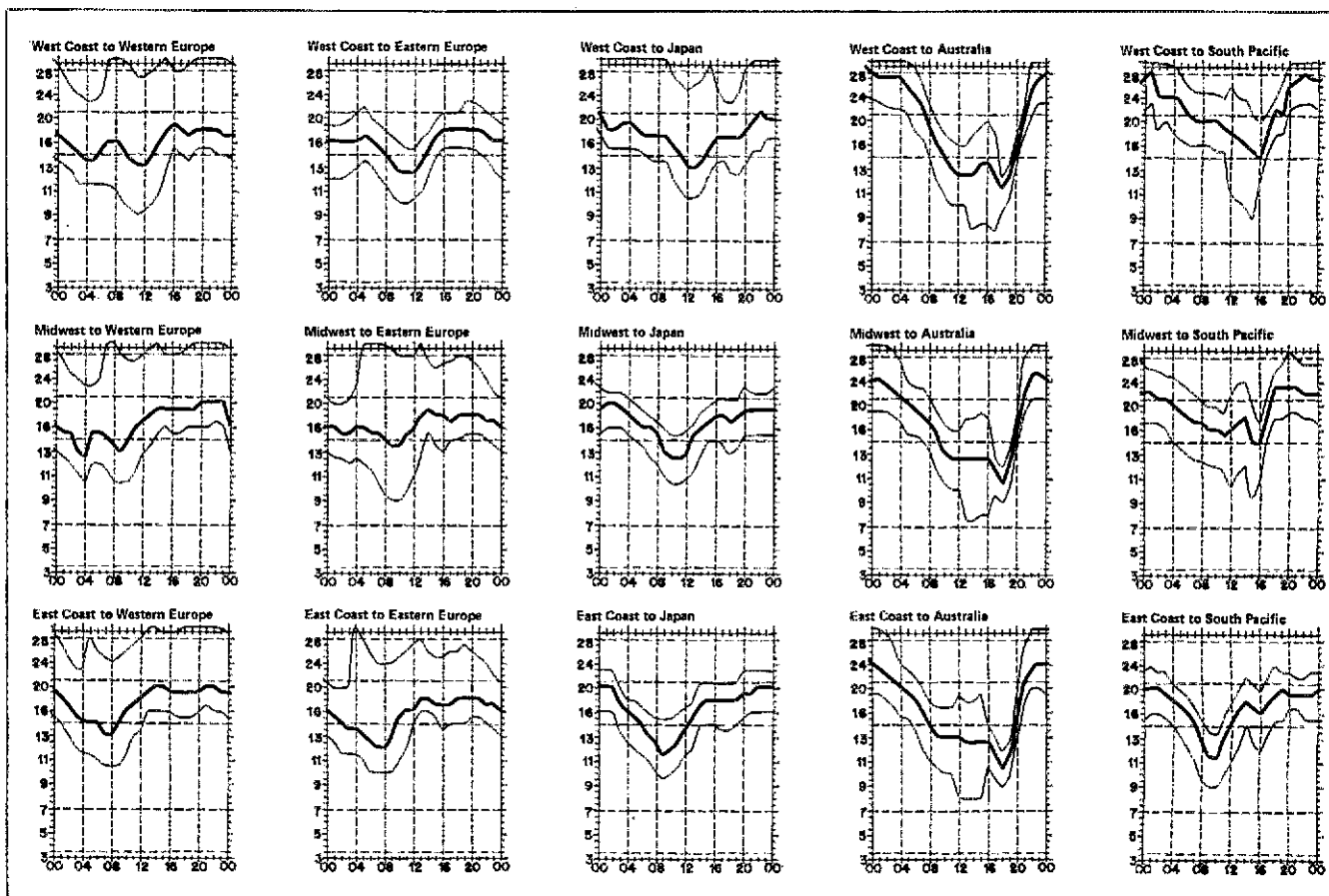
ZS2MI should continue to be heard, as the replacement for the current operator received his amateur license just before departing for the sub-antarctic weather station on Marion Island.

3J1, 8J3 and 8J9 prefixes were used with the ITU suffix by the JARL during ITU Week in May. (JARL)

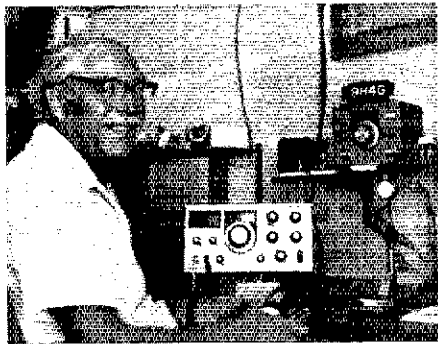
8P6, Barbados. To obtain operating permission, now apply to the Ministry of Communications and works near Bridgetown, as the Electrical Inspector no longer issues licenses. (W1ZT)

NEW U.S. PREFIXES FOR ALASKA, CARIBBEAN AND PACIFIC AREAS

See the "Happenings" column in this issue for details.



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hpf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the



9H4G, Eric Rogers, enjoys retirement on Gozo Island, Malta. Using only dipole antennas, he has managed to work 295 countries. Eric's previous calls were G3HGX and 9H1DG.

QSL Corner

Administered By R. L. White, W1CW

It is possibly just as well that the every other month listing of the domestic QSL bureaus did not take place last month as it will give a reason to point out an address change for the 6th call area QSL bureau. It is one of the biggest domestic bureaus (both in volume of cards handled as well as individuals involved with the bureau operation), so the change in address should be of interest to a significant number of people. Actually the only thing that has changed is the address to which s.a.s.e.s are sent. The operation of the bureau remains under the auspices of the Los Angeles Area of Radio Councils. So, take note of the new address and use it from now on: ARRL W6 QSL Bureau, P. O. Box 1460, Sun Valley, CA 91352.

Back in March of this year, the additional requirement of the inclusion of an s.a.s.e. (self-addressed stamped envelope) for the users of the ARRL Membership Overseas QSL Bureau went into effect. The announcements that ran in the January and February issues of *QST* must have had some effect as the count on the input to the Service showed a 60 percent compliance in April and a jump to better than 70 percent during the first part of May. It isn't expected that the 100-percent mark would ever be reached, but it shouldn't take too long to get to the 90- to 95-percent point. The new requirement has brought out the matter of our Canadian members who may not have any U.S. postage stamps on hand. While better than 80 percent of the Canadian members that have made use of the Service since March seem to have access to a 13 cent U.S. stamp, it is reasonable that there will be some that won't be able to have a U.S. stamp when it comes time to mail in some cards. If that is the case, then send a self-addressed envelope with the cards and make the check or money order for \$1 plus the cost of the postage. (At the time of writing this it appears that the postage will go from 13 cents to 15 cents.)

We also find that a few people appear to feel strongly about the requirement of sending the s.a.s.e. If those people include a note with their cards stating that no acknowledgement of receipt is wanted, no s.a.s.e. need be sent and no acknowledgement of receipt will be made. However, please be sure that the other three requirements have been met; the cards have been presorted alphabetically by prefix, the address label from your current copy of *QST* is included with the cards, and \$1 (check or money order preferred but cash acceptable) is included each time cards are sent to Headquarters for forwarding.

And for those of you who can still afford to send direct QSLs, here are a few bits of information that may be helpful to you, keeping in mind that there is no guarantee on the accuracy:

A35WL, Box 27, Nulalofa, Tonga
 GU4CHY, Box 100, Guernsey, Channel Islands
 JY5CB, Box 146, Amman, Jordan
 VP2EET, Box 10245, St. Thomas, Virgin Islands,
 00801

4U1UN, UN Staff Recreation Council ARC, United Nations Box 20, New York, NY 10017
 5H3FW, Box 293, Arusha, Tanzania

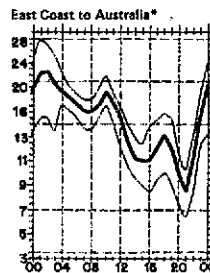
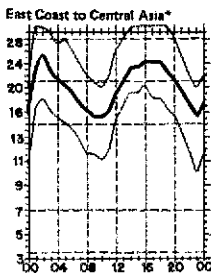
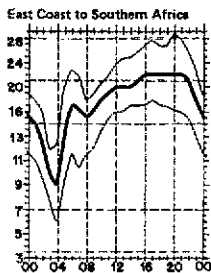
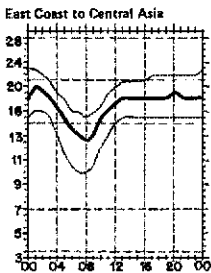
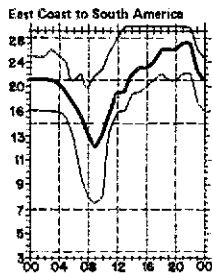
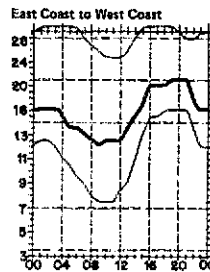
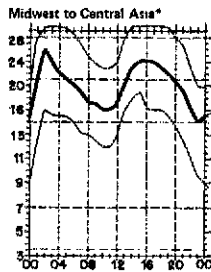
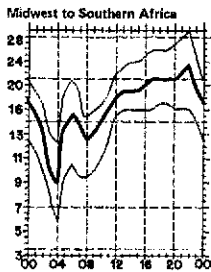
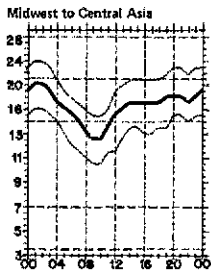
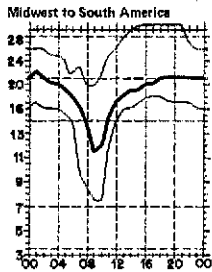
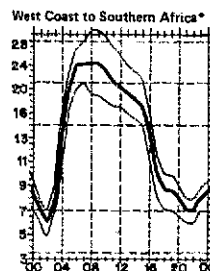
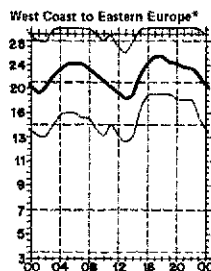
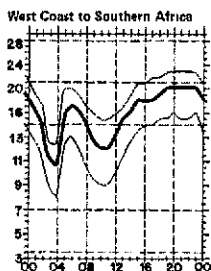
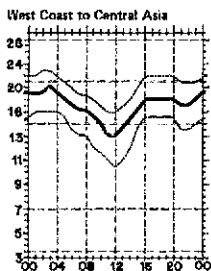
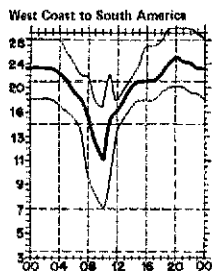
A4XGB-W2LFL
 A4XGY-K2RU
 CT3AF-W3HMK
 D4CBS-K4MPE
 EP2LI-WA2PYF
 FB8ZM-W4LZZ
 HDIA-WA4QMQ
 HH2YL-W7RQ
 HI8XDF-K3SWZ
 HI8XDI-K3SWZ
 HP0POL-SP2BBD
 K9VCM/3D6-W9MZA
 K9VCM/S8-W9MZA
 P18USA-W1CDC
 PY0MAG-PY1MAG
 S79D-N4NW
 S79DF-0NGFN
 VP2MBB-W8LDH
 VP2MBC-W1CDC
 VP2MDA-WB8LDH
 VP2MDH-WB8LDH
 VP2VEN-K5GOE
 VP5EE-WA4CMO
 VR3AH-WB4PRU
 WA4UAZ/HCI-WA4QMQ
 WA4YVG/VQ9-K4GLA/
 W4XQ
 XW8HJ-K3SWZ
 YN1Z-WA4ZXC
 ZD8KG-K4KBL
 ZF2AP-W4YKH
 3C1X-SM6CVE
 3D2WR-G5RP
 4Z4GH-K5JBC
 5V7AS-IT9AZS
 5W1AX-WA7VGV
 6Y5DA-VE4JK
 8P6JB-WB4RRK
 9L1SL/B-WB4WHE

POTENTIAL QSL MANAGERS

These hams want to serve: WB2MCB, WB3JOL, WB4AEJ, WB4FSN, WD4HYE, K5JBC.

QSL INFORMATION NEEDED

If you know the QSL route for any of the following stations, please write directly to the ham who needs the help: KR6CF (72), KR6FG (69), KR6VX (70) needed by W6LOI — CR6WT, D2AFE, FO8DF, 4Z4QB needed by WA3WYV — F6CLZ/FC (9/73), FO8EP (9/76), GC3CGK (8/72), SV1BK (12/74) needed by WB4RFZ.



lowest curve (optimum traffic frequency, or fof). See January 1977 *QST*, page 58, and September 1977 *QST*, page 35, for a complete explanation. The horizontal axis shows Universal Coordinated Time (UTC); the vertical axis, frequency in MHz. Asterisk indicates long-path circuits. Data are provided by the Institute for Telecommunication Sciences, Boulder, CO. These predictions for July, 1978, assume a sunspot number of 94, which corresponds to a 2800-MHz solar flux of 140.

The Corner's couriers this month are GU4CHY, IT1AZS, K2TV, K3SWZ, K5GOE, VE4JK, W1s CDC OPJ VV, W4YKH, WA4s CTA QM QYV ZXC, WB4PRU, W8UVZ and WD8EAU.

ARRL DX QSL BUREAU SYSTEM

□ First Call Area: all calls* — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.

□ Second Call Area: all calls* — North Jersey DX Assn., P. O. Box 8160, Haledon, NJ 07508.

□ Third Call Area: all calls* — Jesse Bieberman, W3TK, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.

□ Fourth Call Area: K4, N4, W4 — National Capitol DX Assn., Box DX, Boyce, VA 22620.

□ Fourth Call Area: AA4, WA4, WB4, WD4, WN4 — Sterling Park Amateur Radio Club, P. O. Box 599, Sterling Park, VA 22170.

□ Fifth Call Area: all calls* — ARRL W5 QSL Bureau, Box 1690, Sherman, TX 75090.

□ Sixth Call Area: all calls* — ARRL Sixth (6th) District DX QSL Bureau, P. O. Box 1460, Sun Valley, CA 91352.

□ Seventh Call Area: all calls — Willamette Valley DX Club, Inc., P. O. Box 553, Portland, OR 97207.

□ Eighth Call Area: all calls — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.

□ Ninth Call Area: all calls — Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.

□ Zero Call Area: all calls* — W0 QSL Bureau, Ak-Sar-Ben Radio Club, P. O. Box 291, Omaha, NE 68101.

□ Puerto Rico: all calls* — Radio Club de Puerto Rico, P. O. Box 1061, San Juan, PR 00902.

□ U.S. Virgin Islands: all calls — Graciano Berlarado, KV4CF, P. O. Box 572, Christiansted, St. Croix, VI 00820.

□ Panama Canal Zone: all calls* — KZ5 QSL Bureau, Box 407, Balboa, CZ.

□ Hawaiian Islands: all calls* — John H. Oka, KH6DQ, P. O. Box 101, Aiea, Oahu, HI 96701.

□ Alaska: all calls — Alaska QSL Bureau, 4304 Garfield St., Anchorage, AK 99503.

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

□ QSL Cards for Canada (VE and VO) may be sent to: ARRL Central QSL Bureau, P. O. Box 663, Halifax, NS, Canada, B3J 2T3. Or, QSL cards may be sent to the individual bureaus.

□ VE1* — L. J. Fader, VE1FQ, P. O. Box 663, Halifax, NS B3J 2T3.

□ VE2 — A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal, Quebec H3R 2E3.

□ VE3 — The Ontario Trilliums, P. O. Box 157, Downsview, Ont., Canada, M3M 3A3.

□ VE4* — W. A. Stunden, VE4BJ, 578 Oxford St., Winnipeg, Man., Canada, R3M 3J9.

□ VE5* — A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, Sask., S4S 5E3.

□ VE6* — G. D. Holeyton, VE6AGV, 4003 1st St., N.W. Calgary, Alta., T2K 0X2.

□ VE7* — Howard Martin, VE7AFY, No. 45-9960 Wilson Road, Ruskin, BC V0M 1R0.

□ VE8* — Al Sturko, VE8NS, P. O. Box 72, Fort Smith, NWT X0E 0P0.

□ VO1, VO2 — William Coffen, VO1KM, P. O. Box 6, St. John's, Nfld., A1C 5H5.

*These bureaus sell envelopes or postage credits. Send an s.a.s.e. to the bureau for further information.

QSL bureaus for other areas can be found in the December 1975 issue of QST, page 64.

DXAC NOTES

The following recommendation from the DX Advisory Committee was submitted to Headquarters by the DXAC chairman W9KNI in April, 1978: Rio de Oro should be deleted from the ARRL DXCC list.

The recommendation was accepted by the Communications Manager. For more information on the function of the DXAC, see page 90 of QST for December, 1974.

DXCC NOTES

A deletion to the ARRL DXCC list is Rio de Oro, deleted as of August 1, 1978. Spain relinquished control of this area, which was absorbed by Morocco (CN) and Mauritania (5T).

This action brings the grand total on the ARRL list to 363; 317 current and 46 deleted.

DX Century Club Awards

Administered by Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from April 1 through April 30, 1978. An s.a.s.e. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed

K8ZR/276	DL3ME/120	JA2HXV/109	W9NM/104	WB3DEN/102
K9UA/225	K9KQ/120	W8KUZ/109	W8VDC/104	K4CXY/101
F8CB/195	N0YC/120	JA1SQF/108	WB9TIG/104	N9RS/101
K8RW/181	W2XI/119	W2JGQ/108	C5AJ/103	VA3JJ/101
JA7BMR/150	W5TOS/119	WA3YRM/108	DL1VW/103	W3OY/101
XE1FL/149	DJ4MJ/118	K8MZA/107	K1RN/103	WA4FKK/101
JR6CF/140	K1PAD/114	WB9POH/107	K8GG/103	W6EUP/101
W0DYI/139	DK5WN/110	JH6KXG/106	K8JH/103	WB8ILM/101
K7YBX/138	JA4CUIY/110	J1TDX/108	N6RQ/103	WB9ICR/101
W5TSF/132	JH3JU/110	W4MGX/106	WB3HAZ/103	K1DP/100
K2RU/131	JY5US/110	H89JF/105	W4OX/103	K5OY/100
W9PWZ/131	WA1UHA/110	K1LA/105	W6D7Y/103	N5DX/100
YU1PEU/128	WB2LJH/110	N2LR/105	DJ2KA/102	N8HE/100
OK1AMR/126	W5LFS/110	EP2SB/104	DK2WU/102	WB1DGD/100
K4NFE/124	EP2LI/109	WAAMDS/104	VP9JJ/102	WA4TTK/100
VE3AMJ/121				

Radiotelephone

K8ZR/269	K2RU/127	I1RYS/109	I7MJ/105	N6RQ/102
K9RF/253	W5TSF/124	W1KSZ/109	JA15QF/105	H8DJPW/102
F6CYL/249	VE3AMJ/121	K4EQC/109	K4NFE/105	WA4BIM/101
AA4AR/206	W4OEU/121	W9PWZ/108	WB3FDB/104	WB8ILM/101
W2RS/173	W9TC/121	K8MZA/107	K8GG/103	ZL4KM/101
DL3UH/156	DK5WN/110	K0CC/107	N0YC/103	WB9WZS/100
K0HSQ/152	W6IA/110	WB5RXP/107	WB0KVV/103	WB8ZRV/100
WA2PCF/139	EP2LI/109	G4FDQ/105	GM4CNF/102	WB9ZAH/100
W0DYI/139	F8BPC/109	I1EVI/105		

CW

N9RR/130	W5LFS/110	W9WI/107	SM5VB/104	P29JS/100
W2RS/122	W6EPN/109	HM2JN/105	W5FL/104	K1RH/100
OH2BDA/121	JA7BMR/108	W1HX/105	W1JZ/101	K1WJ/100
PJ2VD/113	VE3HF/108	WA1UHA/105		

5BDXCC

K3ZO	OH8SR	OH3NY	W6SF	W6CF
DK3VD	K7BR	W2REH	N9MM	W2BMK
K4HP	K4UEE	XE1FR	JABEAT	

Endorsements

Mixed

W5MMD/344	PJ2VD/272	W3FM/227	WA4VDE/186	WB2HJW/160
W2XN/340	DK3SF/271	W1PI/225	K2FW/185	W9MTT/160
W6ONM/335	K4KFH/224	K4KX/224	X2MX/185	W9XK/160
W1FLQ/333	W4HEO/223	W4HEO/223	K1SA/184	W4KEB/159
W9ABA/325	K2UO/270	K8SVW/222	N9RR/184	WA2PCF/153
N9ZN/322	W1LQQ/270	WB4EQQ/222	W1KUL/183	OZ4CF/145
W4KN/318	W8GJQ/268	YU1GMM/220	AA4US/181	HM2JN/144
E1TBC/314	D2HUG/266	W2CXR/220	K4KBL/180	W6MUS/143
I1XK/312	W6JGQ/265	N4HU/219	K4ZVS/180	W6MOP/143
W5DJ/308	K5ETA/264	N5FQ/219	K9DDA/180	K2BXC/140
K8LP/305	N4CC/303	SM6GMG/210	K7SFN/178	KH8DL/140
N6BK/261	W9RJ/260	W1AGA/207	K4BP/176	NBWW/140
N4CC/303	W1AB/300	K5TSC/203	W5FJ/175	WB9MFC/140
W5JW/302	W4JFE/253	WB9SE/202	VE3MV/171	VE8AM/139
W1AB/300	K8NA/252	W7ZJ/169	W7ZJ/169	WA8PF/139
H89IK/292	W8JJE/251	W8SUE/201	N0SS/165	WB4IWW/124
K9RF/292	K6RK/250	YU3EP/201	W1BL/164	W7YS/124
JH1VRQ/291	W6MA/260	JR1TNE/200	W4WEG/164	W4EFL/122
JABJO/290	XE1FR/250	K2GA/200	K2RN/163	DK3YD/121
N2AP/290	W4MWT/287	K8IL/200	W5REM/163	JA5BZL/121
W4MWT/287	K3NN/280	VE3AVD/200	JA11Z/162	WB8AS/121
K3NN/280	W2RS/280	VE7YH/195	K4GFH/162	W3KWH/120
W2RS/280	W4RNP/280	K2SP/192	N9KV/162	WB4VHE/120
W4RNP/280	WA4DCP/280	VE2JQ/193	W2AOG/162	W4CEB/119
N6JV/279	N6JV/279	W1LQJ/190	W3UJ/161	W7ZR/119
W8ZR/275	N2CW/272	W1HV/183	W4FL/161	VEROW/110
N2CW/272		K6YK/237		

Phone

W2XN/330	W9ABA/253	WB2RLK/VE1/226	WA8HAV/180	W5REM/141
W3MP/317	PY6CN/252	W4BV/226	JA1PUK/179	W6MUS/140
K8AQ/301	WATUVO/250	K9UA/221	VE3MV/171	WB7EUT/137
W6NTX/290	W0KU/250	K8GWM/220	WA4PLA/167	WB8HL/137
W5DJ/289	W6HPZ/250	W8ZR/203	W4WEG/163	N0SS/134
JH1VRQ/285	K2UO/249	K8IP/201	VE1DI/160	W7ZR/131
W4MWT/285	K8NA/245	F8DLM/200	K4FZU/160	WB8MOP/128
LU1BAR/W3/280	W1LQQ/244	JASPL/200	W2YTO/160	WB4IWW/123
VE2YU/277	W2GHV/241	W8DQG/199	WB4JKO/160	K9BL/122
W3MDJ/277	CT1WB/240	K2SP/192	DK8FP/155	N2BJ/122
E43SA/271	CX6AM/240	WA4VDE/184	EA3OD/153	JA11Z/121
I7RNH/270	K6RK/240	K9HLW/182	W9XK/153	K8TSC/120
N4CC/270	N5FG/240	WA1KUL/181	WB8RMD/148	VE3HF/120
W5SHGS/270	W2PIX/236	W8CY/181	PA9KB/146	W2FGT/120
W8GIO/265	VE3AKG/232	I8IGS/180	W5JME/144	WA2AOG/119
W2SY/261	W7AE/229	K8VIR/180	H8EJH/142	WASVWP/119
DK3SF/259	N2CW/226			

CW

K2TQC/260	SM6GMG/210	K5ETA/189	N1AC/162	N6JV/141
W9ZM/253	JH1VRQ/209	W6BDNM/186	K8LJG/160	VE3AKG/132
SM5BH/228	W1AB/206	K5RW/181	N2CW/158	K1SA/128
WA4FDR/219	K8DY/201	K2UO/179	K6YK/153	W9OW/125
K8XP/216	W4BV/200	JA5TSQ/172	JA2INS/146	WB4KZ/120

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



The Microwaves — Our New Frontier!

It was well over 50 years ago that amateur radio began its march away from the vicinity of 200 meters, finally reaching "the limit of the useful radio spectrum" — 30 Mc. about 1930. A few forays were made into the then unknown territory of "uhf" but these first attempts to utilize the 56-Mc. band did not produce the improvement in DX capability that previous doubling of frequency had. So, except for a small group of experimentally minded, hardy pioneers who braved the rigors of operation on 56, 112 and even 224 Mc., hamdom halted its upward thrust and went about settling in the territory below 30 Mc. Like any frontier, the ultrahighs, as they were then known, attracted a steady, if small, influx of converts lured by tales of interesting propagation and solid crosstown QSOs free of QRM and QRN. By the time the war clouds were gathering in Europe, enough amateurs were operating regularly on 5 meters and higher bands to justify a *QST* column devoted to the world above 56 Mc. It was called "On the Ultrahighs" and Ed Tilton, W1HDQ, was its originator and first conductor.

Following World War II, it was time to get back on the air. Most hams, quite naturally, headed for 10 meters, the first hf band to become available, but a few, some who had been the "uhf" pioneers before the fray and others who had gotten a taste of the higher frequencies during work with wartime radar and communications equipment, gravitated to the 50- and 144-Mc. bands. Just after the war, the amateur assignments in the vhf and uhf region

were changed but it was quite a while before we started using the term MHz! The 2-meter band was particularly popular with initial equipment consisting of modulated oscillator rigs of various sorts. Soon, however, the advantages of stabilized transmitters and narrow-band receivers became so apparent that a switchover occurred without any edict from Washington. In 1938, an FCC order requiring stabilized equipment on 5 meters had greatly depopulated the band and sparked the move by many to 2-1/2 meters. By the 1950s, however, 144-Mc. operation was almost entirely with stabilized transmitters and activity levels were quite high. The principal mode was a-m phone. Opening of the band, first to Novices and later to Technicians, further increased occupancy. During the late 1960s fm operation on 2 meters grew from a few dedicated souls to the almost universal medium that it is today. Now we are in the process of a great upsurge of interest in ssb and cw on the 144-MHz band. Activity on 50 MHz has been steady despite the specter of TVI to which the band seems continually subjected. Occupancy of the 420- to 450-MHz band has been growing, particularly in recent months. This has taken various forms from cw and ssb to ATV as well as fm. Even the forgotten 220-MHz assignment seems finally to be coming in for more of its share of attention.

What this adds up to is that the bands between 50 and 450 MHz appear to be in regular and quite general use. Certainly, there will be growth and plenty of interesting things to do but our operation on these bands can be lik-

ened to that in the hf range during the 1930s. Now our frontier is higher, in the microwave portion of the spectrum. True, there has been a small group of hams probing these frequencies for years. Some have come and gone, while a very few have stuck with it. But now, more of us must turn our attention to the microwave bands if our hobby is to retain its reputation for providing an outlet for experimentally minded, resourceful and innovative individuals.

Unlike some other applications, amateur microwave work must not be kept secret. This column provides a forum for publicizing your activities, so send along reports of your activities including photos of setups. For two years, I have been attempting to obtain more pages for "The World Above 50 MHz." Unfortunately, the pressures of publication economics and competition from other worthy amateur activities also vying for *QST* space have not made this possible. Now, however, I have it on good authority that additional column space may be forthcoming to accommodate material devoted to 1215 MHz and above. There's plenty to be done on these fascinating bands from weak signal cw and ssb work to fm and even color TV. There is solid local line-of-sight propagation, tropo scatter, long-haul sea ducting and who knows what else. So, let's get going and keep me informed of your progress as well as your setbacks. Exposure in these pages is certain to encourage others to join you, the latest group of amateur pioneers, in exploring our new frontier.

ON THE BANDS

6 Meters — For most of us, the propagation mode dominating in April and early May was aurora although Es began to make its appearance also. With the return of high solar activity has come buzz mode openings like old-timers had all but forgotten and newcomers couldn't even imagine. WA3AIT reports from western PA on auroras occurring April 10, 11, 13 and 19. Ed says that on the last occasion he observed what appeared to be backscatter while working WA2OMU and K2RZI with his beam aimed to the west and theirs pointed north. Signals ranged from below audibility to S9+ with no auroral flutter apparent. Another aurora which took place the evening of April 23 was reported by WA8TTS. Tom notes working 17 stations from IA to ME on that occasion, as well as observing signs of apparent Es propagation. As many old-timers know, aurora on 6 can often lead to one type of sporadic E.

Widespread Es of the kind we would expect to see in June or July made its debut April 30/May 1. K5ZMS, San Antonio, says the band was open for several hours Sunday afternoon (April 30) and about six hours that evening. Worked were northern and central 4s along with 8s and 9s. Later in the evening 8s in CO were very strong. Ray reports working one 0 using a 502 on its built-in whip. So he whipped out (ouch) his 502 and made a whip-to-whip QSO! The regular Sunday even-

ing SMIRK Net had check-ins from FL to WY. Quite a show so early in the season. WA4MVI, Hendersonville, NC, also reports the Sunday evening opening and notes that it correlated with a patch of severe storm activity situated about 600 miles S.W. of his QTH. Readers may recall that Jim's theory on the connection of Es with severe storm activity was mentioned in last month's column. A veteran 6-meter operator with similar ideas is Mel Wilson, W2BOC.

While the rest of us wait, not so patiently, the southern part of the U.S. continues to cash in on international DX afforded by the rise in solar activity.

Two avid vhf men, YV6ASU, seated, and YV5ZZ, standing, in the shack of YV6ASU.



WB5JHG reports from Houston that on April 15 five stations in his area worked LU3EX. One was K5PTG who was running 10 watts to a Squalo sitting on the shack floor! WB5JHG also recounts some fine results he had using a barefoot 620B and Squalo mounted on his car during a recent trip to Dallas and back. Ground-wave contacts of up to 200 miles were maintained and on the return trip, Pat caught the April 30 Es opening which netted him seven states from the mobile.

From Pyong-Taek, Korea, HL9TG writes that he is active on 6 meters with an SB110 to a Squalo but hopes to put up a log periodic soon. Since getting on in March, 1974, Gary, who's stateside call is WA7NTF, has been working lots of JAs as well as DU, KG and more recently VK. Between March 25 and April 20 alone he reports contacts with 18 VKs above 52 MHz. HL9TG would like to know the gang's opinion with respect to his intention of putting on a new HL9 beacon. Those wishing to advise him may write Sgt. Gary Kohtala, 536-60-4911, USAFS, Korea, Box 194 APO, San Francisco, CA 96271. Also from the Far East, JAILZK writes that conditions are the best since he began 6-meter operation 15 years ago. In addition to some 50 VKs, Hiro mentions contacts with P29, YJ8, FK8 and 3D2 by himself and many other JAs. He is looking forward to a repeat of last year's openings between Japan and the U.S. and notes that, many times last year when 50 MHz opened across the Pacific, 10 had been good the evening before over essentially the same path. He urges that Ws look for similar conditions this year.

LU3EX, Buenos Aires, has been keeping track of

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730, or call 301-384-6736 and record your message.

recent 6-meter openings. His data, forwarded by KZSMS, SMIRK no. 1, show that between March 1 and April 23 (54 days) some kind of DX was heard or worked from his area on all but 14 days. Most of the time TE appeared to be involved but in some instances F2 was probably responsible. Some of the calls which dot LU3EX's very detailed report are KZ5NW, KH6IAA, XEJGE, KH6HI, PY5NV, PY2BBR, KP4AAN, KP4EPM, TI2HL, KV4CH, KP4AYA, HC6SS/YV6, YV6ASU, VP2LAW and (beacon) KH6EQI, TI2NA and 6Y5RC, as well as a raft of Ws, most of them in the 5th and 6th call areas.

Several interesting reports of TE and apparent F2 in Africa and Europe have been received from ZE2JV and ZS6PW via KZSMS. Among the highlights are reception by Z33AK of the FX3VHF beacon on 50.104 between 1200 and 1500 UTC and by ZS6PW between 1450 and 1620 UTC, April 9. At 1220 the same day, the ZS6PW beacon operating on 50.029 was reported heard by G4BPY. That's a path of about 5700 miles.

From Brazil, PYINEW reports that he and PYIRO are active on 6 sharing a 620B. RO is on weekday evenings from 2300 UTC while NEW holds forth on weekends. They usually work 50.0 to 50.15. PYIRO has already worked WA5HNK and K5LZO and heard KZ5NW as well as the TI2NA beacon.

2 Meters — As reported in the 6-meter section, aurora has returned with a vengeance. After several lean years during solar activity, the buzz mode is again a major factor in the vhf propagation picture. As an example, look at the report from VE1ASJ, St. John, N.B. Andy, running just 83-watts output to a single KLM 16-element beam at 20 feet, had 300 auroral QSOs during April and observed openings on one-half of the days that month. To illustrate the intensity of some openings, WA2ANZ, Middletown, N.Y., reports that he was one of the 300 who worked VE1ASJ. What is noteworthy is that Mike was running just 3 watts to a

single 11-element beam. QRP does work even on aurora! The big solar flare of April 28 apparently produced the aurora which hit May 1-2. WA4MVI, Hendersonville, NC, says it even reached down there. Jim worked 20 stations in the 1st, 2nd, 3rd, 4th, 8th and 9th call areas including WB4NMA, Gainesville, GA. WA4MVI has been making measurements of solar noise using his 2-meter 160-element collinear EME array. He says that the chart for the 28th indicated that something was going to happen, and it did.

The southeastern part of the country well-known for fine tropo, put on another of its shows the night of April 29-30. WA4LYS, Jacksonville, FL, reports working 38 stations in four states from Mobile, AL, to Corpus Christi, TX, beginning about 2300 local time and lasting well into the night. Paul is a very enthusiastic convert to 2-meter ssb. And from the West Coast, the famous duct to KH6 came early this year, opening up the evening of May 8. Signals were not up to past occurrences but a number of QSOs through the 22/82 HI repeater were made. At least two, K6DYD and WB6NMT worked KH6IAA mobile on Monaloo via ssb.

A third part of the world has joined the Western Hemisphere and the Western Pacific in cashing in on 2-meter transequatorial propagation. ZE2JV, Salisbury, Rhodesia, reports working SV1AB near Athens, Greece and 5B4WR on Cyprus. Signals were quite weak with severe flutter and wide frequency spread. Several such contacts were made from April 9 to 12 between 1700 and 1800 UTC.

In addition, I am informed that ZS6LN, Pietersburg, R.S.A., heard the 5B4CY beacon on 144.139 at 1639 UTC April 11. The path length is 6340 km or 3940 miles, essentially the same distance as that between KP4EOR and Mar del Plata, Argentina.

ZW2JV's description of the TE signals fits well with various other amateur observations as well as with several professional measurements. These appear to

offer a good explanation for the propagation phenomenon which hams have been enjoying. Look for more about this in a future column or full-length QST article.

In its May 1978 bulletin, SWOT has announced its support of the basic band plan put forth by VUAC Chairman W1JR, and outlined in last month's column. This involves a calling frequency at 144.2 MHz with local ragchewing taking place above 144.2 and weak signal DX occupying the space below that frequency. SWOT is also proposing that nets meet on 144.250. By the time this appears in print, we should have an idea of how the new scheme is going to work. If we all follow the plan, the new arrangement should prove a real boon to 2-meter operation. SWOT is to be commended for its stand. With its leadership and the cooperation of all dedicated 2-meter operators, we can have an orderly and enjoyable band on which to pursue our various interests.

1-1/4 Meters — According to the *Northeast VHF News*, 1-1/4 seems to be picking up now that the CB scare appears over. The trend is definitely to ssb as witness WA1WEH who is mixing up to 220 from his FT 221. It is warned, however, that anyone trying this be careful to filter the 228 MHz, third harmonic of the 76-MHz transfer oscillator.

EME on 1-1/4 got a boost on April 18 when K5FF, NM and K7NII, AZ, made the grade. The rig at K5FF/W5FF is 500 watts to a 32-foot dish while, at the AZ end Tom is running 800 watts out to eight EYES. The next evening Fred, W5FF, also made a contact with K7NII. Fred and Lee were pleased and surprised to experience no birdie problems from channel 13 despite the sked frequency of 220.022.

K4GL, SC, is all set up with high power and a good antenna and is looking for 1-1/4-meter schedules.

70 Cm — In response to the comment by SM7BAE in the May column concerning the lack of information on 70-aurora contacts, WB0SBG, Ames, IA, passes along this note about the aurora of April 11. Sean was able to contact both W9JLY and K8WW. The latter is at 600 miles, which WB0SBG thinks is about the limit for 70-cm aurora. Can anyone provide any dope on greater DX via this mode? During the big aurora of May 1-2, WB0SBG was at it again, this time hooking up with W0LZO, NE (20 watts); WA9AAG, IL (30 watts); K8IE/9, IL and K8WW again this time on ssb. Sean said that Dave's 70-cm ssb was not any harder to read than 2-meter signals were at the time. It appears that many of us are missing a bet when buzz signals are good on 2 meters by not watching 70 cm a little closer.

EME continues to gain converts. One of the latest appears to be W7UBI, ID. Keith has a 24-foot dish and a 0.9-dB preamp. The RIW amplifier should be ready by the time you read this. How long will it be before the first 70-cm WAS?

MAN-MADE IONOSPHERE — A POSSIBLE BOON TO VHF AMATEURS

The United States Air Force has announced that it will initiate a series of ionospheric modification tests this summer. These tests, similar to those documented in "Communicating at VHF via Artificial Radio Aurora," QST, November, 1974, are being conducted by the Institute for Telecommunications Sciences using the ionospheric heater at Platteville, CO, on behalf of the Air Force's Rome Air Development Center. As this is being written, it is understood that the tests are tentatively scheduled to occur during three successive, two-week periods starting approximately June 15, July 15 and August 15 of this year. Amateurs throughout the southwestern part of the United States, from Mississippi to California, and northern Mexico may experience unusual propagation conditions on all bands up to the 70-cm band and perhaps higher. Listen to the regular W1AW official bulletins for more detailed scheduling information. Send along any reports of how you make out. I'll publish a summary in a forthcoming column.

ANOTHER 2-METER WAS

The second 2-meter WAS has been claimed by K5CM. Connie traded the trick April 23 by an EME contact with WA0LPK/KL7. He had missed by a hair when K6YNB was operating in AK in August, 1976, but this time he made it. Incidentally this makes K5CM the first to hold WAS on two vhf bands. Connie is already a 50 stater on 6 meters. Congratulations are certainly in order.

With all of the EME activity now on or coming on 2 meters, it should only be a matter of time before we have a dozen or more 2-meter WASs. A look at the standing box in this column shows that quite a few are close.

Two-Meter Standing

Figures are states, call areas and best DX in miles.

K1WHS	49 12 10749	W3IWI	28 8 1200	W6WSQ	16 4 1390	WA9EUA	35 8 881
K1MNS	42 11 5069	W3LNA	27 8 970	WB6NMT	15 4 1250	K9OXY	34 9 1350
K1FO	40 10 4500	K3CFA	25 8 1200	K6HAA	13 4 2580	K9KOR	34 8 1105
W1JR	38 10 2674	W3ZD	24 8 1350	K6JYO	13 4 1240	W9PBP	34 8 820
K1HTV	38 9 2616	W3AJUF	22 8 1350	W6AJRA	11 5 2591	K9VWY	30 8 1052
WA1OUB	36 8 1525	W3KFP5	22 8 1200	K6HMS	11 4 1258	W9UDJ	29 8 1000
W1FZA	35 10 2750	W3TFA	21 8 1342	K6GAA	6 5 2500	K9RVG	22 7 1100
W1XU	35 8 1478	K3OBU	21 7 930	N6TX	7 4 5500	N6JA	50 12 4607
K1PXE	35 8 1400	K4GL	46 11 4850	K7CAD/6	6 2 —	K6MQS	50 12 8008
W1AZK	34 8 1412	WA4MVI	45 10 12000	K7NII	40 11 8950	W0LER	46 10 1620
K1BKK	33 8 1450	WA4GPM	42 10 4200	W7NKYZ	30 10 6000	W0EMS	44 10 1320
W1JSM	33 8 1440	K4IXC	40 10 4850	W7BJU	30 10 2000	W0DAS	43 9 1260
W1YTW	33 8 1430	WA4JQ	40 10 2000	W7CJ	28 9 2200	K0CJ	42 9 1450
K1UGQ	30 8 1370	W4DFK	39 11 12000	W7JF	28 9 1320	W0RLI	42 9 1345
W1VTU	29 8 1296	WA4CQG	39 8 1350	W7VEW	24 7 1300	W0DGY	41 9 1300
W1AAI	28 7 —	W4HKK	38 9 1280	WA7BBM	21 7 2175	W0PJ	37 10 1446
W1FHJ	27 8 1300	WD4GXN	37 8 1255	K7CVT	20 5 1325	W0PVP	35 9 1380
K1MTJ	26 7 1250	K4QIF	36 8 1225	K7CIE	19 4 1278	W0ENC	35 9 1380
W1HDQ	24 7 1040	W4VHH	36 8 1125	K7CVT	18 5 1370	W0PN	35 9 1187
K1RJH	22 7 1450	W4WD	35 8 2727	K7QXA	13 4 1259	W0OHU	33 9 1203
K2RTH	44 11 11000	W4ZD	35 8 1440	W8WN	47 10 10500	W0SD	32 9 1312
W2AZL	41 10 3770	W4AMKJ	34 — 1285	K8AT	45 10 10100	WB0WFY	29 8 1254
WA2BIT	39 11 10000	W4FJ	34 8 1150	K8AXU	38 8 1275	WB0BVC	28 8 1181
W2CUX	38 8 1334	K4KAE	33 8 1200	W8IDU	38 8 1150	K0TLM	27 9 1230
W2NLY	37 8 1300	W4ISS	33 8 1600	K8KJN	38 — 1152	W0DRL	27 9 1295
W2CXY	37 8 1360	K0RHJ4	32 8 1475	W8IDT	36 8 1150	K5BXG/0	26 9 1149
W2ORI	37 8 1320	K1FJM/4	31 8 1190	K8HVVV	36 8 1100	WB0BVC	26 8 1181
W2BLY	37 8 1150	W4LNG	30 8 1330	W8YIO	36 8 1100	W0VB	25 — 1606
WB2WIK	35 8 1650	W8ANMA	30 8 —	K8DEO	35 8 1200	W0IUT	24 8 1312
WA2FGK	33 8 1340	W4AWS	29 8 1350	WABPE	34 8 1100	KH8NS	3 2 6000
W2GRS	30 8 1230	K5CM	50 12 4600	W8BGI	33 8 1125	K0YNB/KL7	15 11 2800
W2EUV	29 8 1232	W5ORH	48 12 4800	W8NOH	33 8 1185	VE1ASJ	18 6 —
K2GEH	29 8 1200	W8SLUA	47 11 3797	W8ABLL	28 8 820	VE1ZN	7 2 500
WB2VWV	28 8 1350	K5MB	46 12 4500	W8HTL	27 8 1102	VE2DFO	41 10 10800
W2UZL	27 8 1310	K5SV	43 10 1490	W8TIU	24 8 1000	VE2JU	32 8 1300
K2OVS	27 8 1250	W5UGO	43 10 1398	W8KBC	24 7 900	VE2HW	18 6 800
WA2PMW	28 8 1245	K5MWH	42 10 1609	K8ZES	22 8 675	VE3ASO	38 9 2140
W2CNS	27 8 1150	W5RCI	42 9 1200	K9HMB	49 12 9894	VE3BQN	37 8 1250
K2DNR	27 7 1200	W5FF	41 10 3261	W9ADOT	48 12 9909	VE3DSS	37 8 1203
WB2TGC	25 8 1250	K5FF	40 9 3261	K9CA	46 10 1888	VE3FN	34 8 1300
WB2CUT	25 8 1200	K5WXZ	40 10 1450	K9UIF	45 10 1874	VE3EJC	33 8 1283
WB2SIH	25 6 1000	W5HFV	38 10 1285	W9YF	44 10 4500	VE3AIB	29 8 1340
WA2UDT	24 7 1020	W5FF	38 9 1950	K9CT	42 9 1100	VE3EVW	29 8 1100
WA2EMB	23 6 1335	W5HN	37 10 1500	K9SGD	42 9 1300	VE3EMS	27 8 1100
K2BWR	27 7 1350	K5FF	36 8 1960	K9AAJ	41 9 1200	VE3FKX	27 7 1070
K2DWJ	23 5 860	W5SWV	34 8 1260	W9GAA	41 9 1200	VE3AQQ	18 8 1300
W3BHG	40 10 2488	K5VWV	33 10 5200	W9OII	41 9 1156	VE7BQH	12 3 7900
K3CQC	37 8 1375	W5AHNK	33 10 1540	N9SS	41 9 1010	VK3ATN	4 4 10417
K3CFY	37 8 1250	W5UJK	33 9 1290	K9AAG	41 9 1200	VK3MC	7 7 10000
W3RUE	36 8 1250	K5BMG	31 8 4100	W9WJH	41 —	W1NU/VP9	8 3 800
K3AF	33 10 2500	K5PTK	29 9 1350	W9UD	39 9 1600	SM6CKU	4 4 4200
K3WHC	33 8 1700	W5BKY	29 9 1407	W9OJ	38 9 1400	SM7BAE	15 9 11055
W3OMY	33 8 1200	W5UWB	28 7 1857	K9UNN	38 8 1046	ZL1ZR	2 2 11055
W3BDP	32 8 1275	W6SXD	25 6 1265	W8JRN	36 9 1268		
W3TMZ	31 9 2410	W6PO	32 10 8000	W9IP	35 8 1030		
WA3UFU	31 8 1280	K6QEH	21 10 5500				
W3XO	31 8 1200	W6GDO	18 5 1326				

Gilchrist — One Ham's Dominion

Next time you're sitting transfixed in front of the tube, watching "Charlie's Angels" do their thing and you don't even have enough energy to get another beer from the fridge (even during the commercial), consider this:

Dave Myers, WD4IHA, is the only active amateur in the entire Florida county of Gilchrist. Dave Myers has been licensed only a little more than a year. Dave Myers is an ARRL emergency coordinator. Dave just turned 17.

"I claim WD4IHA as the youngest emergency coordinator in the U.S. and Canada," says AA4FG, Northern Florida section emergency coordinator. "Dave received his EC certificate at age 16 and reached his 17th birthday on May 5, so I make this claim until someone proves differently." It should be pointed out that Dave received the EC appointment because of a combination of factors, mainly his excellent leadership skills. Youth was only one of the criteria.

Presently Technician class, Dave will probably have attained his General by the time this appears. The fact that amateur radio is the hobby he enjoys the most probably won't come as a shock to the reader. He coordinated local participation in the Simulated Emergency Test in January (results this issue) and, believe it or not, he is now in the process of organizing a Novice course. Thirty people have signed up; 10 of them Dave describes as "really gung ho."

There is irony here, because Dave says that "I was fully capable of passing the Novice at age 12." The problem was that he didn't know any local hams who could or would serve as a volunteer examiner. Nowadays, the ARRL Club and Training Department has alleviated that complication by matching up prospective

hams with one of the over 5000 volunteer instructors.

In any event, Dave initially became interested in amateur radio when he was 12, after his parents gave him a shortwave radio which covered some of the ham bands. He learned code by sending to a tape recorder and playing it back. His theory training commenced when he accidentally discovered some ARRL publications in a radio store in Gainesville, FL.

Ultimately, he managed to contact some real-life amateur radio operators, but it wasn't easy. His father tipped him off to the fact that someone employed by a prison (no kidding) in nearby Cross City was a ham. So Dave embarked on a letter-writing campaign to this penitentiary, and finally after months had gone

by, his letters reached Jerry, W8VYG/4, who taught electronics there. Through this ham, Dave became acquainted with another Cross City amateur, Glenda, K4KRU, who at the time was emergency coordinator for Dixie County. Jerry served as his *Elmer* for the theory, while Glenda helped out with the code duties. Shortly thereafter, Dave became WD4IHA. Later on, he passed his Technician exam at the FCC office in Tampa. And as they say, the rest is history.

Within a month of receiving his Tech, Dave managed to give about 30 amateur radio demonstrations — approximately 300 people in Gilchrist County were exposed to ham radio for the first time. Presently he is trying to establish a club at school. He is doing all this while pulling good grades at Trenton High.

As an EC, Dave works closely with the county sheriff's office, the Red Cross, c.d., and search and rescue. He is a captain in the Gilchrist County Sheriff's Explorer Deputy Team and hopes to become associated with emergency services full-time, when his education is completed. As a Novice, Dave built an HW-8 QRP transceiver. Lately, his activity has been mainly on 2-meters, using a converted business-band rig, but he does monitor the novice nets on 80 meters as often as possible.

When asked what his most vivid impression of our hobby/service is, this enthusiastic and energetic young amateur immediately replied that "there is definitely no generation gap in amateur radio." If a gap does exist, it might be called an activity gap. While WD4IHA is a relative newcomer to hamming, he already has become a part of the fine tradition of operating in the public interest. He is also having a good time!



WD4IHA (AA4FG photo)

PUBLIC SERVICE DIARY

□ Campbell Co., KY — December 21. Northern Kentucky and Cincinnati, OH, hams assisted the Red Cross in the search for a missing five-year-old child. A portable ham unit was assigned to each search team which combed 20 square miles of rural countryside for three days. (WA4KUB)

□ Miami, FL — April 2. WB6MID/8R3 broke into K4GGX's QSO seeking assistance for a five-year-old boy who had suffered a serious concussion. A Guyanan rescue center was contacted and instructions were relayed to help save the boy's life. (WD4KRZ)

□ Lansdale, PA — April 6. WB2RBG received a call from a Venezuelan ham seeking a drug to save the life of a woman who had slipped into a coma after undergoing open-heart surgery. The drug was located and arrangements were made with the Venezuelan Embassy to fly it to Caracas. (WB2RBG)

□ Caribbean Sea — April 13-14. W3KVG and WB4ITO heard the distress call of a yacht foundering in the Caribbean and maintained contact with the vessel for many hours until the Columbian Navy came to the rescue. (W3KFH)

□ Medina, OH — April 15. W8HPD, WB8UIN and WA8MHO have conducted a regular sked with CE3EQ to relay information to a Medina woman about the condition of her brother-in-law who had undergone brain surgery in Santiago. (WA8MHO)

□ Repeater Log. According to reports received to date, repeaters and fm simplex frequencies were used in conjunction with 107 vehicular emergencies, nine

weather emergencies, seven fires, four crime reports, four searches and rescues, three medical emergencies and four miscellaneous incidents. Repeaters involved were WR1s ABU ADE ADR AGN AHQ, WR2ADM, WR3s AAD ALJ, WR4s ABN ACB ADD AGN AHL AID AJJ ALW, WR5s ABA ABY AFN AJG, W6IYY/RPT, WR6s ABD ADE AEZ AWM AZO, WR7s AEL AFN, WR8s ABC AGR, WR9s ABY AGS AKX, WR0s AFW AGR.

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Sudbury, MA — March 23. A doctor in Guyana

sought the advice of a cardiologist to help save the life of a 33-year-old man who had gone into cardiac arrest. WA1OJ heard the SOS, contacted a Boston doctor, and the patient was saved. (W1ALP, SCM EMass)

□ Shalimar, FL — April 5. A propane gas tank exploded seven blocks from the Okaloosa County c.d. center and quickly area hams established communications from the scene to aid rescue and relief efforts. (WB4PGQ, EC Okaloosa Co.)

□ Nassau Co., NY — April 9. The Long Island ARC provided communications for medical teams and ambulances stationed along the route of the Nassau County Marathon. In about 20 cases, ambulances

The ARRL Ham Radio Newsline: 203-667-0138

Our Public Information Office's 24-hour Newsline should be used to report items of interest to the general public, so that this information can be passed on to the news media. News dies a quick death, usually within hours, so please call before, during or immediately after the newsworthy event.

We suggest that you write down the essential details of the event before calling and when you do call, please follow the directions on the recorded message. Don't forget to sup-

ply your name, call, address and telephone number(s) where you can be reached. Names and phone numbers of other contacts in your area would also be appreciated. Remember, your story is for the public at large, which for the most part, is unfamiliar with amateur radio. So, for publicity purposes, names are more important than call signs.

Please note: In order to have *emergency communications reports* duly covered in the Public Service Diary or elsewhere in QST, follow up your phone call with a *complete written report*, directed to the Communications Department. — K1XA



Base station for emergency communications in muddy, rain-damaged Hollywood Hills, manned by (l to r) Jim Tadevick of the Associated Blazars of California Alert Team (4-wheelers); Joe Oliveira, WB6BJM (owner of repeater, WR6ABW which served the large group of volunteers); Dr. William C. Adler, WB6DLI; Mike Ramirez, W6YLZ; Steve Miller, WB6GXW; and Ms. Hunter Sheldon, assistant director of California Conservation Project and dispatcher commander. (photo by Bob Jensen, W6VGG)

were dispatched by hams to aid runners with various medical complaints. (K2MZ, EC Oyster Bay Village)

□ SEC Report. For April, 34 SEC reports were received denoting a total ARES membership of 14,941. This represents a 6 percent decrease in reports received one year ago (36), but a 17 percent increase in ARES membership (12,765). Sections reporting were Alta, Ariz, Ark, Colo, Conn, ENY, EMass, EPA, Ga, Ind, Kans, Me, Mich, NC, NNJ, NFla, NTex, Ohio, Ont, Org, Oreg, SDgo, SF, SJV, SBAR, SCV, Sask, SFla, SNJ, Utah, Va, Wash, WV, WMass.

NATIONAL TRAFFIC SYSTEM

W2RQ has succeeded N2YL as manager of 2RN-D. Linda has gone on to bigger and better things (see TCC section). Solar activity caused some problems on the nets; conditions during the day seemed to be worse than during the evening. W3NEM has a few chaps on his 3RN net control roster who are in the 14-16 age group! This was *not* a banner month for reports making the deadline.

April Reports

Area Nets

(evening sessions)	(daytime sessions)						
1	2	3	4	5	6	7	
EAN	30	1792	59.7	1.475	100.0		
EAN	56	507	9.1	4.78	79.2		
CAN	30	1029	34.3	.910	99.4		
CAN	57	417	7.3	.301	91.6		
PAN	30	1133	37.8	1.169	98.3		
Region Nets							
1RN	87	717	8.2	.504	94.6	87.9	
2RN	113	845	7.5	.540	88.9	84.4	
3RN	91	408	4.5	.418	99.2	95.6	
4RN	115	1197	10.4	.409	69.5	95.5	
RN5*	30	358	11.9	.407	81.2	95.5	
RN6	91	752	8.3	.448	90.9	100.0	
RN7*	60	480	8.0	.582	93.0	98.3	
8RN*	56	316	5.6	.310	84.4	91.1	
9RN	120	501	4.1	.319	90.5	93.3	
TEN*	60	336	5.6	.353	86.6	93.3	
ECN						100.0	
TWN	90	536	5.9	.341		96.7	
TCC							
TCC Eastern	113'	671					
TCC Central	78'	449					
TCC Pacific	111'	748					
Sections*	4917	19438	8.5				
Summary	6033	32354	5.4				
Record	6256	36620	19.1				

TCC

TCC Eastern	113'	671
TCC Central	78'	449
TCC Pacific	111'	748
Sections*	4917	19438
Summary	6033	32354
Record	6256	36620

*Incomplete report

†TCC functions not counted as net sessions.

‡Section and local nets reporting (159): BCEN (BC), MEPN MMN MSTN MTN WRSIN (MB), APN (Mar/NFLD), CMN GBN GBSSN ODN OPN OSN OLN (ON), WQV/UHF (PO), SATN (SK), AENB AEND AENM AENS (AL), ASN (AK), ATEN HARC (AZ), AMBN APN

ARN OZK (AR), NEN SDNN SCN (CA), HNN (CO/WY), CN CPN NVTN WESCON (CT), DEPN (DE), FAST FMTN FPON GN PBTN QFN SPARC TPTN (FL), CGVHFN CVEN GARES GGN GSSBN GTN WGN (GA), PTN (HI), IMN MTN (ID/MT), ILN IPN (IL), INTN ITN QIN (IN), I75MN TLOC (IA), KPN KSNB (KS), KNTN (KY), LAN LRN LSN LTN (LA), CMEN MPNS MSNPTN SGN (ME), MDCTN (MD/DC), EMRIPN EMRI-SS EM2MN HHTN RIEM2MTN WMPN (MA/RI), MACS MI6M MNN QMN WSSBN (MI), MSN MSPN-E MSSN PAW (MN), MN MSBN MTN (MS), MOSSBN PHD (MO), CHN MNARES2MN NARES75MN WNN (NE), NHVTN (NH/VT), NMRRN SWN (NM), MCN NJN NJPN NJSN (NJ), NLI NLIPN NLIVHF WDN (NY), A2MN NCCSSBN SCSSBN THEN (NC/SC), ONN OSN (OH), OAN OLZ OPEN OTWN STN (OK), ARESTN BSN JGARES LBARES OSN WCN (OR), EPA EPAEP&TN PFN PTTN WPA WPA2TN WPA2MTN (PA), SDN (SD), TN TPN (TN), HCN TEX TTN (TX), BUN UCN (UT), SVSN VFN VN VNTN VSN VSN (VA), NTN WSN (WA), WNN WVN WVPN (WV), BEN BWN WIN WNN WSSN (WI).

- | | |
|--------------|------------------------|
| 1 — NET | 5 — RATE |
| 2 — SESSIONS | 6 — % REP. |
| 3 — TRAFFIC | 7 — % REP. TO AREA NET |
| 4 — AVG. | |

Transcontinental Corps

N2YL has been appointed daytime TCC Director for the Eastern Area. She and W9NXG (Central Area TCC Director for the daytime cycle) are hard at work organizing initial skeds. If you are available during the day, please let Linda or Ward know.
W1KX received his first annual TCC-E certificate. W2RQ his tenth and K3NGN his numero uno. W7VSE and WB4TAQ received TCC-P certificates.

	1	2	3	4	5
Eastern	120	94.2	877	671	
Central	90	86.6	877	449	
Pacific	120	92.5	1496	748	
Summary	330	91.1	4184	1868	

- | | |
|------------------|------------------------|
| 1 — AREA | 4 — TRAFFIC |
| 2 — FUNCTIONS | 5 — OUT-OF-NET TRAFFIC |
| 3 — % SUCCESSFUL | |

TCC Roster

The TCC Roster (April): Eastern Area (VE3SB, Dir.) — W1s KX NJM QYY, WA1ZAZ, K1s BA EIR GN PAD SSH XA, W2s CS FR GKZ MTA RQ, WA2ICB, N2GM, W3s PQ YQ, K3s KW NGN, N3HR, W4s SQQ UO, K4s BIX KNP, N4KB, W8s LTAJ2 PMJ, K8KMQ, VE3s GOL SB. Central Area (W5GHP, Dir.) — W4ZJY, W5s MI RB, K5s GM MC TTC, N5s TS YL YXW, W5s HNN IQU, WBSFDP, W9s CXY DND FC NXG, N9TN, W9s AM HI, WA9TNN. Pacific Area (K5MAT, Dir.) — N5MR, W5KH, K5MAT, N6s GW WP, W6s EOT MLF OA VZT, K6HW, KH6IUQ, N7NO, W7s OZX EP GHT VSE, K7IWD, W9s ETT IW LQ, K9s BN DJ TER, WB9TAQ VE7ZK.

Independent Nets (April)

1	2	3	4
Amateur Radio Telegraph Society	30	426	410
Central Gulf Coast Hurricane	30	196	2577
Clearing House	29	295	451
Empire Slow Speed	30	99	395
Hit & Bounce	58	1031	396
North American SSB	23	193	240
North American Traffic and Awards	30	35	835
Southwest Traffic	30	172	1115
20 Meter ISSB	28	551	508
75 Meter ISSB	30	742	1168
7290 Traffic	40	335	2104

- | | |
|--------------|---------------|
| 1 — NET | 3 — TRAFFIC |
| 2 — SESSIONS | 4 — CHECK-INS |

Public Service Honor Roll April 1978

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw

nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points. This listing is available to Novices and Technicians who achieve a total of 20 or more points.

72	N4NK	K4JGW	WA7JRC
W5KLV	WB4QBB	WA4YIU	K9DAC
64	N4WA	K7GXZ	W9NXG
WA5RKU	W5GHP	WA7MEL	43
K5OWK	W6OA	WB7YQ	W4FMN
W7VSE	WB8MTD	K8DJ	WB4OXT
WB6ZAL	WB8YDZ	48	WB5LT
62	WB9HOX	VE3FGU	WB5RPU
WA4CNY	55	WA2MSO	WA5RVT
N5ES	WB1ELP	K5HN	K5SOR
WB5NKD	WA5JWD	47	K6PIZ
61	W6RFF	VE3GOL	42
K1BA	54	K1UZ	WA2YGI
W1RWG	N5TC	WA3NAZ/4	WA4OEM
WA1UNC	WA9QCF	WB8FTY	WB5AHH
WA1UWF	53	WD9AUD	WB5SDD
WA1VEI	W2XD	K9EF	WA5VBM
WA1ZAZ	N5YL	46	41
WA2ERT/1	WD9CQC	K3JL	K3NGN
N5T6	52	WB4KSJ	W4ZJY
N6CY	W4MEE	W5BGE	WB4ZQJ
WA6UAZ	WB6PVH	WB6VJW	WD5AAT
K8LGA/4	WB6SHD	45	K5OEW
W8SOP	WB6DMX	WB9KPX	WB7JK
59	50	44	K6JTW
WB2KIH	W1HXR	VE1LCR	K6PVI
WA4JDH	WA2JKG	VE1RO	WB6VHN
WB5NKC	AA4NC	VE3FHZ	40
N5RB	N4PQ	VE4IZ	WA3YDC
K5TL	WA5YEA	VE4QU	K3YL
57	49	WA1MJE	NG6W
VE3GT	VE1GW	K1OQG	31
WA2NPP	VO1FW	WA1QFX	WD4LUG/N
K2VX	VE3DPO	WA1YMN	WAMHO/T
58	VE5AAE	WB3A0B	25
VE4PG	WA1HYN	K4EV	WA4QGV/T
W1KX	K1PAD	WD5BDC	22
W1TN	N1RI	WB5JOV	22
WA3YEQ	W3YQ	WB5LBR	WA4MJT/T
K4BKX			

Brass Pounders League April 1978

BPL Medallions (see December 1973 QST, page 59) have been awarded to the following amateurs since last month's listing: N2TW, WA9QIT.
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.

1	2	3	4	5	6
W3CUL	517	2290	2519	86	5412
W4DUG	1232	42	1237	1	2512
W0WYX	54	1207	502	705	2468
K3NSN	1521	200	195	5	1921
WA4JDH	3	813	818	4	1638
W3VR	312	307	509	15	1143
K1BCS	190	338	517	31	1076
W92GQ		609		263	872
W4MEE	2	387	357	12	758
WA0AUX	46	254	409	7	716
W9JIJ	23	331	319	12	685
W7DZX	21	311	320	2	654
WA3ZRY	52	275	292	33	652
K5OWK	285	26	314	5	630
WB2KIH	13	247	231	54	545
N4PO		246	275		521
W5KLV	11	290	192	25	518
WB9YXN	58	217	228	11	512
W7VSE	25	213	235	30	503
K7VWA	55	256	50	142	503
WA0RWM (Mar.)	55	573	14	558	1200
WB2KIH (Mar.)	40	359	387	62	843
WA2SPL (Mar.)	1	249	266	34	550

BPL for 100 or more originations-plus-deliveries

K1DFS	279	WA9VRE	118
WA3ATQ	240	W7SQT	112
AA4FG	225	K4KA	110
W7TZK	171	VE3GOL	108
K4KDJ	165	WB6SHD	102
WB4TZR	143	N1NH (Mar.)	150
WB9ZAL	122		

- | | |
|-----------|-----------|
| 1 — CALL | 4 — SENT |
| 2 — ORIG. | 5 — DEL. |
| 3 — RCVD. | 6 — TOTAL |

Results, 1978 Simulated Emergency Test

By Robert Halprin,* K1XA and Stan Horzepa,** WA1LOU

Ben Franklin once said that nothing is certain in life except death and taxes. As great a philosopher as he was, he forgot the third certainty — a blizzard on the ARRL Simulated Emergency Test weekend. For the second consecutive year, a real snow emergency clobbered the Midwest just in time for SET (January 28-29). Thousands of amateurs, many of them newly licensed, exercised their HTs and low-band gear to prove that amateur radio is *the* emergency service, whether it be practice or the real thing.¹

Getting down to cases, overall net activity, mainly liaising with ARRL's National Traffic System (NTS), showed a 69 percent increase! Local activity, largely under the auspices of the League's Amateur Radio Emergency Service (ARES), increased by 19 percent. Emergency-powered net stations increased by 78 percent, emergency-powered ARES stations by 21 percent. Local participation grew by 34 percent and traffic handled skyrocketed by 84 percent! This was a tremendous SET, even if parts of it were a "disaster." Judging from the input, it seems to be the newer members of the amateur fraternity who are largely responsible for walloping last year's record-breaking totals. Check the summary boxes for further reports.

The results that appear on these pages represent either traditional SETs, combined emergency and simulated activities or rescheduled SET activities, depending on what the ARRL field officials involved reported to us. We are pretty liberal, y'know. And our two-month leeway program for SET exercises (any two-day period between January 1 and February 28 counts) also helped maximize activity.

Move It to October?

Many SET participants have suggested

that this annual event be held in a better time of year, weather-wise. As ECAC member WA4PBG has said: "Weather has a bearing on the type and extent of any exercise. A more reasonable expectation of favorable weather lends itself to more varied scenarios and a wider range of outdoor activities and possible greater participation in SET by amateurs in general and the public." [Including the *media* — Ed.] The Emergency Communications Advisory Committee is now studying the possibility of returning SET to October, when it was originally held in the first place. How do you feel about this? Let your ECAC call-area representative know your opinion — his name and address can be found on page 64 of May 1978 *QST*. Any other suggestions for

changes in SET procedures can be routed to the ECAC or the Communications Department as well.

Of course, not everyone was affected by the snows. Most groups were able to hold old-fashioned *simulated* emergencies with obviously good participation and good results.

The National Traffic System schedule used in 1978 was based on an official recommendation made by the Central Area Staff of NTS. No one ever seems to be completely satisfied with the schedule that is implemented in a given year, but it seems, at least from here, that this NTS contingency emergency plan didn't work out all that badly, when augmented by additional net sessions at the discretion of the net managers.

The Pasadena, CA, Radio Club and the Pasadena chapter of the Red Cross teamed up for the SET. From left: W6HAH, W6ZH, Joshua Potter (Red Cross disaster coordinator) and N6JA operate from the chapter house. (Walt Mancini, Pasadena Star-News photo)



*Assistant Communications Manager, ARRL

**Communications Assistant, ARRL

¹*QST* will chronicle the amateur performance during the genuine emergency, plus the subsequent East Coast onslaught, in a future issue.

Local Activity	1978	1977	% Change
ECs/ROs submitting mail reports or mail and radio reports	404	340	+ 19
ECs/ROs submitting only radio or informal reports	6	18	-66
Number of sections reported active	63	63	—
Total reported ARES/RACES membership under ECs/ROs	20,545	12,390	+66
Total reported participation	9,524	7,134	+34
ARES/RACES messages to SEC	4,858	3,931	+24
Emergency-powered stations	5,701	4,725	+21
Total number of points	106,630	89,436.1	+19
Net Activity			
Nets reporting	278	256	+9
States/provinces reporting	50	50	—
Nets affiliated with or having liaison to NTS	248	—	—
Number of messages handled	42,950	23,320	+84
Minutes in useful directed session	129,198	74,870	+73
Different stations participating	8,619	6,562	+31
Stations on emergency power	3,279	1,845	+78
Number of different net control stations	1,415	1,088	+30
Number of different liaison stations to NTS	937	1,023	-8
Total number of points	214,721	126,746	+69

Pacific Area Transcontinental Corps Director K5MAT is advocating that the three area staffs of NTS agree on one emergency plan and try it out next time. We would be overjoyed if an emergency schedule could be agreed upon by all concerned. The chairmen of the area staffs are W2JJ, W0HI and W7DZX. Your move, gentlemen.

We'd like to thank several SCMs and SECs for going to the trouble to coordinate their sections' reporting, so it would be complete. N8XX, VE1OC, VE3GT, W1XX and W6INI, among others, were very helpful. We need all the help we can get.

In fact, this may come as a shock to you, but your Public Service Branch operatives, K1XA and W1LOU, are not perfect. We do make mistakes (at least one). The five-point credit for each emergency-powered repeater used (which *should have been* category J on the EC/RO report form) was inadvertently left out. Since it was mentioned in the SET Bulletin's scoring guidelines, a few eagle-eyes did claim and receive credit for this missing category.

But we're not the only ones who err. Many of the individuals completing the SET reporting forms figure the point totals incorrectly. We try to catch these errors as the reports come in, as best we can. However, we'd hate to think that those of you who fumbled on the relatively simple SET arithmetic could be called into the IRS office for an audit. Anyway, please let us know how we can make the scoring guidelines easier to understand.

Media Contacts Merit Certificates

Now for the good news. Each correspondent who attached proof that a press release was indeed used was awarded a Certificate of Merit, courtesy of the ARRL Public Information Office. This proof could have been in the form of a newspaper clipping or details of radio or TV coverage. If anyone was overlooked, please excuse us. But in many cases we

just weren't able to determine if the news media used your publicity. Those of you who accomplished publicity during the snow emergency will be getting certificates later, in conjunction with our upcoming blizzard article.

Reporting to Headquarters continues to increase. A total of 404 local activity reports were sent in; last year we received 340 — 278 net reports showed up; last year we got 256. And what you see is what we got.

For comparison purposes, the average local group had 51 members registered and 24 of them participated in SET, 14 on emergency power. Last year, it was 38, 22 and 13 respectively. The average section or local net handled 140 messages in 469 minutes, with 30 stations participating, 13 on emergency power, five serving as net control and three performing liaison to NTS. 1977 looked like this: 70-267-22-7-4-3.

Total scores of participating groups are listed with scores based on the sum of the following: 1 point for each ARES or RACES member; 2 points for each participating member; 1 point for each message from an ARES/RACES member to the SEC; 1 point for each message sent by participants to friends (limit one per amateur); 5 points for each mobile, self-powered portable or fixed station using emergency power; 5 points for each agency for whom messages were originated; 10 points for each community in which agencies were contacted; 10 points for a release to the news media; 10 points for submitting an emergency plan; and a quality point ranking from 1 to 10 based on how the local group performed overall. Last year's points are listed in parentheses.

Total points for nets are based on the following: 1 point for each message handled; 1 point for each minute the net was in useful directed session; 2 points for each different station participating by handling traffic; 3 points for each different station reporting into emergency-powered-only sessions; 5 points for each

different net control station; and 5 points for each different station performing liaison to a higher level NTS net. Last year's points are listed in parentheses.

The following sections (14) managed more than 2000 total points: Connecticut, Alabama, Georgia, Kentucky, North Carolina, Northern Florida, Southern Florida, Tennessee, Virginia, South Texas, Washington, Michigan, Ohio and Indiana. Net totals in the following states/provinces (20) surpassed 2000 points: Maritime/Newfoundland, California, Connecticut, Florida, Georgia, Indiana, Kansas, Kentucky, Maine, Massachusetts/Rhode Island, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas and Virginia. Last year, 14 made the first cut and 17 the second. Ohio had the highest totals in both categories this year.

Here's what you had to say about this most unusual but successful SET.

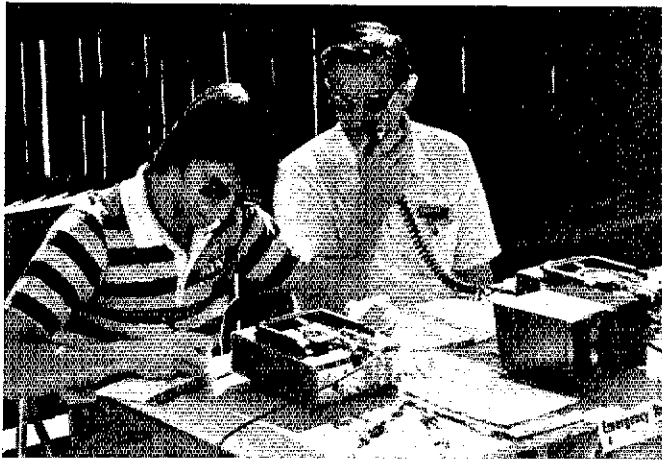
Local Activity Soapbox

I noted that some areas of operation in different jurisdictions departed from what I understood the main thrust of the SET. Having a bunny hunt to find a simulated downed aircraft is great training but doesn't exercise the participant in the art of handling formal written traffic. (W7YLV) Health and welfare traffic needs to be on a separate frequency than Red Cross and civil defense command and administrative traffic. (WA9BLA) This year, the SET became the real thing, probably the most widespread severe emergency situation ever to hit Ohio. (W8BKO) This EC wishes to commend the Chicago FM Club in particular for their cooperation in the operation of the SET in this county. (W9HPG) Our SET was preceded by a real emergency — flooding due to ice jams on Fall Creek. After two days of manning radios for the Red Cross at the flood site, evacuation shelter and chapter house, most operators who took part were understandably unenthusiastic about a simulated emergency, especially since the SET was (of all things) an ice storm with flooding on Fall Creek. Next year, I think I'll plan an SET dealing with sunshine and warm weather. (WB2JWD) We more than doubled last

Why is There a SET?

For the uninitiated, the purpose of SET is

- 1) To test the capability of the local amateur communications organizations (primarily ARES and RACES) under emergency conditions.
- 2) To test the ability of nets (primarily NTS) to function under overload conditions.
- 3) To demonstrate to served agencies (Red Cross, c.d., Salvation Army, etc.), to the public and to the media, amateur radio's value as an emergency communications service.
- 4) To provide operator training and experience in emergency communications practices.



The San Diego ARES conducted a simulated earthquake for their SET. Emergency communications were set up throughout the county. Pictured here are WA6CFE and his father, WD6EEL, two of the many amateurs who took part. (WD6AMC photo)



Putnam County, TN, Service Response Team members heading out on a simulated search and rescue mission. The temperature in the field was 11 degrees F. Note the IC-22S backpack rig for long-distance 2-meter work. (WA4DSH photo)

year's scores. It's gonna be a tough act to follow next year. (WB4TTJ) We found out how inadequate we really were. (W1BB) This was our first SET and it was a real bang-up. (WA3YOE) More participation in the annual SET would help familiarize amateurs with emergency conditions and procedures. (WB3COR) It is nearly impossible and quite impractical to revert to formal ARRL written form to advise a hospital of a patient in critical condition and that the patient is on the way. (WA6CTR) We actually handled 109 messages in a period of about one hour. (WA5GYF) ECs and their groups should be made more aware of the value of NTS, the traffic branch of ARPSC. Some ECs who are not traffic oriented are not fully conscious of what the NTS is and what it can do. (VE3GT) Several ops with no traffic experience got plenty. Also most of our net controls were new at the game and gained a lot of experience. (K2AYQ) Where were the hams in Ventura? (W6RIC) SEC W2HOB was interviewed on a local radio station by W2BN, a local ARES member. (K2QIJ) The SET in Virginia was successful with broad and

serious involvement. (WB4ZNB) Northern Inyo Group, the Amateur Radio Club, cooperated with REACT CB Team for area communications. Liaison worked very well. (WA6YWS) Centre County and Blair County, PA, amateurs had a very successful SET. (K3EZZ) My position as EC is very interesting and presents sufficient challenge to make it worthwhile. (VE6ABC)

Net Activity Soapbox

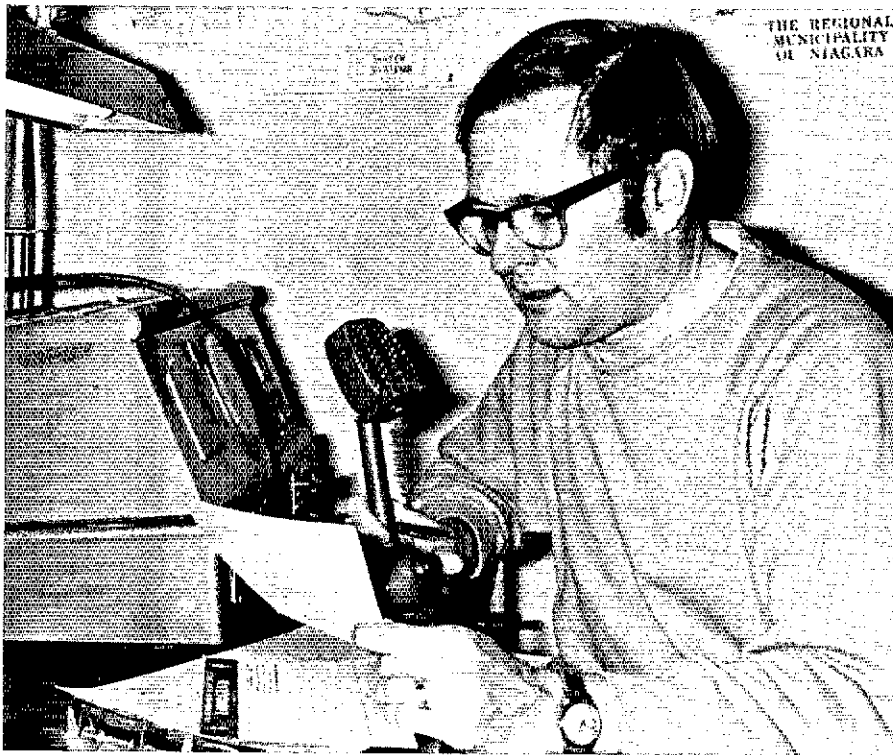
There is no such thing as a "Test Routine" message. A routine message is a routine message and it will ever be thus. (WB2NOM) Again this year the weather did not cooperate and the real thing arrived before the test was to start. (W9HUF) Most net members either busy with real emergency or snowed-in. (WB8WTS) Owing to the "Great Blizzard of '78" about half the P traffic and nearly all of the Q traffic were real, not Test Messages... Isn't it about time we hold this annual weekend of "organized confusion" on a weekend less likely to be emergency prone? (WA8MCR) SET coincided with blizzard

traffic, but no special problems handling extra traffic from both sources. (K4ZN) SET is great... but why do stations (who never get on nets during the rest of the year) originate thousands of pieces of traffic all over the country? This is not necessary... are we after quantity or QUALITY? (WA1MJE) SET went very well for us this year, the schedule used proved to be very effective, in fact, on some sessions there wasn't enough traffic! (K1BA) Still enjoy traffic handling but fail to see what a nationwide SET proves. (K0DJ) Let's cross off SET. Those of us already experienced do one beautiful job. (W2RUF) SET generated interest and enthusiasm. It motivated local hams to become familiar with emergency equipment and traffic-handling procedures. It created an awareness among several organizations of the capabilities of amateur radio. (K4BAV) Wouldn't be a bad idea in the future to have a regionalized SET... a snowstorm in New Jersey, a hurricane on the Gulf Coast, rain in southern California. (WB2LCC) This was our first year — new EC — new club — new net. We'll be ready for next year.

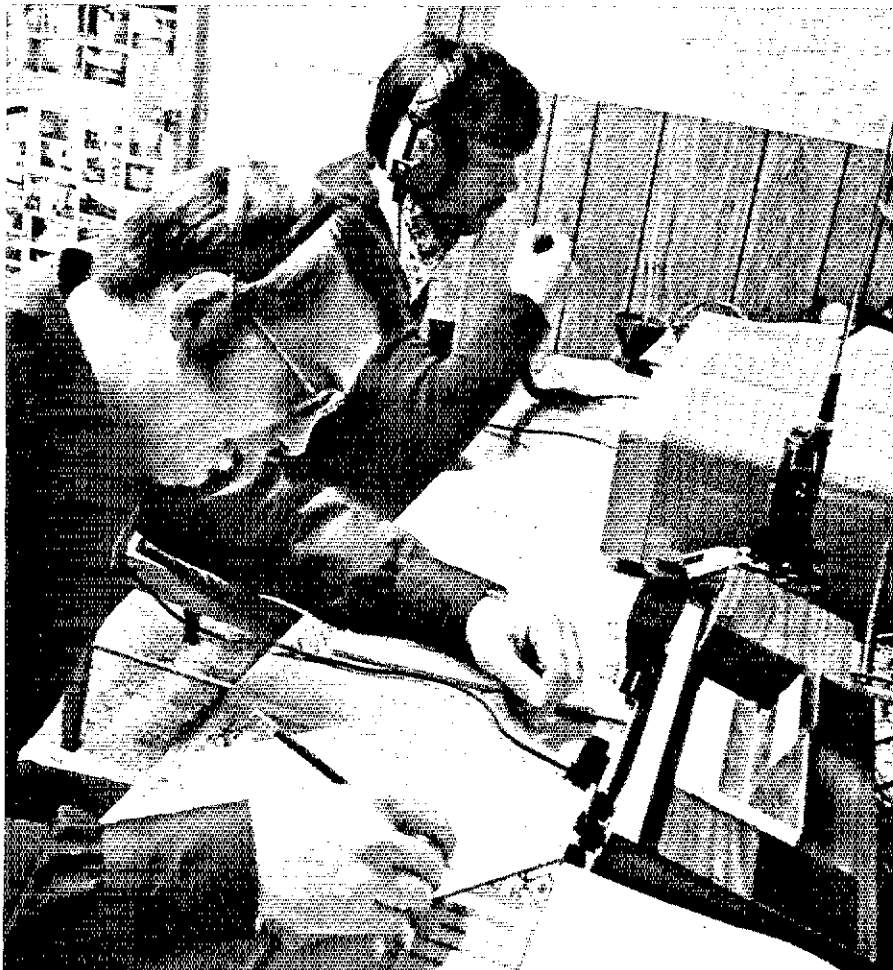
It lost something in the translation. BEFORE — as initially sent by W1KX. AFTER — as ultimately received at ARRL HQ.

THE AMERICAN RADIO RELAY ASSOCIATION	
RADIOGRAM	
TO	TEST P. R. W1KX
FROM	NEWINGTON CT
CLASS	URGENT
TIME	10:00
DATE	12/17/78
TIME	10:00
DATE	12/17/78
<p>URGENT MESSAGE & REQUEST W1KX RECURRENT W1KX BULLETIN ADVISING 1000 AND FREQUENCY ALLOCATION CHART</p>	
<p>HANDLING COMMUNICATIONS DURING ICE STORM MAINTAIN OPERATION ON 1440 AND 2000 CLEAR</p>	
<p>W1KX 50M</p>	
REC'D	SENT

THE AMERICAN RADIO RELAY ASSOCIATION	
RADIOGRAM	
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<p>W1KX 50M</p>	
REC'D	SENT



Emergency Coordinator VE3DVE gets ready for the St. Catharines, ON, ARES SET, 10 minutes before the start of the festivities.



WA4ZBR (foreground) and WA4YMZ operate from club station WA4QWI during a simulated plane crash, held by the Central Georgia ARES. (WB4BDP photo)

(WASACF) We should try for more participation so that old regulars will have smaller work load and more will be trained in net operation and traffic. (N4UZ) Seemed to be a lack of interest, except among newcomers. Maybe we are just becoming more efficient. (W0FT) It was a great experience for all of us since it was our first SET. Two of our guys even ended up in the slammer for photos and publicity. (WB0ZAL) Quite a successful SET. We learn something from every drill. (K2QIJ) Hernando County's first time in participating in the SET. (W4ILE) Our SET was communications for a ski-athon in Stowe, VT, at the Trapp family lodge. (WAIYEH) Our exercise used 75 meters to link NCS to various 2-meter repeaters. (K0GND) WB6PKA was our emergency-powered star. (W7EP) Two of the participating stations were permanently installed and operating within the confines of the two local hospitals. (WB4MDC) Heavy SET activity on 2-meter fm. Good drill. (WAIYUW) The RTTY operation was a tremendous success. (WA4BZY) The members of the GSSBN really worked hard and long to make this a great SET. I would like to express my wholehearted thanks to them. (W4HON) I'm glad it's over for one more long year. Whew! (K4BKX) Best SET ever. (W3NEM) We started on Saturday morning from almost zero and by Sunday evening we had an emergency-ready group of expert traffic handlers. (N2NS) Believe this to be one of the better and more successful SET exercises in recent years. (VE1WF)

How to Get Involved

SET is the one annual event that involves thousands of amateurs in what they do best — providing public service. Any interested amateur can participate in this or any of a number of activities that will benefit your community in times of emergency or disaster.

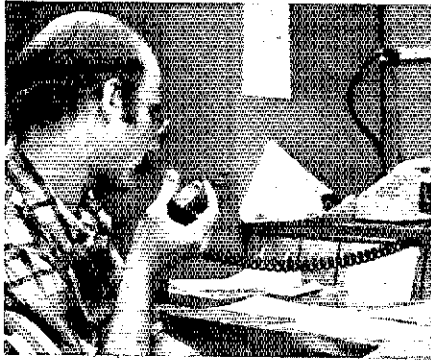
A good way to get involved is to procure an application form for the Amateur Radio Emergency Service (ARES) from the ARRL. Ask for form CD-98. After it is filled out and returned, it finds its way to your local emergency coordinator. The EC, who is probably active on the local repeaters, can show you how to help provide communications during the next drill, walk-a-thon or real emergency.

If your community doesn't have an EC, contact your Section Communications Manager (SCM) listed on page 8 of each month's QST. Perhaps you might be the one for this challenging job. The Radio Amateur Civil Emergency Service (RACES), which operates under the direction of state or local government officials, is also active in many communities. Contact your local civil defense director for details.

Free literature on the various public service programs is available from Headquarters; a 9 x 12 self-addressed envelope with postage for seven ounces will get you a complete Public Service Package by return mail. The latest Net Directory will be included, but can be ordered separately for a return envelope with postage for three ounces.

LOCAL ACTIVITY

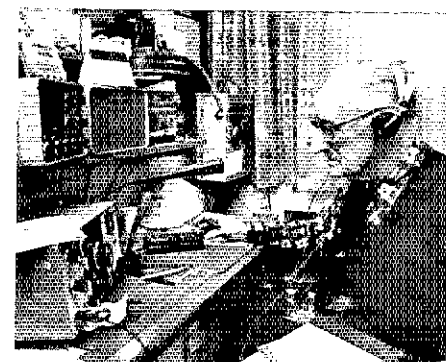
Jurisdiction	Reported by	Total Points	Jurisdiction	Reported by	Total Points	Jurisdiction	Reported by	Total Points	Jurisdiction	Reported by	Total Points											
Maryland-DC (217)		1067.5	York Co.	WB4UHC	105	Hood River Co.	W7EG1	131	Scott Co.	K0MS1	177											
Allegany Co.	W3DFW	196	5			Jackson Co.	W7VSE	423	Story Co.	W0LEY	330											
Baltimore Metro	W3JUTC	522.5	Arkansas (359)	1052	Josephine Co.	WA7HRG	245	Tama Co.	WB0LDR	0												
Calvert Co.	W3ZNV	63	Baxter Co.	W5ASD	766	Linn/Benton Cos.	K7UGF	424	Zone 8	K0CNM	124											
Harford Co.	W3BF7S	17	Boone Co.	W5BMQH	134	Utah (1016)	995	Kansas (1359)	785	Leavenworth Co.	W0NNG	144										
Howard Co.	W3JURO	137	Newton Co.	W5WJG	47	Cache Valley	K7RQB	176	Zone 1	W05RR	63											
St. Mary's Co.	W3HJH	32	Pulaski Co.	W5VNV	106	Salt Lake Co.	K7CVB	382	Zone 6B	W0K1	206											
W. Pennsylvania (4123)	852		Louisiana (15)	593	Toole Co.	W7TZW	81	Zone 7	W0BYWZ	136												
Blair Co.	W3TFF	280	Baton Rouge Area	N5RB	436	Utah Co.	W07GEG	262	Zone 10C	W09QXX	236											
Cambria Co.	W03COR	55	East Feliciana Par.	K5BLV	37	Weber Co.	W07GL	94	Minnesota (1269)	305												
Centre Co.	W03LW	177	Webster Par.	K5WOD	120	Washington (2199)	3510	Dimstead Co.	W0VB	249												
Crawford Co.	W03YXJ	205	Mississippi (1660)	1973	Winona Co.	N0VV	56	Winona Co.	N0VV	56												
Indiana Co.	K3CWL	34	DeSoto	K5FC	221	Missouri (752)	1118	Adair Co.	W0OTF	150												
McKean Co.	W3OCR	95	District N	W0SLFG	1016	Barton/Dade Co.	W0HH	100	Barton/Dade Co.	W0HH	100											
4			Lafayette	W5SOK1	92	Boone Co.	W0K1	156	Boone Co.	W0K1	156											
Alabama (4084)	2088		Tate Co.	W5TOD	237	Callaway Co.	W0ATL	81	Callaway Co.	W0ATL	81											
Baldwin Co.	K4JIE	73	N.Texas (1421)	1717	Hickory Co.	W0GCSY	104	Hickory Co.	W0GCSY	104												
Chambers Co.	W04VEK	20	Clay Co.	W5SUHC	99	Johnson Co.	W0FND	113	Johnson Co.	W0FND	113											
DeKalb Co.	W04ASU	138	Collin Co.	K5MWO	289	Saline Co.	W0VZ	206	Saline Co.	W0VZ	206											
Etowah Co.	W04QOW	443	Dallas Co.	K5JD	502	Vernon Co.	W0APKO	106	Vernon Co.	W0APKO	106											
Jackson Co.	W04QXD	127	Henderson Co.	K5GKM	99	West Co.	W0JUC	75	West Co.	W0JUC	75											
Limestone Co.	W04MTO	125	Lamar/Red River Cos.	W0KZA	92	Nebraska (117)	743	Cheyenne Co.	W0GQX	44												
Marshall Co.	K4WSS	195	Lampasas/Mill Cos.	W5RPU	155	Scottsbluff Co.	W0VGR	73	Scottsbluff Co.	W0VGR	73											
St. Clair Co.	W04UKB	381	Roster/Randall/Oldham & Armstrong Cos.	W5CBT	156	Southeast NE	K0GND	547	Southeast NE	K0GND	547											
Tuscaloosa Co.	W04SVH	245	TX Panhandle Cos.	W5GYV	335	York/Polk Cos.	W0BYG	79	York/Polk Cos.	W0BYG	79											
Georgia (2158)	3520		Oklahoma (1712)	1160	Ionia Co.	W0LCU	72	North Dakota (—)	33													
Central GA	W04ZPD	95	Bryan Co.	W05MVR	83	Renville Co.	W0OSP	33	Renville Co.	W0OSP	33											
Central GA	W04BDP	345	Cleveland Co.*	W05TZ	512	South Dakota (—)	115	South Dakota (—)	115													
Clayton/Fayette Cos.	W04CBT	278	Concho Co.	W05VF	96	Beadle, Hand & Jerauld Cos.	W0ZXV	115	Beadle, Hand & Jerauld Cos.	W0ZXV	115											
Cobb/Douglas Cos.	K4VHC	382	Pattie Co.	W5Q1V	91	NET ACTIVITY																
Columbus	W04HYX	212	Payton Co.	K5KXZ	236	NATIONAL TRAFFIC SYSTEM																
Decatur	W048ZV	171	Porttaormie Co.	W5QZ	164	AREA/REGION NETS																
DeKalb Co.	W04MYV	264	Stephens Co.	W04OUB	74	A	Messages handled															
Lafayette Co.	W04NBZ	3	Texas (453)	2084	B	Minutes in directed session																
Laurens Co.	W04CVY74	212	Bexar Co.	W5ARNV	567	C	Stations participating															
Muscogee Co.	W04KAU	137	Brainerd Co.	W05TNN	170	D	Stations reporting in on															
Northwest GA	W04K9E	136	Calhoun Co.	W05QJ	181	E	Net control stations															
Southwest GA	W04YMP	285	Fort Bend Co.	W05ACF	119	F	Liaison stations															
Kentucky (2509)	3695		Harris Co.	W05BA	975	NET Name/Manager																
Area 3	K4UDZ	1008	Ottawa Co.	W5FLV	72	A	B	C	D	E	F	TOTAL										
District 1	N4GD	413	6			Adams/Brown Cos.	W0ACFX	263	Eastern Area	W2JJ	196	855	466	92	7	21	1775					
District 2	W0ZUL	727	East Bay (—)	254	Allen Co.	K8JH	318	Central Area	W5KLV	370.5	909	503	77	5	9	1139						
District 3	W04IGS	437	Solano Co.	W06FDB	254	Belmont/Monroe Cos.	K8JP	318	Central Area	W5KLV	4067	293	294	38	4	6	643					
District 4	W04EQR	437	Los Angeles (110)	0	Clark Co.	W0BKH	1107	Highland/Clinton Cos.	K8JH	286	Pacific Area	W7EP	584	307	46	1	4	1076				
District 9	W04ILF	134	Pasadena	—	Orange (1563.5)	483	Clermont Co.	W0BTSX	688	Lake Co.	W0BHEB	159	262	456	32	2	—	824				
District 10	K4AVK	148	San Bernardino Co.	K6GGS	—	Inyo Co.	W06YVS	38	Fayette Co.	W0BHXR	439	Leralon Co.	W0KRF	439	598	644	79	9	14	26	1627	
District 12	W04JQS	274	San Diego (1458)	1850	Western Riverside Co.	W06KN	95	Fulton Co.	W0BEPK	171	Marion/Wyandot & Hardin Cos.	W0KRF	370.5	598	644	79	9	14	26	1627		
District 19	W04JQS	274	San Francisco (—)	—	San Bernardino Co.	K6GGS	—	Hamilton Co.	W0BZTX	13	Medina Co.	W0GSR	346	609	503	77	5	9	1139			
District 20	K4HDE	103	Marin Co.	W06MGK	217	San Diego (1458)	1850	Harrison Co.	W0BZTX	13	Montgomery/Greene Cos.	W0BLC	4067	293	294	38	4	6	643			
Franklin Co.	W04IBO	22	San Joaquin Va. (505)	855	San Diego (1458)	1850	Morrow Co.	W0BLC	4067	Ottawa Co.	W0BHXH	143	584	307	46	1	4	1076				
Zone 14	W09JUX	285	Eastern Kern Co.	W06KZV	89	City of San Diego	W6INI	601	Richland Co.	W0BGR	435	Richland Co.	W0BGR	435	262	456	32	2	—	824		
N.Carolina (3765)	3260		Fresno Co.	W06CTR	187	Imperial District	W06LAW	256	Sandusky Co.	W0BKWD	122	Sandusky Co.	W0BKWD	122	598	644	79	9	14	26	1627	
Alamance Co.	W04SGA	269	Kings Co.	W06TP	412	North	N6AT	446	Summit/Portage	K8EIO	428	First Region	K1BA/WA1VEI	309	520	81	3	16	21	1133		
Area 10A	K4A	131	Tulare Co.	W06MG	167	Southwest	W06LAZ	236	Washington Co.	W0BUIP	283	Second Region	W2MTA/INZYL	598	644	79	9	14	26	1627		
Asheville/Blount Cos.	W04TTJ	410	Santa Barbara (773)	847	San Francisco (—)	—	Williams Co.	W0BWMW	127	Wayne Co.	W0BUIP	305	Third Region	W03NE/W03THT	240	382	29	6	14	18	895	
Cabarrus Co.	W04TJ	171	Northern Santa Barbara Co.	W06GRW	421	Marin Co.	W06MGK	217	W.Virginia (238)	174	Washington Co.	W0BUIP	305	Fourth Region	W0ASHU/K4ZN	387	520	81	3	16	21	1133
Carroll Co.	W04OPO	109	South Co.	W06TUO	206	San Joaquin Va. (505)	855	W.Virginia (238)	174	Berkeley Co.	W0BKEG	66	609	503	77	5	9	1139				
Cherokee	K4AIH	54	Ventura Co.	W06RIC	220	Eastern Kern Co.	W06KZV	89	W.Virginia (238)	174	Hancock Co.	W0BKEG	66	293	294	38	4	6	643			
Dare Co.	W04PCN	381	S. Clara Valley (1555.6)	1800	Fresno Co.	W06CTR	187	W.Virginia (238)	174	Hancock Co.	W0BKEG	66	175	284	73	—	5	6	660			
Durham Co.	W04EN	381	Half Moon Bay	W06EEP	140	Orange	9	W.Virginia (238)	174	Marshall Co.*	W0BCL	108	364	820	80	3	16	25	1433			
Guilford Co.	K4CJZ	895	Mento Park, Redwood City	237	San Joaquin Va. (505)	855	Illinois (1297)	1020	Marshall Co.*	W0BCL	108	272	573	45	—	6	16	102				
Mecklenburg Co.	W04KUH	512	Palo Alto, Mountain View, Los Altos	561	Eastern Kern Co.	W06KZV	89	Cook Co.	W0HPG	596	175	284	73	—	5	6	660					
Pitt Co.	W04KZG	138	San Mateo, Burlingame, Foster City	561	Fresno Co.	W06CTR	187	Greene, Jersey & Calhoun Cos.	W0HJ	137	175	284	73	—	5	6	660					
Wake Co.	W04FMN	787	Santa Cruz Co.	W06HPK	375	Kings Co.	W06TP	412	LaSalle Co.	K9BK	105	272	573	45	—	6	16	102				
N.Florida (4589)	5480		Northern Santa Barbara Co.	W06GRW	421	Tulare Co.	W06MG	167	Lee Co.	W0LDU	182	143	309	81	3	16	21	1133				
Alachua Co.	W04QXW	343	South Co.	W06TUO	206	Santa Barbara (773)	847	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875					
Columbia Co.	W04ZFG	8	Ventura Co.	W06RIC	220	Northern Santa Barbara Co.	W06GRW	421	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875				
Duval Co.	W04VZF	431	S. Clara Valley (1555.6)	1800	San Joaquin Va. (505)	855	South Co.	W06TUO	206	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875			
Escambia Co.	W04SK1	707	Half Moon Bay	W06EEP	140	Eastern Kern Co.	W06KZV	89	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875				
Franklin Co.	W04TJ	59	Mento Park, Redwood City	237	Fresno Co.	W06CTR	187	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875					
Glenn Co.	W04HHA	76	Palo Alto, Mountain View, Los Altos	561	Orange	9	Illinois (1297)	1020	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875				
Hernando Co.	W04LE	169	San Mateo, Burlingame, Foster City	561	San Joaquin Va. (505)	855	Cook Co.	W0HPG	596	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875			
Hernando Co.	W04LE	169	San Mateo, Burlingame, Foster City	561	Eastern Kern Co.	W06KZV	89	Greene, Jersey & Calhoun Cos.	W0HJ	137	226	457	37	5	8	12	875					
Jackson Co.	W04BK	141	Santa Cruz Co.	W06HPK	375	Fresno Co.	W06CTR	187	LaSalle Co.	K9BK	105	226	457	37	5	8	12	875				
Jacksonville Beach	W04ANKA	288	Northern Santa Barbara Co.	W06GRW	421	Kings Co.	W06TP	412	Lee Co.	W0LDU	182	226	457	37	5	8	12	875				
L Levy Co.	K4PPG	32	South Co.	W06TUO	206	Tulare Co.	W06MG	167	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875				
Marion Co.	W04HHC	122	Ventura Co.	W06RIC	220	Santa Barbara (773)	847	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875					
Nassau Co.	W04ZSX	59	S. Clara Valley (1555.6)	1800	Northern Santa Barbara Co.	W06GRW	421	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875					
Okaloosa Co.	W04PGQ	620	Half Moon Bay	W06EEP	140	South Co.	W06TUO	206	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875				
Walton Co.	W04JZR	351	Mento Park, Redwood City	237	Ventura Co.	W06RIC	220	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875					
S. Carolina (718)	482		Palo Alto, Mountain View, Los Altos	561	S. Clara Valley (1555.6)	1800	Illinois (1297)	1020	Washburn Co.	W0P1P	0	226	457	37	5	8	12	875				
Anderson Co.	W04FVV	482	San Mateo, Burlingame, Foster City	561	Half Moon Bay	W06EEP	140	Cook Co.	W0HPG	596	226	457	37	5	8	12	875					
S. Florida (4647)	4707		Northern Santa Barbara Co.	W06GRW	421																	



K2JLD rogers a 2-meter fm message. (WA2TSF photo)



WB4GBI maintains contact with the Tennessee SSB Net, while preparing traffic to be sent to the state civil defense office. Tim is a member of the Putnam County Amateur Radio Service Response Team. (WA4DSH photo)



VE3FZG handled traffic to the National Traffic System for the Oakville, ON, ARES.

Ontario Phone Ontario Southern	VE3EWD VE3GFN	394 139	Georgia (5686)	24080	Central Maine Emerg. Pine Tree Sea Gull	WA1YJW W1RWG K1GUP	1288 454 554	Emerg. Burlico ARES Cumberland Co. Amateur Emerg. Net	W9KB K2QLJ WA2EMY WB2LCC N2NS	158 1398 97 1021 464	9PA Phone & Traffic South Carolina Anderson RC 3-Meter ARES South Carolina Single Sideband South Dakota Teen Age Traffic Tennessee Blunt Co. ARES Kristol 2-Meter PARG Davidson County CDB London County Water FM Putnam County Emerg. Shelby County Public TN SSB Wayne County Emerg. Texas Brazoria Co. Emerg. Dallas Co. ARES Fort Bend Co. Emerg. Henderson Co. Communications Club Hill Country Emerg. Lamar Co. ARES Parham Traffic & Emerg. Texas CW Tlc. Texas Traffic Utah Utah Code Utah Co. ARES Virginia Arlington Co. ARES City of Hampton ARES Lynchburg 2- Meter FM Norton & Wise Co. DES Harts. Rockham Co. ARES SET Shenandoah Valley Sec. Virginia Phone Virginia CW Virginia Sideband Washington Kitsou County ARES Puget Sound Emerg. San Juan Is. Washington Section West Virginia Berkeley Co. ARES Woods RACES Wisconsin Badger Emerg. Lane Co. ARES Shawano Co. RACES Waukesha Co. Emerg. Wisconsin Intrastate Wisconsin SSB	K35MB W4FVY W4MTK (0) WHZER (2127) WB4GJR W4WVW WB4BKJ W44RW W4WNP W44SA W44AV W4CTF W44BDL (1424) WB5TNN K5PC W5ACF K54KM WB5RPU W5AKZA W5CST W5SRKU N5TC (1008) WA5MLL W578G 4289 WB4QAX WB4UDZ WB4MDC W5CFV N4UY K4BJ K4BAV W540DS K4MUW K4BKX W44DQZ (837) W57RGT W4FESB W471WB K7QXZ (568) WB8EKG K8QEW (2224) W91EM K9QXY W9BZW K9PAK K9LQU 251	784 345 393 1220 1220 4077 536 346 362 917 97 419 819 419 1195 17 18 3833 448 155 191 379 343 638 434 1283 472 173 594 405 714 120 75 167 178 341 908 184 808 1853 1408 252 605 303 149 277 136 141 1959 490 682 161 167 259 231				
Alabama Emerg. Net B Alabama Emerg. Net D Alabama Emerg. Net I Alabama Emerg. Net M Alabama Emerg. Net S Alabama Emerg. Net Z Etowah County	VE3EWD VE3GFN (298) VE5AAE (4667) N4MD WA4RND WA4VFK K4JIE K4VZN WA4SNU WA4QOW	394 139 383 383 5277 474 289 29 1444 418 194 424	Alabama (5686)	24080	Alabama Emerg. Net B Alabama Emerg. Net D Alabama Emerg. Net I Alabama Emerg. Net M Alabama Emerg. Net S Alabama Emerg. Net Z Etowah County	WA4CBI K4GNK WA4CCY W44ADV K4DNH WA4BZY W4HON W4MVL N4UZ WH4FAS WA4NBZ W4KAU WA4ZPO WB4BUP WA4AJY	176 1793 1464 332 2439 3527 9233 2189 530 49 54 185 107 1617 255	Alabama Emerg. Net B Alabama Emerg. Net D Alabama Emerg. Net I Alabama Emerg. Net M Alabama Emerg. Net S Alabama Emerg. Net Z Etowah County	WA4CBI K4GNK WA4CCY W44ADV K4DNH WA4BZY W4HON W4MVL N4UZ WH4FAS WA4NBZ W4KAU WA4ZPO WB4BUP WA4AJY	176 1793 1464 332 2439 3527 9233 2189 530 49 54 185 107 1617 255	Alabama Emerg. Net B Alabama Emerg. Net D Alabama Emerg. Net I Alabama Emerg. Net M Alabama Emerg. Net S Alabama Emerg. Net Z Etowah County	WA4CBI K4GNK WA4CCY W44ADV K4DNH WA4BZY W4HON W4MVL N4UZ WH4FAS WA4NBZ W4KAU WA4ZPO WB4BUP WA4AJY	176 1793 1464 332 2439 3527 9233 2189 530 49 54 185 107 1617 255				
Alaska Aleutian ARES Greater Anchorage Area ARES Emerg.	KL7JG KJ7SE KL7IRT	1320 473 658	Alaska (274)	1320	Aleutian ARES Greater Anchorage Area ARES Emerg.	KL7JG KJ7SE KL7IRT	1320 473 658	Alaska (274)	1320	1320	1320	Alaska (274)	1320	1320	Alaska (274)	1320	1320
Arkansas Emerg.	WB5MQH	193	Arkansas (936)	193	Arkansas Emerg.	WB5MQH	193	Arkansas (936)	193	193	193	Arkansas (936)	193	193	Arkansas (936)	193	193
California Half Moon Area ARC Indian Wells Gateway Emerg. Kings County Emerg. Novice Emerg. Southern Calif. Peninsula Emerg. Comd. System Southern San Joa quin FM	WA6EFP WA6KZV WBKTT WB5YWS K6JIT WB5ASH WB6MG	131 448 176 458 1006 141	California (3212)	3007	Half Moon Area ARC Indian Wells Gateway Emerg. Kings County Emerg. Novice Emerg. Southern Calif. Peninsula Emerg. Comd. System Southern San Joa quin FM	WA6EFP WA6KZV WBKTT WB5YWS K6JIT WB5ASH WB6MG	131 448 176 458 1006 141	California (3212)	3007	3007	3007	California (3212)	3007	3007	California (3212)	3007	3007
Colorado/Wyoming High Noon Colorado/Wyom- ing Eastern Slope ARES Connecticut Bristol Emerg. Civil Prepared- ness RACES Eastern Conn. Emerg. Connecticut CW Connecticut Phone Meriden Emerg. Nutmeg VHF Tlc. Wallingford Emerg. Western Conn. Emerg. & Tlc.	W9HE K0DJ W9HEP W1GY K1QGC WA1RLV K1E1H K1E1C N1AN WA1ELA W1SY WA1VNZ	473 1075 140 350 907 188 325 908 438 92 679	Colorado/Wyoming (1634)	1688	Colorado/Wyoming High Noon Colorado/Wyom- ing Eastern Slope ARES Connecticut Bristol Emerg. Civil Prepared- ness RACES Eastern Conn. Emerg. Connecticut CW Connecticut Phone Meriden Emerg. Nutmeg VHF Tlc. Wallingford Emerg. Western Conn. Emerg. & Tlc.	W9HE K0DJ W9HEP W1GY K1QGC WA1RLV K1E1H K1E1C N1AN WA1ELA W1SY WA1VNZ	473 1075 140 350 907 188 325 908 438 92 679	Colorado/Wyoming (1634)	1688	1688	1688	Colorado/Wyoming (1634)	1688	1688	Colorado/Wyoming (1634)	1688	1688
Delaware Emerg. Phone	K3JL	772	Delaware (736)	772	Delaware Emerg. Phone	K3JL	772	Delaware (736)	772	772	772	Delaware (736)	772	772	Delaware (736)	772	772
Florida Beach AR Escambia County ARES Charlotte AR Sec. Emerg. Florida Middy Traffic Florida Phone Traffic Gainesville ARS Hernando Emerg Nassau County Emerg. Northern Florida Phone Okaloosa County Emerg. Pasco County ARES Pinellas Emerg. K45CL South Florida Single Sideband Traffic Phone	WA4NKA WB45KI W48X WB4AID WB4YQ WA4DXW WA4EET WB4PGB WB4PGG WB4TZP K45CL WA4NBE WA4OEM	723 474 335 1015 406 305 144 172 1439 718 516 1684 569 64	Florida (3329)	3254	Florida Beach AR Escambia County ARES Charlotte AR Sec. Emerg. Florida Middy Traffic Florida Phone Traffic Gainesville ARS Hernando Emerg Nassau County Emerg. Northern Florida Phone Okaloosa County Emerg. Pasco County ARES Pinellas Emerg. K45CL South Florida Single Sideband Traffic Phone	WA4NKA WB45KI W48X WB4AID WB4YQ WA4DXW WA4EET WB4PGB WB4PGG WB4TZP K45CL WA4NBE WA4OEM	723 474 335 1015 406 305 144 172 1439 718 516 1684 569 64	Florida (3329)	3254	3254	3254	Florida (3329)	3254	3254	Florida (3329)	3254	3254
Georgia Layton & Fayette County Cross Valley Emerg. No. 1 Cousa Valley Emerg. No. 2 Douglas County ARES Georgia Cracker Georgia RTTY Emerg. Georgia Single Sideband Georgia State C.D. Georgia State C.D. Training Laurens County ARES Northwest Georgia ARES Oconee Area Emerg. O'Connell Warner-Robins Tri-County Emerg.*	WA4CBI K4GNK WA4CCY W44ADV K4DNH WA4BZY W4HON W4MVL N4UZ WH4FAS WA4NBZ W4KAU WA4ZPO WB4BUP WA4AJY	176 1793 1464 332 2439 3527 9233 2189 530 49 54 185 107 1617 255	Georgia (5686)	24080	Georgia Layton & Fayette County Cross Valley Emerg. No. 1 Cousa Valley Emerg. No. 2 Douglas County ARES Georgia Cracker Georgia RTTY Emerg. Georgia Single Sideband Georgia State C.D. Georgia State C.D. Training Laurens County ARES Northwest Georgia ARES Oconee Area Emerg. O'Connell Warner-Robins Tri-County Emerg.*	WA4CBI K4GNK WA4CCY W44ADV K4DNH WA4BZY W4HON W4MVL N4UZ WH4FAS WA4NBZ W4KAU WA4ZPO WB4BUP WA4AJY	176 1793 1464 332 2439 3527 9233 2189 530 49 54 185 107 1617 255	Georgia (5686)	24080	24080	24080	Georgia (5686)	24080	24080	Georgia (5686)	24080	24080
Idaho/Montana Idaho Montana Missoula Area Emerg. Montana Tlc. PARC Round- table	W7RBD K7IMZ WA7QBN WA7ZPO	438 248 345 122	Idaho/Montana (1553)	1153	Idaho/Montana Idaho Montana Missoula Area Emerg. Montana Tlc. PARC Round- table	W7RBD K7IMZ WA7QBN WA7ZPO	438 248 345 122	Idaho/Montana (1553)	1153	1153	1153	Idaho/Montana (1553)	1153	1153	Idaho/Montana (1553)	1153	1153
Illinois Green County Illinois Emerg. Illinois Section Starved Rock Radio Emerg.	W9IFA W9LDU W9NUP K9BK	181 103 237 182	Illinois (1108)	703	Green County Illinois Emerg. Illinois Section Starved Rock Radio Emerg.	W9IFA W9LDU W9NUP K9BK	181 103 237 182	Illinois (1108)	703	703	703	Illinois (1108)	703	703	Illinois (1108)	703	703
Indiana ARES of Lake County Blackford ARES Clinton County Amateur Emerg. Delaware County ARES Huntington County Emerg. Indiana Traffic Kosciusko County Emerg. Randolph County Snow Emerg. Yuba County Emerg. Service	WB9HCH WB9VJO WB9WWS W9EYH WB9GCH W9HUP W9ENU WB9UJZ WA9WZ	2354 103 72 9514 122 3125 2215 120 1970	Indiana (13763)	15492	ARES of Lake County Blackford ARES Clinton County Amateur Emerg. Delaware County ARES Huntington County Emerg. Indiana Traffic Kosciusko County Emerg. Randolph County Snow Emerg. Yuba County Emerg. Service	WB9HCH WB9VJO WB9WWS W9EYH WB9GCH W9HUP W9ENU WB9UJZ WA9WZ	2354 103 72 9514 122 3125 2215 120 1970	Indiana (13763)	15492	15492	15492	Indiana (13763)	15492	15492	Indiana (13763)	15492	15492
Iowa Harrison County Mobile Muscatine County ARES SET West Central Iowa ARES	W9UIZ WA9ZIK WA9BRU K9CNM	83 260 134 147	Iowa (260)	624	Harrison County Mobile Muscatine County ARES SET West Central Iowa ARES	W9UIZ WA9ZIK WA9BRU K9CNM	83 260 134 147	Iowa (260)	624	624	624	Iowa (260)	624	624	Iowa (260)	624	624
Kansas Kansas Sec- tion CW Kansas Sideband Kansas Slow Speed Lawsonwerth County ARES Zone 6B ARES Zone 10C ARES Zone 14 ARES	W9FT W9OYH W9FT W9NYG WB9QX WB9JX	434 1207 333 127 213 243 224	Kansas (2494)	2781	Kansas Sec- tion CW Kansas Sideband Kansas Slow Speed Lawsonwerth County ARES Zone 6B ARES Zone 10C ARES Zone 14 ARES	W9FT W9OYH W9FT W9NYG WB9QX WB9JX	434 1207 333 127 213 243 224	Kansas (2494)	2781	2781	2781	Kansas (2494)	2781	2781	Kansas (2494)	2781	2781
Kentucky Kentucky CW Traffic Kentucky Tlc. Laport Amateur Radio Soc. PAREN Southeast Kentucky Emerg Kentucky Amateur Louisiana Louisiana (fc. MTA ARC	WA4IGS WB4AUN K4HOE WA4ZVL N5TS K5TL WB5IOE	552 1728 107 4003 807 483 7	Kentucky (858)	6407	Kentucky CW Traffic Kentucky Tlc. Laport Amateur Radio Soc. PAREN Southeast Kentucky Emerg Kentucky Amateur Louisiana Louisiana (fc. MTA ARC	WA4IGS WB4AUN K4HOE WA4ZVL N5TS K5TL WB5IOE	552 1728 107 4003 807 483 7	Kentucky (858)	6407	6407	6407	Kentucky (858)	6407	6407	Kentucky (858)	6407	6407
Maine Central Maine Emerg. Pine Tree Sea Gull	WA1YJW W1RWG K1GUP	1288 454 554	Maine (1257)	1934	Central Maine Emerg. Pine Tree Sea Gull	WA1YJW W1RWG K1GUP	1288 454 554	Maine (1257)	1934	1934	1934	Maine (1257)	1934	1934	Maine (1257)	1934	1934
Maryland-DC BARK SET Hartford County RACES Maryland Emerg. Tri-State 4-Meter	WA3LQV WB3FFS K3ORW W3DFW	419 131 655 729	Maryland-DC (1932)	3251	BARK SET Hartford County RACES Maryland Emerg. Tri-State 4-Meter	WA3LQV WB3FFS K3ORW W3DFW	419 131 655 729	Maryland-DC (1932)	3251	3251	3251	Maryland-DC (1932)	3251	3251	Maryland-DC (1932)	3251	3251
Massachusetts/ Rhode Island Aquidneck Island Communications Bellingham ARES Eastern Mass.- Rhode Island Emerg. Rhode Island Phone Honey Hitters Tlc. Mt. Tom Am. Rptr. Assn. SET New England Emerg. Phone Newton SET Western Mass. Emerg. Western Mass. Western Mass. Phone	W1JFF W1XA W1EAE W1EJ W1UWF K1HQZ W1BZA W1JDA W1DNE W1LM W1MJE	214 155 501 428 198 472 290 148 143 252 450	Massachusetts/ Rhode Island (1932)	3251	Aquidneck Island Communications Bellingham ARES Eastern Mass.- Rhode Island Emerg. Rhode Island Phone Honey Hitters Tlc. Mt. Tom Am. Rptr. Assn. SET New England Emerg. Phone Newton SET Western Mass. Emerg. Western Mass. Western Mass. Phone	W1JFF W1XA W1EAE W1EJ W1UWF K1HQZ W1BZA W1JDA W1DNE W1LM W1MJE	214 155 501 428 198 472 290 148 143 252 450	Massachusetts/ Rhode Island (1932)	3251	3251	3251	Massachusetts/ Rhode Island (1932)	3251	3251	Massachusetts/ Rhode Island (1932)	3251	3251
Michigan Arrow Berrien County ARES Calhoun County CHARLEM. C.D. Kent County ARES Michigan Thumb Wayne County ARES	W8LM1 WB8DNQ WB8BJ WB8HKL K8H WB8UP K8BTH	4487 670 248 126 1376 71 2508	Michigan (5631)	9586	Arrow Berrien County ARES Calhoun County CHARLEM. C.D. Kent County ARES Michigan Thumb Wayne County ARES	W8LM1 WB8DNQ WB8BJ WB8HKL K8H WB8UP K8BTH	4487 670 248 126 1376 71 2508	Michigan (5631)	9586	9586	9586	Michigan (5631)	9586	9586	Michigan (5631)	9586	9586
Minnesota Section Phonet AHS Day Watch GII Graduate Radio Club Mississippi Mississippi Sideband	N9DF WB9YVT WB9ZAL WB9SNB	138 111 428 1114	Minnesota (2416)	1683	Section Phonet AHS Day Watch GII Graduate Radio Club Mississippi Mississippi Sideband	N9DF WB9YVT WB9ZAL WB9SNB	138 111 428 1114	Minnesota (2416)	1683	1683	1683	Minnesota (2416)	1683	1683	Minnesota (2416)	1683	1683
Missouri Barton-Grade County Emerg. Cedar-Vernon County ARES Indiana out- lets ARES Johnson County ARPSC Missouri CW Missouri Slow speed Montalto ARA SET NE MOE Vernon County ARES	W9HH WA9FKD WB9ZK WB9FND WB9V K9ONK WB9JTC WB9FT WB9FKD	478 504 69 255 374 197 292 163 842	Missouri (1676)	2839	Barton-Grade County Emerg. Cedar-Vernon County ARES Indiana out- lets ARES Johnson County ARPSC Missouri CW Missouri Slow speed Montalto ARA SET NE MOE Vernon County ARES	W9HH WA9FKD WB9ZK WB9FND WB9V K9ONK WB9JTC WB9FT WB9FKD	478 504 69 255 374 197 292 163 842	Missouri (1676)	2839	2839	2839	Missouri (1676)	2839	2839	Missouri (1676)	2839	2839
Nebraska Eastern Nebraska ARES 2-Meter 3-Meter York-Polk County ARES New Hampshire/ Vermont Granite State Phone New Hampshire Emerg. Phone New Hampshire Vermont WRIAEA SET New Jersey Atlantic County ARES Bavonne ARES- RACES Tlc.	K9GND W9VQR W9BOK K9CWL W3TEF K1BCS K1RSC N1NH W1AIEH W3EYV	416 195 231 1209 370 30 565 205 439 3337 239	Nebraska (174)	842	Eastern Nebraska ARES 2-Meter 3-Meter York-Polk County ARES New Hampshire/ Vermont Granite State Phone New Hampshire Emerg. Phone New Hampshire Vermont WRIAEA SET New Jersey Atlantic County ARES Bavonne ARES- RACES Tlc.	K9GND W9VQR W9BOK K9CWL W3TEF K1BCS K1RSC N1NH W1AIEH W3EYV	416 195 231 1209 370 30 565 205 439 3337 239	Nebraska (174)	842	842	842	Nebraska (174)	842	842	Nebraska (174)	842	842
New Jersey Atlantic County ARES Bavonne ARES- RACES Tlc.	W3EYV	239	New Jersey (3529)	3337	Atlantic County ARES Bavonne ARES- RACES Tlc.	W3EYV	239	New Jersey (3529)	3337	3337	3337	New Jersey (3529)	3337	3337	New Jersey (3529)	3337	3337
New York AFSN/ATEN Chemung County ARES Huntington ARES New York State CW Smithtown ARES RACES Westchester County ARES No.1 Western District Western New York Emerg.	WB2ZCM WA20HZ W2GLE W2C WB2GUB WB2VUK WA2AV WB2FTX	899 261 433 717 403 634 685 385	New York (3139)	4419	AFSN/ATEN Chemung County ARES Huntington ARES New York State CW Smithtown ARES RACES Westchester County ARES No.1 Western District Western New York Emerg.	WB2ZCM WA20HZ W2GLE W2C WB2GUB WB2VUK WA2AV WB2FTX	899 261 433 717 403 634 685 385	New York (3139)	4419	4419	4419	New York (3139)	4419	4419	New York (3139)	4419	4419
North Carolina Alamance County ARES Central North Carolina Tlc. Civil Prepared- ness GUILFORD County Emerg. Hatteras Metrolina 3-M																	

Results, 31st ARRL VHF Sweepstakes

VHF SS starts its fourth decade, but it's not just getting older, it's getting better.

By Bill Jennings,* K1WJ

The 31st annual ARRL VHF Sweepstakes, January 21-22, 1978, was a blend of surprises and predictability. What with the new scoring system, which rewards contest operation above 148 MHz with a substantial increase in the points per QSO ratio, it seemed likely that increased uhf activity would be the stimulus for greatly increased scores and the downfall of all-time division records by the score. Not so. Variable propagation characteristics and the ravages of "mean old Mr. Murphy" do take their toll.

Eight new all-time division records now stand in the wake of the latest, and largest since 1972 with 838 entries (an increase of 96 entries over the 1977 totals), running of the VHF SS. Four of these new records are those of single operators and four are in the multiop category. Some real "oldies but goodies" in the record department have been bettered in 1978. The single operators were lead by N6NB, who more than doubled, in total points, his own

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1970 record in the Southwestern Division. WA4LJQ added 6k points to the 1976 WA4GPM record and now leads all single operators in the Roanoke Division. W7YOZ now owns the score to beat in the Northwestern Division. And K5CM holds the record for gunning down the oldest division record, broken in 1978, by laying to rest the 18-year-old "granddaddy," set by K5KTR in the West Gulf Division.

The multioperator stations fared at least as well. The K9HMB group topped the 10-year-old mark in the Central Division. The gang at W4VO, in the Southeastern Division, went out and not only doubled their own one-year-old record, but added an extra 2.5k points for good measure. The W3KKN and K8III operators came on to best their own previous efforts in the Atlantic and Great Lakes Divisions, respectively.

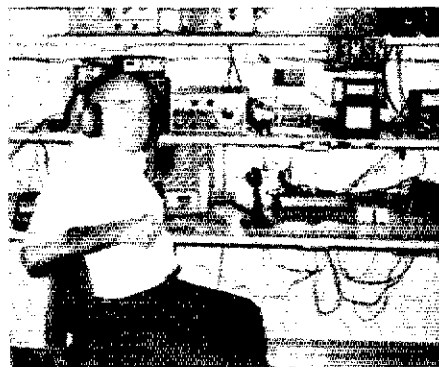
Top Ten

The average operator in the single-operator top-ten listings, aside from

posting an average score increase of 6000 points over his 1977 counterpart, is from the third U.S. call area, the Eastern Pennsylvania Section to be precise (seven of the 1978 top ten are); had made the single-operator top-ten listing in the 1977 VHF SS (five stations, those holding 1978 positions one, two, three, four and six, held top-ten positions in 1977); and is a member of the Mt. Airy VHF Radio Club (eight of the 1978 top ten are members, only those stations holding positions nos. five and nine are not members).

The "average" station in the top ten for multioperator stations is slightly harder to categorize. The average 1978 top-ten multiop station scored 4k points more than the average 1977 top tenner. The second U.S. call area has four representatives to the top ten, three of those being from the Northern New Jersey Section. Four of those listed (those holding positions one, five, seven and nine) in this year's top ten are "repeaters" from the 1977 listing. And there is no predominate club affilia-

Maryland-DC Section's W3MSN put his station on 50, 144 and 220 MHz for the 1978 VHF SS.



2 meters and 70 cm were the sole stomping grounds of Dick, WB3EFM, who placed second among the single operators in the Maryland-DC Section.



154 QSOs in seven sections on 50 and 144 MHz, netted Willard, WB9PXW, third place in the Indiana Section.



Affiliated Club Scores

Club	Score	Entries	Winner
Mt. Airy VHF Radio Club (Packrats)	755,538	65	W3HQT
Rochester (NY) VHF Group	694,176	215	W2CNS
South Jersey Radio Association	164,080	36	W2BV
Potomac Area VHF Society	124,396	12	WA4LJQ
West Jersey Radio Association	69,650	20	WA2DFU
Ill-Wind Contesters	68,344	3	
Gloucester County Amateur Radio Club	57,204	20	N2CQ
Mobile Sixers Radio Club	42,418	18	W3ETB
Six Meter Club of Chicago	33,898	14	WA9FIH
Northern California Contest Club	26,544	7	K6KLY
Dutchess County VHF Society	24,914	3	W2AWX
M.I.T. Radio Society	22,802	3	WA4TTG/1
Tri-State Amateur Radio Association	19,518	5	WA1LUJ
Mitre-Bedford Amateur Radio Club	18,428	12	W1JR
Hampden County Amateur Radio Association	17,358	13	W1KK
Central Michigan Amateur Radio Club	16,388	8	WA8ABN
Muskogee Amateur Radio Club	16,020	3	K5CM
RCA Amateur Radio Club	15,914	5	WB9CEP
Northern Virginia FM Association	14,426	4	WB4EYP
Montgomery Amateur Radio Club	11,508	4	WB3CHS
Pentagon Amateur Radio Club	9,436	5	WA4NTP
Lake Success Radio Club	6,828	4	WB2GVD
York Radio Club	5,496	3	WA9RIJ
Northrop Radio Club	4,812	4	W6CN
Rochester (MN) Amateur Radio Club	4,756	10	W0VB
Mt. Tom Repeater Association	4,080	3	W1JP



K8BI, one of the eight operators at WA8PLZ.

tion (although the Ill-Wind Contesters and the Mt. Airy VHF Radio Club both have two member stations in the top ten, the remaining six being from other clubs or nonaffiliated).

Club Competition

Although according to the Chinese calendar, this is the year of the horse; as far as the VHF SS is concerned, as it has been so many times in the past, this is the year of the rat — the Packrat, naturally. The Mt. Airy VHF Radio Club, lead by W3HQT, the number one single operator, is again the number one club in the VHF SS club competition. The Packrats, fielding five fewer entries this year than in 1977, posted a 130k aggregate-point increase to lead the field of 26 participating affiliated clubs. The Packrats' clubhouse has got to look like "gavel city" by now.

Don't look now, Packrats, but that hot breath on your necks is coming from the 215 members of the Rochester (NY) VHF Group. Rochester, in second place by nearly 200k points in 1977, rallied their forces for an additional 68 entries and pulled to within 60k points of the first place Packrats. The 1979 VHF SS club

competition should be verry interesting.

The South Jersey Radio Association and the Potomac Area VHF Society round out the list of the top four clubs, which by the way, are all holders of the same respective positions in the 1977 VHF SS, and are all the clubs with aggregate scores of 100k or more points.

Administrative Stuff

The uhf incentive scoring system met with general approval, as much so as the consecutive serial number (chronologically, not by band) met with general opposition. Be sure to carefully read the rules for the 1979 VHF SS as rule changes and refinements are anticipated.

If vhf contesting is for you, and you're especially taken with operating the bands at 220 MHz and above, then the new ARRL UHF Contest is just what the doctor ordered. Date? August 5-6. Details? Elsewhere in this issue. Good luck.

In the preparation of this report, we're happy to acknowledge a little help from our friends Tom, K1KI and Arlene.

Soapbox

The additional points for the higher

vhf/uhf bands are long overdue and should be extended to the June and September contests. (W7TYR) Believe there should be a multiplier for climbing the tower in the blizzard to reorient the beams. (K2LZF) We would like to go on record as opposing the use of fm simplex above 146 MHz for contest purposes. The purpose of vhf contests is to broaden the horizons of vhf operation, *not* just work everybody and his brother within 30 miles. (N4SM, N4YN and WD4AQH) Scatter conditions were very poor — bursts were very short and few in number. (WA8OGS) What is the big deal about a single frequency? My opinion on .52 is all or none. (WB7DZD) Bet I was the only one to work a "snowmobile-mobile" station. (W1AIM) I heard some tantalizing bursts, but the band was pretty quiet and disappointing this January. (WB3DDA) I do not like the sequential exchange, *period*. (WA8ZCO) I vote to repeal the limited .52 rule, and just say no contest operation on repeater frequencies. (K2OEO) Big effort ended up big flop. (WA1RWU) I feel I would have enjoyed it even more if the contest were held during the minor sporadic-E season, either near

QSOs per Band/Antenna Configuration for Top Six Scores.

Call	Band → 50 MHz	144 MHz	220 MHz	432 MHz	1296 MHz	10 GHz
<i>Single Op</i>						
W3HQT	213/11-el. Yagi	227/14-el. Yagi	58/15-el. Yagi	32/52 el.	6/4-ft dish	
WA3AXV	183/6-el. Yagi	252/12-el. Yagi	89/10-dB stick	45/32-el Slott		
K3MWV	158/4-el. Yagi	304/14-el. Yagi	73/5-el. Yagi	29/18-el. Quagi		
<i>Multio</i>						
K8II	331/11-el. Yagi	410/32-el.				
WA2VUN	291/11-el. Yagi	331/16-el. Yagi	99/Vertical	24/27-el. Yagi	4/S.I./LY	8
K2XR	348/6-el. Yagi	450/14-el. Yagi				

Top Ten

Single Operator Call	Score	Multiooperator Call	Score
W3HQT	50,232	K8II	68,172
WA3AXV	45,084	WA2VUN	56,880
K3MWV	42,624	K2XR	55,860
W3ZD	35,278	K9HMB	45,312
K1FO	32,576	W3KKN	43,860
W3HMU	30,380	K3DUA	30,360
W2EIF	30,000	WA2SNA	26,514
K3IUV	29,970	K9HDE	22,724
N6NB	25,200	W2PAU	22,330
WA3JUF	25,140	WA3FOF	22,126

Division Leaders

Single Op	Division	Multlop
W3HQ7	Atlantic	W3KKN
WB9CEP	Central	K9HMB
WB0HHM	Dakota	WB0BDI/0
WB4JGG	Delta	WA4LDU
WB8IGY	Great Lakes	K8III
WB2BUR	Hudson	WA2VUN
WB2UFQ	Midwest	K0TLM
K1FO	New England	W1FMF
W7YOZ	Northwestern	K7ND
K6KLY	Pacific	W6YKM
WA4LJQ	Roanoke	W4BFB/4
WB5AOX	Rocky Mountain	W0WYZ
N4QH	Southeastern	W4VO
N6NB	Southwestern	K6MEP
K5CM	West Gulf	N5EX/5
VE3BQN	Canadian	VE3AEA/3

All-Time Division Leaders

Single Operator

Call	Score	Year
W3MFY	52,910	68
K9HMB	20,746	73
WA0CSL	8,190	76
WB4JGG	11,270	77
K8LEE	41,080	76
WB2WIK	54,132	77
K9ECV/0	12,690	68
WA1NGR	33,110	76
W7YOZ	8,126	78
WA6JUD/6	23,868	76
WA4LJQ	21,692	78
K7UFG	5,320	68
W4GDS	26,400	73
N6NB	25,200	78
K5CM	14,100	78
VE3ZZZ	12,896	72

Multoperator

Division	Call	Score	Year
Atlantic	W3KKN	43,860	78
Central	K9HMB	45,312	78
Dakota	WB0PIV	3,640	76
Delta	WB4HELJ4	8,880	73
Great Lakes	K8III	68,172	78
Hudson	K2OWR	65,562	76
Midwest	K0VUY	14,196	76
New England	W1FMF	46,440	76
Northwestern	K7BBO/7	5,642	63
Pacific	WA6BMV	24,814	77
Roanoke	W4BFB/4	21,880	76
Rocky Mountain	WA0PHZ/0	8,062	68
Southeastern	W4VO	18,966	78
Southwestern	W6FNE/6	20,352	63
West Gulf	K5STI	12,804	59
Canadian	VE3ASO	7,800	74

the end of December or early January. (WB1FAE) Increased activity on 432 was a big plus. (W3XO) I like the new scoring for 200 MHz and up. Heard the most activity on uhf this January SS than any other year I've been active. (K2CBA) Midwinter mountaintop operation is certainly no picnic. I would like to see the contest started at the same GMT throughout the country. (K1LPS) New point rules are great. They finally rewarded adequate points for the time and effort required per uhf QSO. (W1JR) Your new log sheets are bogus. (K1FO) Almost nobody bothered with the higher bands out here before. (N6NB) How about extra points for working SSTV? (WB2BUR) I sure wish sections could count more than once per contest; i.e., be able to count on different bands. (K1FJM/4) Forty minutes before the contest started 2s and 3s were coming in very good. Nothing heard once it started. (WB5JAR) High activity on 1296, over 15 stations on the air, due to efforts of N6TX. (K6KLY) Wish they (FCC) would give Techs the full 2-meter band! (K2OVS) [They did! — Ed.] I found that conditions on the relatively long paths (400 miles or so) on 2 meters were quite good, with many signals heard consistently through the weekend. (VE3FN) A fair amount of QRM, but that's OK because it

was caused by lots of activity . . . very little frequency hogging on the popular contest frequencies. (WB2CUT) No special openings were noted and several sections, which are usually heard were absent. During the entire contest period, it was even very difficult to work many stations on scatter, as the bursts were very few and far apart. (WB8RNY/W8MRM) Neither snow nor sleet nor wind nor freezing cold could keep us from the VHF SS. (K4ROM) Sure could use some more stations on 432. (WA5WCP) It is much easier to find 432 contacts than 220 contacts around Detroit! (WA8EUU) I think that the new rules for the VHF SS are a step in the right direction. One additional change would go a long way in equalizing things for those who operate above 50 MHz, as the ability to gain additional section multipliers on 6 meters, due to sporadic-E band openings is certainly a factor. Allowing a multiplier of only X1 for all contacts on 50 MHz would help to even things out. (K8DIO) Nice to hear all the activity (QRM, splatter, crossmode, etc.) on 144 this year. Fm sure made a difference in the scores. (VE3DSS) Activity was far above that of last year, although 432 fell short of our expectations. We had 220-MHz capabilities, but only had two takers . . . Looking forward to June when we hope to have a new 2-meter array.

(WB4AEG/W4VO) Glad to report five sections worked during the contest. I've worked them all previously, but was surprised that they actually came through for the contest . . . Have to report that both vertical and horizontal polarization are needed for contesting here in the less populated areas. Sideband activity has really mushroomed here in New Mexico lately. Last year only worked two or three stations on ssb, this year worked 20 ssb stations. I'm still not happy with your restrictions on .52 contesting . . . We have practically no tropo here in the dry, high mountainous west. We sit by the hour, night after night, tickled to death if we can work one or two stations out to around 300 miles. Although it's usually working locals and listening to the hiss. Then in a contest, we are restricted as to how long we can work .52. Why not impose restrictions on those in areas where problems occur, rather than on everyone? (WB5AOX)

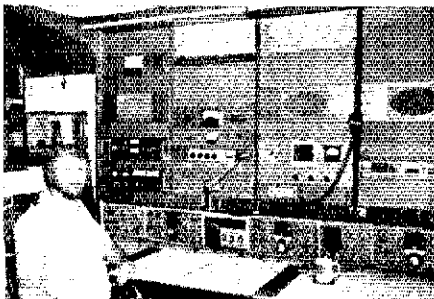
Feedback

The score of W1JP was omitted from the listings of the 1977 VHF SS on page 91 of August 1977 QST. The listing should read W1JP 3400-100-7-AB. This would put W1JP in third place among the single operators in the Western Massachusetts Section.

Dave, K0LCB, says his 1978 effort from the Missouri Section is just a warmup for bigger and better things to come.

K1LPS ascended Burke Mt. (elevation 3267 feet) and put Vermont in 93 logs during the SS.

The number three single operator from the Southern New Jersey Section, Bill, WA2DPU, divided his 360 QSOs between 6, 2 and 1-1/4 meters.





Gene, W0GL, the 144-MHz operator at K0TLM. Tom, WB8NZM, of WA8PLZ, OH.

WD6CGF (left) and WD6DRI at WB26RI.

Scores

Scores are listed in order, single-operator stations first within each section. From left to right: Call, score, number of QSOs, number of multipliers, bands operated (A-50 MHz, B-144 MHz, C-220 MHz, D-432 MHz, E-1298 MHz, F-2304 MHz, G-3300 MHz, H-5 GHz, I-10 GHz).

U.S.A.

Table listing scores for Connecticut stations including K1FO, K1DH, and K1YON.

Table listing scores for Eastern Massachusetts stations including W1JR, W1LPM, and W1WJ.

Table listing scores for Maine stations including K1OT and W1WJ.

Table listing scores for New Hampshire stations including W1GUR, W1BDC, and W1WJ.

Table listing scores for Rhode Island stations including W1PBR, W1GCM, and W1WJ.

Table listing scores for Vermont stations including K1LPS, W1AIM, and W1WJ.

Table listing scores for Western Massachusetts stations including K1WGN, K1QXJ, and W1WJ.

Table listing scores for Eastern New York stations including W2AWX, W2YQU, and W2YVW.

Table listing scores for New York City-Long Island stations including K2OVS, W2SLV, and W2YVW.

Table listing scores for Northern New Jersey stations including WB2UR, WB2CT, and W2YVW.

Table listing scores for Southern New Jersey stations including W2EFP, W1NGR/2, and W2YVW.

Table listing scores for Western New York stations including W2CNS, W2WVW, and W2YVW.

Table listing scores for stations including W2CNS, W2WVW, and W2YVW.

Table listing scores for stations including W2CNS, W2WVW, and W2YVW.

Table listing scores for stations including W2CNS, W2WVW, and W2YVW.

Table listing scores for stations including W2CNS, W2WVW, and W2YVW.

Table listing scores for stations including W2EKK, W2NZO, and W2YVW.

Table listing scores for stations including W2EKK, W2NZO, and W2YVW.

Table listing scores for stations including W2EKK, W2NZO, and W2YVW.

Table listing scores for stations including W2EKK, W2NZO, and W2YVW.

Table listing scores for stations including W2EKK, W2NZO, and W2YVW.

Table listing scores for stations including K1D, W2ZGL, and W2YVW.

Table listing scores for Delaware stations including W3GXP, W3BDP, and W3CVC.

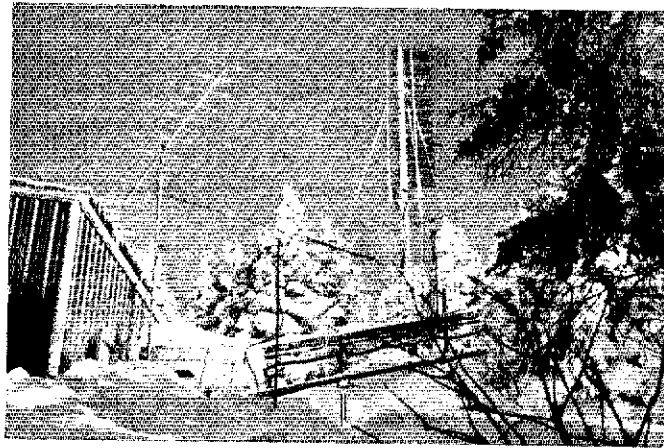
Table listing scores for Eastern Pennsylvania stations including W3HQT, W3AKV, and W3JMU.

Table listing scores for stations including W3HQT, W3AKV, and W3JMU.

Table listing scores for stations including W3HQT, W3AKV, and W3JMU.

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Table listing scores for stations including W3HQT, W3AKV, and W3JMU.



In case the warm summer sun has helped us to forget, that white stuff on the trees and on the ground is snow; lots of snow, as seen through the camera of K1LPS, VT.



This year's SS found the K6MEP crew atop Pine Mountain (elevation 6700) in southern California, from which they turned in the number one multiop score in the Southwestern Division.

WA3YBL(+WA3JSR) 540-35-2-AB	Tennessee WB4JGG 6750-120-17-ABD W8R1B/4 468-18-3-B WA4LDU(+WA4KJH) 5440-129-10-ABDE	WB6MFW 2268-63-8-B PA9ZNV/W6 1176-33-4-BD	QDR JPK KMU,oprs) 5372-154-7-ABD N8HT(+WD8CQN) 1512-54-4-B	W9WJ 1036-37-4-B N9TD 918-27-7-B WB9ROF 336-14-2-AB												
Maryland-D.C. WB3KO 12,064-201-16-ABD WB3EFM 9272-219-9-BD K3LFO 9272-128-16-BCD WA3OYW 8170-184-9-ABCD WA3USC 6084-117-16-B WB3HQ 5894-134-12-B WB3CHS 5754-137-11-B K3AKR 3358-139-9-ABD WB3YF 4600-92-15-B WB3JG 3808-86-7-BCD WB3VW/3 3712-105-6-ABC WB3OZ 3528-56-11-BCD WA3EOQ 3080-74-10-BC W3EAX(N1QG,oprs) 2088-87-8-BCD WB3MSN 2072-67-4-ABC WB3DAJ 1808-73-3-AB WB3JUF 1404-54-3-AB WB3TF 1104-34-12-ABCD WB3XP 144-6-2-B K3DUA(+WA3N3) 30,360-426-20-ABCD W3PGA(K3 CWZ FRD PHH KOJ,N3IT,W3 JDF,VHF WA3I FHV HZJ LAW OTZ QKB,WB3S BGS 8IT,oprs) 13,680-261-14-ABCD K3IVO(N3FL,W3 DPU FG ICL WA3TID,WB3R YG FGW IPJ JVK,WB3CKB,oprs) 13,536-225-14-ABCD	Virginia WA4LJQ 21,692-336-19-ABCD K2JOP/4 13,050-227-15-ABCD WA4GPM 10,230-145-21-ABD W4PS 8106-172-11-ABC WA4SBC 7544-154-13-ABD W4OJP 7084-161-12-B WB4QVP 5358-141-9-B K4LHB 5082-102-11-ABCD W4NFR 4664-106-12-B WD4MUO 4160-104-10-B K4EVH 3358-132-3-AB WB4MJF 2828-84-4-ABD W4MHQ 2822-83-7-AB K4FTD 2680-67-10-AB W4ARNS 1008-36-4-B W4ANTP 910-35-3-B N4VA 432-18-2-B W4XNB 372-12-3-B WB9RUB/4 240-12-2-B K8QMT/4 218-18-2-B W7ADK/4 132-6-1-B K4AF(WA1MEO,W3BDNL,WA4S NTP RCS,oprs) 7938-189-11-AB N4NBI(+W4XU,WA4S BBY KNP ZHS) 5040-120-11-AB K4FJW(+WB4BG) 2304-64-8-AB WD4JMW(WA4OF,WB4S HDL HDN,oprs) 1296-54-2-AB	Santa Barbara N6NB 25,200-444-11-ABCD W6OAL 690-20-5-ABC K6MEP(K6VMN,N6MA,WA6S DJS IJZ UED,W66DU,oprs) 11,362-247-9-ABCD	Ohio WB8IGY 15,566-249-13-ABD WA8OGS 15,190-217-25-AB W8STJL 8000-155-15-ABD K8NHO 6556-136-12-BC K8NXL 6528-116-14-AB WB8DHF 5290-115-13-B W8ZHE 5016-124-9-BCD K8DW 4356-109-8-ABD K8WV 3960-45-12-D K8YAI 3120-102-5-ABD WB8AW 2158-31-3-B K8EF 1472-46-6-B N8TM 1038-37-4-AB K8CKY 690-23-5-AB K8IIT(+K8MR,WA8RGN) 68,172-741-36-AB WA8PLZ(K8S AT BI,WA8S DZJ SVY ZAN,WB8NWB,W8S EGO MSF,oprs) 13,400-268-15-AB WB8SMC(WB8S OFR QVC SVN VLU,oprs) 12,190-265-13-AB WB8PAT(+K8TY) 65,56-126-8-ABD WA8KCZ(+K8AHK,W8MEU,W8S KRC KRE) 2988-83-8-AB	Colorado K0ZZM 1210-45-1-BCDE WB0BJP 802-41-1-AB WB0MHP NLA SDW TIC TLP TLQ,W0DDLY) 2626-97-3-ABD	Iowa WB0NZA 2646-63-11-AB W0SI 2220-74-5-AB W0RAP 1972-52-7-BD K0EJZ 690-23-5-B	Kansas WB0QDK 1666-49-7-AB W0RT 1224-36-7-B WB0QA 1080-30-8-B N0L 832-26-6-AB WB0RET(+WB0KWI) 702-54-3-AB	Minnesota WB0RLI 2550-75-7-AB WB0S 2108-62-7-AB K0SE 1824-53-4-ABD WB0YEE 418-19-1-B W0RCU 364-14-3-AB WB0EKL 336-14-2-AB WB0ZBL 88-4-1-B WB0ZK 66-3-1-B WA0QWY 44-2-1-A WB0CNEJ 44-1-1-B WB0BDJ(WB0N LU PTE WD0EL,oprs) 1064-38-4-B	West Virginia N8II 9480-179-15-BD WB0EC 6768-115-14-ABD WB8NQB(+WB8CWW) 4200-100-11-B	g Illinois WA9AHZ 8064-209-8-ABD K9MBX 6560-205-6-B WB9FIH 5650-170-5-ABCD WB9QBU 5282-130-9-ABD WB9BQ 5140-173-4-AB W9V1 4186-90-13-ABD WB9WYA 3672-102-8-AB WB9NBA 3360-120-4-B WB9TWW 2512-110-5-AB K9ZUW 2798-02-1-ABCD WA9RIJ 2730-91-5-AB K9ZUW 2794-100-3-ABCD WB9GUE 2516-90-3-B K9YJG 2160-90-3-B WB9SPV 1992-61-2-ABCD W9DOR 1830-55-4-BD WB9WR 1456-53-6-B K9IQG 1690-75-3-AB WA9CJZ 1512-63-2-AB WB9QTE 1464-61-2-AB K9V 1376-43-6-B WB9JZ 1376-43-6-B WB9N 1320-60-1-B WB9VNG 1064-36-4-AB K99CD 1008-42-2-AB K9ENZ 728-2-2-B WA9NRI 456-19-2-B WB9DVQ 440-20-1-B K9KD 308-11-4-B K9GJU 308-10-1-ABC K9HMB(+WA7JCO,K9C KM MR MTE NO,WA9S BOW PBK) 65,512-612-2-ABCD WB9GAT 22,724-468-13-ABCD K9HDE(+K9KD,W9S IWA3-ABD) 22,724-468-13-ABCD W9RVG(+WB9EXD) WB9I(+K9AKS) 6512-231-6-ABCD K9I 8148-194-11-B WB9CHM(+WB9BKH) 2130-71-6-B	Missouri WB9JUF 4662-111-11-B WB9WH 4116-98-11-B WB9PK 2560-75-7-AB WB9JR 2232-62-8-AB K9LS 1260-45-4-AB 2112-11-3-ABD WB9GK K9TLM(+WB9L,WB9S DRJ ITA) 5200-113-10-ABCD	Nebraska WA9MRH 1620-45-8-AB WB9DGF 680-19-5-BD	South Dakota WB9HHM 3640-32-6-B K9VXM 1856-46-8-AB WB9QY 1024-32-6-B WB9LX 468-18-3-AB	VE Maritime-Newfoundland VE1ASJ 3080-55-18-A WB2RLK/VE1 324-9-8-A	Quebec VE2DFO 9170-131-24-AB VE2K 1632-51-6-AB VE2BK 598-39-7-ABD	Ontario VE3BQN(VE3CNU,oprs) 11,880-278-12-ABCD VE3DS 9312-194-14-AB VE3FN 4980-83-20-B VE3G 4800-160-8-B VE3BPH 3584-126-4-AB VE3APH 2304-70-6-BD VE3EUV 1084-30-6-ABD VE3AEI(VE3AA-Y FDP IGM IRK IRW JPD,oprs) 896-32-4-B VE3IQZ(VE3JPD) 288-12-2-B	Check Logs WB1CWZ K1RG/1 WA2LJM K3OLS K3IUV/3 WA3RFT K4EJQ W8LT WB8WYC K9ENZ/9 K9ENZ/6 K9GJU/M K9GJU/7 W8TAI, WB8WYC K9ENZ/9 K9ENZ/6 K9GJU/M K9GJU/7 W8TAI, WB8WYC K9ENZ/9 K9ENZ/6 K9GJU/M K9GJU/7 W8TAI,

Rules, 1978 ARRL UHF Contest

Time and again, amateurs have proved communication is possible over amazing distances on higher and higher frequencies. By 1924, amateurs had proved that the spectrum from 200 meters and down was far from useless by completing coast-to-coast contacts in broad daylight on 20 meters.

Today, two amateurs have earned Worked All States awards on 2 meters and several others are on the brink of duplicating this feat. Meanwhile, a host of hams have worked all continents on 432 MHz. And a group of enterprising English operators have conducted QSOs over a distance of more than 300 miles on 10,000 MHz.

Where will it all end? Twenty years ago if someone had proposed a contest in which all QSOs were to occur on frequencies above 220 MHz, skeptics would have predicted that the participants, if any, would achieve scores little above zero.

Today, with literally thousands of amateurs active on the bands above 220 MHz and more arriving daily, it's time for just such an operating event — a uhf contest.

The new UHF Contest will occur on the first weekend of August, a good time for "DXpeditions" to mountaintops all over North America. And more than just the frequencies will be unique — this contest will introduce a brand-new multiplier system.

In the ARRL UHF Contest, the multipliers will be based on longitude and latitude, not states, provinces, sections or any other political subdivision. Each station will send its longitude and latitude, rounded down to whole numbers, and each geographic unit of one degree in longitude by one degree in latitude will be a separate multiplier on each uhf band.

The other rules are pretty much what you'd expect in such an event. But the complete rules are listed below.

Mark August 5-6 on your uhf calendar now. Official uhf entry forms are available from ARRL hq. for a self-addressed, stamped envelope. GL. — N6NB

Rules

1) The 1978 ARRL UHF Contest begins at 1900 UTC on Saturday, August 5, and ends at 1900 UTC on Sunday, August 6. Entrants may use as much of this period as they wish.

2) Contacts may be made on all authorized amateur bands above 220 MHz, using all authorized modes of emission. (However, use of the 430-MHz band is limited to 430-433 MHz, inclusive.)

3) No station may contact any other

station more than once per band for QSO credit, regardless of mode.

4) For a valid contact to occur, each station must send and receive an exchange consisting of a signal report plus either a four- or five-digit number, indicating the position of the station in longitude and latitude, rounded down to the next whole number. Example: K5CM in Muskogee, OK, might send 59 and 9535 as his exchange, since his longitude and latitude is 95 degrees west, 35 degrees north. W7UB1 in Boise, ID, would send 11643, since his longitude is 116 degrees west and his latitude is 43 degrees north. Even a station at 116 degrees, 59 minutes west would send 116, not 117!

Stations not competing in the contest may be counted for contact and multiplier credit if they send their location with enough specificity that the competing station may determine the appropriate longitude-latitude designation.

5) Partial QSOs do not count. Both calls, the full exchange, and acknowledgment must be sent and received.

6) Fixed, portable or mobile operation under one call is permitted. Only land-based stations (not aeronautical or maritime mobiles) may be counted for multipliers. A portable or mobile station may not be counted for more than one QSO per band, even if the station is moving. However, a station that changes locations may be contacted for additional multipliers but only once for QSO points.

7) A transmitter, receiver or antenna used to contact one or more stations under one call sign may not subsequently be used during the contest period under any other call sign, even if more than one call is assigned to a given location by the licensing authority. One complete station must exist for each contact an entrant claims.

8) All equipment and antennas used by entrants must be owned and operated by amateurs. Use of nonamateur-owned gear is not prohibited, but use of such equipment places the entrant in a separate category, ineligible for awards.

9) All equipment and antenna adjustment, logging and operating must be performed by one person for a station to qualify for single-operator status. All stations in which more than one person participates in any of these functions during the contest period are classified as multioperator stations.

10) While no minimum distance is specified for contacts, equipment in use must be capable of real communication (i.e., able to communicate over a distance of at least a kilometer).

11) Scoring: a) Each completed contact on the 220- and 430-MHz bands is worth three contact points. QSOs on 1296 MHz are worth six points each, while those on 2304 and higher frequencies are worth 12 points each.

b) The total multiplier is derived by counting the number of different exchanges (i.e., longitude and latitude numbers) received on each band and summing these band totals. Thus, each geographic area one degree in longitude by one degree in latitude is a unit worth one multiplier and may be counted as such on each band on which they are worked.

c) The final score is determined by adding up the contact-points amassed on all bands used and multiplying that total by the sum of longitude-latitude multipliers on each of the bands.

Example: K1FO works 28 stations in 14 one-degree multipliers on 220 MHz; 47 stations in 21 multipliers on 432, and 3 stations in two multipliers on 2304 MHz. He has 261 contact-points (84 + 141 + 36) and a total multiplier of 37 (14 + 21 + 2), for a final score of 9657 points (37 times 261).

12) Contact made by retransmitting either or both stations, whether by satellite or terrestrial means, are prohibited. Frequencies regularly occupied by a repeater in a locality may not be used for contest work in that area, even if the repeater is turned off.

13) A station located precisely on the dividing line between two one-degree longitude or latitude units may select either one as his location but may not hand out both multipliers without moving his complete station (including antennas) at least 100 meters.

14) Entries must be postmarked no later than August 21, 1978 and must set forth the call sign, exchange (both sent and received), time/date, frequency/band and mode used for each claimed QSO. An accompanying summary sheet must list the total number of QSOs and multipliers (both broken down on a by-band basis, also), the final claimed score, a description of the equipment used, calls of all operators if multiop, mailing address and station location, and a signed statement that all rules and regulations have been followed.

15) The high-scoring single-operator and multioperator station in each ARRL Division will receive a certificate. Additional certificates will be awarded at the discretion of the ARRL Awards Committee.

16) Disqualifications: see page 83 February 1978 QST.

Operating News

Conducted By George Hart,* W1NJM

QRP Defined

The international signal QRP, when used as a question, means "Shall I decrease power?" When used without the question mark, it simply means "Decrease power." Both military and commercial users of QRP and its opposite, QRO (increase power) strictly adhere to the definitions as set forth by international agreement (the Geneva Documents). Specific power instructions are sometimes included, such as "QRP 1/2" or "QRO 2X," a request from a receiving station to alleviate a problem in copying the transmitted signal.

We amateurs, however, have a tendency to use the Q signals loosely to indicate a condition. QRM is interference, QRN is atmospheric, QSO is a contact (a "kewso"!), QTH is location, QTR is the time, etc. — and QRP is low power. Sometimes we deplore this tendency towards looseness, but more often we just accept it as a part of our service jargon. Carrying the concept of low power even further, some have even devised a more specific term, QRPP, which presumably means *very* low power. No doubt, then, QRO should be supplemented by a similar term, QROo, meaning *very high* power.

But high, low, very high, very low are all relative, after all. Compared to one milliwatt, 5 watts is high (QRO), but compared to a kilowatt (a gallon!) it is low (QRP, or even

QRPP). The terms actually were *meant* to be relative, since QRP means merely "decrease" and QRO means merely "increase," with no high or low basically inherent.

Do we amateurs want to bow to this international regimentation? Never! To us, the signal QRP will continue to mean "low power" and QRO will mean "high power." But we can usefully carry this rebellion a step further. We can put digits after the signals to indicate specifically how high or how low; thus, QRP 1 will mean low power of one watt, QRP 5 five watts, and so on. Let's chuck QRPP, it has no meaning. And let's not worry about putting digits after QRO, since QRP is the way to go, and it's a lot of fun.

So dust off your old 6V6 rig or try brewing up one around a pair of MRF742s and get into QRP 5 or even QRP 1 — or *less!* Any comment? — *NICC and W1NJM*

Sure enough, it has been more than two years (March, 1976, to be exact) since we last recapped 160-meter frequency usage. If you're new to the band this may help take some of the mystery out of apparent operating habits. Years of trial and error have proven these tips to be acceptable and appropriate.

The "DX Window," 1825-1830 kHz, is recognized by almost all and principally used by European operators. Almost all the DX works "split" — that is, listening on 1800-1805, DX ssb within 1810-1820 kHz, South American DX on the very low end. Until July, 1978, Hawaiian amateurs may use 1800-1810 kHz from 4-8 P.M. their local time, with a maximum input of 100 watts.

What makes this all so? Nothing very mysterious. The above has evolved from generally recognized good habits by fair-minded individuals. With deregulation being the name of the game — and happily so — it doesn't hurt to keep in mind a simple equation, applicable to all operating phases: government deregulation = personal self-regulation. — *W1YL*

160 — A REMINDER

A recent correspondent noted he hadn't seen anything in *QST* for some time regarding gentlemen's agreements,¹ particularly in regard to the "top" band.

¹"Gentlemen's Agreements: an informal substitute for an agreement, secured only by the honor of the participants."

MEET YOUR SCM

Virginia SCM Rick Genter, K4BKX, was elected for a two-year term of office which began April 1, 1978. K4BKX majored in psychology at Roanoke College, graduating in 1971. He is employed as a Senior Claims Adjuster for the Bituminous Casualty Corporation. In addition to his radio amateur background, licensed for 20 years (previously K8VTF), Rick holds commercial First Class Radiotelephone and Third Class Radiotelegraph Licenses. This active operating amateur is involved in many phases of the hobby — contests, traffic, cw, construction and clubs. He is a

*Communications Manager, ARRL

W1AW Operating Schedule (April 30, 1978-October 29, 1978)

PDST	CDST	EDST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6 A.M.	8 A.M.	9 A.M.	1300 *	Slow'	Fast'	Slow'	Fast'	Slow'		
7	9	10	1400 *	←	←	Cw Bulletins'	←	←		
8	10	11	1500 *	←	←	RTTY Bulletins'	←	←		
1 P.M.	3 P.M.	4 P.M.	2000 *	Fast'	Slow'	Fast'	Slow'	Fast'	Slow'	Slow'
2	4	5	2100	←	←	Cw Bulletins'	←	←		
3	5	6	2200	←	←	RTTY Bulletins'	←	←		
4	6	7	2300	Slow'	Fast'	Slow'	Fast'	Slow'	Fast'	Fast'
5	7	8	0000	←	←	Cw Bulletins'	←	←		
6	8	9	0100	←	←	RTTY Bulletins'	←	←		
8:30	8:30	9:30	0130	←	←	Phone Bulletins'	←	←		
7	9	10	0200	Fast'	Slow'	Fast'	Slow'	Fast'	Slow'	Slow'
8	10	11	0300	←	←	Cw Bulletins'	←	←		
9	11	12	0400	←	←	RTTY Bulletins'	←	←		
9:30 P.M.	11:30 P.M.	12:30 A.M.	0430	←	←	Phone Bulletins'	←	←		

*Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 5, 7-1/2, 7-1/2, 10, 13, 15 wpm.

†Fast code practice on cw bulletin frequencies, 8 minutes each session; 35, 30, 25, 20, 15, 13, 10 wpm.

*Cw bulletins, 18 wpm, on: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz.

†RTTY bulletins 60 wpm/170-Hz shift on 3.625, 7.095, 14.095, 21.095, 28.095-147.555 MHz.

*Phone bulletins on 1.835, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.

*W1AW will beam 45° for these transmissions on Mondays, Wednesdays and Fridays on 20, 15 and 10 meters.

European listeners are encouraged to report use of these transmissions during this summer trial period.

Normal W1AW visiting hours are 3:30 P.M. to 1 A.M. seven days a week (local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Note: ARRL office-visiting hours are 8 A.M. to 5 P.M. Monday through Friday. Maps with local street detail are available upon request. Please note that all footnoted frequencies are approximate. If you wish to operate when visiting, you must have your original operator's license with you. (Schedules can also be arranged to work W1AW.) The station will be closed July 4 and September 4.

Staff: Chief Operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Stan Gibilisco, W1GV.

In a communications emergency monitor W1AW for special bulletins as follows: *phone* on the hour, *RTTY* at 15 minutes past the hour, *cw* on the half hour.

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy on certain tapes, note the UTC dates and QST text to be sent in the Q200 practice from the issue of QST two calendar months past: July 7, It Seems to Us; July 11, World Above; July 19, League Lines; July 20, Public Service; July 24, Happenings; July 28, Operating News.



Virginia SCM Rick Genter, K4BKX.

MARS member ABM4BKX, and his nonham pursuits include Boy Scout merit badge counseling, antique autos, and sports-car racing.

SCM ELECTION NOTICE

To all ARRL members in the Missouri, Southern New Jersey, Quebec, South Carolina, Western Pennsylvania, Eastern Massachusetts, Saskatchewan, Nebraska and New York City and Long Island sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures on that petition. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL
225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.
(Signature . . . Call . . . City . . . ZIP . . .)

SCM candidates must have been a member of the League for a continuous term of at least two years and a licensed amateur of General class or higher (Canadian Advanced Amateur Certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, September 8, 1978.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on October 2, 1978, returns counted November 21, 1978 and SCMs elected as a result of the above procedures will take office January 1, 1979.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition, for a two-year term beginning January 1, 1979.

If no petitions are received for a section by the specified closing date, such section will be resolicited in January 1979 QST, and an SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.
George Hart, WINJM
Communications Manager

Appointments: In the South Dakota Section, Lydia S. Johnson, W0KJZ, was appointed to complete the term (until October 1, 1978) of Ed Gray, W0SD (resigned).

In the Western Pennsylvania Section, John T. Fleming, W3GQJ, was appointed to complete the term (until December 31, 1978) of Donald J. Myslewski, K3CHD (resigned).

SCM ELECTION RESULTS

The following were elected for two-year terms of office beginning July 1, 1978:

Balloting results

In the Northern Florida Section, Frank M. Butler, Jr., W4RH, defeated Jay E. Camac, WB4QBB, 732-124.

In the Oregon Section, Dale T. Justice, K7WWR/K7WW, defeated Dwight J. Albright, W7HLF, 426-379.

OSCAR 7

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
16579B	1 July	0134	81.6
16591A	2 July	0034	66.4
16604B	3 July	0128	80.0
16616B	4 July	0027	64.9
16629A	5 July	0121	78.5
16641B	6 July	0021	63.3
16654B	7 July	0115	76.9
16666A	8 July	0014	61.7
16679B	9 July	0109	75.3
16691B	10 July	0008	60.2
16704A	11 July	0102	73.8
16716B	12 July	0002	58.6
16729B	13 July	0056	72.2
16742A	14 July	0150	85.8
16754B	15 July	0050	70.6
16767B	16 July	0144	84.2
16779A	17 July	0043	69.1
16792B	18 July	0138	82.7
16804B	19 July	0037	67.5
16817A	20 July	0131	81.1
16829B	21 July	0030	66.0
16842B	22 July	0125	79.5
16854A	23 July	0024	64.4
16867B	24 July	0118	78.0
16879B	25 July	0018	62.8
16892A	26 July	0112	76.4
16904B	27 July	0011	61.3
16917B	28 July	0106	74.9
16929A	29 July	0005	59.7
16942B	30 July	0059	73.3
16955B	31 July	0154	86.9
16967A	1 Aug.	0053	71.7
16980B	2 Aug.	0147	85.3
16992B	3 Aug.	0047	70.2
17005A	4 Aug.	0141	83.8
17017B	5 Aug.	0040	68.6
17030B	6 Aug.	0134	82.2
17042A	7 Aug.	0034	67.0

OSCAR 8

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
1637J	1 July	0145	65.2
1650J	2 July	0007	40.7
1664A	3 July	0012	42.4
1678A	4 July	0017	43.4
1692X	5 July	0023	44.7
1706A	6 July	0028	46.0
1720A	7 July	0033	47.3
1734J	8 July	0038	48.6
1748J	9 July	0044	50.0
1762A	10 July	0049	51.3
1776A	11 July	0054	52.6
1790X	12 July	0059	53.9
1804A	13 July	0105	55.2
1818A	14 July	0110	56.6
1832J	15 July	0115	57.9
1846J	16 July	0120	59.2
1860A	17 July	0126	60.5
1874A	18 July	0131	61.8
1888X	19 July	0136	63.2
1902A	20 July	0141	64.5
1915A	21 July	0003	40.0
1929J	22 July	0009	41.3
1943J	23 July	0014	42.6
1957A	24 July	0019	44.0
1971A	25 July	0024	45.3
1985X	26 July	0029	46.6
1999A	27 July	0035	48.0
2013A	28 July	0040	49.2
2027J	29 July	0045	50.6
2041J	30 July	0050	52.0
2055A	31 July	0056	53.2
2069A	1 Aug.	0101	54.5
2083X	2 Aug.	0106	55.8
2097A	3 Aug.	0111	57.2
2111A	4 Aug.	0117	58.5
2125J	5 Aug.	0122	59.8
2139J	6 Aug.	0127	61.1
2153A	7 Aug.	0132	62.4

Have you listened to OSCAR 8 yet? This newest of amateur satellites is available to anyone with a good-quality, 10-meter receiver. To track it, you'll need an OSCARLOCATOR and reference-orbit information (available on W1AW bulletins). It orbits the earth every 103 minutes; the morning and evening passes occur at approximately the same times each day. Decoding the telemetry from the beacon is a simple matter using the ARRL OSCAR telemetry forms, available from Hq. for an s.a.s.e. When you return it, we'll send you a colorful OSCAR 8 QSL card.

To keep abreast of the latest developments, tune in to the regular phone and cw bulletins over W1AW, AMSAT bulletins transmitted around 29.440 MHz on Mode A, 145.960 MHz on Mode B, during A-O 7 reference orbits, and AMSAT nets (East Coast at 0100 UTC Wednesdays on 3850 kHz; Mid States at 0200 UTC; West Coast 0300 UTC).

Notes

- 1) All time and date references are in UTC.
- 2) The times and longitudes are for OSCAR's first equator crossing each day, which is called the reference orbit.
- 3) A-O 7 will operate Mode A only on days of the year fully divisible by three (July 2 is day number 183, for example), and the other two days in between will be Mode B.
- 4) All Monday orbits are reserved for QRP use only. Use a maximum of 10 watts erp. Wednesdays are reserved for special experiments. Schedule A-O 7 experiments through AMSAT, A-O 8 through ARRL.
- 5) The OSCAR 7 Mode B and OSCAR 8 Mode J transponders invert signals. Upper sideband into the uplink becomes lower sideband on the downlink.
- 6) A-O 7 progresses an average of 28.737478 degrees west per orbit in a period of 114.945207 minutes. A-O 8 progresses 25.808614 west in a period of 103.231422 minutes.
- 7) A-O 8 modes of operations are Monday, Tuesday, Thursday and Friday — Mode A, Saturday and Sunday — Mode J. Wednesdays are for experimental use only.

Spacecraft Frequencies

Spacecraft	Uplink	Downlink	Beacon
A-O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz
A-O 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.100-435.200 MHz	435.095 MHz

This schedule of orbits for OSCAR 7 and OSCAR 8 is a regular feature of QST. Tune in W1AW bulletins for updated reference orbit data. Further information on the radio amateur satellite program can be obtained free of charge from ARRL hq. Also, the popular and informative series of QST articles for the beginner has been reprinted in book form. *Getting to Know OSCAR — from the Ground Up* covers OSCAR 6, OSCAR 7, the newest satellite, OSCAR 8, launched in early March, and the exciting Phase III program scheduled for late 1979. It includes the OSCARLOCATOR, a tracking device that lets you know which passes you can access and where the satellite is in the Northern Hemisphere at any given moment. The book is available for \$3 postpaid (\$3.50 outside the U.S.), from the ARRL. The OSCAR 7 and OSCAR 8 OSCARLOCATOR plastic overlay is available free from ARRL. Send your request with a 9 x 12 s.a.s.e., please.

Operating Events

JULY

1-2: Binghamton Amateur Radio Association, W2OW, golden anniversary celebration and Seven-Land QSO Party, page 80, June QST.

2: North American CW Sprint (part two, a "separate" Sprint, will be held September 10); sponsored by the *National Contest Journal* from 0100-0500Z each night. An entrant may submit scores for either one or both Sprints, but he may not combine his scores. CW only, 80-40-20 meters. Suggested frequencies are 3530-3550, 7030-7050, 14030-14050. A station may be worked once on each band. You must make the entire exchange as follows: his call, your call, consecutive QSO serial number, your name and state (or VE province or country); i.e., JA1KSO de KØTO nr 32 Tod MN K. A complete two-way between a North American station and another station counts a point. Multiply the number of contacts by the sum of states, VE provinces and other countries (do not count USA and Canada as countries) for final score. Stations ex-North America use the sum of states, provinces and other North American countries for the multiplier (do not count USA and Canada). KH6 is not counted as a state and is not a N.A. country. VE multipliers are Maritime (VE1, VO1 and VO2), and VE2-VE8 (total of 8). Note for N.A. stations only: If any N.A. station solicits a call by sending CQ, QRZ? QRZ, etc., he is permitted to work only one station in response to that solicitation. He must then move at least 1 kHz before he works another station, or at least 5 kHz before he again solicits other calls. Entries must be sent to Rusty Epps, N6SF, 35 Belcher St., San Francisco, CA 94114, and received no later than 30 days after the Sprint to be eligible for trophies/awards. Entries must include a summary showing valid contacts by band, total multipliers, total score, name and call sign of the operator, station call and station location; a complete legible log (including dupes marked as such) with indication by numbered sequence of each multiplier claimed. Logs, summary sheets and check sheets may be homemade or patterned after those shown in the NCJ. Team competition is limited to a maximum of 10 operators as a single entry unit. Clubs having more than 10 members may submit more than one team entry. **Pre-contest requirement:** To qualify as a team entry, the name, call of each operator and call of the station operated, should the operator be a guest at a station other than his own, (e.g., WA7NIN op by N6SF) must be registered by a letter, which must be received by N6SF before the start of the Sprint, or it may be contained in a W.U. mailgram dated at least 24 hours prior to the start of the Sprint. There are neither distance limitations nor meeting requirements for a team entry. Only pre-registration for the team is a requirement. Any entry may be disqualified for illegibility, incorrectness, or illegal or nonethical operation. This is at the discretion of the NCJ Contest Review Committee. A trophy to the highest-scoring entrant. Certificates of merit to call district and country highs, to each of the 10 high scores, to each member of the winning team and to the top entrant on each team.

4: Straight-Key Night, page 80, June QST.

5: West Coast Qualifying Run (W6OWP prime, W6ZRJ alternate) 10-35 wpm at 0400Z (Universal Coordinated Time, abbreviated UTC, with Z used as a time designator), on approximately 3590/7090 kHz. This is 2100 PDST the night of July 4 (9 P.M. PDST). Please note that dates are always shown at least two months in advance and times are always the same local "clock time." Underline one minute of the highest speed copied, certify that the copy was made without aid, and send to ARRL for grading. Include your full name, call (if any) and complete mailing address. A large, addressed, stamped envelope will help to speed your award/endorsement.

8-9: IARU Radiosport Competition, page 75, May QST.

13: WIAW Qualifying Run at 0200Z, 10-40 wpm, transmitted simultaneously on 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08 and 147.555 MHz. This is 2200

EDST (10 P.M. local Eastern time) the night of July 12. Other instructions under the July 5 listing.

15-16: HK Contest, sponsored by the Colombian Society, the LCRA, commemorating the 167th anniversary of the independence of Colombia, the full 48-hour period UTC. Categories are single-op single band, single-op multiband, multi-multi (one rig); 80-10 meters. Modes are phone and cw. Call CQ HK. Exchange serial number of report plus consecutive QSO number starting with 001. HK stations will transmit report plus HK prefix (i.e., 57HK3 or 589HK4). Each QSO with an HK station counts 5 points, with stations on another continent 3 points, with a station in another DX country (same continent) 2 points, same country 1 point. The multiplier is the sum of different countries worked on each band. This times points equals final score. Log each band separately, in UTC, note new multiplier the first time it is contacted. Include a signed summary sheet. A minimum of 50 QSOs must be shown to qualify for an award. Only one contact per band with the same station. No crossband or cross mode. Club stations participate as multioperator multiband (single transmitter). Usual disqualification criteria. Entries must be postmarked by Sept. 30 and sent to LCRA Contest, Apartado Postal 584, Bogota, Colombia, S. A. **Ten-Ten International Net Summer QSO Party**, the full 48-hour period UTC. Open to all but only members are eligible for awards. Contacts must be made on 10 meters, any mode, a station to be contacted only once. Exchange name, QTH, 10-10 number (log date/time each contact). Score 1 point per contact, add a point if with a 10-10 member (maximum 2 points per QSO, no multipliers). Give the name of your chapter for credit. Awards. Members only send log to Grace Dunlap, K5MRU, Box 13, Rand, CO, no later than August 30. **VHF Space Net Contest**, commemorating the 9th anniversary of Apollo II, man's first landing and walk on the moon. Activity will be on 50, 144, 220, etc., all modes, except repeaters. Exchange signal report and ZIP code or P. O. locations (out of the country). Each contact is worth 2 points. The same station may be reworked on a different mode for an additional 3 points and reworked again on different bands for additional points. Each different ZIP code counts as one multiplier. All out-of-country contacts will use the P. O. location as a ZIP code. Total contacts times the total of code equals final score. Awards. Categories are Class 1, 100-500 watts; Class 2, 250-100 watts; Class 3, 5-25 watts; Class 4, 1-5 watts; Class 5, cw only (no power limitation); Class 6, XYL only (no power limitation); Class 7, club participation. Mailing deadline is August 10. Send to VHF Space Center, K4AWS, Box 15, Sumterville, FL 33585.

20-23: National Blueberry Festival special event station, W8IGV, sponsored by the Black River Amateur Radio Club. Check the following frequencies: 3975, 7175, 14275, 21375, 28675, 29475 (OSCAR) and random points in the Novice allocations. The group has a colorful postpaid certificate to any station contacting W8IGV during the weekend who sends a QSL to National Blueberry Festival, Box 224, South Haven, MI 49090.

22-24: Rhode Island QSO Party, sponsored by the East Bay Amateur Wireless Assn., during two periods; 1700Z July 22 to 0500Z July 23 and 1300Z July 23 to 0100Z July 24. RI stations work other RI stations and the rest of the world. Others work RI only. The same station may be worked once per band and mode. Exchange RS(T), QTH (county for RI, state, province or country for others). RI stations score 2 points per QSO (RI Novice/Technician stations score 5 points per QSO), others score 2 points per RI QSO and 5 points per QSO with RI Novice/Technician. RI Novice/Technician stations sign with 'N' or 'T' to designate license status. Frequencies: cw, 1810, 3550, 3710, 7050, 7110, 14050, 21050, 21110, 28050, 28110; phone, 3920, 7260, 14300, 21360, 28600, 50.3, 145.1. Use of simplex is encouraged (no repeaters). Log date/time(Z), calls, exchanges, band/mode. On a separate summary show name, call, mailing address, club affiliation (if any) and total QSO points, multiplier claimed and final score. Scoring: RI multiplier total QSO points by the number of RI countries,

states, provinces and DX countries worked. Others multiply total QSO points by the number of RI countries worked. There is a maximum of 5 RI countries: Bristol, Kent, Newport, Providence and Washington. All stations score 10 points for QSO with club multioperator station N1R1. Single-op certificates plus club awards (minimum of 3 entries per club). Postmark entries no later than August 31 and send to East Bay Amateur Wireless Assn., Box 392, Warren, RI 02285. Please include an s.a.s.e. for a copy of the results. **Seanet World Wide DX Contest**, organized by the Singapore Amateur Radio Transmitting Society (SARTS), open to all; cw July 22-23 and phone Aug. 19-20; full 48-hour period UTC for each mode (160-10 meters). Classifications are single-band single operator, multiband single operator, multiband multioperator. Call CQ SEA or CQ Seateast on phone. Exchange RS(T) plus consecutive serial starting with 001. Scoring: for stations outside of the Seanet area score as follows. Contacts with HS YB DU 9V1 9M2 9M6 and 9M8 count 20 points on 160, 10 points on 80/40, 4 points on 20/15/10 — for other contacts in the Seanet area not listed above count half of the above points. Contacts with non-Seanet area stations do not count. Multipliers will be 3 points for each Seanet country. Final score will be the sum of points multiplied by the sum of country multipliers. Seanet prefixes: A4 A51 A6 A7 A9 AC3 AP BV BY CR9 DU EP HL/HM HS JA/JE/JF/JG/JH/JI/JR JD1 JY KA KC6 KG6 KH6 KX6 P29 S21 S79 VK VQ9 VS5 VS6 VS9K VS9M/8Q6 VU2 VU (Andaman, Nicobar, Laccadives) XU XV5 XW8 YB YJ8 ZL 3B6 3B8 3D2 4S7 4W1 5Z4 9K2 9M2 9M6 9M8 9N1 9V1. No cross-band, no cross mode, no combined cw/phone logs. Transmission of two or more signals at the same time is not permitted. Only one contact per band with the same station. Contest numbers should begin with 001 on each different band. Log in UTC. Send entries to Henry Woo, 9V1RD, Box 2728, Singapore, to reach there before October 31. Results will be announced at the 8th Seanet Convention in Singapore on Nov. 12. Results for one IRC included with your entry.

29-30: New Jersey QSO Party, sponsored by the Englewood Amateur Radio Assn., 19th annual, open to all. Times: 2000Z July 29 to 0700Z July 30, and 1300Z July 30 to 0200Z July 31. Phone and cw are considered the same contest. A station may be contacted once on each band (phone and cw are considered to be separate bands). CW contacts may not be made in phone band segments. NJ stations may work other NJ stations. Frequencies: 1810, 3535, 3905, 7035, 7135, 7235, 14035, 14280, 21100, 21355, 28100, 28600, 50-50.5 and 144-146 (phone activity is suggested on the even hours, 15 meters on the odd hours 1500-2100Z, 160 meters at 0500Z). Exchange QSO number, RS(T) and QTH (ARRL section or country); NJ stations will send county for their QTH. Scoring: out-of-state stations multiply number of complete contacts with NJ stations times the number of NJ countries worked (maximum of 21). NJ stations count 1 point for W-K-VE-VO contacts, 3 points for DX counts. Multiply total points by the number of ARRL sections (including NNJ and SNJ). KP4, KH6, KL7, KZ5, etc., count as 3-point DX contacts and as section multipliers. Awards will also include second-place certificates if four or more logs are received from a given NJ county, section, country. Logs must show date/time(Z), band, emission, calls, exchanges, and must be received no later than August 26. Indicate first contact for each claimed multiplier (and number). Include a checklist of contacts and multipliers. Send to Englewood AR Assn., Inc., Box 528, Englewood, NJ 07631. A size no. 10 s.a.s.e. should be included for results. Stations planning active participation in NJ are requested to advise EARA by July 8 to allow planning full county coverage. Portable and mobile operation is encouraged. **County Hunters CW Contest**, from 0001Z July 29 to 0200Z July 31, open to all. Exchange QSO number, category (portable or mobile, P or M), RST, state (province or country) and county for U.S. stations. Stations may be worked once on each band and again if the station has changed counties. Portable/mobiles changing counties during the contest may repeat contacts for QSO points. Stations

on county lines give and receive only one number per QSO but each county is valid for a multiplier. QSOs with fixed stations are 1 point, with portable/mobile stations 3 points. Multiply QSO points times the number of U.S. counties worked. Mobile/portables calculate their score on the basis of total contacts within a state. Suggested frequencies: 3575 7055 21070 28070 kHz. It is requested that only P or M category stations call CQ or QRZ on 40 meters below 7055 and on 20 meters below 14070 (all stations spreading out above these frequencies). Awards. Logs must show category, date/time(Z), stations, exchanges, band, QSO points, location and claimed score. All entries with 100 or more QSOs must include a check sheet of counties worked or be disqualified from receiving awards. Enclose a large s.a.s.e. if results are desired. Postmark entries by September 1 and send to Jeff Bechner, W9MSE, 673 Bruce St., Fond du Lac, WI 54935. **Danubian Bent Activity Contest**, sponsored by the Radio Amateur Society of the County Pest in Hungary; as an aid to achieving the Danubian Bent Diploma. Cw event the full 24-hour UTC period July 29, phone the similar period July 30. Call CQ DD; all

hands. Categories Class A single band, Class B multi-band, Class C are group stations (multiband). QSOs in your own country count 1 point, outside your country but within your continent 2 points, other continents 5 points, HA7 QSOs count 10 points. Exchange RS(T) plus consecutive serial number starting with 100. Multipliers are countries on the ARRL DXCC List. Log separately each band and mode. Final score is the sum of points on all bands multiplied by the sum of multipliers on all bands. Awards. Postmark your entry by Sept. 1 and send to PRA Sz. H-1387, Budapest, Box 36, Budapest, Hungary.

18: WIAW Qualifying Run, 0200Z
19-20: SARTG RTTY Contest, Can-Am
Championship, Seacnet Contest phone
24: WIAW Qualifying Run, 2000Z
26-27: All-Asian Contest cw

SEPTEMBER

2-3: Four-Land QSO Party
6: West Coast Qualifying Run, 0400Z
9-10: VHF QSO Party
10: North American CW Sprint
12: WIAW Qualifying Run, 0200Z
16-17: SAC cw, Washington State QSO Party
17: Frequency Measuring Test
19: WIAW Qualifying Run, 1300Z
23-24: SAC phone, Delta QSO Party

AUGUST

3: West Coast Qualifying Run, 0400Z
5-6: ARRL UHF Contest, YO Contest,
Illinois QSO Party
12-13: Worked All Europe cw

Silent Keys

It is with deep regret that we record the passing of these amateurs:

WA1AXF, Fred J. Walsh, Hyde Park, MA
W1BAB, Warren E. Holmgren, Malden, MA
W1BAX, Forrest F. Howell, Manchester, CT
WA1DDW, Bertha M. Eldridge, Lynn, MA
WA1EBG, Irving C. Bailey, W. Barnet, VT
K1FVF, Earl E. Allaire, Woodbridge, CT
W1JBG/W4FPF, John H. Barrett, Fort Lauderdale, FL
W1NRT, Harry Thomas, N. Reading, MA
WA1YTS, Norman D. Curley, Magnolia, MA
W2AGU, George W. Smith, Ridgefield Park, NJ
W2AIZ, Richard Weir, Jr., Delray Beach, FL
WA2CTV, Joseph Angelo, Brooklyn, NY
K2DF, Carl W. Bieber, Buffalo, NY
W2GNT, Frank L. McKenna, Salt Point, NY
W2HHO, Leonard Page, Levittown, NY
W2HQ, Howard L. Becker, Rexford, NY
WA2JKT, Ray Fenske, Syosset, NY
W2MTV, Frank C. Koch, Dumont, NJ
W2SSM, Herbert W. S. Bowen, Cooperstown, NY
W2VX, Charles H. Jenkins, Jr., Westville, NJ
WB3BWX, Robert C. Eckel, Germantown, MD
W3HEN, John J. Selther, Bethesda, MD
WB3KSB, A. Leon Johnson, Cumberland, MD
W3KVK, Samuel A. Bottonari, Pittsburgh, PA
W3MFB, William B. Hann, Brockway, PA
W4BM, Dewey R. Villareal, Safety Harbor, FL
W4BTL, Eldridge E. Emswiler, Roanoke, VA
W4CBA, J. Warren Roberts, Clearwater, FL
WA4CCB, Horace Young, St. Petersburg, FL
WB4DJO, Alfred VanLeeuwen, Hollywood, FL
W4EZG, Donald V. Gause, Miami, FL
K4FHZ, Kenneth J. Brown, Tampa, FL
K4FN, Ralph A. Reedy, Fort Charlotte, FL
W4FWE, Clyde L. Walkden, Lake Worth, FL
W4IP, Charles G. Landis, Bonita Springs, FL
WB4JRW, Roger D. Tucker, Mt. Juliet, TN

W4KES, Frank B. Lucas, Coral Gables, FL
K4KOY, Dr. Gerald Feinberg, N. Miami, FL
W4KR, Clarence White Jr., West Point, GA
WA4LHF, L. Russell Cook, North Palm Beach, FL
W4LKJ/WA0WPQ, Ben L. Sutton, Glen Elder, KS
WB4NCV, Loyd B. Wheelchel, Gaffney, SC
K4NW, John D. Davies, Rockledge, FL
W4OGZ, Phillips E. Strout, Pittsboro, NC
W5AJJ, Bernard Shields, New Orleans, LA
WA5ALG, Melvin E. Fielder, Pasadena, TX
K5GHX, Jewel E. Savage, Dallas, TX
K5GJQ, Leslie H. Comstock, Houston, TX
WA5LJE, George W. Ayer, El Paso, TX
W5LTB, Rua S. Choice, El Reno, OK
W5OCN, George "Tex" Bacon, Lafayette, LA
W5SCZ, George R. Leonard, Wimberley, TX
WB5TDI, Thomas H. Hollis, Pampa, TX
W6FK, Fred D. Rowe, San Francisco, CA
WA6HMO, Johnny G. Mills, Compton, CA
W6KLR, Carlin "Perk" Perkins, Montecito, CA
WB6MAZ, Elton E. Suhling, Portland, OR
W6OCT, William L. Beck, Sparta, MO
WB6PKX, Kenneth J. Palmer, Santa Rosa, CA
W6QHF, Sidney W. Douglas, Forrestville, CA
K6RPT, Walter A. Flanigan, Lafayette, CA
W6RTZ, Wilfred C. Neil, Atwater, CA
W6SDE, Vernon O. Lieb, Ventura, CA
WB6UYA, Robert E. "Pappy" Jenkins, Oceanside, CA
W6WUE, William A. Schultze, Folsom, CA
K6ZEY, Lester G. Quarles, El Cajon, CA
W7CM, William R. Zinn, Seattle, WA
W7CYV, Helmer C. Stormo, Black Diamond, WA
W7GNT, Edwin J. Rost, Seattle, WA
WA7JKG, Leslie C. Tennant, Myrtle Point, OR
W7K1W, Charles Szelestey, Sun City, AZ
W7KK, Frank A. Mueller, Jr., Boise, ID

W7OO, Ernest J. Sing, Auburn, WA
K7THJ, Albert L. Blevin, Seattle, WA
W7TND, Frank T. Chase, Seattle, WA
N7TV, Robert E. Howell, Tucson, AZ
K8AHG, Nathaniel T. Henderson, Kenova, WV
W8EAE, Orin J. Brown, Algona, MI
W8GDC, Richard B. Jeffrey, Columbus, OH
W8HQX, Robert H. Breeze, Xenia, OH
WA8HXI, George A. Krupp, Detroit, MI
WA8ILN, Robert J. Mongan, Martinsburg, WV
WD8JXE, Kenneth M. Barnes, Warren, OH
W8MCO, Lewis C. Litzenberg, Howell, MI
K8MHM, William E. Buskirk, Stow, OH
WD8PES, Russell C. Jones, Salem, OH
W8RL, James W. Voorhees, Hillsdale, MI
K8ZGV, Paul P. Stein, Troy, MI
W9CKB/W91XR, James Sugioka, Indianapolis, IN
WB9FMA, Edward E. Werner, Middleton, WI
W9HXW, William S. Soich, Dolton, IL
W9LQR, John J. Knapp, Brookfield, WI
W9NMS, William F. Bean, Hammond, IN
WB9OUG, E. Earl Holloway, Marion, IN
WB9WCX, Herman P. Pardvan, Chicago, IL
WB0JPB, David E. Priestley, Osage, IA
W0MJJ, Richard J. Busch, Minneapolis, MN
W0BJ, Preston A. Richardson, St. Louis, MO
W0SDV, Howard M. Jackson, Sioux City, IA
WA0UWG, William G. Riecks, Danbury, IA
*WA0VAS, Casper H. Schroeder, Minneapolis, MN
W0ZYB, Cecil E. Brittenham, Fort Dodge, IA
VE1AER, M. McMullin, Cape Breton, NS
VE3ANP, H. H. Tamblin, Thunder Bay, ON
ZETJK, Mrs. A. M. "Bobby" Mitchell, Salisbury, Rhodesia
E7GAN, Paul Canavy, Guadeloupe, FWI
HC2EO, Dr. Emiliano Crespo, Guayaquil, Ecuador
*Life Member

Club Notes

A 4-H amateur radio club? We received two letters in the last few months from amateurs, the latest from WB4ZWT, who are also 4-Hers. What's 4-H? A youth organization similar to Scouts, which was originally oriented toward rural projects, but lately has gone urban also. The projects progress in difficulty each summer that a person is involved. Electricity 1, for instance, requires that the enrollee construct a lamp. A higher level could be added to Electricity, to cover study for the Novice license. The ARRL Novice lesson plans would need some adaptations by the instructor, to fit the vocabulary level of 12- to 18-year-olds. We'd like to know of any hams involved in 4-H who want to exchange ideas. Write us.

Joseph Sefcik, WB1CWZ, suggests that affiliated clubs may be interested in "sponsoring" a 20-meter receiver and transmitter to less-developed countries. The receiver, featured on the cover of April QST, now has a matching transmitter, also designed by W1VD. The radios demonstrate to representatives of foreign countries, that amateur radio can be an inexpensive yet exciting hobby. Hopefully this will result in a vote cast favorably toward amateurs at the 1979 World Administrative Radio Conference. The pair to be shipped in kit form, costs \$50. Is your club interested? All clubs' efforts would be publicized in QST and Radio Club News. Write us! (Contributions are tax deductible.)

What's the latest forum topic at conventions? Radio club forums. The biggie, Dayton Hamvention, held a forum with the assistance of Amateur Radio News Service, called "Making Your Club Go." Coverage included newsletters, programs, PR, public service, repeaters and ARRL help. The Wisconsin State Convention, Yellow Thunder ARC as sponsor, put on "The Club Officer's Forum." Main topic: effective leadership. So if your group needs forum ideas for a convention/hamfest, try clubs. — WA1STO

Strays

QST congratulates . . .

Bill Lowry, W1VY, recently promoted to professor of marketing at Central Connecticut State College, New Britain, CT.

U.S. Information Agency Officer George R. Thompson, W3HLR/JY9US/9Y4GT, recipient of the Marks Foundation Award for new and "more effective use of communications media to further the objectives of U.S. public diplomacy."

Theodore J. Cohen, N4XX (ex-W4UMF), for his recent promotion to head of the Advanced Technologies Branch, Electronic Systems Division, Tracor Sciences & Systems, Arlington, VA.

Station Activities

SCM X AREC X ORS X OVS X SEC X OBS X TCC X OO X NTS X WAC X

CP X A-1 OPR X EC X DXCC X CLUBS X RM X OPS X RCC X PAM X WAS

CANADIAN DIVISION

ALBERTA: SCM, Sydney T. Jones, VE6MJ — SEC: VE6X-C. PAM: VE6AFC. The Northern Alberta Radio Club participated and manned a demonstration Solar powered station recently in cooperation with the Alberta Research Council. Conditions were not the best but several contacts were made during the five day demonstration. VE6MJ visited the Medicine Hat club and received a warm welcome. VE6BBL and VE6BEQ were responsible for setting up an emergency communications link in the Westlock area recently. A chapter of the Ten-Ten international net has been formed in Edmonton and will be known as the Edmonton Area Ten Tens Net with VE6AAB as net control. Look for them on 28.0 MHz at 0500 UTC Wed, or 2100 local time Tue. VESAG and the Lakeland Radio Club plan to time the canoe races at Elk Point in early June. VEBANV is now VE6OA and has just returned from the Dayton Hamfest with some goodies. Traffic: VE6AAT 42, VE6AOJ 24, VE6BBL 16, VE6MJ 4.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — British Columbia ARPC Net 3755 NM VE7BOO and Asst. NM VE7QC report net activity very high. BCEN NM VE7GY would like to hear some of those cw check-ins on 3755 kHz come down to 3650 kHz. Net speed is 10/15 wpm. Senior Citizens ARC annual general meeting — VE7AWL, pres.; VE7CIL, vice-pres.; VE7AMW, secy. East Kootenay ARC officers VE7AIT, pres.; VE7AQE, vice-pres.; VE7AJI, secy. VE7BXD a white canner plans chess with radio with VE7AD traffic: VE7DKY 173, VE7ZK 126, VE7CCJ 60, VE7GY 58, VE7FB 52, VE7QO 48, VE7BLO 39, VE7HQ 15, VE7BLS 13.

MANITOBA: SCM, Peter Guenther, VE7CGA — Asst. SCM: VE4UL. RMs: VE4ADS, VE4GJ. PAMs: VE4JP, VE4TE, VE4VJ. Sun flares have cut down on all QNI. MSTN the slow cw net is now on a 3 day schedule for the summer. ARES now has 18 ECs and more coming. Everyone seems to be gearing for summer activities and amateur radio will not be a priority. MEPPN QNI 1119, QTC 25, 30 sess. MTN QNI 254, QTC 60, 31 sess. MSTN QNI 103, QTC 81, 21 sess. WRHSN QNI 92, QTC nil, 5 sess. MMN QNI 338, QTC 8, 30 sess. Traffic: VE4HP 74, VE4IZ 37, VE4JQ 26, VE4JP 15, VE4JA 13, VE4HR 10, VE4LU 9, VE4AA 8, VE4TR 7, VE4MG 4, VE4UL 4, VE4DE 2, VE4CR 1.

MARITIME-NFD: SCM, Aaron D. Solomon, VE1QC — Asst. SCM: VO1FG, SEC: VE1DI, PAM: VO1JN, APN Mgr. VE1WF. Speedy recovery VE1s BMA BY CD CT FX GG HH KV TJ UB. Band condx poor due to solar flare activity. VE1s UT SJ spanned Bay of Fundy 220 MHz FM 190 mi. VO1s OB NS, VE1BJD Adv. amateurs; VE1s BOD BOE BRG 10M, end. VE7CAM has ret'd BC after winter in Halifax. VE1s AGH FQ XJ rec'd Navy presentation for file handling. NS VHF A Tx Hunt Winners: 1st. VE1YZ; 2nd. VE1s GL BMA. NB ARA Ex. VE1AKJ, pres.; VE1BGI, vice-pres.; VE1NR, secy.; VE1BOG, treas.; VE1AKB VE1WK dir. New Cois VE1AJ. Asst. ECs Moncton are VE1BRW, VE1HAR. Exp. planning D Expedition to St. Paul's Island. VPIN secy. QNI 1293, QTC 1029 (Mar.) NTN sess. 22, QNI 78, QTC 19. Traffic: (Apr.) VE1WF 159, VE1LCH/R 104, VE1ASW 90, VE1AMR 45, VE1HJ 30, VE1OC 16, VE1R 16, VE1CH 14, VE1EJ 13, VE1ABG 8, VE1AMB 2. (Mar.) VO1GW 32, VE1ASW 24, VO1KP 6.

ONTARIO: SCM, Larry Thivierge, VE3GT — Asst. SCM: VE3GOL. The ARRL Affiliated Club Charter was presented by VE3GOL to Thornlea High School ARC pres. VE3IPZ with teacher sponsor VE3FSX and club members in attendance. The event took place, along with a school radio demonstration during Student Activity Participation Day. The students originated many messages that were handled on EANN(D) from the school station, VE3TSS. Messages were also handled by VE3s CDK and HGL. VE3TSS school and teaching classes in amateur radio pleased to see VE3SRC assist Keys Adam Scott C.S. in Peterborough. VE3s APK and DH winners in a recent CD Party contest. New appointments: VE3GJG, RM of the Ont. Daytime Net; VE3ISW, RM of the Ont. Southern Net. VE3BSA sporting a new TS-820S and OVS VE3FN pleased with his new FT-901DM. VE3s ITY BTM and JTL latest members of the Hamilton ARC. VE3ISW penning "CW Topics" for the Hamilton Club bulletin. VE3HJQ enjoying a break from traffic chores, on 20 meter cw. VE3GFN, along with the directors of the FM have opened a VHF traffic net on VE3RPT called "Open Line Net." Starting time is 1830 local time and the net has access to a school North American address. Regrettably VE3s AA and DHV have become silent keys. Congrats to VE3DET on passing his Advance and welcome to VE3s JY JIZ JIZ KIX KPJ KPL KVC and KTM. Traffic: (Apr.) VE3GOL 445, VE3CDK 301, VE3SB 279, VE3HJQ 222, VE3DPO 196, VE3ISW 190, VE3GFN 149, VE3GJG 113, VE3FGU 110, VE3EWD 109, VE3GT 98, VE3FZG 84, VE3DVE 66, VE3FHZ 65, VE3JRT 52, VE3GYD 51, VE3ATR 46, VE3AWE 39, VE3HSF 25, VE3GNW 23, VE3IPZ 20, VE3CYR 15, VE3DUK 12, VE3HCS 8, VE3ILP 6, VE3DZH 2. (Mar.) VE3AWE 28, VE3GCV 7, VE3GCC 6. (Feb.) VE3AWE 27. (Jan.) VE3AWE 20.

QUEBEC: SCM, Ed Sieb, VE2BAQ — Everyone is busy with antennas, cleaning, fixing, etc; now is the right time to get your antenna systems straightened out after the winter. A warm welcome to new calls: VE2s DWW DWX DQX FME FKO FKB and many other graduates of our local code and theory classes. Some Que. amateurs

have complained that the SET should be rescheduled for Oct. "when condx are better." VE2s PY SH BEN playing with their micro-computers; getting ready for packet radio guys? I would like to ask all Que. section CD appointees to please inform me of their status, i.e. active, inactive, etc. I would like to update my files; also please note that all monthly reports must be received at my QTH no later than 5th of each month. Traffic: (Apr.) VE2UN 124, VE2OH 76, VE2BP 53, VE2EC 18, WB1EZI/VE2 7. (Mar.) VE2OH 173.

SASKATCHEWAN: SCM, P. A. Crosthwaite, VE5RP — The Regina's Hamfest promises to be a goodie with loads of displays for most interested Hams. The Hamfest will be at the Univ. of Regina, there will be plenty of room for those who wish to stay at the Univ. or you may wish to park your trailer at one of the camp sites. A change has been made to the frequencies of the Saskatoon Repeater, you will now find us on 148.04 146.64 on your dial. I would like to wish our travelers good mobilizing this summer while on your vacation. Traffic: (Apr.) VE5AR 36, VE5NJ 14, VE5RP 12, VE5HG 11, VE5DN 6, VE5AR 4, VE5QI 4, VE5UX 4, VE5Q 2. (Mar.) VE5AAE 52, VE5RP 20, VE5OY 13, VE5HG 8, VE5U 6, VE5U 6, VE5B 5, VE5AB 4, VE5DF 4, VE5NU 4, VE5RB 2, VE5WM 4, WV5QO 4, VE5BD 2, VE5LN 2, VE5NR 2, VE5XY 1.

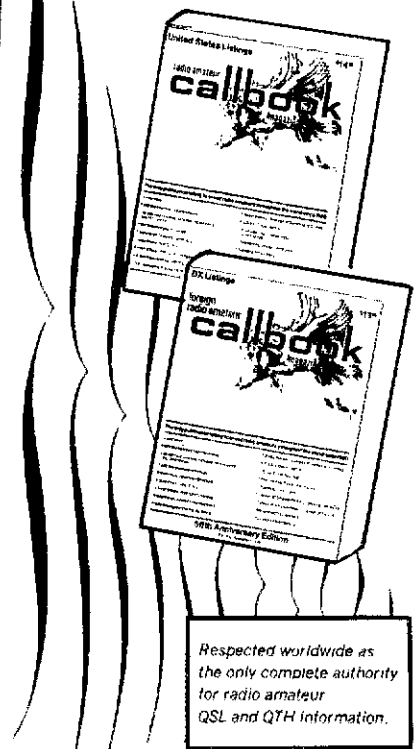
ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3P-Q. PAM: W3WD, RM: W3QC, PSRR: K3JL 46. Jesse Bieberman, W3KAT, Atlantic Div. Vice Dir. was an interesting speaker at the May DARC meeting. K3NCL spoke on "Autopatch Control for CAP Repeaters" at the 1st State Apr. meeting. Del. amateurs upgrading their licenses included WA3WJH, WB3JUJ and WA3VEE. N2UT/WA3LMY received his Master of Science Degree in Engineering from Princeton U. and will be leaving for Sandia Labs in Albuquerque, NM. WB3ANC's new station is at Pearl Harbor. Tentative Delmarva Hamfest date is Aug. 20th at Dover. WB3FUP provided March of Dimes Walk-a-Thon Autopatch communications thru the WA3-QLS repeater. DEPNI: QNI 94, QTC 9. Traffic: (Apr.) W3DKX 39, K3JL 35, WA3WJY 29, WB3DUG 14, W3QC 5. (Mar.) W3QQ 12.

EASTERN PENNSYLVANIA: SCM, Geo. S. Van Dyke, Jr., W3HK — SEC: WA3PZO. RMs: K3NGN, K3KW, WA3PZO, W3IAZ. Net reports: PTTN QNI 313, QTC 113; PFN QNI 333, QTC 733; EPA QNI 533, QTC 206; EPAEP&TN QNI 283; WA3RPG: OVS reports back to W3CL, WA3BJQ; OBS reports W3ID, K3EBZ, W3AVJ, W3CL, WA3RPG, BPL, W3CUL, K3NSN, W3VR, WA3ATQ, WA3ZRY, PSRR: K3NGN, W3DP, WA3YDC, WA3PZO, WA3RPG, K3ARR, K3YL. The old pros still at it W3VR and W3CUL. Activity on EPA and PTTN building up. WA3ATQ says spring will be for sure in June. Now we have activity t/c is dropping off. How about originating one each time you check into a net. Also don't forget to work a Novice once in a while! WB3BKV wondered how W3ADE could QNI from Chicago. It's easy when you have in-laws there! Note we have a new SEC. You ECs out there how about moving and getting EPA back in the running. WA3YOE reporting to new QTH. Welcome back to W3CL, W3ID, really hot on 15M DX. WA3CKA now has the big A ticket. WA3MVP got his 2nd class phone ticket. W3GMK got his rigs working finally now he hasn't time to operate them. The club papers are getting more professional all the time, keep up the good work. Remember if you have an election either let me know or circle it in your news letter or bulletin. Looks like heavy clothes & a bon fire will be in order for Field Day this year. Don't forget to do all those antenna repairs during the nice weather. Traffic: (Apr.) W3CUL 5412, K3NSN 1921, W3VR 1143, WA3ZRY 652, WA3WQP 423, WA3OTQ 338, K3KW 280, WA3THT 208, K3NGN 192, K3YL 161, W3LTA 118, W3PXL 118, W3DPO 77, WA3YDC 66, WB3BKV 32, WA3PZO 37, W3DPO 29, WA3GJQ 22, W3BI 20, WA3YOE 20, K3NB 18, W3ID 17, K3ARR 14, K3EBZ 13, N3GP 13, W3AVJ 10, WA3CKA 9, W3CL 8, WA3MVP 8, W3ADE 6, N3EG 4, W3GHA 9, WA3RPG 4, WA3BJQ 3, N3AI 1, W3EU 1, W3GOA 1, W3GMK 1, W3KEK 1, WA3VDQ 1. (Mar.) K3FD 59, WA3CKE 5.

MARYLAND-DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — Fone Nets 3920 kHz at 6 PM local time daily. CW net 3643 kHz at 7 and 10 PM daily. PON's at 5:15 PM except Sun. Give 'em a try. ARES get together first Sun, each month on 10 AM with N3II and the ECs. W3PQ has the PRVEN 1st and 3rd Sun. at 8:30 AM on 3935 kHz. With the nets: Mgr/Sessions/Traffic/QNI average: MDC PON/W3OYU 4/11/23 7 WR PON W3DFW/17/21/17. MDCNT K3ORW/18/55/15 2. Top honors to WA3ZRY, WB3AOB, W3DKX, W3FA and WB3CES. MEPPN WA3PRW/22/95/23.7. 100 percenters K3ORW, WA2YFM and WA3ZRY. Others W3ADQ, W3DKX, W3FA and WA3ZRY. MDD W3CQJ is looking for NCS and 3RN reps. N3QA with the rig at full power missed PSRR by 5 Fone check-ins! WA3EOP keeps W3CWC activated. K3ORW is back to work or is it the grind, and feeling pearly. WA3EHK is heard regularly. WB3CES owns new boots with 10 meters yet! W3BHE tells us that the Mt. ARC has WB3BZZ, pres.; K3MHI, VP; WB3FNN, secy. WA3YMM, treas. W3FZY, who been filling MDD NCS spots. K3JL enjoyed his first ever to Dayton. Get up early to catch N3II on the cw nets. W3GDO is happy with the 21 MHz indoor antenna. WB3AOB has landed a part time job for pay. W3WBY took the 40-meter beam down for a higher tower. WA3RSK avid contester won the section Radiosport do. WA3EQI retired Chief of VOA is now W4PRX on Longboat Key. N3RL is off on a quickie to Rome. W3JPT works OSCAR B Mode A and J with 10 watts. WB3EPN/WA21JR is busy getting educated. W4MLR/3 and W3MR keep busy observing the HF bands. BARC congrats to K3COP, W3DMW Extra, Advanced to K3SOB, WA3AXP, WB3DUJ. General to WB3KMU and WB3DRD. KMU and SOR a father son team competing for the rig! The Ham Arundel News congrats K3SZN 2nd Telegraph, WB3CLF General and 14

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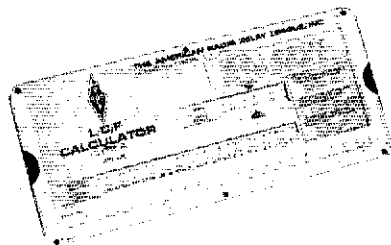
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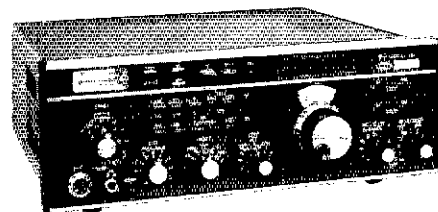
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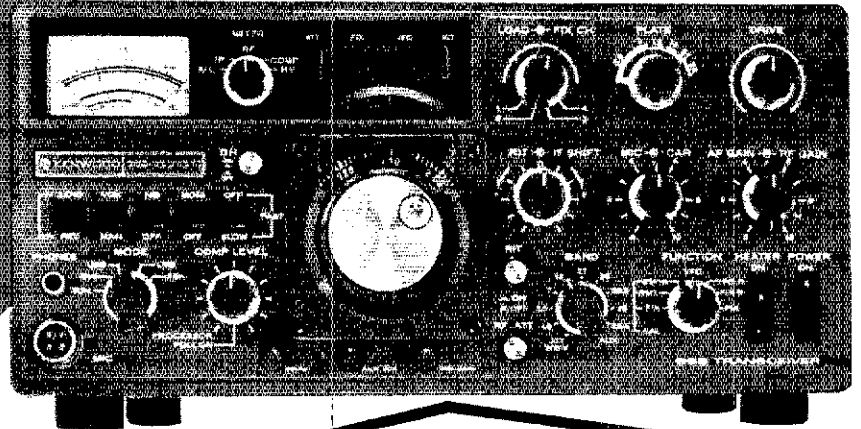
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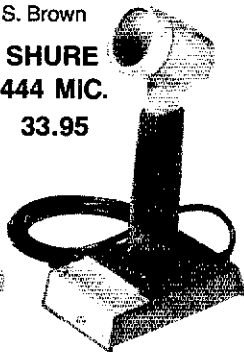
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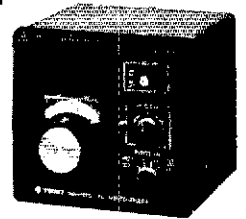


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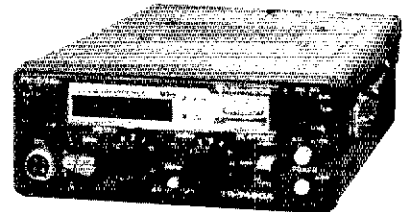


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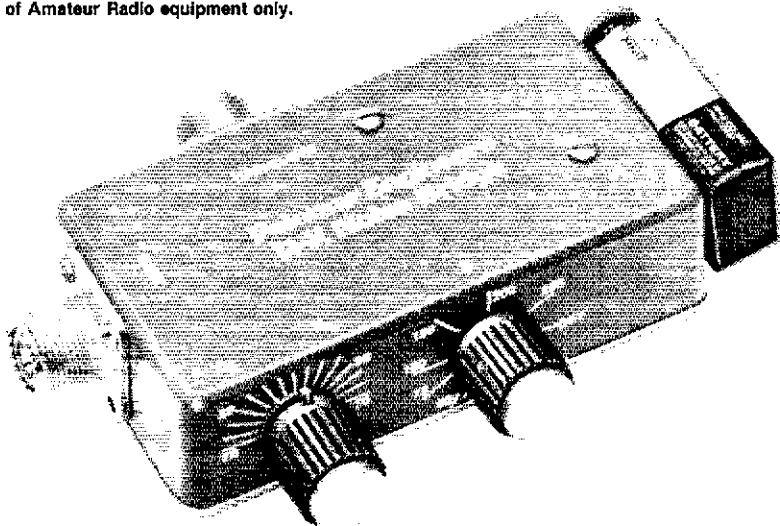


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year old WB3JLJ a General. MDD-MEPN-MDCTN picnic Sun. Aug. 20 at Patapsco State Park McKeldin Area no. 501. Shelter rented for the whole day. Traffic: (Apr.) WB3AOB 165, W3FA 106, N3QA 60, K3IU 44, WA3EOP 39, W3FZV 27, N3IT 23, N3RC 11, WB3CGG 10, WB3GES 8, W3WBY B, WA3EHK 7, WA3PRW 4, K3ORW 2, N3RL 2. (Mar.) WA3PRW 20.

SOUTHERN NEW JERSEY: SCM, Raymond F. Clancy, WB2GTE — Ask WB2DXB how to pack 76 hrs into 72 Las Vegas vacation; WA2YSW W2FFU how the OSCAR demo went at Woodrow Wilson HS; how WA2YSW spent \$395 on repairing VHF Mobile platform (Buick); how WA2OFM works MM from the bath; WB2GCE if he took WA2CWX out; WA2USI K2TJ WB2LNR if they enjoyed the Dayton Hamfest? Bike-a-Thon assisted by base stns WA2ONZ WA2AOL and check point stns. K2NH K2JRU WA2VEE WB2FJE WB2RRJ WA2OOL W2USO a success. Rescued boy with flat tire and one who was exhausted. Jewish Community Center Cherry Hill will use K2UK call assisted by N2LR K2KA WA2GSZ WA2HPF WA2DHD WA2ONB W2IAB WB2OEZ WB2OFA WA2PMM to celebrate 30th anniversary of Israel with skeds to 4X4-Land, WB2GEX and WB2QJO celebrate 25th anniversary. Silent Keys W2VX K2MLS. WB2AY is W2HXV at W2OH Code. W2OH reports WA2NBN, wkld 21 new countries in Mar. SJRA celebrates 62 birthday Jun. 4 at the Ellisburg Shopping Center with Hamfest and Flea Mart. WA2NUJ W2EKB discuss laser applications at meeting. SPARC's K2MYS makes 30 Generals in new class. Salem Co. RC set for FD. WJRA's WB2LCC sez class of 80 will soon be completed. W2HOD reports W2UNI resigns as Ec of Salem Co. Upgrades WA2UTZ nw W2ISD Is Extra. K2WQ WB2OUI WB2VVI WB2UFI WB2KPO. New ticket W2AIE. Changes WB2EAH nw K2PN, WA2RJN nw K2GN, W2VI wkld in 6 contests. Remember the 19th annual NJ OSC Party July 29 to 31. Congrats to WA2MNJ on his Mercer Co traffic nets 30 sess. Lots of traffic. Traffic: WA2MNJ 204, W2IU 39, WB2UBQ 18, WA2UNJ 12, K2SB 7, W2UJ 4, W2EA 2, W2KI 2.

WESTERN NEW YORK: SCM, Joseph M. Hood, K2YA — Asst. SCM: W2MTA, SEC: N2JC. The Rochester Hamfest looks to be bigger and better this year. As of two weeks before Hamfest more than 600 have applied to take FCC exams at the Hamfest. I'll have a report on the exact totals next month. OBS W2ZOJ is transmitting bulletins on the WR2AOP Repeater. WA2AIV reports a very successful emergency exercise involving Batavia area hospitals in late Apr. New officers for the Cornell ARC are: K2VD, pres.; WA4QNV, vice-pres.; WA2EO, secy.; WB1ARY, treas. New Ravny officers are: W2JK, pres.; WB2LKO, vice-pres.; WA2VTI, treas.; W2HB, secy.; Niagra Falls RC held their annual auction in Apr. ARATS, STARS, QCWAWNY, BARRA, and Lockport ARA ran an Amateur Radio demo at the Boulevard Mall on Apr. 21. Congratulations to these new or upgraded amateurs: WA2KTY WA2HIF WA2OWR WB2OJY WB2OKB WA2NHP WB2DFJ WB2SIB WB2YCI WA2KGH WB2TOE WA2WAX WB2WAX WA2WBA WB2VYL and WA2SIQ. W2OQI at Lockport will now be W2AET. WA2Z-JP loves OSCAR 8. The Rochester VHF Group are planning a club project, Solid State Transverter with models to cover 50, 144, 220, and 432 MHz bands. Regret to report that BARRA secy-treas, K2BCI, in the hospital. Finally one a happier one, W2UB and WA2Z are planning to tie the knot in Aug. this year. Traffic: N2TY 333, WA2ELD 288, WB2PJU 92, WA2MFV 78, W2MTA 78, W2FR 69, WA2HSE 68, W2TZ 53, KN2MDO 47, WB2WCE 36, W2CEQ 30, K2VR 29, WA2ZJP 28, WB2NFB 22, W2UB 18, W2ROF 16, WB2FXG 7, WB2KQS 7, WA2AIV 6.

WESTERN PENNSYLVANIA: SCM, John Fleming, W3G-CJ — SEC: WA3VUP, Asst. SECs: K3SMB WA3LJW, PAM: K3SMB. RMs: K3AT W3NEM W3KUN. I would like to introduce myself. I am married. My wife's name is Rita. We have 4 children between 3 and 12. I am 38 and have had my license since 1956. On behalf of all WPA amateurs, I would like to wish K3CHD all the best in his new home. I would appreciate receiving copies of all radio club news letters. I will frequent the WPA 2-meter traffic net at the beginning of each month for station activity reports. I can also be reached on the Irwin repeater WB3JSI 146.325. Spring is here! W3KWH — SCARC is practicing volleyball! Blue Knob has their new repeater operating on 147.15. New appointments: N3WS and WB3EML as ORS. WB3JQD and WA3RVD upgraded to General. WA3SXC/N3KB and K3YL/K3MJ upgraded to Extra. WPA (Pgh) 2 Meter Traffic Net had 30 sess. 468 QNT, 83 QTC. WPA Home and Traffic Net had 30 sess., 223 QNT, 70 QTC. WPA CW Traffic Net had 30 sess., 377 QNT, 144 QTC. PSHR Traffic Net had 30 sess., W3YQ 49, WB3DKT 32, WB3GZR 22, WA3JUD 18. Traffic: W3YQ 185, K3HI 172, WB3HGL 162, W3EGJ 158, N3FM 29, WA3YEO 56, WB3BK 55, WB3EY 54, K3LL 42, W3GQJ 39, W3GB 25, W3SN 23, K3SMB 22, W3KUN 21, WA3UNX 18, WA3-QNT 11, K3VQV 9, WB3GZR 5, WA3YXJ 4, W3SMV 3, W3UT 2.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU, SFC: W9AES, PAM: WA9KFK, RM: W9NJP, Cook County EC: W9HPG.

Net	Freq.	Times/Day	11c	Sess.
I-1	3690	2300/2300 Dy	22	90
I-1 Phone	3915	2245 Dy	18	30
NCPN	3915	1200/1700	194	50
IEN	3940	1400 Su	5	4

WD9BEX is using a new HW-101. W9TCO presented a program describing "Old Time Radio" to the Assn. of Ill. DXers (an SWL-club) on Apr. 28th. WA9LHU, EC for DeWitt Co. appointed K9BJJ and W9IVR as asst. ECs. New Generals are W9UTY and WD9EED. New Advanced is WD9CJT. Now call heard was WD9IU. WA9VLK is on the air on newly acquired Ranger and II. New Novices reporting from the Chicago Area are: WD9HMB, and WD9IFK. WA9FBC and W9LMJ are now Extra Class. W9YTO's new call is K9XL. W9IUA won the Jack Benny Contest sponsored by the Radio Club in Bloomington (CIEN). WB9VEB and WD9GAL are new Techs. W5KLV reports that the CAND for Apr. had 57 sess. with 90 percent participation from the 9th regional net and Ill. check-ins were W9NXX W9UJ W9HOT and W9MZS. WB9IPX has a new Drake MN-2000 and an HQ-1 at 40 ft. WB9YJU now an Extra Class licensee. The Moultrie Amateur Radio Klub (MARK) (with a new place and date) held their annual hamfest and reports the largest crowd ever. The Chicago Area Chapter of QCWA will host the 1979 QCWA National Convention in Chicago. The Ill. state Convention will be held Sept. 10th under the auspices of the Rockford Amateur Radio Assn. at the Winnebago County Fairgrounds west of Rockford. The Peoria Radio Club annual hamfest will be held Sept.

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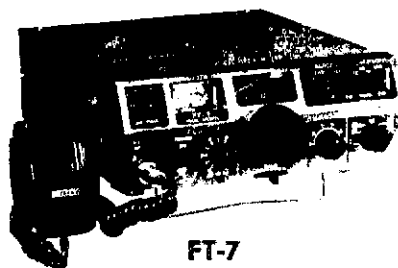
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SPECIFICATIONS

ELECTRICAL: 2 MHz bandwidth, 1.5:1 SWR - 146/148 MHz, 30 watts max.

MECHANICAL: 66" long with 6' co-ax and connector attached

MODEL	CONNECTOR TYPE	PRICE
101-PLC	PL-259 TYPE	\$7.95
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101-FC	'F' Type - (Wilson 2W)	\$7.95
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SPECIFICATIONS

ELECTRICAL	MECHANICAL
Frequency Range . . . 145 - 148 Mhz	Length 66 inches
SWR Less than 1.5:1 at resonance	Weight 6 oz. (190-201) 8 oz. (190-202)
Bandwidth 3.5 MHz (1.5:1 SWR)	Surface Area 11 sq. (190-203)
Power Rating 100 Watts	Connector 27.34 square inches
	Connector SO-239 type

MODEL	DESCRIPTION	PRICE
190-201	Base or sailboat with co-ax connector at antenna base, white fiberglass.	\$17.50
190-202	Vehicle or power boat with 3' co-ax and 3/8" - 24 male stud, specify white or black.	\$20.50
190-203	Vehicle use, 3' co-ax and quick disconnect with 3/8" - 24 male stud, specify white or black.	\$21.50

RF Antenna Mounts

199-501	A two piece snap - in white PVC sailboat mast mount. Designed to accept and offset the model 190-201 type antennas. Offset is 5 3/4 inches and may be varied to suit individual installation requirements. Installation is made by mounting the two mounts 6 inches apart with the stainless steel screws supplied.	\$7.50
199-502	A white plastic totally adjustable ratchet mount for power boat antenna installation. Locks antenna in the upright as well as the down position and may be mounted on the deck or bulkhead. Accepts 3/8" - 24 or 1" - 14 antennas and includes stainless steel hardware.	\$16.50

RF HT Antenna Adaptor Cables

Small flexible 4 foot co-ax cable assemblies primarily intended for interfacing between a hand held transceiver and a base or mobile antenna / amplifier. Inline SO-239 connector on one end for antenna / amplifier connection and the required HT connector at the other end.

195-011	2.5 mm Subminiature Phone Plug - (Standard)	\$7.95
195-012	3.5 mm Miniature Phone Plug - (Midland)	\$7.95
195-013	'F' Type - (Wilson 2W)	\$7.95
195-014	BNC - (Genave, Wilson MK II & MK IV)	\$8.95
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W.F. Dunklee, W1KW

TEN-TEC, Inc.

Dear Sir:

I just received my 544 after you identified my problem. Just thought I would let you know what I think about the service and help . . . everyone else knows so thought you should too.

You people are the greatest I've had any dealings with. Your service is the quickest and you really go all out to help solve the problem instead of just fixing the rig. You can count on good advertising from this QTH. Thanks again.

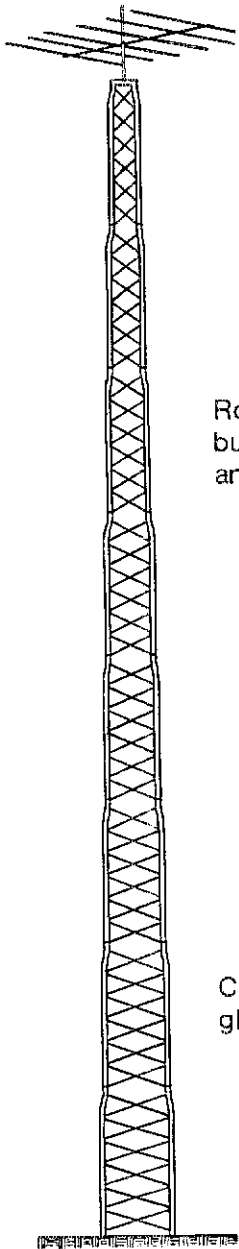
Jerry Rochelle, WB5MMM

TEN-TEC, Inc.

You have a great rig and I am extremely pleased with it. My wife, WD5IHY, just loves it because it is so easy to operate. Believe it or not, I sold my 7883C/3883 so I could purchase the 544. I am not sorry . . . The Rx in the 544 is just as sensitive (if not more) than the 8-line. The transmitter is superb, always giving me good audio reports. Respectfully,
Roger White, KB5AJ

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17th in Peoria. The Chicago FM Club's EXPO '78 will be held Sept. 29 and 30. W9EWX is back again on the airways after his bout with a serious heart attack. The IL section was well represented at the annual hamvention in Dayton. Our sympathy to the family and friends of Ralph J. Knouf a pioneer in radio engineering who recently passed away. W9SL has joined Silent Keys. W9DXD is now N5SL and WD9EDR is now NGBZ. W9SAEV is the new 220 MHz repeater auto patch of the Kankakee Area Radio Society. The Chicago FM club provided communications for the Annual March of Dimes Marathon. New officers of the Wheaton Community Radio Amateurs are: WB9TTE WB9PWW WB9WBN WB9TTC and WB9JLL. Sympathy to WA9CEU upon the loss of his wife who passed away during the month of Apr. W9JLJ is the only BPL recipient for the month. Traffic: W9JLJ 685, W9NXX 193, K9DAC 185, N9TN 165, W9HOT 147, W9SKF 140, K9MX 106, K9PFG 96, W9KH 94, W9OK 93, WA9VGV 90, WB9JSR 77, WD9BK 69, W9NJP 65, K9BVE 60, W9OBS 56, K9EEA 40, N9DR 39, WB9ZED 39, W9LNC 32, N9MX 31, W9AON 30, W9PRN 22, W9YCE 14, WB9SGK 10, WA9VLK 5, W9RYU 5, W9HPG 4, W9PE 4, WB9IPX 2, W9RFC 2, K9BK 2.

INDIANA: SCM, J. M. Kell, W9LTU — SEC: W9UMH. Greetings from your new SCM. I am here to serve you. You must keep me informed of your activity and let me know if you have problems. Congrats to WB9UMB and WB9SKA on passing their Extra Class exams in Apr. Were there more? I would like to know which group had the biggest Field Day activity in Ind. Send me a report (nr ops, stns, ants, etc). Don't miss the Indianapolis Hamfest on July 9th. Hope to see you there. Try something new, participate in the IARU Radiosport Championship on July 8 and 9. Its a new and different contest. W9NCW is moving to W1-Land. W9JVF will soon be returning to ZB2-Land. Congrats to W9JLJ who has taken over as RM. Participate in one of Indiana's traffic nets. They are among the best in the Nation. ITN, 3910 kHz, 1330, 2130, and 2300Z Daily; INTN, 3910 kHz, 1730Z Daily; QIN, 3656 kHz, 0000Z and 0300Z Daily; ICGN, 3737 kHz, 2315Z Daily; IPON, 3910 kHz, 1300Z Su. Net traffic: QIN 344, ITN 310, ICGN 32, INTN 22, IPON 2. Traffic: (Apr.) WB9YXN 512, W9FC 210, W9JLJ 160, W9GLW 145, WA9QCF 122, W9LTU 111, W9EI 106, W9ZLV 100, K9DC 98, W9DLF 67, W9ZKN 43, W99DX 33, WB9JLU 28, W9ONX 26, K9RPZ 22, K9TKE 20, WB9VNV 15, K9DCX 14, K9FG 14, WB9VJE 12, K9YBM 10, W9CMT 9, W9RTH 5, W9BDP 1. (Mar.) 34.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: W9FCZ. PAMS: W9AYK K9UT0 W9IEM. RMs: WB9ICH K9KSA WB9KPX K9LGU K9EN. Nets, Freq., Time, QNI, QTC, Mgr. BWN, 3985, 1245Z (1145Z daylight time) M-S, 716, 633, W9AYK; BEN, 3985, 1700Z (csdt) Dy, 800, 125, W9IEM; W9BN, 3985, 2200Z (csdt) Dy, 1190, 290, K9LUTQ; W9NN, 3725, 2215Z (csdt) Dy, 27, 2, WB9ICH; W9SN, 3662, 2330Z (csdt) M-W-F, 20, 8, K9KSA; WIN-E, 3662, 0000Z (csdt) Dy, 45, 138, WB9KPX; WIN-L, 3662, 0300Z (csdt) Dy, 192, 109, K9LGI; WRN, 3662, 0030Z (csdt) Sat., K9EN 100 EXPO, 3925, 1712Z (csdt) M-F, 835, 44, WA9IX; WB9HCE has LW-12A and active on nets. WB9OAL is now K9EC. WB9ZBS Tech to Advance (XYL). WB9VJS Novice to Gen (YL). W9GLUC Novice to Tech (W9XM father). W9BDTM Gen to Advance. W9YSD Novice to Advance. K9MIF K9VAL to Advance. W9BN certificate to W9FVJ W9AJA K9EF. WIN-E certificate to K9EF. BEN certificate to WA9DOT W9AJA, K9IF WB9BAH has Extra. WB9UMT W9AUC has General. Every lightning storm disconnect your radio equipment. W9DND received BPL medalion. BPL to W9ZGQ. WB9SEJ received PSA from headquarters. W9FC completed 2nd computer program for decoding OSCAR telemetry-prints-bargraph of telemetry parameters — made 1st OSCAR 8 contact. Hope everyone has a good summer. WB9ICH has 40 foot tower and triband beam. Last part of Apr. has had very bad band conditions. News items from Watts Snoo — Smoke Signals — Kettle Drums — Intercom. Traffic: (Apr.) W9ZGQ 872, K9EF 258, W9DND 245, W9CXY 208, W9SFL 185, W9CQC 163, WB9KPX 140, K9FHI 137, W9IEM 120, W9AUC 118, W9DHF 109, K9LEU 89, W9IHW 65, W9AYK 64, K9UTQ 54, WB9YP 48, W9RRU 44, WB9MPF 40, W9FDY 39, W9BQI 32, W9CP 31, K9ANV 30, WB9BE 31, K9AG 30, W9YCV 29, W9AJA 25, K9CPM 25, W9BELM 23, W9UW 22, W9EAQ 22, K9EC 16, K9KSA 14, WA9DOT 11, WB9SEJ 4. (Mar.) W9YVC 47, K9JPS 36, WB9ESM 25, W9AJA 15, K9EC 3, K9SAC 2.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, WB0HOX — SEC: W0SA. Minn. Nets.

Net	Freq.	Time	QNI	QTC	Mgr.
MSN 1	3685	8:30 P	261	80	N9HY
MSN 2	3689	10:15 P	124	33	K9PZ
MSPN N	3945	12:05 P			WB0YLT
MSPN E	3929	5:45 P	637	259	W0DUV
PAW	3925	9-12/1-5	3008	54	WA0YVT
MSSN	3710	5:30 P	145	30	WB0ZAL
MWX	3925	6:15 P	257	213	WB0UKI

Congratulations to WB0ZFG from Tech to Gen; WB0FPX W0BEN from Nov. to Tech; WB0GYL WB0ZQ Nov. to General. WB0ZRA Nov. to Adv. W0DAGI Gen to Adv. W0HOX new Novice. Grapevine has it that by the middle of June W0ZZ will depart MN for residence in OH, we will miss you Nick but the best of everything to you and yours. WA0EWK suffered a stroke on Apr. 15 and will be confined to St. Mary's Hospital for sometime. We're pulling for you Jim. WB0ZAL and WB0HOX would like to thank the Dayton Amateur Club and all of the participants for a wonderful Hamvention. We were fortunate to renew friendships of long standing and make new friends, also we would like to say thanks to the many friends who invited us into their homes. Rochester Amateur Radio Club assisted in the recent Rochester bike-a-thon. Good job well done fellas. Austin Radio Club and others also need a thank you for the good job well done in the Albert Lea bike-a-thon. By the time you read this, summer will be in full swing. Everyone has a good vacation and a Happy 4th of July. MSN N QNI 532 QTC 69 Traffic: WB0ZAL 777, WB0CXY 230, WB0UKI 100, W0DUV 84, W0YVT 94, K9PZ 84, WA0QIT 80, WB0NZB 66, N9HY 65, W0YLT 65, W0BQN 61, WB0SYT 61, WB0PKG 55, WA0TFC 51, K0CSE 46, W0YUA 39, K0JTW 36, W0PNE 31, W0HZU 29, K0J 29, K0S 25, W0UIP 25, N0JP 13, W0RP 10, K0CW 7, W0OPX 4.

SOUTH DAKOTA: SCM, Lydia S. Johnson, W0KJZ — Asst. SCM: W0DVB. SEC/RM: WA0TNM. Net Mgrs.: NJO, WA0VRE. Evening Net, K0TVJ; Morning Net, W0HOJ W0MZI; PERC, WA0UEN. Sincere thanks to W0SD to his many years as SCM. FBI K0AIE WA0FUZ W0HOJ W0MZI

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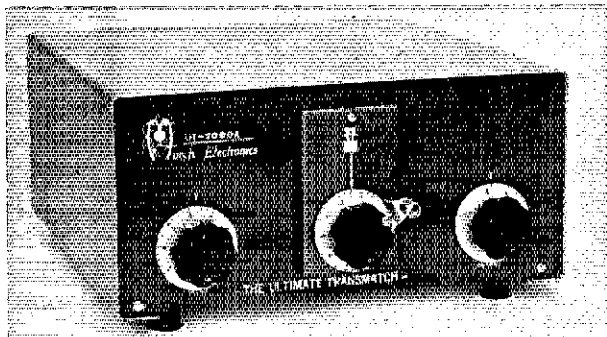
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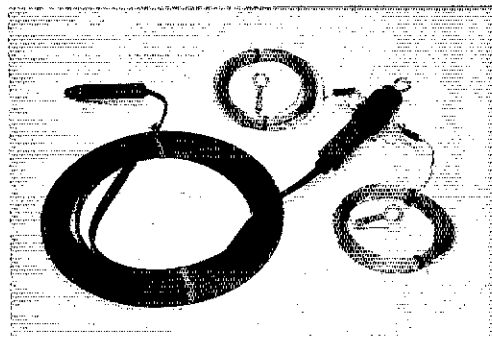
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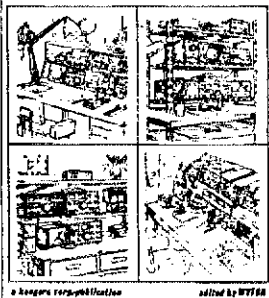
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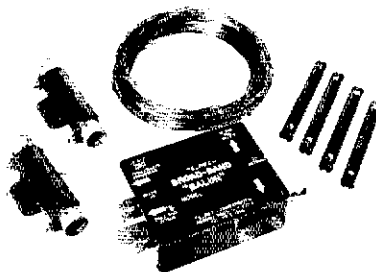
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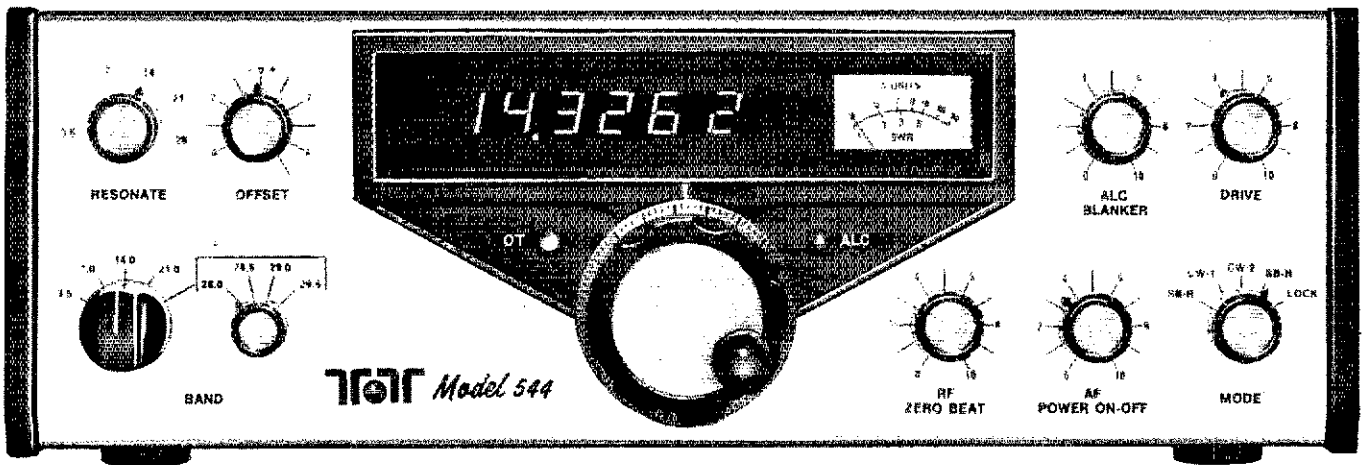
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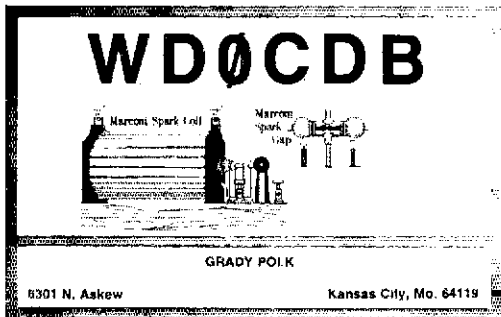


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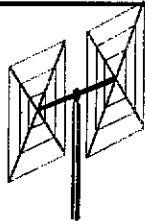
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WBØDWH WAØFGV WØUFZ active in SET for the Fall River and Shannon Counties. WX NET closed until Fall. Officers Signal Hill ARC are: WAØLYO, pres.; WØPHP, vice-pres.; WØJZ, sec.; WØJZ, Treas. Net: Mar. WY QNS 400, QTC 310; NJQ QNS 730, QTC 48; SDN CW QNS 193, QTC 167 in 30 sess. Apr. Morning: QNS 297, QTC 83 (WX Net included); NJQ, QNS 755, QTC 35; SDN CW, QNS 142, QTC 61 in 27 sess. Traffic: (Apr.) WAØVRE 148, WØHOJ 112, WAØTNM 108, WØDVB 76, WAØUEN 72, WAØNZA 52, WØIG 34, WØBQH 17, WØKJZ 10. (Mar.) WAØVRE 323, WAØTNM 189, WØUOH 118, WØDVB 100, KØFRE 87, WAØNZA 67, WØIG 54, WØBQH 9, WØKJZ 2.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5UAU - SEC: W5AVN, PAMS: W5POH, W5ZWZ, K5MEA, RM: W5MYZ, N5S, kHz, Times/Tax, QNI, QTC, Mgr. QZK, 3760, 0000/DY, 190, 11, W5MYZ, APR, 3937, 100M-S, 986, 37, W5POH, M-Bird, 3928, 2130M-F, 812, 18, W5ZWZ, ARN, 3995, 2330/DY, 938, 78, K5MEA, SCAR, 10 mtr net, 28.7, 0200/S & 0130/M, 87, 6, W5ZCW, CC, Wx, Net, 28/88, 0030/M, 175, 13, W5WUH, New Exc. W5B5RUA Bradley Co. W5D5DVR Nevada Co. W5D5ENG Pulaski Co. Cancel EC appt. W5SQGD, W5BRXV now General W5B5FH now Advanced. W5ASD built Accukeyer with memory. W5ASDs general radio class ends last of May. OBA: K5MEA 17, W5WVVA 3, PSHR: W5AHNN 52, W5POH 39, Traffic: (Apr.) K5MEA 80, W5POH 23, W5B5NZL 14, W5UAU 13, W5K10, W5WUJH 8, W5WVVA 8, W5QEK 6, W5B5GQH 1. (Mar.) W5AHNN 189.

LOUISIANA: SCM, S. T. "Tom" Losey Jr. K5TL - ASST. SCM: K5DPC, SEC: W5B1V, RM: N5TS, PAM: N5ES, VHF PAM: W5VBX, K5GHK Mgr. of new Weather Net in Monroe, 1st sess. had 39 QNI, W5B1KT recuperating from recent operation. W5A1BT now N5B. K5HXK W5B5GHN W5B5MAH W5D5ELP W5B5VEE have upgraded to Extra Class. W5D5ELL to General Glass. W5B5GHN to 1st phone and N5WH to 2nd phone. W5B5TPG, Instructor and pres. of SPARC, Sabine Parish ARC advises that four of his students recently up graded to General and two to Tech. Baton Rouge Hamfest big success. La Council of Clubs now working even harder toward next year's National Traffic Handlers Picnic planned for end of July in Alexandria, their meeting in Baton Rouge well attended with 24 being present. B55HR now helping coordinate 2-meter frequencies in North La. DRNS Mgr. advises that LA represented by K5BLV N5TS W5GRV and W5SLBR, K5PP now full member of Delta DX Assn. New Orleans Hamfest to be held Sept. 18-17.

Net	Freq	Time/Day	QNI	QTC	Mgr.
LAN	3615	7:10 PM Dy	228	195	N5TS
LTN	3910	6:30 PM Dy	489	80	N5ES
LSN	3703	8:30 PM M-F	80	12	W5BOOM
LRN	3587.5	6:30 PM Su&W	15	3	N5RB

Traffic: W5GHR 309, N5TS 228, N5ES 150, N5YL 136, K5TL 61, K5BLV 68, N5RB 54, W5SLBR 41, K5HN 20, W5YN 12, W5B1KT

MISSISSIPPI: SCM, E. Ed Robinson, W5XT - W5B5FXA. Had fine meeting with the Tompigeon ARC in Starkville; good turnout, good interest and support for MS Amateur Radio. Report from Tupelo, has new officers elected, new constitution and good support. New Tupelo hams W5D5JOD and W5D5JKW with K5AYA now K5JG, Congrats and tnx W5B5WQI. With the numerous thunderstorms and tornados upon us several state emergency groups busy. Recent reports from Vicksburg (K5VXV) and Jackson (K5QNE) indicate successful support and activity. MTN supporters N5RN W5EDT K5OAF W5WZ W5D5GNH and others welcome W5B5KZX. Pat now the site 103. Please check in your local nets: MN-WA5JWD 3987.5 kHz 8:00 A.M. local time. MN-N5WE 3733 kHz 8:00 P.M. local MWF. MSBN-W5B5NB 3987.5 kHz 8:15 P.M. local (day). MTN-W5B5FHA 3665 kHz 8:45 P.M. local (daily). DRNS-W5D5CDX 30 sess., QTC 358, sess. with Ms. Rep. 80 percent by W5D5GNR W5EDT, CGCHN-K5WOB 30 sess., QNI 2577, QTC 198, MSBN-W5B5NB 30 sess., QNI 1931, QTC 75, MTN-W5B5FHA 30 sess., QNI 160, QTC 49, MN-WA5JWD 25 sess., QNI 454, QTC 14, Traffic: N5RN 146, W5D5GNR 119, W5EDT 114, W5B5FHA 109, W5B5NB 49, WA5JWD 48, K5OAF 41, W5WZ 28, W5XT 21, K5M 8, W5B5W 6, W5LL 3, W5B5VFS 3, W5B5NGF 1.

TENNESSEE: SCM, O. D. Keaton, WA4GLS - SEC: W54YJ, PAM: W54PRF, RM: W54DJ, MGR: Amateur Radio Club is sponsoring a contest which starts at 7:30 P.M. CST daily on W4A1X 14, 72/147, 12, Officers: W4A4K, pres.; W4VXW, vice pres.; W4JCR, secy-treas.; W44ZYX, act. mgr. W4GGM has recently been appointed OBS for the above area. Congrats to W44CNY for qualifying and becoming a member of the Alabama Emergency Net B. Congrats to the upgraders: General W4HJC W4D4GYP, Advanced W4HDG, Extra W4HHR W44GYU, White County 2 Meter Repeater Assn. announces the installation of a repeater on 147.69/09. Anyone interested in membership or wishing to make a contribution toward its operation contact W4B5S. Short Mountain Repeater Club's membership is listed. Charter members 23, Regular members 83, Honorary Life Members 2, XYL Members 4. Every one remember to attend the Crossville Hamfest on 15th & 16th. Certainly glad that SEC W54DYJ is recovering from recent surgery. Tenn. Net reports 33 sess., 350 QNI, 171 QTC. Phone Nets report 98 sess., 4890 QNI, 330 QTC. Your SCM is continually looking for interesting material for this column. Traffic: W44CNY 286, K4CNY 157, W4ZJY 108, WA4NIF 101, K5JGV 59, W4B4KF 58, W44PRF 50, W4PEP 48, W44VVA 46, W44GLS 29, W44DKC 27, W44TY 26, W44UCZ 25, W44ZG 18, W44UW 17, W44PO 15, K4FSK 14, W44JW 10, W4EBZ 9, W44YBL, W44PSN 8, W44TYN 5, W44VWV 3, K4VM 4, W4A4GK 2, W44EWR 2.

GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID - SEC: W44ZML, Apr. Nets:

Net	QNI	QTC	Net	QNI	QTC
KRN	394	40	KPON	51	1
MKPN	937	62	SDARES	55	5
KTN	1163	106	SEKEN	50	1
KYN			CARN	101	2

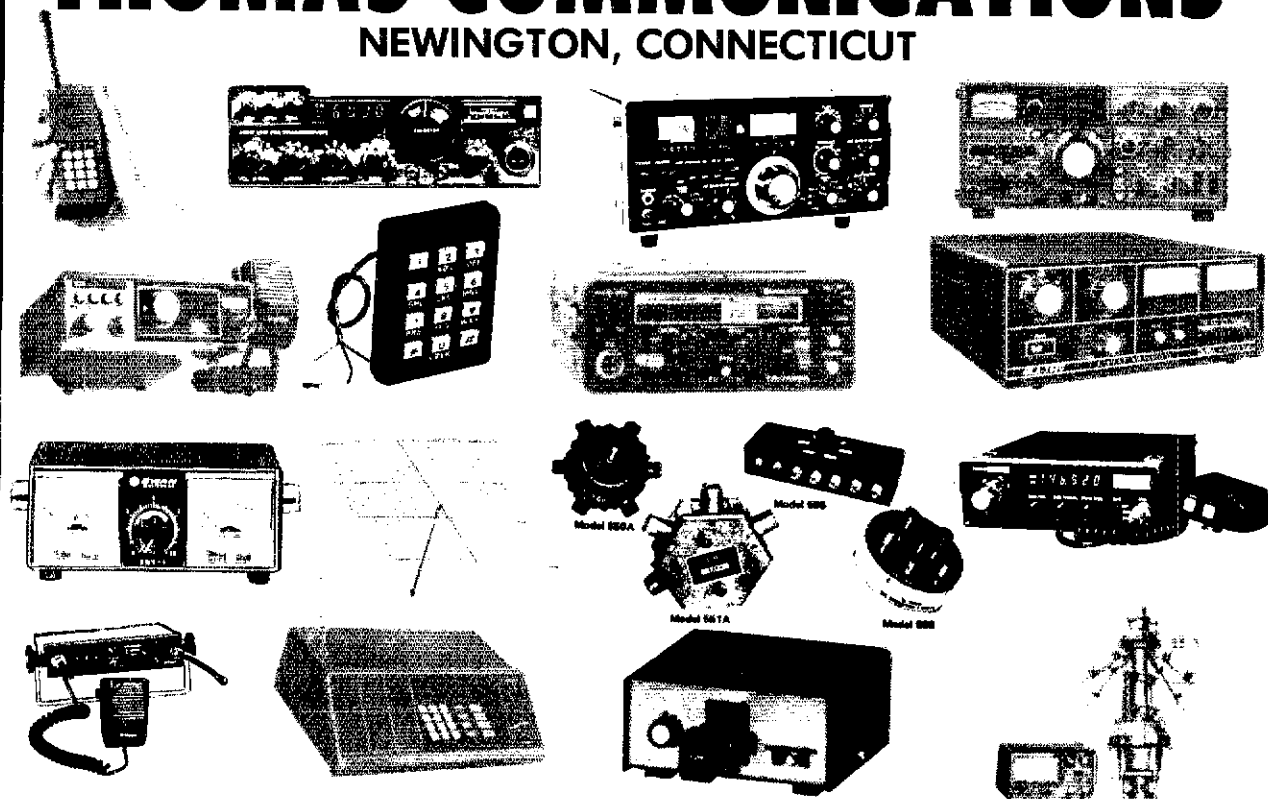
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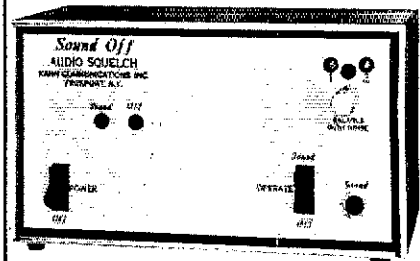
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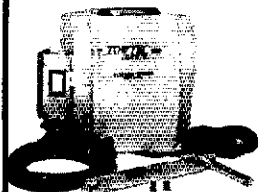
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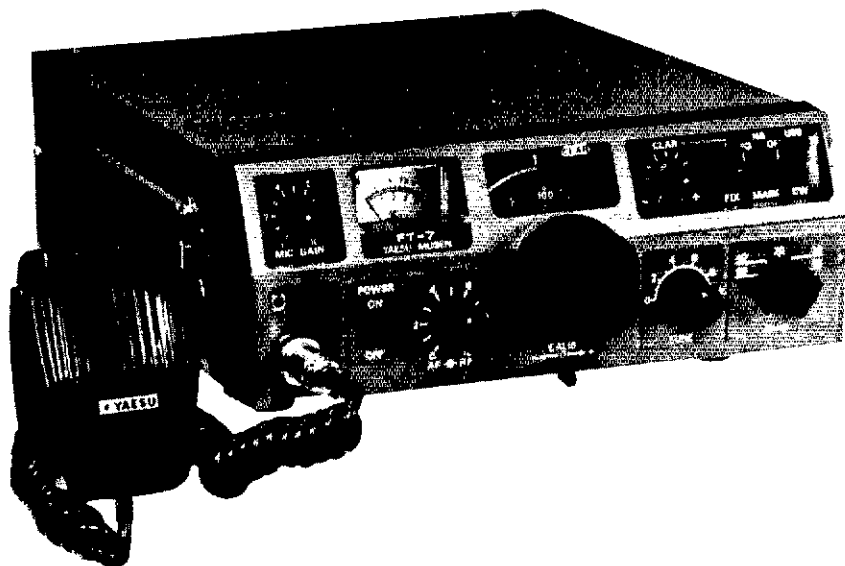
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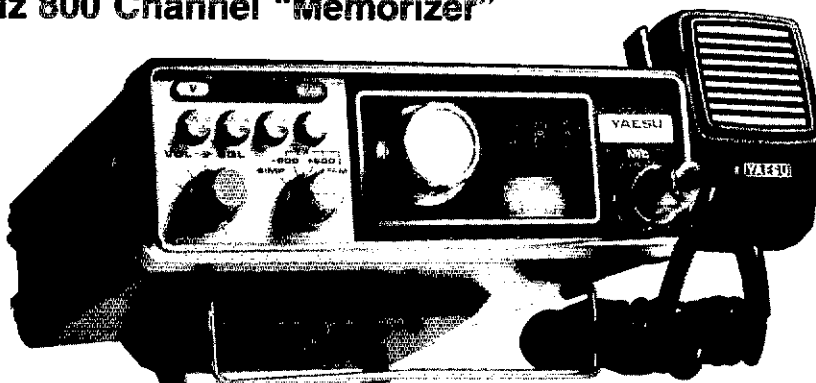
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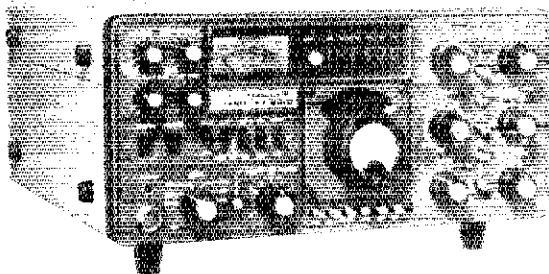


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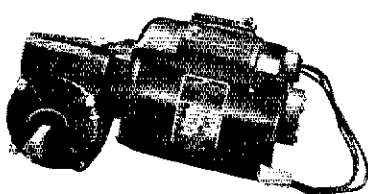
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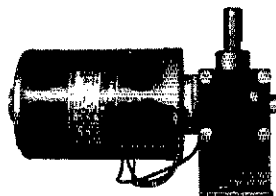
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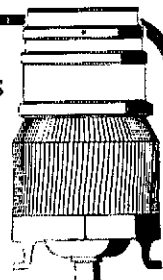
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QMN	3663	2200/0200 Dy	1054	350	86	
MACS	3953	1500 Dy	850	320	30	
MITN	3932	2230 Dy	551	308	30	
MNN	3722	2130 Dy	158	90	30	
WSSBN	3935	2300 Dy	898	78	30	
UPEN	3922	2100 Dy	831	74	35	
GLEN	3932	0130 Dy	672	65	30	
BR	3930	2130 M-S	437	51	25	
MEN	3930	1300 Su	195	15	5	
MGM	50.7	2300 Dy	108	9	22	
VHF PAM			677	16	37	

Report: 9 reports

*UTC summer schedules. The presentation by W1HDO at the ARROW Repeater meeting in Ann Arbor was well timed providing a preview of April's solar activity and its associated propagation conditions. OVS WB8BNY and W8BPOK reported outstanding aurora openings on 6 and 2 meters. (sure made 80-meter traffic nets a mess!) Field appointments: K8RV RM for QMN, WB8BDU EC Eaton Co, WB8BNN EC Van Buren, W8BSCZ EC Marquette, WB8EBS EC Dickinson, WB8WNF EC Midland, K8ZIS EC Genesee, ORS: W8GCSA W8DMFC, OPS: W8BNKA, OBS: W8DMX W8BEAQ W8BPOK, OVS: W8BPOK, Club Elections: Oak Park Ama. Radio Club, K8NKB, pres.: W8RNB, vp: W8DRTB, secy.: W8GOSN, treas.: I am sorry to report the following Silent Keys: W8BJDT and W84JBU (ex-W8AFYA). W8BAAA hit 2000 days of operation with less than 1 percent off time! W8BIXV has worked 104 countries and has been on air for only 1 year. Escanaba now has a new .75/15 repeater. OO reports from K8JH and W8BKJ. More upgrades: W8BBI W8BEO W8QOI W8BTYI to Extra. W8BAPM W8BLDU W8BOEO W8DMCO W8BTVD W8BUYA to Adv. W8BAXR W8BUJU W8BPKC W8BHKJ to Gen. I hope to meet many of you at the big summer event: the P. Hamfest Ironwood July 29-30. Traffic: (Apr) K8LNE 258, WB8MTD 180, K8RV 168, WB8ZNS 128, WB8YDZ 105, W8MPO 101, W8BPOK 97, W8DMX 85, W8BITT 82, W8NCH 82, W8SOP 77, W8ADHB 74, W8SCW 74, K8DYI 72, W8L8H 68, W8BAMM 65, W8WZF 62, W8BAPM 57, W8NYN 56, K8ZJU 50, K8KC 49, W8OAF 48, W8BUZM 48, W8YIQ 46, W8HXI 41, W8DSE 38, K8DTG 35, N8BF 34, W8BNKA 34, W8BCSA 32, K8WRJ 30, W8DMFC 28, W8LRT 27, K8CN 26, W8BZYC 24, W8BIEW 23, K8UPE 23, W8BDIB 19, W8BEEU 19, W8BHYR 19, W8BJRX 19, W8BJX 18, W8BYIG 18, W8TBP 17, W8LDS 15, W8WVW 14, N8AG 12, K8AXL 12, K8BZL 12, W8WVL 12, W8BDJS 10, W8BFYA 10, W8BYO 10, W8FXR 8, N8A 8, W8PPO 8, K8BZ 8, W8VW 7, W8VZ 7, K8CJP 6, W8CJN 6, W8CUP 6, K8GXV 5, W8KJ 5, W8BSE 5, W8DMX 5, W8HKL 5, K8JED 5, K8D 4, W8LOU 4, W8BKM 3, W8FSZ 3, W8JUP 3, W8LD 2, W8JYT 2, W8BPOK 2, W8NBI 2, W8BUU 2, W8BNC 1, W8RNO 1. (Mar.) W8BTL 23, W8FSZ 11, W8Y 10.

OHIO: SCM, Hank Greeb, W8CHT/N8X — Asst. SCMs: W8BJGW W8MCR N4VY. SEC: K8AN. PAMs: W8FU W8DIL W8ASSI. RMs: W8TP N8CW W8BKI W8BWS. Remember OH section traffic handlers picnic July 30 Highbanks park, Worthington, OH. short business meeting 1:30 PM contact your NM for details. Also OH OSO party details in Aug. QST. Net Reports

Net	Times	Freq.	Sess.	QNI	QTC
BNR	2200	3605	30	136	319
OSSBN	1430/3000/3345	2925	90	636	735
08MN	0100	50 160	39	430	81
QNN	2230	3708	29	111	90
BN	0200/2245	3577	57	610	246
OSM	2210	3577	30	287	181

FultonCOARES, 4 sess., QNI 50, 8 QTC, VanWorthCoEN 5 sess., QNI 38, 14 QTC, Burning River 25 sess., QNI 206, 10 QTC, Triple States 21 sess., QNI 254, 19 QTC. Interim D1 is popping up all over the place, as a result of some 1200 exams given at the Dayton Hamvention. Congratulations to all who passed. W8BKW made BPL. This is the very first time that business pressures really got in the way of getting the column out. Apologies to those operators whose reports I may have missed. Traffic: W8BKW 685, W8AGH 201, W8BKI 154, N8VT 139, N8CW 126, W8DIL 125, W8MCR 120, W8QZ 120, W8BZJU 111, K8KWO 86, W8TH 86, W8ASSI 85, N8TM 78, W8SIQ 72, W8BOMQ 71, N8X 71, W8TP 67, W8VWH 62, W8OUU 58, W8BVM 53, W8BCDA 49, W8BVL 47, W8GGX 45, W8BYI 41, K8AN 45, W8BGGX 32, W8BZD 29, W8FVD 28, W8WEG 28, W8BBQ 26, W8BPI 26, W8RG 26, W8BYG 24, W8BHV 24, W8BLU 23, W8BZF 23, W8BMR 22, W8BIO 20, W8RW 18, K8R 18, W8FU 17, K8BY 16, K8CKY 15, K8DL 15, W8BLR 14, W8BTR 14, W8UOY 14, W8VZK 14, K8IOU 10, N4VY 10, K8CYX 9, K8KD 7, W8DLD 7, W8BSSR 7, W8BGR 6, K8MR 6, W8BMC 5, K8HF 4, W8DYF 2, W8ZM 2, K8ONA 1, W8BVEC 1.

HUDSON DIVISION

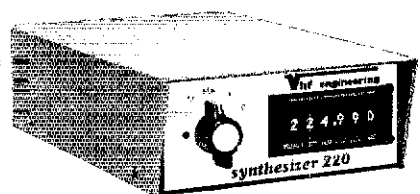
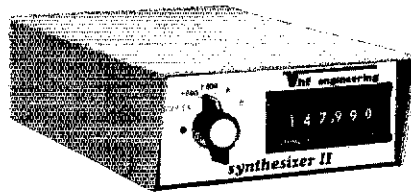
EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV — SEC/ASCM: W8ZVUK, ASE: K2AYG. RMs: W2CS K2OYG W2WSS. PAM: W8KPT. Nets: NYPON 5 PM 3913, ESS (slow) 6 PM 3590, NYSPTEN 6 PM 3925, NYS 710 PM 3677. Congrats to N2YL on appointment as Daytime Eastern TOC Dir. Our loss is NTS' gain. Any many more congratulations to W2SK, honored at AAFRA dinner, made honorary Life Member, 10th anniversary, etc. for long service to Albany hamdom. To new Novices W8ZVKB, age 12 and sister W8ZVKC, age 10! Both daughters of W2BEW. To Novices: W8ZPY W2AAAX. To General: W8ZMX. To Advanced: W8ZROM W8ZOH. To W8ZSPL for his medallion BPL. To an unnamed station who discovered I didn't live on Magnolia Dr., or in zip code 12541, when station reports evaporated. (see page 8) Same station an inveterate helper of new hams. ESS bulletin fulla good stuff! Want on mailing list? Just QNI! OES Rules: regular CD appt. rules + 1. Reg. member Emer. Comm. net. assn. etc. 2. QNI emer. net. participate pub. serv. events 3. Handles emergency traffic in good form. 4. Send appl. to SEC/EC/Net mgr cert of 1, 2 & 3. Monthly report to SCM + QNI and traffic tot. PSHR. W8ZKDC W8ZSPL. Traffic: (Apr.) W8ZSPL 867, K2XV 156, K2AV 90, W2BIW 80, W2YJR 48, W8ZEW 46, K2NN 26, W8ZKH 18, W8ZCJ 14, K2HNW 14, W8ZPAU 14, W8ZFU 5, K2DN 5, W8ZMKQ 4. (Mar.) W8ZKDC 145.

NEW YORK CITY-LONG ISLAND: SCM, John H. Smale, K2IZ — SEC: K2HTX. PAM: W8ZYEI. RM: W8ZEU. The following are major AREC/RACES, join one, please. Bronx 28.84 MHz, 50.33 MHz, 146.88 fm. Kings: 28.64 MHz, 50.35 MHz, 146.88 fm, Richmond: 146.88 fm. New York: 29.5 MHz, 146.88 fm, Queens: 29.5 MHz, 50.52 MHz, 145.62 am/fm, Nassau: 28.72 MHz 145.88 am, Suffolk (West): Hynl: 28.73 MHz, 145.59 am. Smithtown: 28.65

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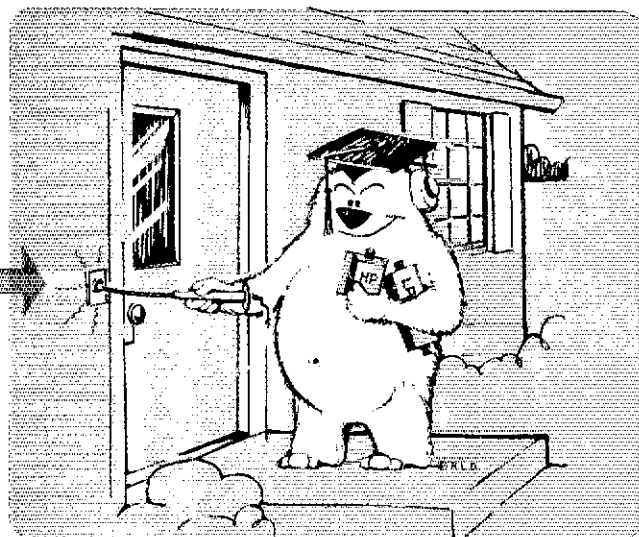
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HERE ARE THE "BEAR" FACTS:



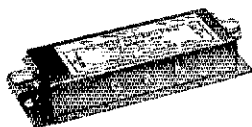
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MHz, 147.21 fm, Babylon: 21.430 MHz, 146.085/685 fm, Islip: 28.65 MHz, Suffolk (East) 146.82 fm, Brookhaven: 146.115/715 fm, Riverhead: 37.30 kHz cw. Note: Net times between 2000 and 2100 local on Mon. A special thanks to the following stations who helped with communications for the special Olympics held at SUNY Stony Brook: K2ROG K2IZ K2VL K2TV WA1WMZ WA2CZY WA2CSR WA2PYO WA2TRH W2HAE WB2COO WB2GOC WB2KIB WB2DQH WB2DYO WB2PJE WB2INI WB2DCJ WB2WLP WB2ADF WB2EKJ WA2KH WB2YUJ WB2MLC. Once again the FCC was at Stony Brook giving exams, on May 20th. Congrats to WA2PXH who passed his General. Now is the time to prepare for the Hudson Division Convention to be held at Great Gorge, NJ on Nov. 10, 11, 12, make your reservations now. Congrats to WA2YUS who upgraded to Advanced and also received his 3rd tone ticket. WB2DCJ was elected pres. of the LILCO ARC, N2HH is VP. WB2DYO will be running code practice each Tue. and Thur. on WR2ADM at 2030 local. WB2ABJ is now K2NZ. WB2KHH has a HA-460 for six meters, WA2YEI converted a Lafayette Micro 23 CB radio for ten meter am. WB2JAY is now equipped for 220 MHz. K2GCE back from visiting with his son in Chicago. New Officers for Kings County Repeater Assn: WA2NDA, pres.; WB2AFD, vp; WA2ZDD, treas.; WA2RAH, secy; also, congrats to WA2RAH who upgraded to General. WA2MCG no longer has a Tech license. K2SJO was the speaker at the Apr. TARCOM meeting. Now that Field Day is over, lets not forget what we learned on this year's event, perhaps this winter will not be so bad, but, one can never tell, why not try checking in to the cw and tone nets to help. Traffic: (Apr.) WB2KH 545 W2GKZ 62, WA2JUG 60, WB2EUF 46, WB2JAY 42, K2GCE 35, WA2YEI 28, W2DBQ 22, N2LI 11. (Mar.) WB2KH 843, WB2JAY 82, W2HXT 59, WB2DCJ 8.

NORTHERN NEW JERSEY: SCM, Bob Neukomm, WA2MVG — SEC: WB2VUF, RM: W2XD, PAMS: WB2LCC WA2OPY (VHF), RM: RTTY W2PSU, RM: NJSN N2MW. Net Mgr. Freq. Time/Days Sess. QNI OSP
 NJN W2XD 3695 7 P Dy 28 325 144
 NJN W2XD 3695 10 P Dy 30 201 107
 NJSN N2MW 3730 8:15 P Dy 30 481 244
 NJPN WB2LCC 3950 6 P Dy 30 481 244
 NJPN WB2LCC 3950 9 A Su 5 175 33
 NJRTTY W2PSU 147.51 7P Dy

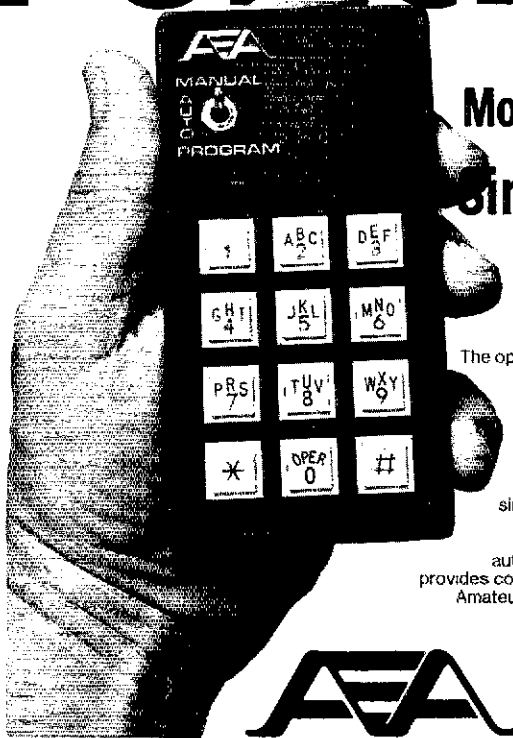
NJ2MTR Tfc WA2OPY 145.5 8:30 P Dy
 All above times Eastern Daylight Savings Time. New Extras: WA2MIW now N2HE and WB2IWH. Advanced: WA2EWG and WD2AJU. To General: WB2EOB WA2LHV and WA2LWU. To Tech: WA2PIR. New Novices: WA2YYB WA2ZCK and WB2ZCP. New call for W2WHB is K2VX. K2OP fixed and added a new kw linear for under \$10. WB2VUF reports Morris County ARES and RACES groups will be providing communications with some assistance from Passaic County ARES for the "March of Dimes Walkathon" for Morris County. There is an urgent need for all ECs to routinely report to the SEC. How about it gang! OO reports from: W2TPIJ WB2GST and WA2MVQ — mostly lots of chirpy signals and some out of band operations during the Clipperton DXpedition. All received some thank you letters — it happens! N2GJ and W2CC report nice times at the recent Dayton Hamvention. N2ZM acquired some additional parts for his HB linear out there. Lot's of Field Day plans received from BARA, 550 Club (QRZ). Englewood ARC getting antennas ready. K2BJC recuperating fine from a triple bypass. Late upgrade notices: WA2VZW and WB2WAB to General. WB2YMW and WA2YYO to Tech. WB2KLF graduated from the Chubb Institute for Computer Technology on Mar. 17th & is now working for Supermarkets General Corporation. CD drills at WB2RTG on Apr. 5 and 19. W2APT's XYL passed away. Net Report: NJ/NY Slow Net, sess. 30, QNI 92, QTC 24. Net meets daily at 4 PM on 3.735 MHz. Here is another excellent net to get acquainted with net procedures. Check into it all you Novices and Techs. Traffic: WA2NPP 252, K2VX 231, WB2MSO 130, WB2MSV 102, W2XD 95, W2SW 54, WA2MSQ 53, K2OP 48, WB2DMB 47, WB2RM 47, W2UH 47, WA2LHV 46, K2SE 33, WA2XD 23, N2GJ 22, WB2JVE 22, K2ZF1 21, N2NS 20, W2QNL 17, W2CC 13, WB2KLF 8, W2SWE 3.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF — The Pony Express riders were given assistance by W0HTP W0HCN WA0WHZ WA0ODB WA0YGV W0FQ WA0UVH W0FSM W0KCV0 WA0JUP WB0NGT K0HR WA0TXB WA0PKA WA0NNR W0FDA WA0MIZ WB0SFJ K0TBV K0UTC W0IYW WA0KVB K0ZQ and WA0AJX. The FCC was very much impressed by help given them by WB0OAM WB0VLZ N01V WB0MMT WA0ZCG WB0NYO W0YV and K0FLY for their special exam session in Cedar Rapids. The Iowa 75 Meter Net election results: WA0VZH mgr. of noon session with WB0AVW WB0JFF K0JGI WB0TWW W0WDC and WA0VZH as regular NCS with WA0EKC and K0ZQ as alternates. Evening session has W0YLS as mgr. and K0DBW WB0JYF WB0DGF W0TGQ WB0CPR and W0YLS as regular NCS with WB0JJJ as alternate. WB0JFF reelected as secy. and W0SRR W0KMXJ W0IYW WA0EKC WA0YGV and WB0MOY as dir. WB0DGF now with Collins. W0SS new mgr. of NTS-TEN. W0GWW and W0GWN have OM/XYL station in Ft. Dodge and congrats to W0JBJV for General. Clinton ARC new officers: WB0YU and WB0SEL, vp; K00MA, secy-treas. Bi-State VHF Teleprinter Soc. has WB0QCD, pres.; N0LA, secy.; WB0SAX, treas. Have a safe and sane 4th, so you can CO on the 5th. Nets: Iowa 75 Meter, 3970 kHz, 1730Z M-S, QNI 1485, QTC 85, sess. 25, Mgr. WA0VZH. 2330Z M-S, QNI 935, QTC 54, sess. 25, Mgr. W0YLS. Tall Corn, 3560 kHz, 2330/0300Z Dy, QNI 469, QTC 116, sess. 60 Mgr. W0YLS. Traffic: (Apr.) WA0AUX 716, W0SS 208, K0EVH 167, N5YX0 137, W0YLS 104, W0LJW 45, W0FCI 17, W0LFF 10, W0GDJ 7. (Mar.) W0BW 4.

KANSAS: SCM, Robert M. Summers, K0BFX — SEC: W0KL, PAMS: W0OYH W0S2S, RM: W0FT, PAM: W0CZS. Mid States will start up on the 15th on a limited basis. Apr. 1978 traffic results as follows: QNI SS, QNI 143, QTC 57, QTR 640 in 30 sess. CST, QNI 1004, QTC 101; KWN, QNI 739, QTC 332; 30 sess. KSN, QNI 1148, QTC 113, 20 sess., KPN, QNI 304, QTC 14, 22 sess.. WB0HGG has applied for his Worked All States. On Mar. 30 & 31, Amateur Radio was used to assist Sheriff for 37 hours by 7 amateur stations on 2 meters to locate escaped prisoner. WB0LHJ was base station, the rest were mobile. WB0KYU WB0LBF WB0WCC WB0LHJ WB0LHK WB0PKM K0MXJ & 78 mph winds up to 85 & 100 mph out at W0AM home. C.W. Wade, antenna stayed up. On June 3 and 4 the Hamfest took place in Salina. The Kansas-Nebraska Radio Club, Inc., Hamfest will be Aug. 12-13. This will be when The Raymond E. Baker W0FS Traveling Memorial Trophy award will be

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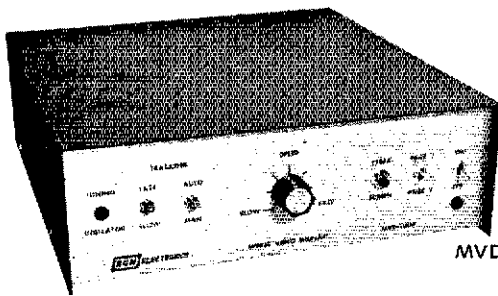
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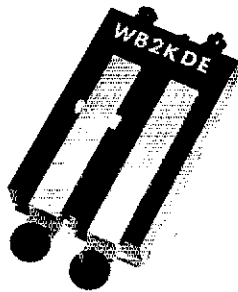


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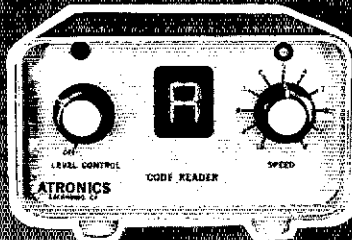
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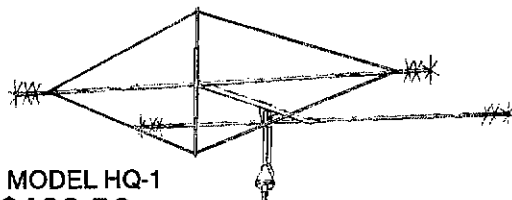
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1001 West 18th Street, Erie, Pa. 16502

presented. Sorry to say that K0NL lost his wife on Apr. 19th. Traffic: (Apr.) WB0VEZ 183, WB0OBH 178, W00YH 144, W0CHJ 75, K0EZ 73, WA0LBB 67, W0F1 66, W0H1 59, W0AM 57, W0F1R 56, W0LX 47, W0SN 43, K0KD 40, K0BXF 23, W0ZUX 22, W0BHG 21, W0FDJ 17, W0PP 14, W0DFP 12, K0PC 12, W0BZS 11, W0BKDE 3, W0R0 9, WA0SEV 8, W0IN 8, W0ASY 6, WA0KVP 6, W0NYG 1. (Mar.) K0JDD 9.

MISSOURI: SCM, L. G. Wilson K0RWL — Asst. SCM: Joe Flowers W0DTF. SEC: W0BFKY. Congratulations to the PHD ARC on an outstanding Hamfest. Guest speakers at the banquet were W1CW W1YL W0FIR and the Mayor of Kansas City, MO. Everyone who worked on the Hamfest should be commended on a job well done. Many Kansas City area hams, under the direction of W0AIB participated in the March of Dimes Walkathon and their combined efforts helped make it a big success. W0JEB W0SHP and K0JAD joined the ranks of Silent Keys. Our deepest sympathy to their families and friends.

Net	QNI	QTC	Net	QNI	QTC
SCEN	72	7	PHD ARC	27	8
PHN	262	19	PHD ARC (Mar.)	29	8
MEOW	315	60	MOSSBN	782	109

Congratulations to W0BYA and W0BYC on their new harmonic. W0AUB back home after a stay in the hospital. Here's to a speedy recovery. N0RT sporting a new IC-211. Congratulations to W0CCK on his 82nd birthday. Congratulations to the following new licensees: Novice: W0DVB through GVD GVI GVR GVT GVIU GVX GVC GVG GWH GVL; GVO through GWT GVV GWZ GXI and GXX; Tech: W0GXD; General: W0FES after a 28 year lapse. Traffic: K0ONK 398, W00VHN 108, W0SMA 104, K0SSN 103, W0H1R 98, W0BKK 87, W0DTF 84, W0UD 54, K0SI 53, W0BSND 34, W0BVL 33, W0BFD 24, K0BM 18, W0AFZ 10, W0EPI 9, W0QMF 9, W0CAU 9, W0CAU 9, W0AKUH 4, K0RWL 4.

NEBRASKA: SCM, Ed O'Donnell, W0GWR — The Nebr. Q0WA chapter now totals 68 members. The Platte Valley 2 Mtr Net members will act as storm spotters for the U.S. Dept. of Commerce National Oceanic and Atmospheric Administration. K0KP formerly W0VFM, OO, has received some interesting comments in the mail. Hams do appreciate being notified of troubles with their signals. Congrats to upgrades: W0SVO Extra; W0AAI, Advanced, and W0BDE General. Comhusker Net, QNI 1230, QTC 70; Mid-Nebr. ARES 2 Mtr Net, QNI 333, QTC 10; Nebr. Morning Phoenix Net, QNI 1204, QTC 54; Nebr. ARES 2 Mtr Net, QNI 243, QTC 6; Nebr. Storm Net, QNI 1163, QTC 36; Pawnee ARC 2 Mtr, FM Net, QNI 136, QTC 1; Platte Valley 2 Mtr Net, QNI 54, QTC 2; PM Net, QNI 246, QTC 96; Q0WA Net, QNI 62, QTC 0; Western Nebr. Net, QNI 369, QTC 18. Traffic: W0FQE 297, W0EUT 74, W0C0BJ 31, W0VEA 31, W0HOP 30, W0HTA 30, W0SGA 28, W0ZNI 17, W0VYX 11, W0PCC 10, W0BROG 10, W0YFR 10, K0BRS 9, W0QEX 8, W0BGR 7, W0JIH 7, K0FJT 4, W0GAK 4, W0BGM 3, W0AHV 2, W0BEE 2, W0GHZ 2, K0HNT 2, W0IXB 2, W0BMD 2, W0NIK 2, W0LOY 1, K0UP 1.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, John McNasser, W1GVT — SEC: W1XX. RM: K1EIR. PAM: K1EIC. VHF: W1AELA.

Net	Freq	Time/Days	Sess.	QNI	QTC
CN	3640	1900/2200	Dy 60	110	195
CPN	3965	1800 M-S	30	469	122
		1000 Su			
		2130 Dy	30	329	67

VHF-2 28.88
CORN 147.75/15 RTTY 24 Hrs.
WESCON 147.78/18 2030 M-F 20 307 65

SEC W1XX suggests interest in EC work to insure competent amateur in the role of new Director. W1HFR LC meeting at ARRL provided many suggestions to be implemented for the good of Amateur Radio. CN/CPN 25th Annual Net Dinner social highlight of Section — well attended and planned via K1EIR and K1EIC. ICRC 28/88 says dues are due — please support your repeater clubs. Tri-City Feedback notes ARRL membership renewal thru club adds treasury income. Southington ARA notes with sincere regret the loss of W1IOB (treas for many years) and K1VWZ who have been added to the list of Silent Keys. Manchester Short Skip thanks K1THF for Circuit Board Program. Shoreline ARC Repeater active on 176.75. Stamford RA held a Hunt also. Flex makes Fairfield ARA held Town-wide 2-meter practice drill. Congratulations to: K1DFS Apr. BPL; N1BJ Extra Class; W1ASH Advanced; W1EPD W1BVS W1BVC General; and W1YBB 2nd Class Comm. I to get a bang out of amateur radio, get Novice members active on traffic nets! Happy Fourth of July!! Traffic: (Apr.) K1DFS 330, K1GF 229, W1LOU 114, W1AIU 96, W1EJV 95, K1OQG 73, W1RLV 55, W1KV 53, K1XA 46, W1GVT 43, W1HYN 43, W1TPF 37, W1C0PF 36, W1BUN 28, W1AZS 27, K1ACE 20, W1ASH 15, W1EW 12, W1JUW 12, W1L19 9, W1C0F 7, W1B0I 6, W1C0H 6, W1THU 3. (Mar.) K1EUW 4, W1WEE 2.

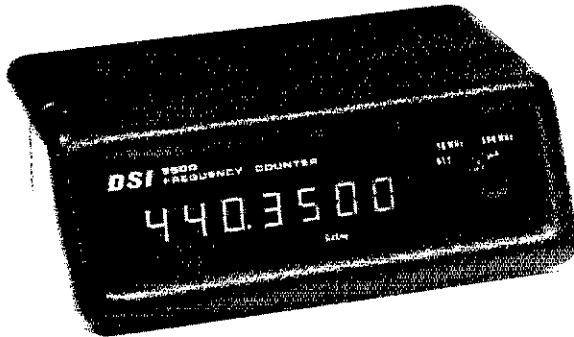
EASTERN MASSACHUSETTS: Frank Baker, W1ALP — Asst. SCM: W1A0WC. SEC: W1A0G. W1B0C W1QUN. K1UPZ W1ALC are Silent Keys. Capaway Club had their Ladies night at Ridders Farm. N1GO is ex-W1YUJ now in Stoughton. W4EIK in Quincy on 2. N4PL is ex-W1UX W1XP ex-K9AQP. K1CH ex-W1UIR. K1OX ex-K1AGB. K1TK ex-W1TAK. W1DJC/K1PZU moving back to E Bridgewater. W1ZMH has his General. W1GXT on 10. 29.6 MHz. FM. W1TKZ Club radio out for repair. W1ZMC says they have an emergency net for the area on 146.9 simplex. W1YMD has National VFO for 2. W1AN home from FL. N1DC ex-W1KJT. The 4 PMers had a luncheon at Valle's in Ware. South Shore RA had a ham auction. W1VAB new ORS. W1BLG new EC for Medford. EM2MN had 50 QNLs, 23 QTC. W1FNM took part in March of Dimes. W1MZ helped W1NF rebuild his antenna for 80, worked SM6EHY. W1UQB one of the Mugford Twins moving to Chester, NH. Endorsements: W1A0G OPS. W1IGL OBSIOPS. W1IYD W1BK EC. W1QJB is W1VAB's Uncle. Foxboro Co. ARA is on 975/375. W1ALP & W1TFP attended the annual banquet of the Norfolk CRA. officers: W1JJA, pres.; K1PNH, vice pres.; W1CQN, secy.; W1IDV, treas. They have a 50 y certificate from ARRL. EB: W1TC active on 180-19 kHz. E. Liaison Net meets on 7205 kHz at 11 A.M. Sa. W1QJ planning experimental transmission below 1 kHz. W1FGD has an M-Tech PISA1 to go with his IC 215. Massasoit ARA had W1C0Q speak and demonstrated some of his radio gear. SEC W1A0G received reports from: W1s BLG HPS AER ZLO, W1 BHD ZMO XA UBC III, K1NFV, W1YGG, worked W1WRJ, Westbrook, ME on 146.04/64. W1A0NB 4. K1TR constructing an array for 432 for VHF QSO Party. W1N1JG gave a talk on National's HRO-600 at the Quarnapowitt RA. K1BJ is ex-W1APT. The Tarlow family

DSI

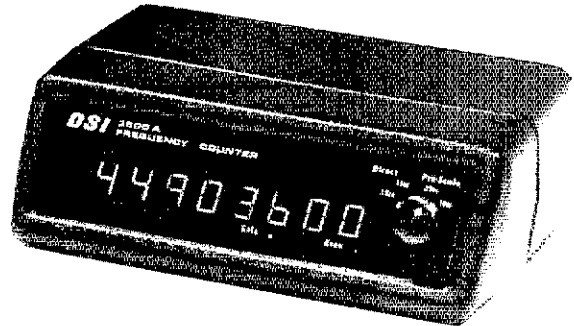
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- Resolution—10Hz Non-Prescaled 100Hz Prescaled, .1 sec Gate
- **ACCURACY** \pm 1 PPM \pm one count \pm 1 PPM per six months from 65°F to 85°F
- **SENSITIVITY**—50 mVrms 150 to 250MHz 100mV @ 450MHz
- Gate Time Light—Automatic Decimal Point Placement
- Automatic Leading Zero Blanking When No Input Signal is Present
- No RF Connection Required with Supplied Antenna
- **50239** Connectors Supplied for Direct Probe Input
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- Comprehensive Owners Manual with Complete Schematics
- Size 2 7/8" H x 8" W x 5" Deep

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- 8 Large Bright— $\frac{1}{2}$ inch LED Readouts
- Two Selectable Gate Times—.1 sec. & .1 sec. 100Hz to 600MHz
- **Accuracy** \pm .5 PPM \pm one count \pm 1 PPM per six months from 50°F to 100°F
- **Sensitivity**—10mVrms 150 to 250MHz 50mV @ 450MHz
- Gate-time & Oven Light—Automatic Decimal Point Placement
- Automatic Leading Zero Blanking—When No Input Signal is present
- No Direct RF Connection Required—With Supplied Antenna
- **50239** Hz input 50Hz to 75MHz—**50239** Low \pm 10MHz to 600MHz
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- **FCC Certifiable**—Designed for the Professional Service Technician
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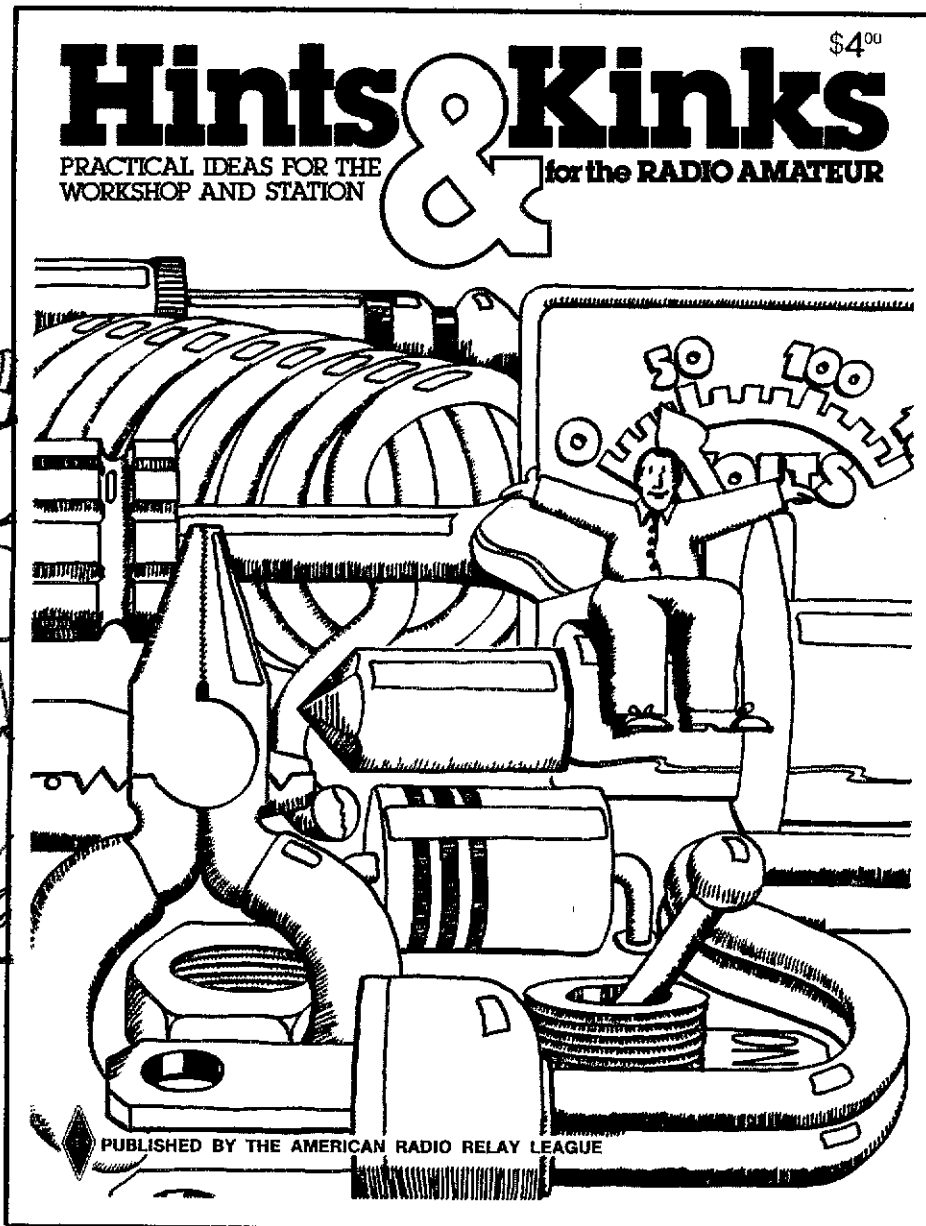
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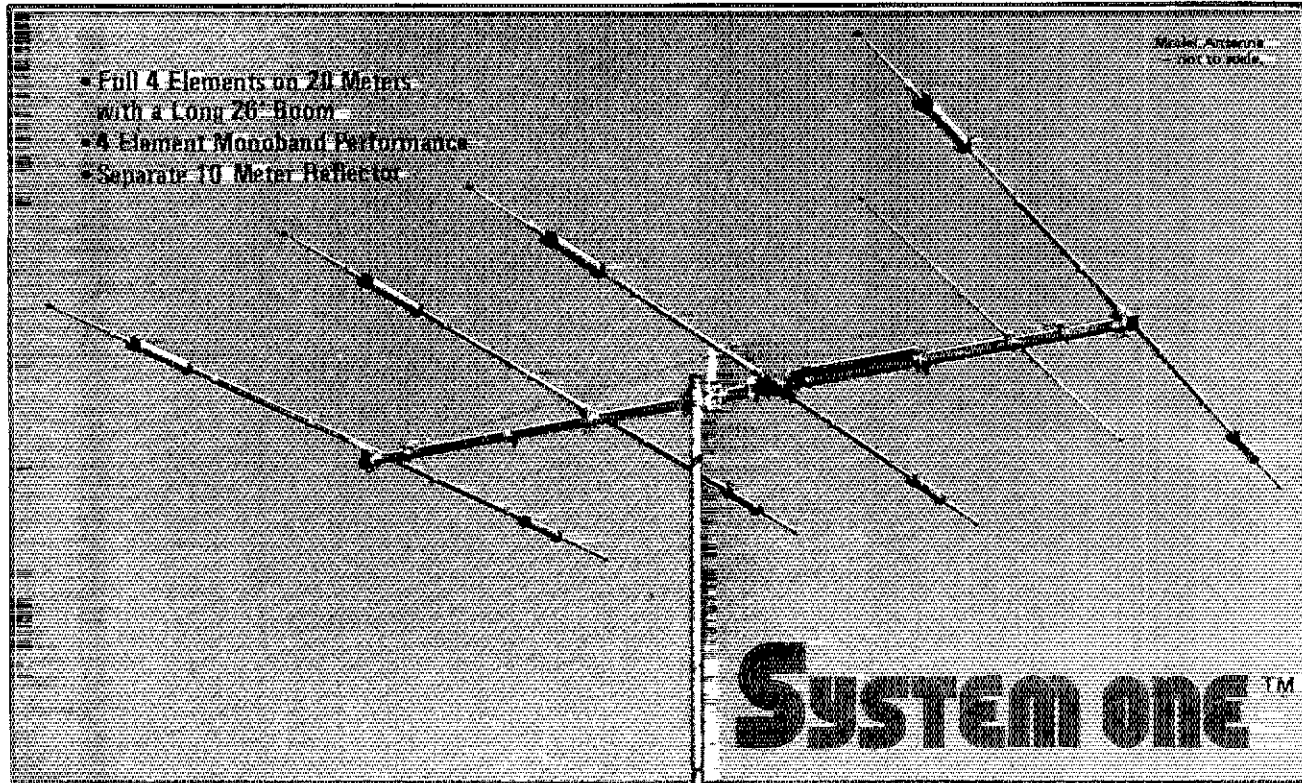


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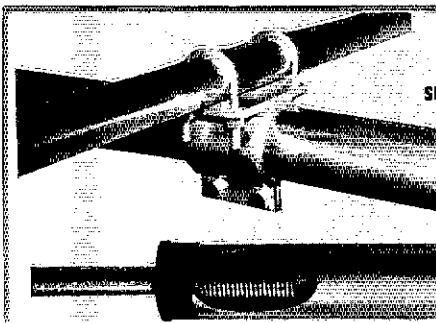
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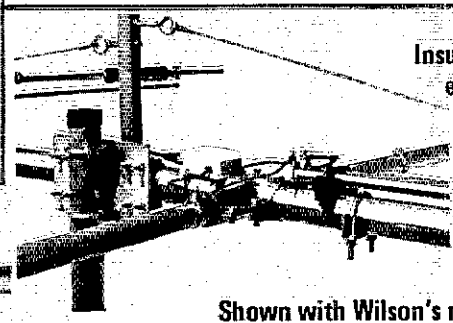


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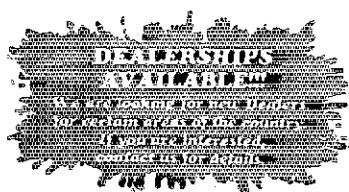
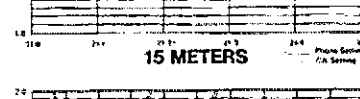
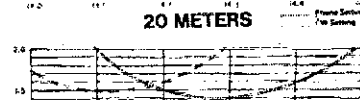
Shown with Wilson's new optional Toroid Core BN-50-A Balun.

SPECIFICATIONS: SY-1

Matching Method Beta
Band MHz 14-21-28
Maximum Power Input Legal Limit
VSWR (at Resonance) 1.5 to 1
Impedance 50 ohms

Boom Length . . . 26'
Boom Diameter . . . 2" O.D.
No. of Elements . . . 5
Longest Element . . . 26' 7"
Turning Radius . . . 18' 6"

Required Mast Diameter . . . 2" O.D.
Surface Area 8.6 sq. ft.
Windload at 78 mph . . . 215 lbs.
Shipping Weight 65 lbs.
UPS Shipment in 2 Cartons

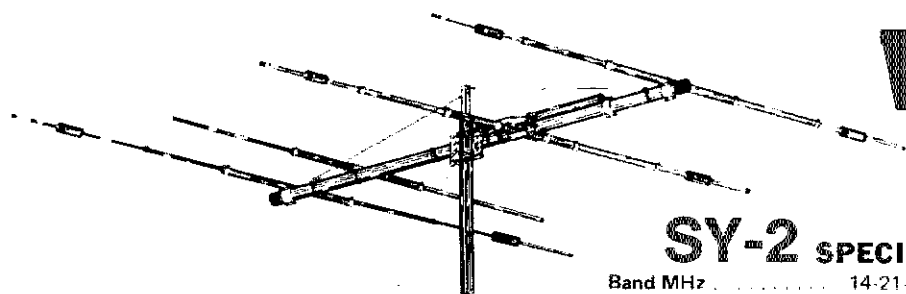


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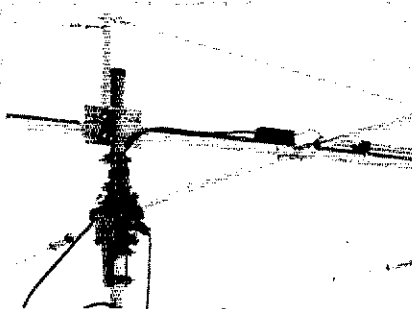
SY-2 SPECIFICATIONS

Band MHz	14-21-28	Boom Diameter	2" O.D.
Maximum Power Input	4 Kw	Surface Area (Sq. Ft.)	6.15
VSWR (at Resonance)	1.5:1	Wind Loading	at 80 mph 153
Impedance	50 Ohms	Assembled Weight (Lbs. Approx.)	47
Boom (O.D. x Length)	2" x 18'6"	Shipping Weight (Lbs. Approx.)	50
No. Elements	4	Matching Method	Beta
Longest Element (Ft.)	27' 2"		
Turning Radius (Ft.)	16' 5"		
Req'd. Mast Diameter	2" O.D.		

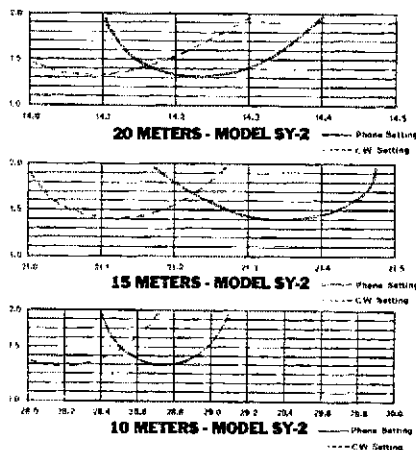
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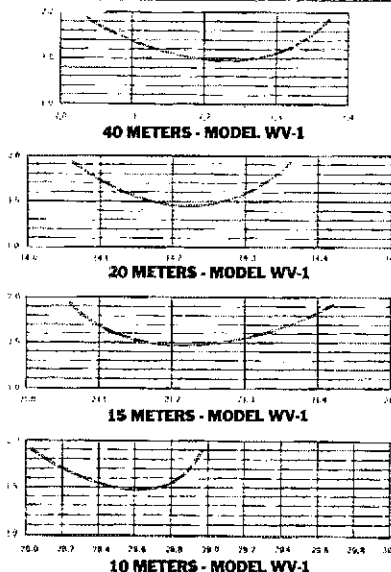
Wilson's WR-500 Rotor and SST-64 Crank-up Tower used with System Two. Recommended Balun: Wilson BN-50A.



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... space efficient, high performing, cost effective new tribander.

40 THRU 10 METERS VERTICAL TRAP

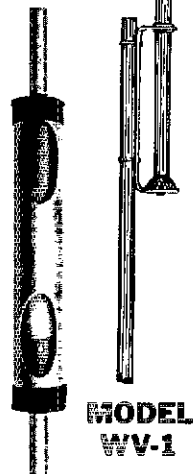


WV-1 WILSON VERTICAL TRAP ANTENNA

No bandswitching necessary with this vertical. An excellent low cost DX antenna with an electrical quarter wavelength on each band and low angle radiation. Advanced design provides low SWR and exceptionally flat response across full width of each band. Featured is the Wilson large diameter High-Q traps which will maintain resonant points with varying temperatures and humidity. Easily assembled, the WV-1 is supplied with base mount bracket to attach to vent pipe or to mast driven in the ground. The new WV-1 Antenna is competitively priced . . . and ships via UPS!

SPECIFICATIONS

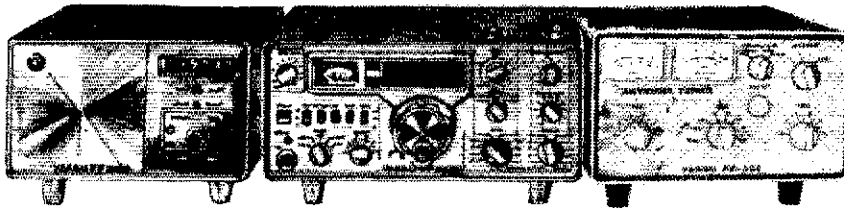
Input Impedance: 50 Ohms • Powerhandling capability: Legal Limit • Two High-Q Traps with large diameter coils • Low Angle Radiation Omnidirectional performance • Taper Swaged Aluminum Tubing • Automatic Bandswitching • Mast Bracket furnished • SWR: 1.5:1 on all Bands • 1½" O.D. Heavy wall aluminum tubing • Does not require guying • Overall length: 19' 3".



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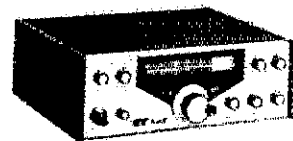
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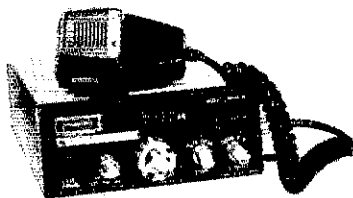
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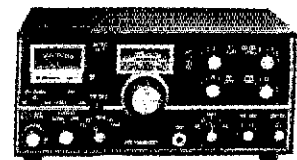
ALDA 103



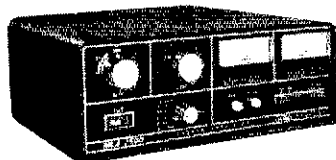
TEN-TEC TRITON IV



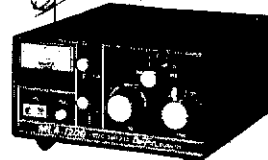
MIDLAND 13-510



SWAN 750 CW



DENTRON MLA-2500



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RADIO FREQUENCY INTERFERENCE...

will get you
if you don't
watch out!

Radio Frequency Interference can ruin your favorite TV show or curtail the enjoyment of operating on 10-meters. It can drive a wedge between neighbors who used to be friends. It can be a headache to the service technician who tried to get rid of it once and for all.

RFI is a thorny problem that comes in many guises. Not only does it have many causes, but it has an ever-increasing number of electronic entertainment devices to prey upon. Twenty million Americans may be its victims.

This book covers what you need to know to combat RFI. If you're an amateur radio operator, you'll learn why RFI exists on certain bands and not on others, and you'll get to know your legal responsibilities under FCC regulations.

If you're a CBER, you'll profit from a knowledge of how RFI is generated and how it can be prevented before it threatens your operating.

If you're an electronics technician, you will learn the root causes of RFI and how each type can be cured with often-simple modifications to the appliance. If you're a TV viewer, you'll discover that your neighbor's radio gear may not be the real cause of all your difficulties.

At times the solution to your RFI problem may be as simple as adjusting the fine tune control of the TV set. Or it may involve a modification to the stereo equipment. But whatever the cause, there is an answer to every type of RFI problem. You'll find it all in the new ARRL publication *Radio Frequency Interference*.

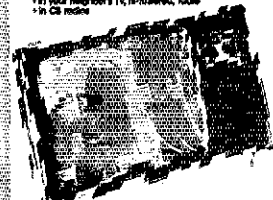
Available soon from your favorite electronics or book store. \$3.00 U.S. and \$3.50 elsewhere.

AMERICAN RADIO RELAY LEAGUE

RADIO FREQUENCY INTERFERENCE

How to identify it and cure it.

- In your ham shack
- In your neighbor's TV, Hi-Fi stereo, radio
- In CB mode



Published by the American Radio Relay League

5200

ENTER THE EXCITING WORLD OF SOLID STATE...

Come on in, we've been expecting you. Here is your new guide book to where the action is.

In the beginning there was solid state — the simple crystal set — made possible by mother nature's galena crystal diode. Today, it's man-made solid-state diodes, transistors and integrated circuits. Yet, with all our technology, these new components are really not much more difficult to understand and use than the crystal set with the cat's whisker.

The new ARRL publication, *Solid-State Basics*, meets the needs of the beginner and the experienced builder. It provides both the *why* and *how* in one easy to understand manual. Chapters include step-by-step instructions for building equipment incorporating the principles discussed.

Let's talk transistors, Basic theory section leads into a practical discussion of circuits. Amplification, biasing and power dissipation are covered.

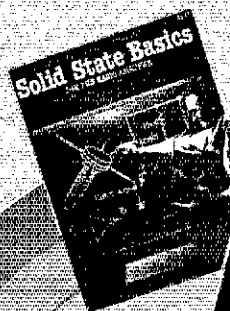
Learning to work with semiconductors gets into the design and construction of a cw/ssb receiver and an 80-meter transmitter. Each part and stage is explained along the way.

Understanding linear ICs covers the ins and outs of integrated circuits, with a 40-dB audio amplifier included as the workshop project.

Learning to work with integrated circuits. A step-by-step guide ending up with a digital voltmeter.

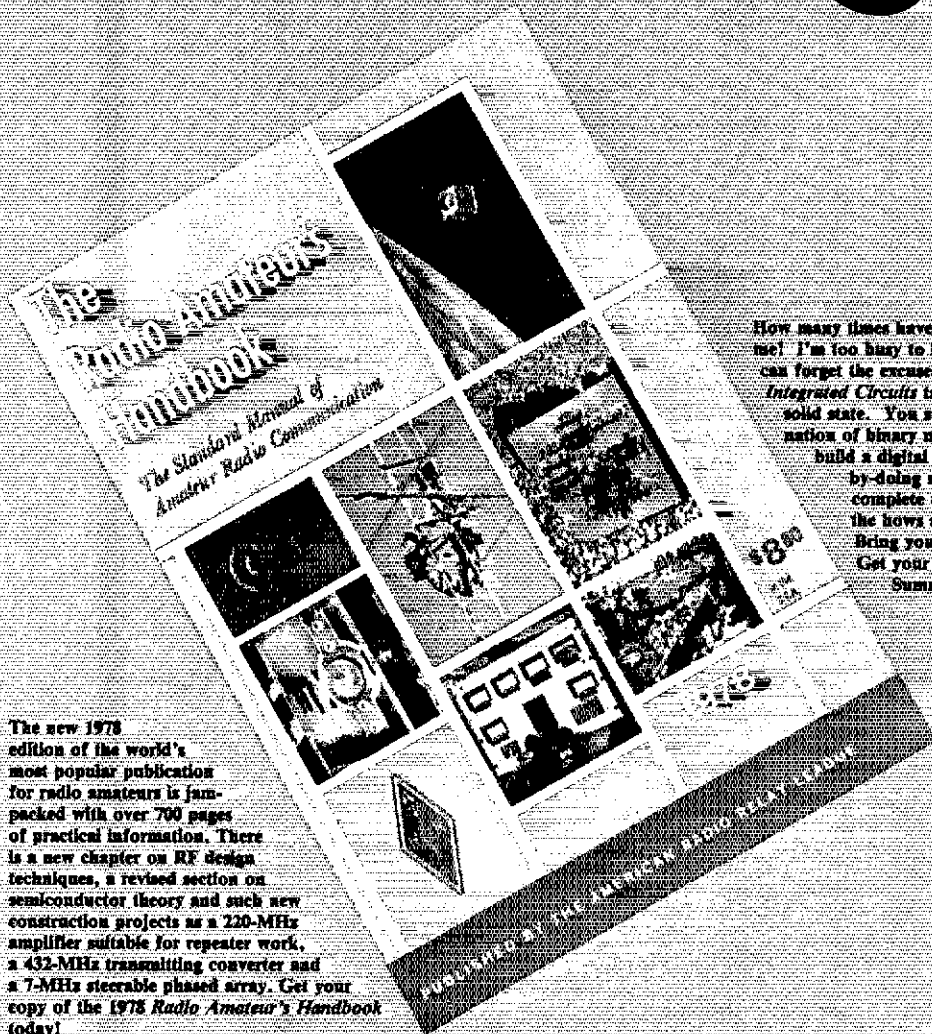
With your copy of *Solid-State Basics* you can step into this exciting world of solid-state electronics with confidence. Coming soon. Pick up your copy at your favorite dealer. Only \$5. in the U.S. and \$5.50 elsewhere.

THE AMERICAN RADIO RELAY LEAGUE



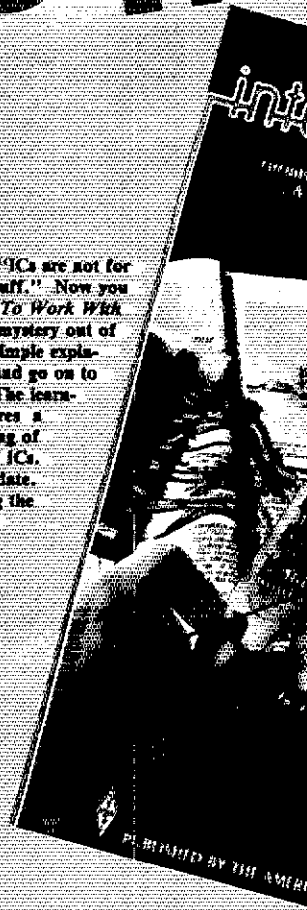


SUMM



The new 1978 edition of the world's most popular publication for radio amateurs is jam-packed with over 700 pages of practical information. There is a new chapter on RF design techniques, a revised section on semiconductor theory and such new construction projects as a 220-MHz amplifier suitable for repeater work, a 432-MHz transmitting converter and a 7-MHz steerable phased array. Get your copy of the 1978 *Radio Amateur's Handbook* today!

How many times have you said, "ICs are not for me! I'm too busy to learn that stuff." Now you can forget the excuses. *Learning To Work With Integrated Circuits* takes all the mystery out of solid state. You start with a simple explanation of binary mathematics and go on to build a digital voltmeter. The learn-by-doing method insures a complete understanding of the hows and whys of ICs. Bring yourself up-to-date. Get your copy during the Summer 76 Sale.



Summer 1¢ SALE!

THE RADIO AMATEUR'S HANDBOOK	\$8.50
LEARNING TO WORK WITH INTEGRATED CIRCUITS	+ 1¢
TOTAL	\$8.51



Ready to tackle those long-delayed projects? You are when you have your own copy of *Learning to Work with Integrated Circuits* and the 1978 *Radio Amateur's Handbook*! Your participating ARRL dealer is featuring the 1978 Handbook for just \$8.50, and during this special sale you can pick up *Learning to Work with Integrated Circuits* for only 1¢ more! Why not complete your library today with these two popular books? This special Summer 1¢ Sale expires July 31, 1978, and is void where prohibited.

Incidentally, don't forget to check out the rest of the ARRL publications your dealer carries. Whether you're into antennas or OSCAR, fm or RTTY, you'll find what you're looking for in a League book.

THE AMERICAN RADIO AMATEUR LEAGUE



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Larsen Antennas



meters in the near future. The Pocatello ARC planning improvements on their repeater. The Eagle Rock ARC have 358 Net Tue. nites on two mics on the WIMU Hamfest will be held Aug. 4th, 5th, and 6th at Macks Inn near Yellowstone National Park. WB7WET new ham Pocatello area. W7GBO active on 3 different nets. W7LLM also active on 3 nets. WA7WXI looking for relief as Net Control, can someone give Joe a hand. The IMN changed net time to summer time of 0300Z. W7FIS keeping busy on MARS net plus ragchewing on other bands. W7FOF and W7ID are DX chasers in southern ID. SEC: W7JMH. PAM: WA7HOS.

Net	Freq.	Time	QNI	QTC	Mgr.
FARM	3935	1410	1032	29	W5GJC
RACES	3930	0200	504	9	WA7WXI
IMN	3835	0300	180	102	W7GHT

Traffic: W7GBO 61, WA7WXI 26, W7LLM 25, W7KDB 23, K7UBC 11, W7ASA 10, W7FIS 1.
MONTANA: SCM, Robert Leo, W7LR — Congrats to WA7JN on working all 3075 USA counties. He is no. 183 worldwide, and this took ten years effort. Havre ARES active. Many new hams in MT, or many who upgraded in recent Helena and Billings FCC exams. WA7PDC QSO 6 Meter DX QRP Aurora CW. W7LR gave talk at GT Falls ARC. WB7PCZ formed MT slow speed net (MSS) 3705 0200Z daily. W7LYR new EC for Hamilton and Havall, contacted 33 hams to organize ARES, and Bitterroot Radio Club. W7DB continues OBS duties. Bozeman area hams helped on local Hike-Bike. IMN QNI 180, QTC 102. MTN QNI 830, QTC 65. Traffic: W7IXD 49, W7DB 4, W7HAH 4, W7LR 4.

OREGON: SCM, Dwight J. Albright, W7HLF — SEC: W7LBH, ARES Jackson Co., 445 QNI, 31 QTC, 12 sess., N7SN, ARES 3993.5, 664 QTC, 127 QTC, 60 sess., WA7RWM, QSN 3585, 285 QNI, 139 QTC, 28 sess., N7NO, WGN, 3702, QNI 450, 120 QTC 30 sess., WA7PJ, BSN 3908, QNI 469, QTC 41, QST 21, 30 sess., WA7GFE, ARES Linn-Benton, QNI 669, QTC 8, QST 38, K7UGF, K7UGF and Linn Benton Co. participated with Benton officials in a search for missing girls. Girls have been missing since Apr. 15. Looks like Lincoln Co may have a new radio club starting out with pres. W7BFX; vp W7ONM; secy. WA7QOM; treas. W7PIO. Rogue Valley Officers are WA7IHU, pres.; K7VM, vp; WA7FAB, secy-treas. (WA7SKM WA7HMP & W7HLF Apr. 4th) a little boy who ran away from a care center for children was found after an intensive search by Ashland police and WA7SKM who kept in touch with police through relay through two meters and phone line. Understand The Happy Flyers ws in Springfield at Briggs Jr. High for a demonstration week of May 8th. The Grande Ronde RC as well as many other clubs are looking fwd to Field Day. We (nets) are looking for tic. to come from AK according DRN7-WA7IHS reporting. If FCC gives you two calls take the best one. Traffic: W7VSE 503, N7NO 234, WA7IHS 190, K7OUP 143, W7DAN 89, WB7AAK 70, WB7DIP 45, WA4HRG/7 37, W7HLF 27, WB7ZAP 23, N7NZ 20, W7LT 12, K7QPW 12.

WASHINGTON: SCM, Bob Klepper, W7IEU — NTN 1409 QNI, 86 QTC; NWSSB 681 QNI, 44 QTC; WSN 314 QNI, 84 QTC. Thanks to all who participated in the largest Diabetes Bikeathon, Special thanks to WA7WJF for liaison between the amateurs and Diabetes Assn. SEC. WA7RWK, for setting up the link throughout the section, and the repeater owners who let us use the repeaters. WB7FGC working on a new antenna system. WB7EBP took part in both the Walkathon and Bikeathon. W7YGU reports a FAX-RHY Net Tue. 8 PM, 50.85 MHz. WB7CFH active in MARS. WA7OMX now K7WF. WN7NXC and others are cooking something up for a year from now. New officers for Mike and Kay ARC are W7JIE, pres.; WA7RJ, vice-pres.; WA7HWX, secy.; WA7EBH, treas.; WB7DTI, activities; K7WIG, WA7EKJ, WA7HOC, trustees. K7TT and repeater committee working hard on BEARS repeater package W7AIB back checking into WSN and RNT. W7LG moved to new location and should be back on regular net skeds soon. K7VSY reported Bike-A-Thon big success in Island Cty. July events are: 7-Land QSO Party 1-2; REBEL campout 8-9; Conconully Hamfest 22-23. LCARA has 61 members and looking for more. New officers of HAMS club are W7TWS, pres.; WB7DCC, vice-pres.; WA7OJI, secy.; WA7HKB, treas.; W7ZEV WA7VCC, W7IEU, board. Spokane Dial Twisters report JA3CZY helped K7AOZ and K7KY establish contact, V8KY's former Spokane resident. West Seattle ARC pres. WA7RLY looking for help in getting the club bulletin printed. New officers of Clark Cty ARC are WB7ESV, pres.; WB7NYN, vice-pres.; WA7YEC secy.; W7ZDR, treas. WA7KGT looking for help in forming group of ARES operators to assist local S&F. I can't make all your club meetings but will be attending all hamfests this year, hope to see you there. North Seattle ARC holds get-together dinners on the first Tue. of the month contact WB7FAH for details and location. Radio Club of Tacoma has outgrown their clubhouse and are meeting at Tensile Library in Lakewood, all other activities will be held at the clubhouse. Traffic: (Apr.) W7DZX 654, K7CTP 158, K7GXZ 142, N7AJ 85, N7AJ 73, WA7BDD 40, W7IEU 39, W7EBU 35, WA7LOV 32, W7APS 27, WA7OJI 24, WB7CFH 22, W7LUP 19, W7ZEV 13, WB7EBP 11, WA7KGT 8, W7YH 7, W7XF 7, K7VSY 3, W7AXT 1. (Mar.) N7CT 13.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W6RGG — SEC: K6UWR. Welcome back Chuck, and my thanks to outgoing SEC W6IIF, for his service. PSRR for Apr. N6CY W6OA W6JX-K. N6N/VHF moves with WR6ADC to 144.81/145.41 May 15. Many section members attended the Visalia DX Bash which started W7Y, as one of the participants. K6AK getting started on his tower. K6ARE was on in the recon CW CD Party passing out OO reports! Our Section still leads the NCN activity Honor Roll with these 17 stars: N6CY, WD6CMU, WD6FGA, N6IG, W6JXK, WA6JJC, WA6LUZ, WA6NTI, W6OA, K6OE, K6PMG, WA6SKC, WB6LUZ, WB6VEW, W6VOM, WB6YUO, WB6MSU. NCCC is putting WR6ADM on 147.84/147.24, vacated by WR6ADC, with priority use to Alameda Co. RACES. SBARA member WD6AHZ recently moved up to Advanced. NBARA members taking a Sun. drive to Occidental for dinner. LCARA has stations set up on campus and an open house during Open Day and Engineer's Week. Their members WA6WVN and WD6ELW upgraded to Extra and Tech., respectively. MDARC lost member WA6SZA to the Silent Key column. Traffic: (Apr.) K6HW 389, W6OA 263, W6JXK 171, N6CY 150, N6IG 8, K6PMG 3. (Mar.) N6IG 13, WB6WBG 4.

NEVADA: SCM, Leonard M. Norman, W7PBV — SEC: K7ZAU. Pacific Division Convention in Reno, Aug. 12-13 at Holiday Inn. QSL to NARA, POB 2534, Reno, NV 89505 for registration. W7FJN won a trip to OZ and UA3-Land.

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5-17-78

(1) This list was prepared from an inventory taken on the date shown above. The quantities vary. In some cases there are several of one item, others, maybe only one. Due to the lead and distribution time of this publication some of the items may have already been sold by the time you see this ad. On the other hand, due to the number of trades we are involved in each day, some items are in stock that are not listed. When ordering state more than one choice, if possible. (2) AES reserves the right to sell power supplies and accessories only with matching transmitters or receivers, depending on our stock situation. (3) To insure quality, our used gear is serviced and made ready for shipment after we receive your order. Please allow 5 to 10 working days delay in shipping your order. (4) No trades on used gear.

AMPLIDYNE		GALAXY/GLOBE/WRL		NYE	
621 VHF transmitter	\$ 79	Galaxy V Xcvr	\$189	250-30 Kw tuner/SWR	\$199
ATLAS		Galaxy V Mk II Xcvr	229	PEARCE SIMPSON	
180 Xcvr	\$369	Galaxy V Mk III Xcvr	259	Gladding 25 2m Xcvr	\$ 69
AR-117 AC supply	99	GT-550 Xcvr	279	REGENCY	
215X/NB Xcvr	499	GT-550A Xcvr	299	HR-212 2m FM Xcvr	\$129
DD-68/C Digital dial	159	AC-35 AC supply	65	HR-2S 2m FM ac xcvr	149
MT-1 Matching Xlfr	19	DC-35 DC supply	65	HR-2MS 2m FM Xcvr	159
B & W		AC-400 AC supply	75	ROBOT	
361 Codax keyer	\$ 39	G-1000 DC supply	89	10X Xtal oscillator	55 50
BRIMSTONE		SC-35 Speaker	12	DD-6 Digital dial	199 99
144 2m FM Xcvr	\$279	SC-550A Speaker	15	DD-6B Digital dial	229 169
CLEGG/SQUIRES-SANDERS		GONSET		BIRD	
22'er 2m AM Xcvr	\$ 59	GC-105 2m AM Xcvr	\$ 69	4350 2kw Ham-Mate	\$ 94 59
9'er 6m AM Xcvr	69	G-50 6m AM Xcvr	99	4351 1kw Ham-Mate	94 59
Thor 6 6m Xmtr (RF)	39	910A 6m SSB Xcvr	179	4352 VHF Ham-Mate	94 59
417 AC supply/mod	39	911A AC supply	39	BRIMSTONE	
418 DC supply/mod	35	HALLICRAFTERS		144 2m FM Xcvr DEMO	\$650 350
Zeus VHF Xmtr	175	SK-111 Xcvr	\$139	CDE	
Interceptor VHF Rcvr	129	SR-160 80-20m Xcvr	169	HAM-II Rotor	\$164 119
Interceptor B Rcvr	175	PS-150-12 DC ps	49	TX Tailwister rotor	299 239
SS Booster	39	MR-150 Rack mt	15	QT-1 3A 12vdc supply	49 25
22'er FM 2m FM Xcvr	169	SR-400 Xcvr	395	CES	
FM-27B 2m FM Xcvr	179	SR-400 Cyclone II	475	100 Digital display	\$299 149
031 AC supply	49	SR-400 Cyclone III	649	200W Touch tone pad	59 39
COLLINS		P-500AC AC ps	75	COMCRAFT	
75S-1 Ham Rcvr	\$299	SR-46 6m AM Xcvr	49	CST-60 VHF Xcvr	\$869 599
75S-3 Ham Rcvr	485	HA-1 Keyer	59	CPS-6 AC supply, 6A	139 89
75S-3B Ham Rcvr	795	HAMMARLUND		COMDEL	
75S-3C Rcvr (round)	995	HQ-110 Ham Rcvr	\$109	DW-1550 Wattmeter	\$ 94 35
75S-3C Rcvr (round)	1295	HQ-180 SW Rcvr	249	DENTRON	
32S-3 Transmitter	785	S-200 Speaker	15	160-10M Monitor tuner	\$299 239
32S-3 Xmtr (round)	995	HX-50A Transmitter	229	80-10AT Wire tuner DEMO	59 55
30L-1 Linear	495	HEATHKIT		Trumenna 20 20m beam	129 99
KWM-2 Xcvr	585	HR-10B Ham Rcvr	\$ 69	4V 40-10m vertical	84 69
KWM-2/Waters rej ing	619	SB-301 Ham Rcvr	229	DRAKE	
KWM-2/Blanker	695	DX-40 Transmitter	399	TR-4CW Xcvr w/RIT	\$799 639
KWM-2 Xcvr (round)	1195	DX-60B Transmitter	69	RV-4C Remote VFO/spkr	170 149
KWM-2A Xcvr	1295	HP-10 DC supply	24	R-4C Receiver	699 549
KWM-2A Xcvr (round)	1295	VHF-16 Xcvr	99	T-4XC Transmitter	699 549
3510-2 KWM-2 mount	69	HV-1 6-2m Xmtr	79	AC-4 AC supply	150 119
516F-2 AC supply	149	HWA-7-1 AC supply	9	MS-4 Speaker	33 27
516F-1 KWM-1 DC PS	75	SB-100 Xcvr	299	FS-4 Synthesizer	300 269
MP-1 DC supply	119	SB-102 Xcvr	369	70Q Speaker/Q-mult	49 45
PM-2 Port AC PS	95	SB-110A 6m Xcvr	295	20VS Desk microphone	39 35
COMCRAFT		HP-13 DC supply	45	7072 Hand microphone	19 17
CPS-6 AC supply	\$ 69	HP-13B DC supply	54	DSR-2 Receiver DEMO	3200 2495
COMTECH		SB-104 Xcvr	575	WV-4 VHF wattmeter	89 75
Magnum 6 For Heath	\$ 69	HP-114A AC/spkr	15	AA-10 10w 2m FM amp	49 45
DRAKE		SB-604 Speaker	89	AC-10 12vdc supply	49 45
2NT Transmitter	\$ 99	SB-230 Linear	349	AN-5 Shortwave ant	8 5
R-4A Ham Rcvr	289	HWA-17-1 DC supply	19	DIY-COMM	
R-4C Ham Rcvr	449	ITC		P-1416 12v 15A supply	\$ 90 45
MS-4 Speaker	19	Multi-2000 2m Xcvr	\$299	GALAXY	
SSR-1 SW Rcvr	249	ICOM		Z2M Mobile floor mount	\$ 6 2
SW-4 SWL Rcvr	199	IC-21A 2m FM Xcvr	\$249	R-1530 General cov Rcvr	1550 995
SCC-4 Xtal cal	199	DV-21 Digital VFO	149	SC-1530 Speaker	60 39
ICR-1 SW Rcvr	1195	IC-22A 2m FM Xcvr	189	FL-5306 6 KHz filter	80 60
ICR-2 2m xmit conv	275	IC-230 2m synth Xcvr	229	RPA-1530 Rack adaptor	170 50
MMK-3 Mobile mt	6	IC-245 2m synth Xcvr	349	GENTEC	
TR-4 Xcvr	389	IC-215 2m FM Xcvr	159	PM50U 500w dummy load	\$ 48 24
TR-4C Xcvr	449	IC-502 6m SSB Xcvr	169	HY-GAIN	
RV-4C Remote VFO	89	KLM		3750 160-10m Xcvr	1895 1495
TR-6/NB 6m Xcvr	589	Multi-11 2m FM Xcvr	\$189	3855 Remote VFO	495 399
T-4X Transmitter	339	Echo II 2m SSB Xcvr	199	ITC	
T-4XC Transmitter	475	PA-2-12B 2m FM amp	39	Multi-2000 2m Xcvr	\$695 399
AC-3 AC supply	65	KENWOOD		ICOM	
AC-4 AC supply	85	R-999D Ham Rcvr	\$375	IC-230 Synthesized 2m FM	\$489 289
9C-3 DC supply	65	T-599D Transmitter	375	IC-21 VFO Receive VFO	119 69
9C-4 DC supply	85	TR-200A 2m FM Xcvr	149	IC-22S 2m FM Xcvr	299 239
VV-4 VHF wattmeter	59	LAFAYETTE		IC-21A 2m FM Xcvr	399 299
ML-2 2m FM Xcvr	119	HA-350 Rcvr	\$ 75	DV-21 Digital VFO	299 249
TR-22 2m FM Xcvr	129	MIDLAND		IC-245 (early) 2m Xcvr	499 399
TR-33C 2m FM Xcvr	169	L3-50S 2m FM Xcvr	\$169	KLM	
AA-22 2m amp/preamp	199	MOSLEY		Force 5 Xcvr DEMO	1095 799
IR-72 2m FM Xcvr	949	CM-1 Ham Rcvr	\$ 99	FSPS AC ps/spkr DEMO	249 199
DYCOMM		MOTOROLA		Multi-2700 2m Xcvr	756 599
500D 2m FM amp	\$ 49	Metrum II 25w 2m	\$199	Multi-2000 2m Xcvr	679 549
GLB		NATIONAL		Multi-11 2m FM Xcvr	325 225
400B Channelizer	\$ 89	NC-270 Rcvr	\$119	Multi-U11 450 FM Xcvr	379 299

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350-XL/DD6-XL Xcvr	1424 1149	PA2-70BC 220 2/70w FM	169 149
350-PS AC supply	229 199	PA10-35C 450 10/35w FM	119 109
206 Remote VFO	299 269	KENWOOD	
10X Xtal oscillator	55 50	TS-820 Xcvr	\$919 799
DD-6 Digital dial	199 99	TS-520S Xcvr	739 659
DD-6B Digital dial	229 169	TS-700S 2m Xcvr	729 649
BIRD		TR-200A 2m FM Xcvr	349 199
4350 2kw Ham-Mate	\$ 94 59	TR-7500 2m synth Xcvr	299 249
4351 1kw Ham-Mate	94 59	MIDLAND	
4352 VHF Ham-Mate	94 59	L3-50S 2m FM Xcvr	\$229 179
BRIMSTONE		MOTOROLA	
144 2m FM Xcvr DEMO	\$650 350	T-1670A AC supply	\$150 99
CDE		REGENCY	
HAM-II Rotor	\$164 119	HR-212 2m FM Xcvr DEMO	\$259 159
TX Tailwister rotor	299 239	ACT-W-10 Whamo scanner	329 149
QT-1 3A 12vdc supply	49 25	DFS-5K Dig freq selector	199 99
CES		HR-6 6m FM Xcvr	239 149
100 Digital display	\$299 149	HR-2B 2m FM Xcvr	229 139
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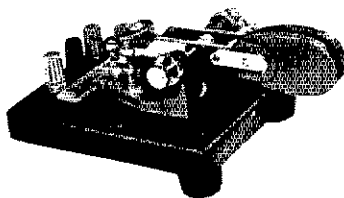
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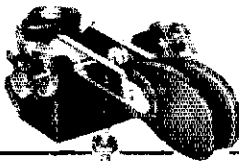
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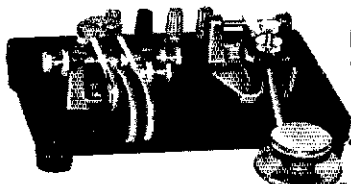
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W7RB is in charge of communications for the High School Junior Olympics. K7RBM is manager of Las Vegas communications store. Welcome home for K3L and K7VNI and K7ZAU vacationing in AZ. WB7DTZ Silent Key. W7QO had another large class of Novices to pass their tests. W7PRM is vacationing in TX. Las Vegas 28/88 back on the air. N7SD is custodian of the Nevada triple 7 certificates. K7ZOK is chapter chairman of the Nevada 10-10 chapter. Traffic: W7LX 121.

PACIFIC: SCM, George Morton; N7HR/KH6 — KH6JIB's Kalawao CTY DXpedition super success! OPSs: KH6s JFY JPL JKN CHL AAI & JFS. KH6DD hosted HB9RS, pres. U.N. ARC on Isle stopover. KH6HAB "social dir" skeds brunches for visitors/locals, QSX 28/88. KH6HP cont's EME work. ARRL VP Carl Smith spoke to HARC on latest at ARRL & FCC. KH6IJ arranged 7,11R Oking-Torishima DX film for HARC. KH6IMK & GM KH6EK plan fly-in to PACDIV conv. Isle UH Fars. KH6s FMT JHR IHP wlk intr-isle w/only 10w! KH6IAA, wkcd 8-Land on 6mtrs! KH6BZF beacons 144/220/432 for Tropo bks. Lee also has ARRL films for PR. Kudos: New Xtra KH6JDF waits NSLC. KH6JVA waits AH6; new Tech. KH6JMS. KH6JKP has new IC211. Traffic: KH6HIJ 51, KH6ST 37, KH6BZF 6, Aloha!

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — The Foothill ARC of Marysville/Yuba City recently elected K6HVM as pres.; WB6GFJ, vp; K6DEO, secy-treas. New officers for the J. I. Sablin Pioneer RC are WB6DQP, pres.; WA6NSI, vice-pres.; WA6NIV, secy.; WA6TZP, treas.; W6BZV and W6TEE, dir. WB6GFJ now an OBS. N6DM has completed a new 20 meter amp. Recent upgrades include WB6GAR with his Extra, WB6FXC and WB6CZC with Advanced and WB6TA holding the General. The pres. of the El Dorado Co. RC is now N6VT. N6JV has a quarter wave stoper on 160 meters. K6SG has a 3DS1 addition to the contest station. N6JV and YF added an 8 pound 10 oz water cooled Amp to theirs. WB6HBI's article on cardiopulmonary resuscitation appeared in May QST. Traffic: W6RSP 87, W6DEF 14, WB6GFJ 12.

SAN FRANCISCO: SCM, Mark L. Nelson, AA6DX — Late report for Mar. & Feb. Approx. 50 exams were administered by the FCC Mar. 7 in Arcata-many more than the examiner expected! HARC sponsored up-grade classes, headed by W6KOZ, and many North Coast hams are sporting interim calls! NCDXC is now a member of CQRC. AA6DX will return to air with new quad and replacement win — darn well! NARC is requesting amateurs get sanctions for repeaters, even the FCC has eliminated special rpt licenses. NCCC will operate Armed Forces Day from Skaggs island, WB6DSV is new Chairman of Cal QSO Party. Thank to N6VV for last year's fine job with COP. North Coast travelers; FWRA repeaters are 34/94, Mt. Pratt; 16/76, Mt. Pierce; 28/88, Horse Mtn; 22/82, Crescent City, and all inter-tied! Ker-Chunk! FYI-FCC, Livermore's No. 1 is 447-3614. Traffic: (Mar.) W6RNL 242, W6NL 200, W6IPL 173, K6PB 146, W6GGR 6, (Feb.) W6NL 266, W6HNL 200, K6PB 104, W6GUPV 20, W6GGR 8, W1ARRF 6.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — SEC: WA6YAB. All ECs please send their monthly reports to WA6YAB. Officers of the San Joaquin Net are: W6LNL, Mgr.; W6CJJA, secy.; WA6VIS, asst. secy. The net meets at 8PM local time on or near 3.918 MHz Mon. thru Sat. K6YK reports 6-meter openings during Apr. WB6VJW made PSHR for Mar. W6XK and WB6OZF have FT901DMs. WB6ZDN and WD6AJB are Generals. WD6DWO a Tech. WB6SON has a new tower. WB6TQH getting a quad. WB6OWI has a MLA-2500 amplifier and tribander. W6PSC now KH6JVJ. SJV amateurs were in good attendance at the DX convention in Visalia. WB6PEL has a TR7400A. WA6YAB made WAS. WA6IQZ thanks K6EKH for repairing his amplifier. WA6UOR operated as G5CHK from the tower of London. WB6RFI and K6PFI have new amplifiers. K6YK and K6YKQ have new 6-meter gear. Plan now to be active in the CA QSO Party Oct. 7-8, 1978. You may become a county record holder as are N6UR WA6IQZ W6DPD WA6KMW K6OZL K6AYA and N6EL. Hope to see many of you at the Pacific Division Convention in Reno on Aug. 12-13, 1978. Traffic: (Apr.) W6DPD 28, WA6GJV 11, WA6IQZ 11. (Mar.) WB6VJW 80, WA6RXI 6, (Feb.) WA6RXI 12.

SANTA CLARA VALLEY: SCM, Jim Maxwell, W6CF — Congrats to WB6SHD, who made BPL, PSHR, and passed his General Class exam all in one month! W6RFF also made PSHR. SCVers on the NCN Honor Roll for Apr. are: WB6AYJ, W6GJZ, WA6JWK, W6KZJ, W6RFF, WB6SHD, WB6VGV and K6YKG (whew!) The Fresno (in Visalia) DX Convention was a rousing and roaring success, reports NCDXC pres. N6GG, with over 350 registered. The new pres. of the Norcal Chapter of CQWA is K6DZU, sez W6AUC. Their annual picnic is scheduled for Aug. 27 at Petaluma. SEC WB6IZF is gearing up for 432, one more step toward his goal of being QRV from DC to light. IZF also urges all hands to check into the SCV EC net every Wed. at 1900 local time on WH6AZO (31/91). Congrats to WA6HAD, who managed to QSO all JA call areas. The Lockheed Club (WA6GFY) is eyeing an OSCAR capability. W6OII is coordinating the effort. This is my last report as your SCM; next month's edition will be penned by your new SCM Jettie Hill, W6RFF, whose QTH will be found on p. 8 of this QST. Jettie is one of the staunchest supporters of public service activities in SCV, as his years of activity as NCN manager attest. But he also brings to the SCM post dedication and broad experience across the whole of ham radio — VHF, DX, construction, contests, for example, and is active both in phone and cw. My thanks to all SCVers for the help you've given me over the past few years — give Jettie the same quality of support and he will do a really bang-up job for you. 73! Traffic: (Apr.) W6RFF 29, W6VGV 29, W6RFF 94, W6AUC 58, WB6IZF 30, W6KZJ 18, WA6HAD 15, W6OII 10, N6VB 5, (Mar.) W6AUC 84, W6KZJ 35, W6OII 15, WA6HAD 13.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, K4GHR — SEC: W4EHF. PAM: W4OFO. RM: K4MC. Forayth ARC demonstrated Amateur Radio at a Science Fair in Winston-Salem with over 7000 persons visiting the demonstration. WCARS (Asheville) making plans to work with the National Weather Svc in a "Weather Watch" program. K4TTN reports over 40 have passed the Novice Code test and are now awaiting the written exam. Remember the Carryover test report as your communications 78 in Greensboro July 29-30. The NC EC Net has switched times — now the 1st and 3rd Sat at 0830 local at 3920. N4AA reports going up with a 100-ft. tower and plans to keep active in all the CD Parties & DX Contests. W4EHF reports having his 2-meter rig stolen.

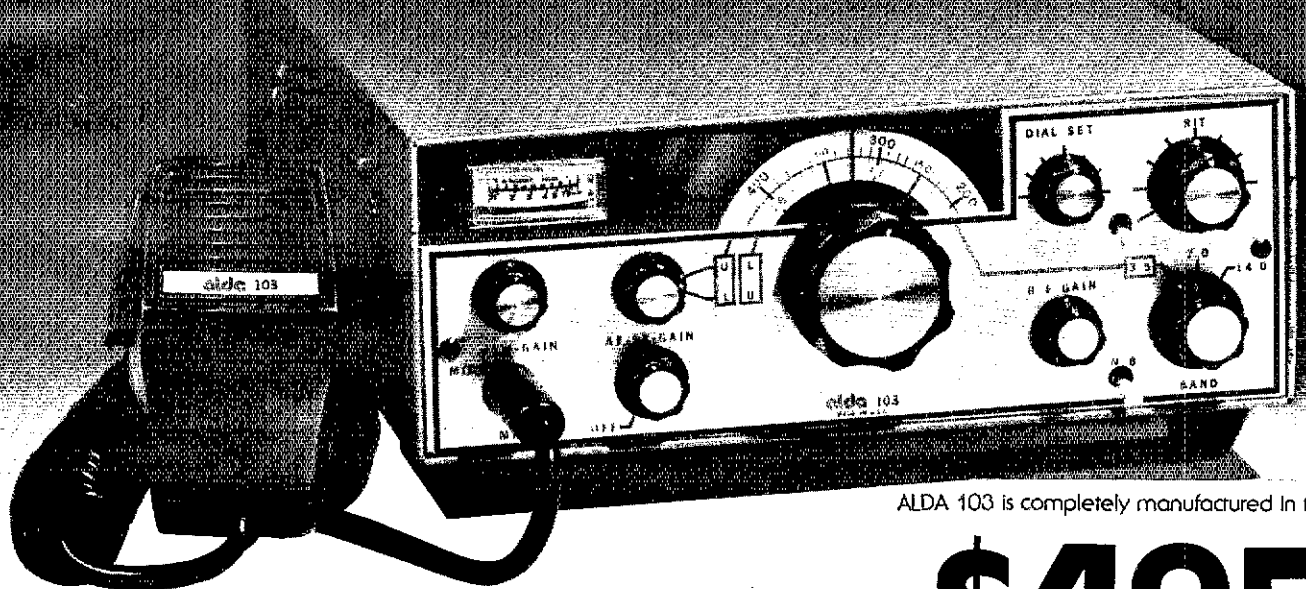
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RF Input Power: SSB — 250 watts PEP nominal
CW — 250 watts DC maximum (adjustable)
Transmitter:
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Carrier Suppression: Better than -45 dB
Side-Band Suppression: Better than -65 dB at 1000 Hz

Distortion Products: Better than -25 dB
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Signal-to-Noise Ratio: Better than 10 dB S+N/N for 0.5 μ V input
Image Ratio: Better than -60 dB (typical with respect to 0.5 μ V input: 80 meters — -130 dB; 40 meters — -100 dB; 20 meters — -75 dB).
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20108 9 ft 14 ft	OSCAR 144-148 432-436	5.5	11

W4OCZ, EC Rowan, ran two storm watch sessions this month. AA4NC says we now have another 10-X Chapter active in NC — the Possum Trotters (Fayetteville) meet at 28.845 Sun. 2300Z. Congrats to WB4OXT now Extra 4 & WB4BQC. Appointees: New ARRL appointees this month include WD4HCY (OES), WA4LLP (EC Yancey), K4VHT & WD4FJ (OES) & WD4CCO (OES). Interested in repeaters? Join the CVRA, write W4ZJ for info. New net Mgr. for the GNCNT (13/73 daily 0200Z) is K4VHT who reports QNI 1131, QTC 50 for Apr. WA4UWK reports NCSSBN (3938 daily at 2330Z) QNI 1741, QTC 30. Congrats to W4ACY now an Honorary Life Member of the Raleigh ARS. Traffic: AA4NC 135, WB4MXG 130, K4FTB 126, W4OPO 92, N4UE 85, N4ZH 84, W4PMN 78, W4EAT 61, K4MC 59, K4VHT 53, WB4RGD 48, WD4JFM 38, WA4SRD 32, N4XB 32, WB4RGS 27, W4ACY 24, K4GHR 22, WB4WJ 20, WB4OXT 15, N4AA 14, WD4CNS 13, K4A 12, WD4DKF 12, WB4CYN 10, W4EHF 7, K4TTN 4, WD4CNQ 2.

SOUTH CAROLINA: SCM, Tom Lufkin, WA4DAX — Asst. SCM: WA4MDP. SEC: WB4TNS. Chief PAM: W4MTK. PAM: WA4DZG. Radio Club Convention at Charlotte was enjoyed by all. Many amateurs report upgrading with over 700 taking the exam. WD4JGV son of WA4SJS has recently upgraded to Tech. N4EE attended the Antique Wireless Regional meeting in CA. The Anderson Club reports extra sessions of 2mtr net due to severe wx watches. N4JX teaching Novice class. Spartanburg ARC has hidden xmitter hunt with five teams participating. K4XP and K4NJS were winners. WB4NBK reports he is operational again on 2 and 6 mtrs. Sumter ARA planning new repeater on 147.615/015. Chesterfield Club plans new machine on 147.630/3 soon. Don't forget Shelby Sept. 3rd and Rock Hill Oct. 1st. Net reports: QNI 1178, QNI 117, Anderson 2mtr Net: QNI 589, QTC 38. Traffic: N4PO 521, W4NTO 122, W4FV 59, W4MTK 46, WB4UDK 38, K4FRX 32, WB8TCT 8, N4EE 6.

VIRGINIA: SCM, Richard L. Gantler, K4BKX — Asst. SCM: W4YE. SEC: WB4ZNB. Virginia section-level NTS nets and managers:

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 VSBN 3947/alt. 7260 kHz 8/10:15 PM WB4DOZ
 VSN 3680 kHz 5:30 PM WA4YIU
 VN 3680 kHz 7/10 PM K8LGA/4

N4RF WA4FTJ WB4OBZ many others provided comm. for flood-stricken Tidewater. Portsmouth ARC campaigning hard for public service supporters. Alexandria ARS to conduct test for city in May. WA4JLJ-EC Lexington also to conduct drill. W4NK busy giving ARS tabs to clubs. WA4YIU planning NTS picnic in Crews, July 9th, visitors welcome. New Public Service Comm. manual now available from Hq. and is superb; a must for all. Explains NTS better than ever. New VNTN under mgr. W4SUS putting VA NTS into the daytime and "system" into National Traffic System. BRAVO! Roanoke Valley ARC worked hard on Walkathon. Tic. stalwart, WB4DBK, inducted into Phi Theta Kappa. WA4STO busy teaching Novices & preaching public service. W4FJ, OVS and Army MARS sgr. held 20th annual Marchfest in Richmond, Apr. 2nd. Century Club sends Mailish Reef brochure, V4K9MR, to members on 10 days Aug. or Sept. Cocoa-Viking maybe June as V4K9YS. K4LEF worked 8RIR. W4NWM has tower half up. W4OOL helping with early history of Shenandoah Valley ARC. K4SPS, EC Franklin, working on 300 + ft. repeater ant. Interested in awards? Catch W4JUU on VN. He just rec'd Minn. Twins Award; has earned many more. QO reports rec'd from W4HU WB4KCL K4ZVS. Your SCM visited clubs in Lynchburg, VA, Beach, and Alexandria; more planned. New appts: WD4DOP/EC, N4IF/EC, N4NK/EC, WA4VJ/EC, W4VRY/4/O/O/PS, K4LEF/O/PS, W4AL/J/O/PS, W4WQ/O/V/W/PS 1st OES! Upgrades: WA4TUG to Extra, WD4OVR to General. Do you get the Virginia Ham, our section newspaper? Contact WB2VYK/4, editor, 419 Norwood Dr., Colonial Hgts. 23834. Apr. was a month of solar flares but traffic handling continued with FB totals. BPL: K4DJ K4KA. Traffic: (Apr.) WB4PNY 326, K4KDJ 320, K4KNP 298, K4KA 236, K4BKX 225, N4NK 195, WB4FLT 183, W4UQ 176, N4RF 172, K4GR 131, W4JK 119, WB4DBK 111, W4LXB 103, WB4DQZ 98, K8LGA/4 96, WA4STO 94, AA4CK 91, N4LE 89, WA4YIU 73, WA4QWC 66, W4SHJ 66, K4JMN 63, WD4DS 57, K4EJ 57, W4SUS 55, W4WJ 54, W4KJ 45, WA4LJ 44, W4NWM 43, WB4ZNB 43, WA4FBG 41, WA4FDV 35, WD4CYX 34, N4FP 33, K4VWK 31, WD4IQF 30, K4LEF 30, W4YVG 25, WD4OVR 21, AA4T 19, W4OKN 19, W4OOL 19, WA4YJF 17, WB4FNW 10, W4KXE 9, N4UY 8, N4OT 7, WD4KUK 6, W4WWO 5, WB4FDT 4, W4JUU 3, WA4EQW 2, WA4NYZ 2. (Mar.) WB4BYC 16, W4TZC 11, W4TMN 3.

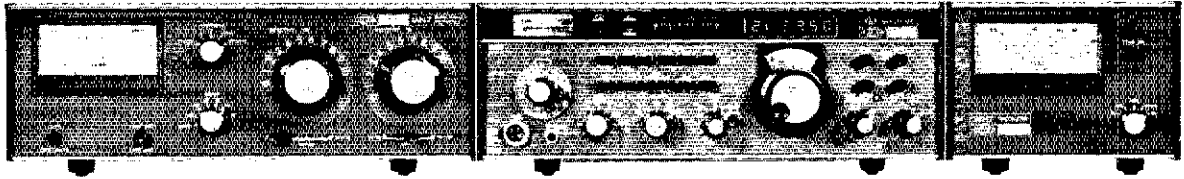
WEST VIRGINIA: SCM, Donald B. Morris, WB8JM — K8KT of Charleston has been appointed Asst. SCM of WVA. Karl is quite active and pres. of the State Radio Council. WB8JH moving to Va and WB8WVP becomes acting WVN-CW Net Mgr. W8LZI received Extra and is now N8JC. W8KVI reports all news items relative Amateur Radio. Good PR work. 20th Annual ARRL State Convention, July at Jackson's Mill. Perry Williams and Stu Leland representing the League.

Net	Freq.	TimeZ	Ch-In	Tic	Sess.
Novice	3730	2215 Dy	179	77	30
Phone	3990	1700 Dy	349	48	27
Phone	3990	2300 Dy	978	161	29
CW-WVN	3567	0000 Dy	161	54	31

WB8VAZ received WACWV certificate No. 85. Traffic: WB8TJN 88, K8KT 47, WB8VAZ 35, N8JC 34, WB8EGV 30, WB8ZA 22, WB8JW 20, K8ZDY 15, WB8JYM 14, WB8CX 12, WB8JYN 12, WB8LFW 9, K8MS 8, WB8VPV 8, K8E 7, K8JQ 7, WB8JL 7, WB8YTP 7, WB8UL 6, K8MZM 6, K8YL 6, WB8YMU 6, WB8CDQ 3, WB8LDY 3, K8QEW 3, K8TCM 3.

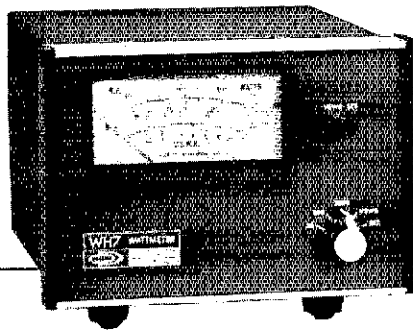
ROCKY MOUNTAIN

COLORADO: SCM, Clyde O. Penney, WA8HLO — SEC: K8FLO. RM: K8TER. PAMs: K8CNU WB8ZQG. E-WB8OPQ has received his new call, K8CI. WB8MTA handled 57 message originations from St. Thomas Moore Hospital & Progressive Care Center in Apr. W5HRS/0 has elected to drop his WB8PVT call. Welcome back to K8PVI who just returned from 5-Land after 4 months there. W8DSW is enjoying his newly acquired SX-117. Congratulations to W8CP who just became a Life Member of ARRL. Net Tic. for Apr.: 55N QNI 120, QTC 50, Informa 35, QN 54, Hi-Ngon QNI 1106, QTC 43, Informa 168, 28 sessions, QNF 1322. Late Net Tic. for Mar.: CWN QNI 270, QTC 204, QNF 847. Traffic: (Apr.) W8VYX 2468, K8DJ 260 (March 387), K8CI 237, WB8MTA 234, WB8MCL 174, WB8ZQG 169, K8JAN 144, W5HRS/0 101, W8RE 70, K8PVI 68, W8LAE 61, W8VYNP 54, W8LQ 47, W8CHX 35, K8RTC 27, W8YKX



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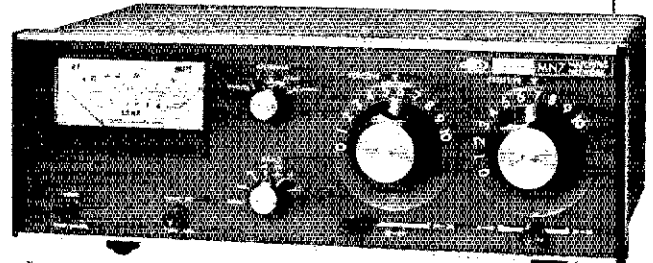


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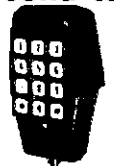
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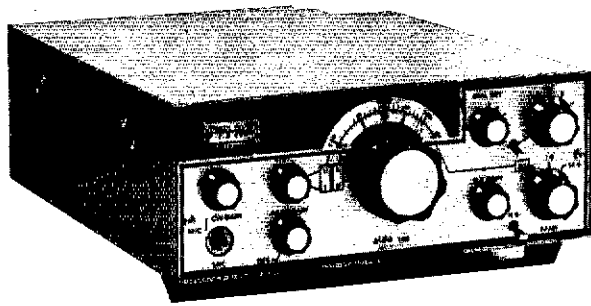
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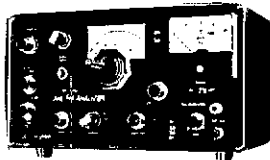
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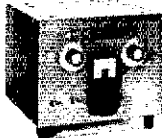
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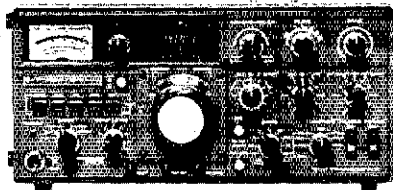
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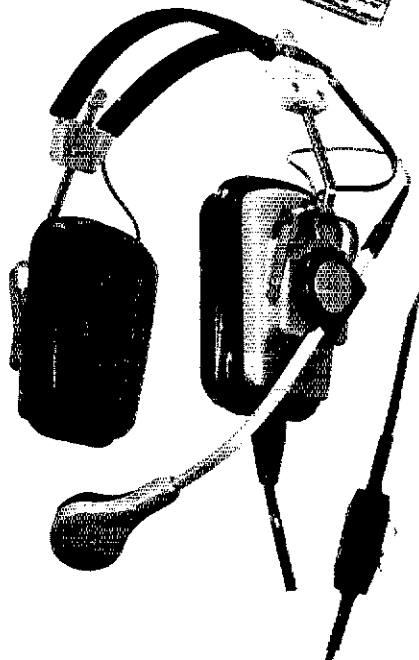
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20. W6GO 11, W6MYB 10, N0TU 10, WA9YED 9, W6GW 6, W6NFW 5, W60HZL 4. (Mar.) WA6CNA 142, W6MCL 141, W6LO 90, WA6YNP 74, W6RE 70, K6RTO 23, W6BBL 4. (Feb.) W6LQ 83, W6BBL 29.

NEW MEXICO: SCM, Joe T. Knight, W5PDY — SEC: W5ALR. PAM: K5IKL. RM: K5KPS. Southwest Net (SWN) meets daily on 3505 kHz, at 1915 local time and handled 214 msgs with 23 stations reporting. New Mexico Roadrunner Net (NMRRN) meets daily on 3540 kHz at 1800 local and handled 72 msgs with 960 stations reporting in. New Mexico Breakfast Club meets daily on 3940 kHz at 0700 local, handled 83 msgs with 620 check-ins. Congrats to Mesilla Valley ARC for a record crowd at the "Bean Feed." Good to see K5EQC, originator of the "Bean Feed" and all the wonderful people who made this gathering a success. W5K5J and his hard workers did FB job on New Mexico Ham Directory W5DAD K5C-QQ W5SROP and WA5WVY on Sick List. Traffic: W5UH 273, W5JOV 199, K5KPS 185, W5KH 157, W5SAHH 100, N5SJ 87, K5MAT 61, W5ASH 12, WA5MIY 10, K5XY 7.

UTAH: SCM, Carl R. Ruthstrom, W7GPN — K7UT active on OSCAR 7 B mode. K7MG building large quad array for 2 meters. K7MFB reports state ECWIA reports station. UARC ladies auxiliary sponsored Easter egg hunt. The Dixie ARC new club in southwest UT. W7YAI, pres.; W7ZC, vice-pres. The Salt Lake Co. ARES group furnished communications for March of Dimes Super rally. It was covered via 2 meter repeaters W7R7AC and W7RAKO along with WA7ZBO K7CVB WA7ARK WB7EYE WB7PLY and WB7YCI. WA7VYJ upgraded to Extra. He, WA7SVN and WA2CHH have new 2 meter transceivers. W7OCX hopes to have better antenna soon and W7BE is working the rare ones with TS2D. Traffic: K7HLR 124, WA7MEL 56, WA7JRC 55, W7UTM 17, W7OCX 11, W7FYR 6.

WYOMING: SCM, Chester C. Stanway, W7SDA — New Novices: WB7VTC Torrington, father of K7TWK. W7VFR Laramie, 81 years young and WA7LEA reports he copies CW at between 20 & 25 wpm. New Techs: WB7SFI WB7WUJ and WB7WUL all of Cody. New General WB7NGB. The amateurs of Cody held a meeting Apr. 21. They organized the Cedar Mountain Amateur Radio Club. Officers are W7PT, pres.; W7KHH, vice-pres.; K7ISG, secy.; WB7BVT, treas. Remember the 1978 Wyoming Hamfest will be held July 15 and 16 at the Diamond Guest Ranch 13 miles Southwest of Chugwater, Wyo. As of May 1 WB7NHR is the new mgr. of the Wyoming Cowboy Net. K7SLM reports the Cowboy net held 20 sess. with 627 QNI and 18 QTC. Traffic: K7VWA 503, W7TZK 390, W7SQ 339, WA7SGG 14, K7VY 14. (Mar.) K7WY 3. (Feb.) K7WY2.

SOUTHEASTERN DIVISION:

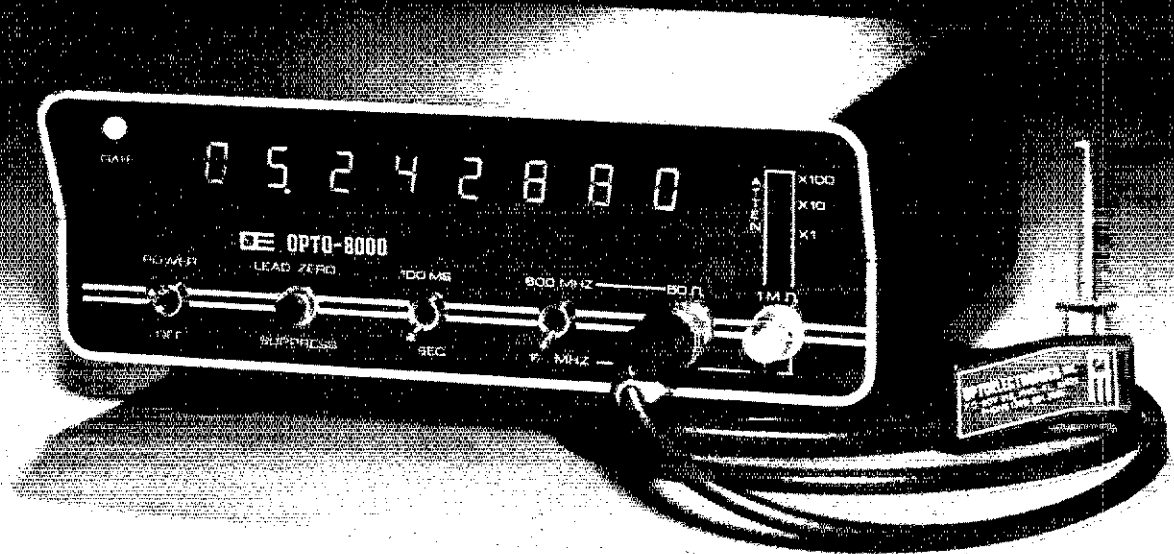
ALABAMA: SCM, Frank S. Brown, W4LNN — SEC: K4WYT. RM: N4MD. PAM: K4JIE. Interested in an EC or OES appointment? Contact your SEC. New appointments: W4IBU PP Class 1, WN4KKN ORS, AENB 3575 kHz QNI 296, QTC 126 in 30 sess. AENB 3725 kHz QNI 289, QTC 135 in 30 sess. WA4CNY K4ZM WAPEX earned AENB certificates. W4EF has more to do since retiring. Ft. Payne enjoying new repeater equipment on 147.872. Election results Montgomery ARC: WA4NKU, pres.; WB4TK, vice-pres. K4EFT, treas., WA4CQ, secy.; WA4EW WB4VZH, dir. Both clubs, Montgomery and Twin Base are joining hands for a 10th of Sept. Hamfest. Also organized the "Cradle of the Confederacy" 10-10 chapter. W4NYT K4JTW WB4SJK WA4YBW WB4YBT WA4VOY W44FQP executed a planned simulated school buscar accident to improve area emergency communications. W4MHO back on the air after a direct lightning strike. Huntsville ARC provided two meter communications for a Bike-a-Thon to help the Diabetes Assn., which included a Trike-a-Thon for pre-schoolers. Congrats to K4HJM, EC Cahoon Co. for a good job. He now has 3 assistants, ECs and one for another one. Upgrades to General: W41YU W44XK, WA4VK finds his straight key fun but rusty. WA4JDH still running over a thousand QTC count each month. Traffic: WA4JDH 1638, N4MD 241, WN4KKN 190, WA4VKD 145, WA4RND 82, K4AOZ 50, W4LNN 32, K4ZM 24, WA4RMP 12, WB4EKJ 9, W4RNX 8, WB4TY 6, W4MHO 2.

GEORGIA: SCM, A. H. Stakely, K4WC — PAM: K4JLN. Congrats to WA3NAZ K4EV and WB4ZQJ making PSHR. Congrats to WB4TYF making Advanced, to WA4OJF and WA4WXK making General and to WB4TYK and W4OEM making Technician. WA4DYK now AA4WA, WB4KEY now AA4KO and WB4FBU now N4ZI. CVEN No. 1 QNI 55, QTC 2. CVEN No. 2 QNI 698, QTC 38. GATES QNI 139, QTC 1. GSN QNI 405, QTC 1. GIN QNI 40, QTC 17. WGN QNI 90, GTC 4. CGVHF QNI 98, QTC 3. WA4VKK now active 80-10. Tornado Apr. 18 kept WA4MQU W4VKK and WB4TYK busy. Northwest Ga. Sky Alert Net 90/30 on Rome rpt WR4BBG every Fri. at 9 P.M. WA4PKP has new tri-band beam. WB4ZQJ represented ORP ARC International in program before Atl. RC. WB4FAS has 75 ft. tower up. WA4OMQ now net mgr. for GIN. K4PIK has company on Jekyll Island now with 3 other hams living there. W4BIA says he is portable half the time but still moves. W4B4DP working on emergency preparedness. W4JM letting work interfere with his hamming. W4BTEK worked Clipperton WA4OZI contesting like mad. K8FI going to Japan. Ailmy 2m net. Mon. & 8 P.M. on 22/82 and 10-mtr. net. Thu. at 10 P.M. on 28.525 North Fulton Amateur Radio League has WA4BRO, pres.; W4OC, vesp; W4YBV secy.; WB4YBE, treas.; WA4YTM, act. mgr. They are meeting 2nd Mon. at Roswell Bank at Holcomb Bridge Rd. at 8 P.M. and planning a 220 rpt. Traffic: (Apr.) W4FOE 224, WA3NAZ 168, W4PIM 95, W4ELO 67, W4BIA 38, K4WC 34, WB4ZQJ 28, WB4FAS 26, WAHON 23, K4N23 23, K4EV 22, WA4OMO 19, WB4DHC 5, W4JM 4, K4PIK 4, W4AA 2. (Mar.) WB4FAS 56, W4AA 15, WB4TEK 13, WA4OZ 7, W4OUN 4.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr. W4RHF — SEC: AA4EG. RM: W4GHU. PAM: WB4PGB73; WA4K540; WB4BSZ7H. New appointments: WB4PGB as PAM/OPS. W4TK as CO; W4DLUG as PRS-II. WA4NBM now AA4FRO — FL Gator! A new 2m AF-SK RTTY freq. for auto-start use in NW FL has been selected — 147.54 MHz. W4DLUG earned SNG on OPRNS and is now Sun. night NCS. Sorry to report WA4BMA & W4ZPN Silent Keys. Pensacola 220 repeater now on the air, 223.34/224.94. Several contacts have been made between Pensacola/Tampa Bay area on 220 by WA4KST W4HKK W4JJEJ & others. NW FL CW training net now meets on 3745 kHz at 2330Z; WA4VLT Nm. Net had 120 QNI first month. WA4FKE apptd. State dir. for AF MARS. W4SKKY and W4D4CQ new proxy and vp for Playground ARC. Live on the air. W4D4CQ and W4D4HT earned WAS certificates. Fort Walton hams providing communications for sailboat races; Tallahassee ARC

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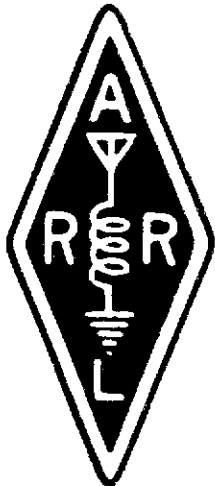
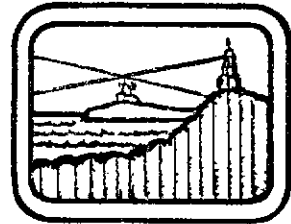
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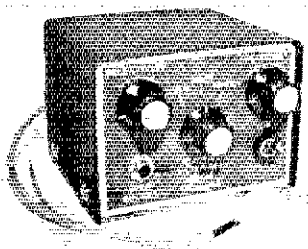
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for MOD Walkathon; Orange Park ARC for Bike-a-Thon. Lake City 7515 repeater provides good coverage along I-10. EG WA4VZF had 26 hams aiding on Goodwill Good-Turn Day. WD4LAHN had top NOFARS score in NR. WD4MFI, WD4MFI WD4OUN & WD4JWK upgraded to Tech.; WD4MDW to General. QST will use one of WB4QVK's Balanced Modulator articles. Silver Springs ARC has on-air meetings on 01/61 repeater each Tue. at 7:30 PM. Officers of Central Fla. Rptr. Assn: K4PWC WBFAK/4 K4HXP W4FZX & WB4FNJ. W4MGO has a new Ham-III rotor. Volusia County RACES new call is WC4ADE. They have 80/40 dipoles and a tri-band beam. WA1TZK, ARRL HQ, visited area for two weeks with USN. Traffic: (Apr.) WA4RQ 43, WB4R 023, WB4 QBB 226, NAWA 163, WA4FKE 160, WD4LUG 115, WB4FAJ 105, WD4NY1 101, WA4VLT 68, WA4XJ 67, W4MGO 67, N4SS 67, WA4J 65, WA4DM 55, WD4HJF 48, W4RH 38, WB4NJ 23, WA4HHC 29, WD4UO 29, W4FZX 24, WB4GHU 24, W4MVG 17, WB4VAP 17, WA4EYU 16, WA4STZ 13, WB4FJY 11, K4RNS 6, WA4CRI 5. (Mar.) WA4OEM 98.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst. SCMs: WB4AID W4KGJ, SEC: WB4ALH, RM: W4MEE, PAMs: WB4AID WA4NBE. New appointments WB4FVV OPS; N8GG/4 ORS. We now have 24 ECs, 24 OES, 12 OBS, 7 OOs, 28 OPS, 30 ORS and 6 OVS. The OPS and ORS will be changed to OTS on July 1st, and Technicians will become eligible for OTS. April was a big month for Public Service events. St. Petersburg ARC provided communication for the Festival of States activities including Night Parade Apr. 4, Day Parade Apr. 8 and Hurricane Classic power boat races Apr. 22nd. A total of 61 Radio Amateurs are believed to have participated, including W4APY W4AARS W4BUD W44CCL WA4CTM WB4DUWU W4BEEE W4EGM W4EEN W4EEN W4FVN W4AFYR W4GPL K5IHH/4 WA4RA K4ISS WA4KCR K4KE WD4KGY WB4KJ5 K4KXC W4MIM WD4MIO K4NAN N4NL WB4OAT WB4OID W4B3NO K8PXM/4 WA4CGV WA4ROX WB4RRC W4A4RQC W4KRXO K4SEF K4SCL K4TH W4RTJG W4UFO W4AUGS WA4AVP W4AIP W4AIPG W4AWG W4AWG W4AWG W4BWSW K4WYN WA4ZDY WB4ZPJ. Sorry we don't have the other calls. Also on Apr. 8th, Clearwater ARS operators, using FL Gulf Coast ARC repeater 223.34/224.94 furnished communications for Largo Junior Packers walkathon with 15 stations active. Apr. 2nd was the Mutt Derby sponsored by St. Petersburg JCs. About 12 Radio Amateurs furnished communications, with K8PXM/4 in charge. Our congratulations to 77 year old AA4BI, sporting a new Extra Class license. Arthur was first licensed in 1916 as 1AEQ. World War I interrupted his Amateur Radio activity and it was 61 years later when he contacted WD4CCL about re-licensing. By Nov. 1977 he was a Novice WD4MIM, then he passed General in Feb. 1978 and was grandfathered to EXTRA! He is active on all bands, all modes but prefers CW. W4BK sends a handsome picture of himself and meritorious award plaque for his work as QCWA National Treasurer. W4DUG, FL State Fair operation included 1423 messages originated Mar. and Apr. Bulk of traffic went to W3GUL CW/RTTY, W4JDH CW, WB8KWD RTTY and W3ATJ RTTY. Wonder why we can't get the old Florida Amateur Teletype (FATT) Net rejuvenated and tied into NT5? Traffic: (Apr.) W4DUG 2512, W4MEE 758, WB4WYG 283, K4SJH 238, K4SCL 231, W4SEC 199, K4EUC 186, W4NBI 178, WB4KSJ 172, W4APFK 172, W4DUG 140, W4DUG 140, W4DUG 140, W4EYR 125, WB4AID 120, N8GG/14 119, WB4NJU 98, WA4RA 85, W4YCL 66, W4GPL 60, WD4CCL 56, N4KB 56, WB4FV 55, K4NAN 53, W4WYR 49, W4KMN 39, WB4BJ 37, WA4RLV 34, WB4AOC 33, N4BU 32, WA4CGV 32, W4IY 28, WB4SNX 27, W4AEC 25, WD4BAJ 24, W4QCM 23, W4BK 22, W4ESH 22, WD4NSG 22, WA4MJJ 19, W4APV 17, WB4KYE 14, WA4MNM 14, K8PXM/4 14, K4GRM 12, WB4GSV 9, W4KJG 5, W4MML 5, K4OSO 5, W4SMK 4, K4TH 4, W4TJM 4, W44BYT 2, W4MPP 2, N4XR 1. (Mar.) W4ESH 40, W44LGT 40, K4GRM 18, WB4DUWU 1.

WEST INDIES: SCM, David Novos, KP4AM — The Radio Club of Puerto Rico held its annual convention at the El Conquistador Hotel, Pajaro, Puerto Rico. Attendance 100. QCW and QCW with technical conferences, FCC exams and forum meetings, YL activities and a lot of fun. The new Board of Directors was installed, as follows: KP4BSQ, pres.; KP4EJN, vice-pres.; KP4ABN, secy.; KP4DEM, treas.; KP4s CV JL XX and AHX, dir. Gud luck to all of them! The election procedure for the new SCM should be in progress by now. Candidates are KP4BRI and KP4JL. They are both good candidates and you should give your cooperation to the new man in this office. KP4DSD has a new tri-band beam. KP4RF and KP4ES very happy with their trip to Dayton hamvention. KP4CQ is back in Virginia Corda for his annual trip as VP2/CN. KP4OL was elected pres. of the PR YL Club. KP4CW building up an antenna farm in his new summer QTH in Bavamon. SCM's XYL finally got her Novice ticket. You may hear her brass pounding as KP4FNQ.

SOUTHWESTERN DIVISION
ARIZONA: SCM, Marshall Lincoln, W7DQS — PAMs: W7UQQ W47KQE, RM: W7EP. The Old Pueblo RC is to be congratulated for putting on a well-organized smoothly-run hamfest in Apr. W6EJJ provided lots of info on current FCC actions and ARRL activities. The Tucson Convention and Communications for the 80 km Women's Int'l Bike Race, WB7CZL, N7EH, "CW is fun," comments WB7TYP, who now is SWN to TWN rep and asst. net mgr. for Daytime Pacific Area Net. K7UDG of Phoenix wants to hear from youth-spirited hams in other parts of the state interested in following the Phoenix example of sponsoring Explorer Posts in ham activities. He'll enthusiastically supply details to anyone interested. Explorer Post 599 provided communications for a Boy Scout camporee in Phoenix. All officers of the Hualapai ARC were reported re-elected (but the club newsletter didn't identify them!) The SCM monitors the Tucson 7515 repeater Fri and Sat. evenings and the beginning of the Cactus Net and ATEN whenever possible for messages, and monitors the Kingman 1676 and Phoenix 9636 repeaters as often as practical as well. Previous multiple-repeater simultaneous monitoring skeds didn't work — too much racket and no traffic! Nets: (Apr.) ATEN 82, Cactus 164 SWN 214, Traffic: (Apr.) WB7TYP 203, W7EP 190, WB7CAG 70, K7NTG 48, WB7ORT 25, W47KQE 20, W7DQS 11, WA7YIG 11, WA7WEB 10, K7NMQ 8, N7EH 6, WA7NHQ 1, WA7JCK 1. (Mar.) W7EP 126, WA7YIG 49, WB7ORT 27.

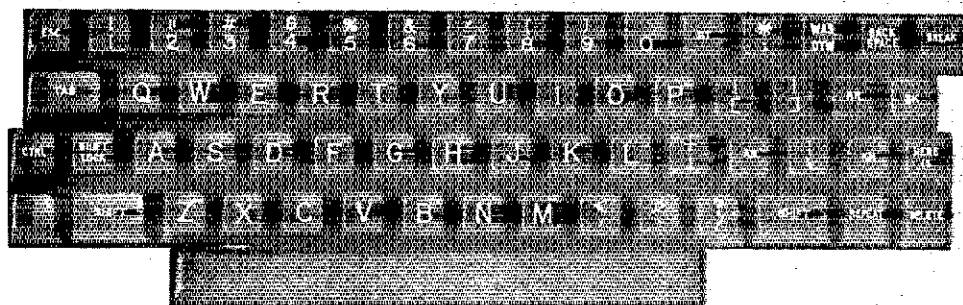
LOS ANGELES: SCM, Perry Masterson, W6RHS — Apr. was a very busy month for the section. The Morse Club held its annual meeting on the 28th and was attended by 135 Amateurs. Railroad telegraphers as well as the Western Union gang, W6FZ2 was in attendance. There

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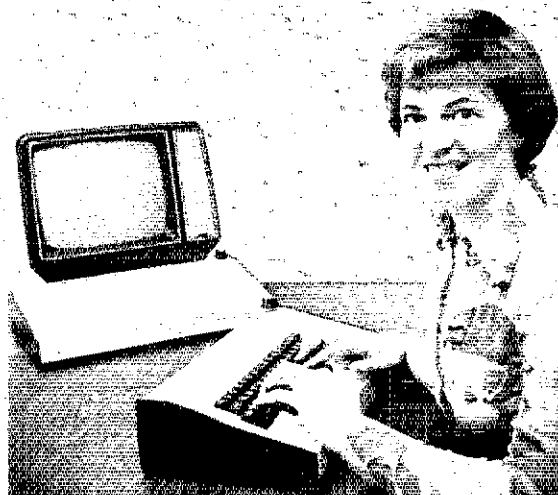
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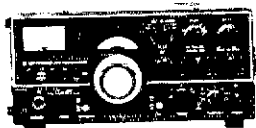
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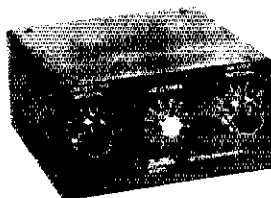
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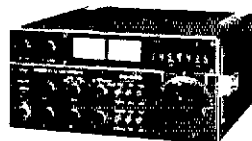
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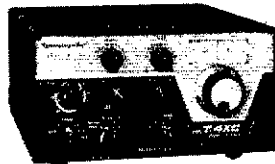


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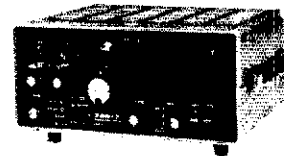


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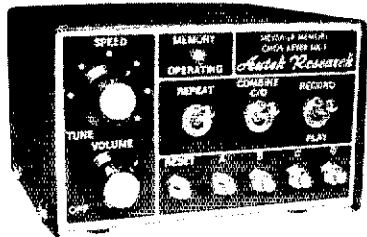
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were \$400 worth of door prizes given to the lucky ticket holders who stayed to the end. This was the 36th annual meeting. WBCK was reelected club pres. for another year. We received word that W6SGZ has moved to Denver. W6SGZ has been an ORS appointee in our section. The UPAC (club) plans to have free give-away circuit boards for the 20 meter Rx described in the Apr. QST for the National Convention to be held in San Diego this Sept. Plan to attend and build this fine receiver. The San Gabriel Valley ARES provided communications for the March of Dimes walk-a-thon in the Arcadia Pasadena area. We are in the process of trying to locate a state representative or Senator to assist us in getting legislation relative to tower heights through-out the state of CA. If any member of the section can help us, please call or write the SCM. We want to have a law patterned after the Vermont bill. The LA Council of Amateur Radio Clubs, Inc. met on the 2nd of May and was quite well attended. It would be well if every club in the area would send a representative to the council. Let your voice be heard! The QOs of the section were active again during the month of Apr. From the reports received, it would seem that a good careful rereading of the regulations is in order. Ham Radio has been getting some good public relations from W6NAZ. She needs some assistance in this important work. Keep her in mind when some news worthy event occurs — before it becomes ancient history. In these times, Amateur radio needs all the assistance it can get. Let's all help! Traffic: W6EOE 162, N6PZ 148, W6INI 124, K5DY6/8, W6BWG 22, K6CL 22, W6BRO 11.

SAN DIEGO: SCM, Arthur R. Smith, W6INI — Only two months to the National Convention in San Diego, Sept. 22-24, 1978, at Town & Country Convention Center. SW Div League Officials met changed to 2100 PDT each Mon. on 3007 kHz. 1807 kHz. 1807 kHz. 220 Club meets each Sun. at 1100 PT on 1818 kHz. 220 Club repeater, W6HFR, 223.30 MHz in, 224.90 MHz out, Palomar Mtn. is newest addition to ARES-dedicated repeaters. New 220 Club officers: WA6OYL, pres.; W6VSA, VP; W6WBW, secy.; W6KBD, treas. W6GP's trip to Hong Kong provided interesting program at Palomar ARC's May meeting. W6INI has been invited to participate on National Assn. for Search and Rescue Emergency Response Manual Project. Poway ARS Emergency Training Net meets each Tue. at 1900 on their repeater, 148.2500 MHz. New ARES members: (Central) W6COM, W6DXJ, W6BLY, W6SUA, (Eastern) W6LE, W6AMJZ, W6ABYK, (Northern) W6DSE, W6BEE, W6JSP, W6AQJ, W6OP, W6SSD, W6BTR, W6YYV, W6BZJ; (Southern) W6BLC, W6BPU, W6NLB, W6BUN, W6BUDT. Upgraded WA6JAA to Adv. San Diego FCC's new location is 7840 El Cajon Blvd. La Mesa. SANDRA's Otay repeater has priority on emergency power installation. Traffic: (Apr.) W6PVB 180, WA6JAZ 140, N6GW 131, W6FTY 106, N6AT 78, W6HUJ 71, WA6SKJ 39, N6RD 25, W6DEY 22, WA6JFY 22, W6UOF 5, WA6HGA 2, K6PM 1. (Mar.) K6LKW 11, WA6COE 2.

SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — SEC: W6HJW, RM: W6VGS, PAM: W6RPS. ECs: W6BWW, W6C, W6ATJ, W6B8G, OBS: K6S2S has developed a monthly reporting form that covers activity in her area. She sends bulletins on W6A7IAS/W6A7IAEL. K6MXO has a new FT301D. New officers of Lompoc ARC are N6AG, pres.; W6SRK, vice-pres.; W6DXY, secy.; W6NBK, treas. K6H6I now W6KON. Santa Barbara ARES activated in May for a mini SET with the Red Cross and Hospitals. W6BPD out of the hospital and recuperating with W6RHR and WA6ZBE. W6ZRR transmitted 33 bulletins in Apr. there were over 90 QNI the Section ARES net in Apr. NCSs are WA6LBS, WA6SKF and WA6ZYG. W6SXV now N6YH. N6NB performed experiments in QRP vs. Yag and presented the results at the Villa De Oro conference. Busy on SCN. SCN has sessions on W6AAK at 0400Z daily. Remember the Convention in San Diego, lets have a good group there. PSHR: N6WP 34, K6YD 10, N5MR 37, K6WI 34, N6MA 22. Traffic: (Apr.) K6HIQ 250, N6WP 172, WA6MBZ 128, N5MR 121, K6W1 78, K6YD 30, W6SXV 22, N6MA 17. (Mar.) K6HIQ 261.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Ted Heithecker, W5EJ — Asst. SCM/SEC: K5PC, RM: W5GN, PAM: W5GSN. ECs reporting this month: WA5HWI, W5UHO, W5KJTD, K5M, W5RPL, W5RPL, W5SIF, W5PFP, K5JJK, K5MWC, WA5KZA, K5DDI, W5SKU, W5BZB, K5HU, W5DUQ, W5B5J, W5BLT, W5YK and W5ADF. QOs reporting: W5T, W5OPX, ORS: W5YK, K5MC, W5SAAT, W5VMP, W5RPU, OPs: W5RPU, W5SAAT, OBS: W5SLAT. Attention all LOS: if you have not reported in last three months, your appt. may be in jeopardy. Public Service Honor Roll: W5BDC, W5RPU, W5BLAT, K5SOR, W5SDD, W5SAAT. Ever wonder how your out-of-state tlc gets to the other end of the line? It's taken by the liaison station to a higher NTS net by the following valiant folks: W5SAAT, W5BLAT, W5GSN, W5VMP, K5SOR, W5RPU, K5PC, W5RRX, N5CY, W5SDD, W5SBHF, W5ASJ, W5RPH, W5BKM, W5CTZ, W5MFP, W5YJK, W5COU, W5B5V, W5SPTF. Their dedication makes the NTS work! K5MC moved to Cowtown from La. crack CW man with TCC experience. (W5GN, take note) Welcome, Mickey; we need you! Lampasas ARES going strong on new 25/85 machine. Navarro ARC: P. O. Box 195, Corsicana, TX 75110; new club looking for "recruits." Tnx, Tom, for Vol. I, No. 1 of NARC News! W5DFP new pres East Tex. VHF Soc; and all East Tex. area ECs starting Skywarn program; will report to new EC at the NWS in Shreveport. New ECs: K5HBU, W5DUQ, W5B5J, W5STK, W5ASHVI, W5OZB. These folks need support! Please report forwarded to HQ from OVS: W5BGI and K5IS. TEXITN720 picnic a big success. W1UED spoke to SRO crowd at RWK re WARAC '79 and other topics. 85 counties now have active ARES program. Our goal is for all 145 counties to be represented by end of year. Please help! (Midland, Howard, & McLennan Co's; we need you!) Contact: K5PG; 1313 Applegate Ln. Lewisville, TX 75067. Welcome to two Chucks now crack tlc men in Dallas area. W5FBQ & N5BT. Traffic: (Apr.) W5T1 240, W5SDD 221, W5BDC 200, W5CTZ 85, K5PC 78, K5MC 70, W5BKM 69, K5SOR 66, W5BLAT 60, W5SAAT 49, W5GSN 45, W5VMP 38, W5DFQ 31, W5E2T 26, W5GN 23, W5RPU 23, W5YK 8. (Mar.) W5RPU 13.

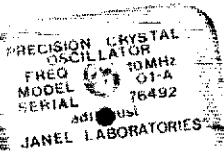
OKLAHOMA: SCM, Leonard Holler, W5FSN — Last month, in writing about the Foster family, we omitted one so-called "low" activity that she has done. Recent sunspot activity has given 3 OVS something to brag about in the DX they have worked, according to their reports. FB! Duncan had 13 operators assist with a Hospital disaster drill. For the 4th year, End ARC coordinated activities during the Tri-State Band Festival

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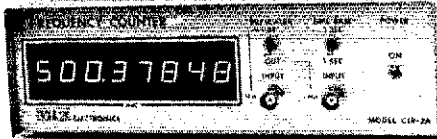
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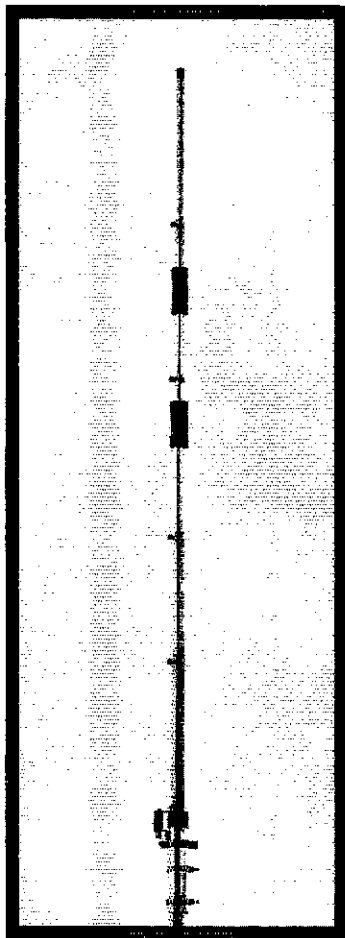
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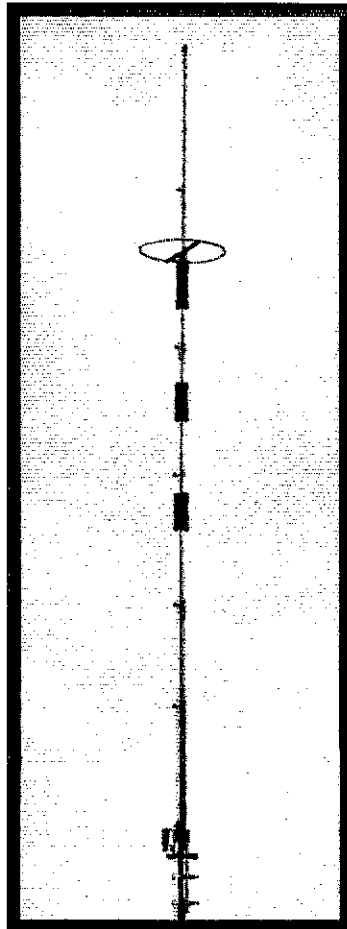
HF VERTICALS BY CUSHCRAFT

10-15-20 METERS



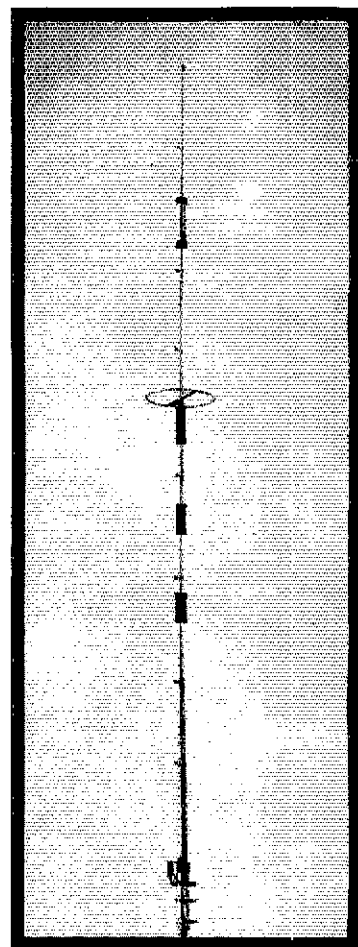
ATV-3 Cushcraft's ATV-3 multiband vertical provides low VSWR operation for both SSB and CW on 10, 15, and 20 meters. Matched to 50 ohms, built-in connector mates with standard PL-259. Stainless-steel hardware is used for all electrical connections. The ATV-3 is a compact 166 inches (4.2 meters) tall. Rated at 2000 watts PEP.

10-15-20-40 METERS

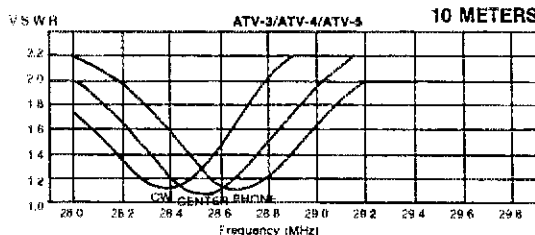
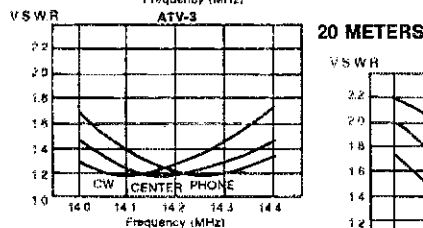
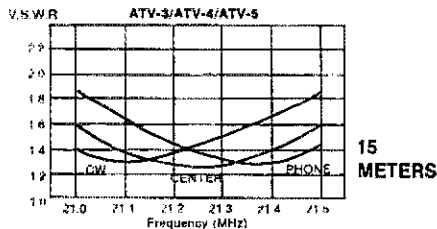


ATV-4 The Cushcraft ATV-4 four-band vertical antenna has been optimized for wide operating bandwidth on 10, 15, 20, and 40 meters. SWR is less than 2:1 over the CW and SSB segments of 10, 15, and 20. The 2:1 SWR bandwidth on 40 meters is approximately 240 kHz; may be quickly and easily adjusted to favor any part of the band. Coaxial tilting takes 50-ohm transmission line with PL-259 connector. Overall height, 233 inches (5.9 meters). Rated at 2000 watts PEP.

10-15-20-40-80 METERS



ATV-5 The ATV-5 trapped vertical antenna system has been engineered for five-band operation on 80 through 10 meters. The high Q traps are carefully optimized for wide operating bandwidth: 2:1 SWR bandwidth with 50-ohm feedline is 1 MHz on 10 meters; more than 500 kHz on 15 and 20 meters; 160 kHz on 40 meters; and 75 kHz on 80 meters. Instructions are provided for adjusting resonance to your preferred part of the band, CW or SSB. Built-in coaxial connector takes PL-259. Nominal height, 293 inches (7.4 meters). Rated at 2000 watts PEP on all bands.



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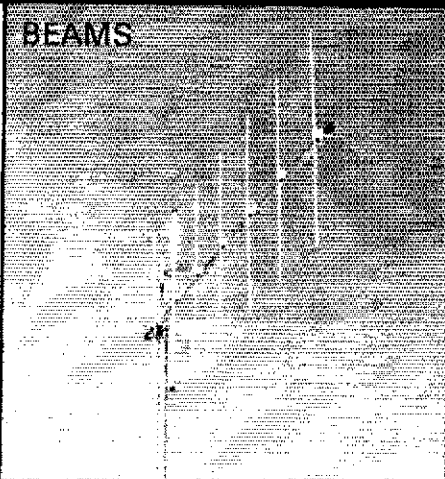
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DIRECTIONAL GAIN BEAMS

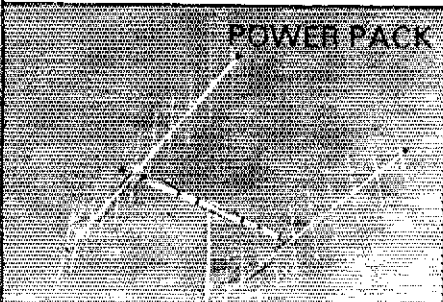
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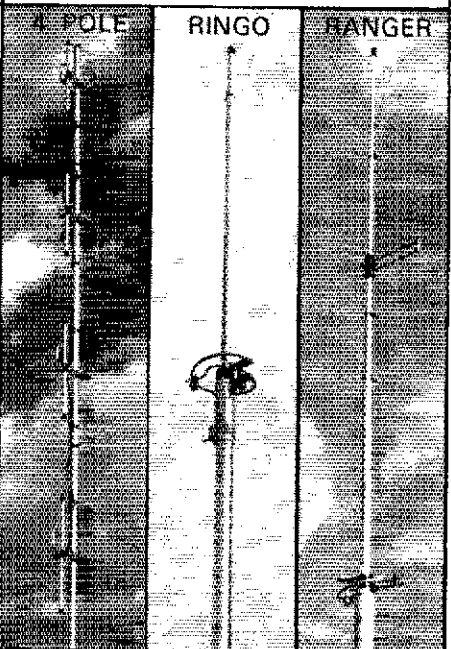
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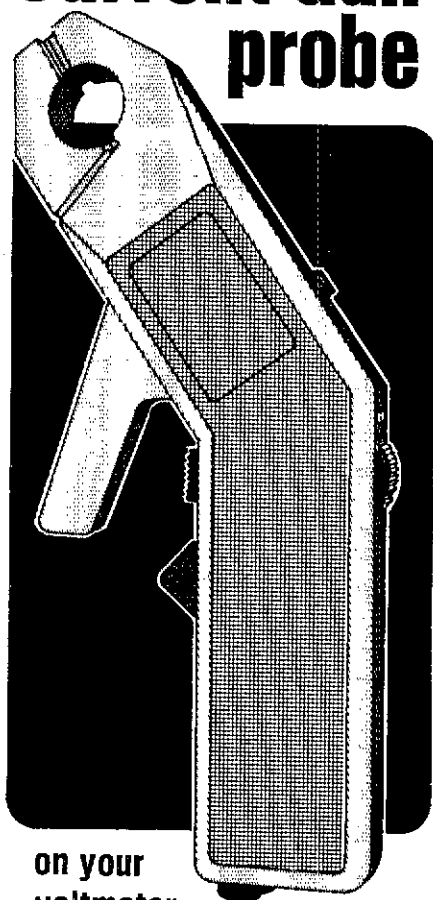


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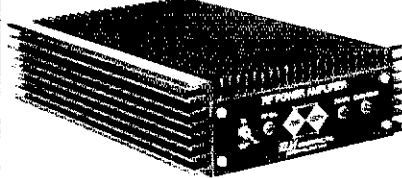
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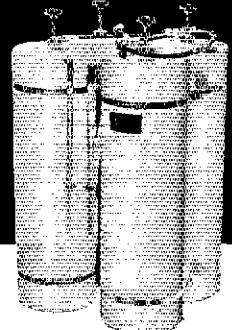


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Parade, handling more than 80 bands participating in street march contests. W5ZWM and WA5MLT moving to new QTHs. W5HZD lost tower and some antennas to a tornado. N5AO, new pres. Ardmore ARC, W5IJA secy-treas. WB7RZL, WB5BVA and WD5JVV new calls heard in Hugo area. Traffic count and participation off some this month. Will blame it on ham and sunspot activities, especially during the evening net schedules. OAN should have new mgr. by the time this is printed. WBSNKD has done yeoman work with the Net and has earned a well deserved rest. Traffic: K5OWK 630, WBSNKC 352, W5REC 272, W5RB 156, WBSNKD 98, W5UYH 68, W5BVC 60, WA5OUV 43, WBSOCZ 34, K5CAY 29, WB5ELG 27, WD5ETB 26, W5SUG 26, W5VQR 26, WA5FSN 22, W5EAY 16, WA5ZKI 6, W5J 2.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR — Asst. SCM/PAM: N5TC. SEC: WBSLHK. RM: WA5RKU. OOs reporting: WBSOIT, K5DL. OVSs reporting: WBSOIT N5AF. The 7290/TTN/TEX picnic in Kerrville State Park had over 150 present; PAM N5TC was program chairman. EC N5FN entertainment chairman. N5FA talked about ARRL Hq growing pains; K5HS, TX State PACES Office, talked about emergency communications; W5KLV, CND Manager, talked of traffic distribution; RM WA5RKU outlined NTS; SCM W5KR described new CD Field appointments; OPS K5HZR told of 7290 Net progress; OPS W5BGE and W5DGG won domino tournament; K5HZR and K5FMI won horseshoe contest. OPS W5GE reports several good six-mtr openings to South and Central America in Apr. OPS K5RVF rpt Jefferson County Amateurs assisted Texas State Guard during emergency exercise Apr. 30, coordinated by EC nominee WA5IEK. EC WA5ACF says W5WVX is now asst. EC for Fort Bend County; rpts Brazos Valley ARC has grown to 28 members. Texas Apple station WA5AO originated and sent via RPT to EC N5I for a radiogram to Apple baseball team; it has over 5000 signatures, took 4 hrs 30 min. to complete, reached length of approximately 97 ft. OPS WA5JYH has new SB220; rpts new Novice Class starting in May. EC N5FN rpts K5QI upgraded to Advanced. ORS WBSHOD moved to new mobile home, has been working Europe and South America with 100W to Denton MT2000A and random wire; he also upgraded to Extra Class! OVS N5AF rpts he and several others worked W4EQR on 145.1 MHz SSB. OO/OVS WBSOIT W5QMU WB9GNC WA5LNL WD5GZD presented Texas Intercity Relay System slide show to Austin ARC. From Coastal Bend ARC District (Carl Christl) WBS5LO WBS5UJ WA5FJ WBS5WDI WBS5FXN WBS5FSD upgraded in Apr. From W5ES Bulletin (El Paso) W5BFN has built two cw keyers from junk typewriters; K5AKR can QSO via cw or voice in six languages. SCM W5KR rpts new ARC in Brownsville, initials CHARRO to fit the border area, has 28 members with WD5CLF as pres. Traffic: W5RLV 518, WA5YEA 265, WA5RKU 231, N5TC 180, WBSMMI 98, K5GM 69, W5BGE 66, K5QEW 50, N5FN 40, WA5JYH 34, WA5RVY 30, W5KR 23, W5AC 11, WBSLTW 10, WA5ACF 5, K5RVF 4, K5GE 2.

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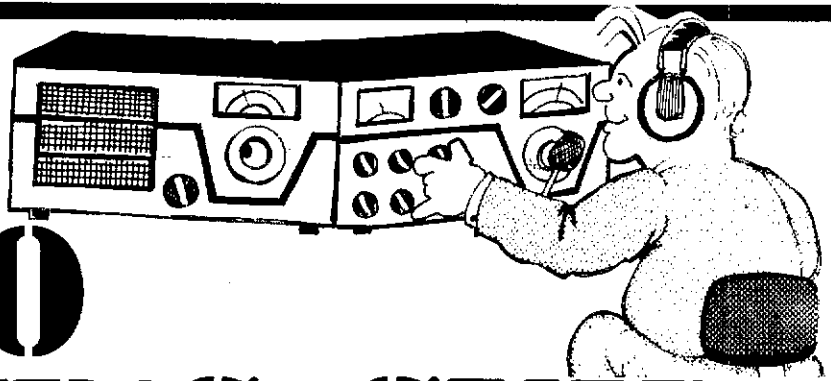
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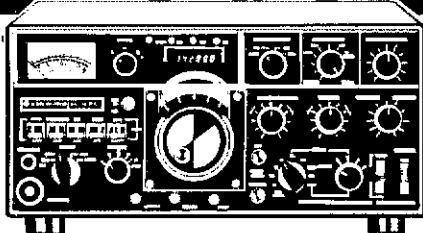
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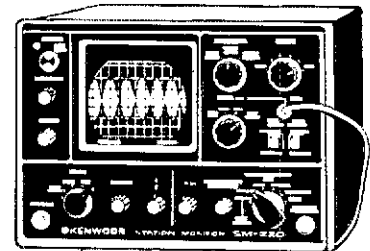
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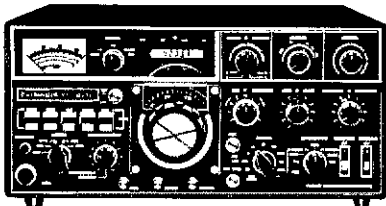
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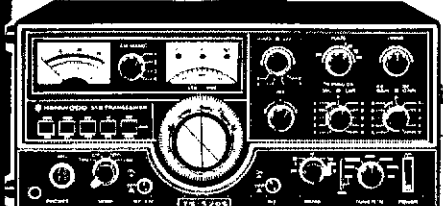
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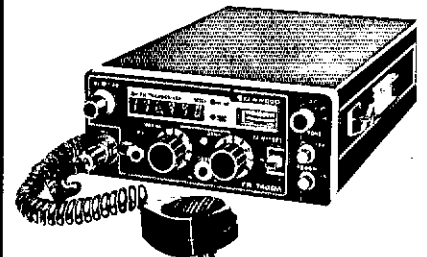
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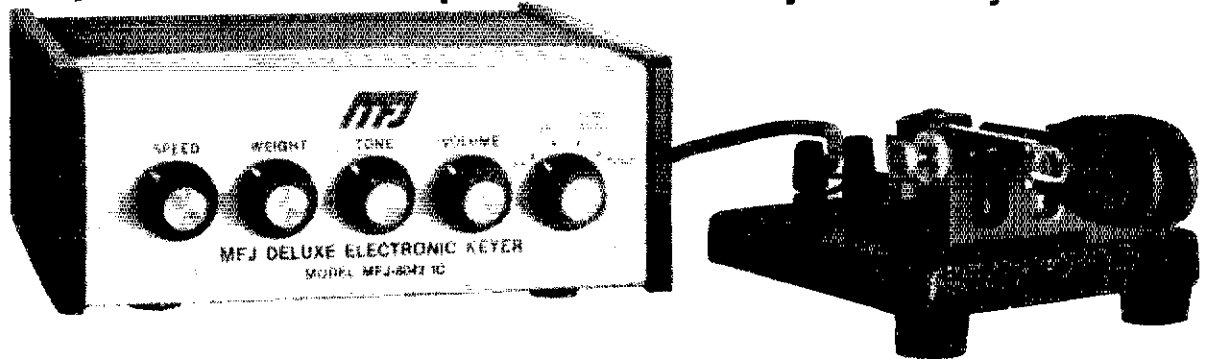


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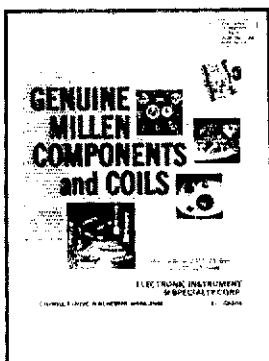
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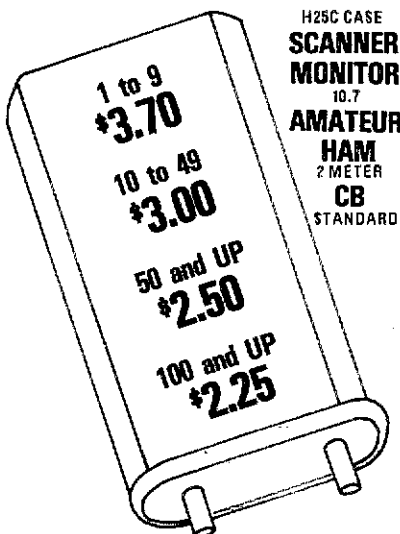


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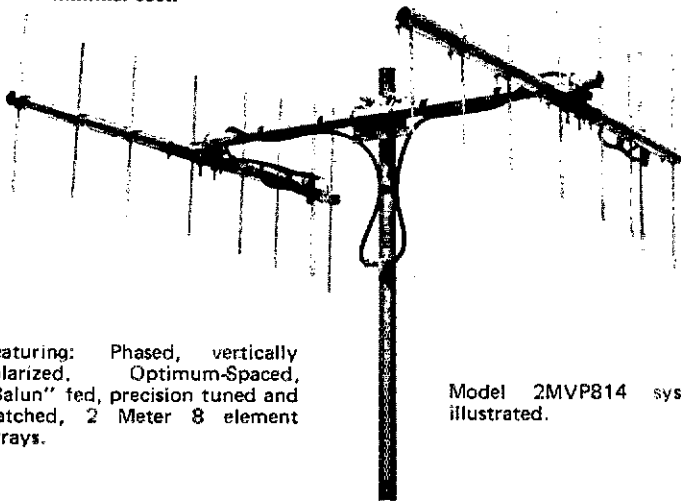


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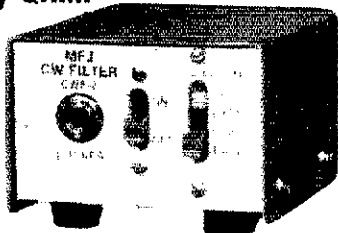
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SN7426	SN7476	.19	.20	SN74158	1.99	2.00
SN7427	SN7477	.19	.20	SN74159	1.99	2.00
SN7428	SN7478	.19	.20	SN74160	1.99	2.00
SN7429	SN7479	.19	.20	SN74161	1.99	2.00
SN7430	SN7480	.19	.20	SN74162	1.99	2.00
SN7431	SN7481	.19	.20	SN74163	1.99	2.00
SN7432	SN7482	.19	.20	SN74164	1.99	2.00
SN7433	SN7483	.19	.20	SN74165	1.99	2.00
SN7434	SN7484	.19	.20	SN74166	1.99	2.00
SN7435	SN7485	.19	.20	SN74167	1.99	2.00
SN7436	SN7486	.19	.20	SN74168	1.99	2.00
SN7437	SN7487	.19	.20	SN74169	1.99	2.00
SN7438	SN7488	.19	.20	SN74170	1.99	2.00
SN7439	SN7489	.19	.20	SN74171	1.99	2.00
SN7440	SN7490	.19	.20	SN74172	1.99	2.00
SN7441	SN7491	.19	.20	SN74173	1.99	2.00
SN7442	SN7492	.19	.20	SN74174	1.99	2.00
SN7443	SN7493	.19	.20	SN74175	1.99	2.00
SN7444	SN7494	.19	.20	SN74176	1.99	2.00
SN7445	SN7495	.19	.20	SN74177	1.99	2.00
SN7446	SN7496	.19	.20	SN74178	1.99	2.00
SN7447	SN7497	.19	.20	SN74179	1.99	2.00
SN7448	SN7498	.19	.20	SN74180	1.99	2.00
SN7449	SN7499	.19	.20	SN74181	1.99	2.00
SN7450	SN7500	.19	.20	SN74182	1.99	2.00
SN7451	SN7501	.19	.20	SN74183	1.99	2.00
SN7452	SN7502	.19	.20	SN74184	1.99	2.00
SN7453	SN7503	.19	.20	SN74185	1.99	2.00
SN7454	SN7504	.19	.20	SN74186	1.99	2.00

POP-AMPS at "CENT-CIBLE" PRICES

Case code: T-TO-220 Power Tab; V-Mini dip, K-TO-3; H-TO-5; N-DIP.

Type No.	Each	2 for	Type No.	Each	2 for
LM300H	.49	.50	LM340T-8	1.49	1.50
LM300N	.49	.50	LM340T-8	1.49	1.50
LM301V	.45	.46	LM340T-8	1.49	1.50
LM301H	.45	.46	LM340T-12	1.49	1.50
LM307V	.45	.46	LM340T-15	1.49	1.50
LM308V	.65	.66	LM340T-15	1.49	1.50
LM309H	.49	.50	LM340T-24	1.49	1.50
LM309N	.49	.50	LM350N	1.49	1.50
LM311V	.79	.80	LM370V	1.49	1.50
LM311H	1.49	1.50	LM377V	2.25	2.26
LM338V	.99	1.00	LM380N	1.39	1.40
LM320H-8	.99	1.00	LM380N	1.39	1.40
LM320H-12	.99	1.00	LM380N	1.39	1.40
LM320H-15	.99	1.00	LM386N	1.49	1.50
LM320T-8	1.49	1.50	LM386N	1.49	1.50
LM322N	1.19	1.20	LM386N	1.49	1.50
LM324N	1.79	1.80	LM386N	1.49	1.50
LM339N	1.79	1.80	LM386N	1.49	1.50
LM340K-8	1.49	1.50	LM386N	1.49	1.50
LM340K-12	1.49	1.50	LM386N	1.49	1.50
LM340K-15	1.49	1.50	LM386N	1.49	1.50
LM340K-24	1.49	1.50	LM386N	1.49	1.50
LM340K-24	1.49	1.50	LM386N	1.49	1.50

RIBBON CABLE

Order by Cat. 7M3939 and Conductors

Cond.	20	24	34	40
Size	7-ft. 1.38	4-ft. 1.38	3-ft. 1.38	3-ft. 1.38
Price	14-ft. \$1.90	6-ft. 1.99	6-ft. 1.99	6-ft. 1.99

25 AMP BRIDGE RECTIFIERS

Order by Cat. 7M2273 & voltage

V	30	50	100	200	400	600
Price	\$1.95	2.49	2.99	3.49	4.99	5.99

25 AMP POWER STUD SCRS, TRIACS

Cat. No. 7M1A4147 (SCRs)
Cat. No. 7M60B96A (Triacs)

V	Each	2 for
50	\$1.95	2 for \$1.95
100	2.25	2 for 2.25
200	2.95	2 for 2.95

1N4000 Epoxy Rectifiers

Order by Cat. No. and Type No.

Cat. No.	Type No.	PIV	Price
7M2377	1N4001	50	10 for \$.65
7M2378	1N4002	100	10 for .75
7M2379	1N4003	200	10 for .85
7M2380	1N4004	400	10 for .99
7M2381	1N4005	600	10 for 1.29
7M2382	1N4006	800	10 for 1.39
7M2383	1N4007	1000	10 for 1.49

10 AMP. POWER TABS; 7M4748 - TRIACS

Order by Cat. No. and Type No.

Part No.	Price
7M4748 - TRIACS	1.99
7M4749 - SCR	1.99
7M4750 - QUADRACS	1.99

1.5 AMP BULLET RECTIFIERS!

Order by Cat. No. 7M60B84 & voltage

V	10 for	20 for
50V	\$3.39	\$6.50
100V	5.99	10.70
200V	7.99	14.40
400V	9.99	18.40

MICRO MINI TOGGLE SWITCHES!

3 Amps, 125 VAC contacts, with chrome handles, complete with mounting hardware.

Cat. No.	Type	Price	2 for
7M5085	SPDT	\$1.25	\$1.20
7M5086	SPDT	1.25	1.20
7M4037	DPDT	1.45	1.40

LYTIC KLINIC

Order by Cat. No. 7M3269 and value

UF	Style	Price
10	P.C.	10 for \$1.00
50	P.C.	8 for 1.00
15	P.C.	8 for 1.00
30	P.C.	8 for 1.00
20	P.C.	10 for 1.00
20	P.C.	10 for 1.00

6 AMP CARTWHEEL RECTIFIERS

Order by Cat. No. 7M3584

V	Each	2 for
100	\$2.25	2 for \$2.25
200	2.85	2 for 2.85
400	3.79	2 for 3.79
800	4.99	2 for 4.99
1000	5.99	2 for 5.99

LEDS!

YOUR CHOICE 5 for \$1.01 10 for \$1.01

Order by Cat. No.

- 7M2135 JUMBO RED LED
- 7M2137 MICRO RED LED
- 7M2190 JUMBO RED CLEAR LED

ZENERS!

Order by Cat. No. 7M5210 & voltage & wattage

I Watt	Price	2 for
7.5V	\$1.10	10 for \$1.01
8.2V	1.10	10 for 1.01
9.1V	1.10	10 for 1.01
10V	1.10	10 for 1.01
11V	1.10	10 for 1.01
12V	1.10	10 for 1.01
15V	1.10	10 for 1.01

Parts & Semi One Centers

Qty.	Description (Order by Cat. No. in parenthesis)	Price	10 for	100 for
1	PANCAKE PHOTOCELLS, 500 to 15K ohms (7M2839)	1.95	2 for 1.96	
1	1-KOHM 5% METAL FILM RESISTOR (7M3896)	3.50	2 for 3.51	
1	MOTHERBOARD EDGE CONNECTOR, 106 pins, .125" (7M3987)	1.95	2 for 1.96	
1	48-PIN EDGE CONNECTOR, .156" spacing (7M3963)	1.95	2 for 1.96	
2	LCD THERMAL INDICATORS, 00-108°F, 7x1", flexible (7M3195)	4.00	4 for 4.01	
1	JOYSTICK, four 10K pots, with 1/2" shaft (7M3888)	4.35	2 for 4.36	
1	EXCO THUMBWHEEL SWITCH, BCD, 0-7 (7M2870A)	1.49	2 for 1.50	
1	2-TRACK TAP TRANSDUCER, with amp (7M3010)	9.95	2 for 9.96	
1	PLSSETT TV SIDEBAND FILTER, for chan. 3 or 4 (7M3795)	1.95	2 for 1.96	
20	WIRE WRAPERS, 1/2" x 3/8" x 1/2" (7M3888)	1.00	60 for 1.01	
1	METER, 50uA, 1/4" square, 0-200 (7M3708)	1.19	2 for 1.20	
1	SPST RELAY, norm. open, 12-24 VDC, 1250 ohms, dip style (7M5175)	1.00	2 for 1.01	
1	FEEDER FOOT COUNTER, 000-999, resettable, panel mt. (7M5081)	1.49	2 for 1.50	
1	DUAL IN LINE SOCKET, 16 pins, cut to length (7M3144)	2.00	2 for 2.01	
1	2-TRACK TAPE HEAD, with plug n' cord (7M3468)	2.50	2 for 2.51	
1	CALCULATOR KEYBOARDS, 20 keys and more (7M3524)	\$2.00	20 for \$2.01	
1	CRYSTALS, may include CB, Ham & more (7M3250)	2.00	20 for 2.01	
1	TERMINAL STRIPS, 1/2" x 3/8" x 1/2" (7M3144)	2.00	200 for 2.01	
1	TERMINAL STRIPS, from 2 lugs up (7M3136)	2.00	200 for 2.01	
30	NE-ZEON LAMPS, all 100% good (7M2613)	2.00	60 for 2.01	
40	R-SHIELDED CABLE, 1 core, mike, phone, (7M3577)	2.00	80 for 2.01	
50	DUAL IN LINE SOCKET, 16 pins, cut to length (7M3144)	2.00	100 for 2.01	
3	SOUND TRIGGERS, sound triggers scr w/amp (7M3625)	2.00	6 for 2.01	
1	CB CRYSTALS, for phase lock loop, HAM, HC/18 (7M5050)	2.00	20 for 2.01	
100	DISC CAPACITORS, long leads, marked, ass'd (7M2598)	2.00	200 for 2.01	
100	VOLUME REGULATORS, hobby 1K220, 340, TO-3 (7M3330)	2.00	200 for 2.01	
30	PANEL SWITCHES, slides, rotaries, med. etc (7M3268)	2.00	60 for 2.01	
200	RESISTOR SPECIAL, 1/4 to 1W, carbon, metal (7M3054)	2.00	400 for 2.01	
100	HALF WATT RESISTORS, carbon, metal (7M3046)	2.00	200 for 2.01	
100	NATIONAL IC BONANZA, linear, 7400s ROMS (7M2860)	2.00	200 for 2.01	
15	LM340T VOLTAGE REGULATORS, 5 to 24V, TO-220 (7M2635)	2.00	30 for 2.01	
100	TWO WATTERS, resistors, carbon metal marked (7M2735)	2.00	200 for 2.01	
100	POLYETHYLENE CAPS, ass'd values, voltage, hi-Q (7M2729)	2.00	200 for 2.01	
50	THERMISTORS, resistors that change with temp (7M4088)	2.00	100 for 2.01	
20	BRIDGES, untested, 2, 4, 6, 10, amp, full wave (7M4022)	2.00	40 for 2.01	
25	LAMP SOCKET SETS, 1/4, 1/2, 1/4, 1/2, 1/4 (7M3957)	2.00	50 for 2.01	
150	MIXED READOUTS, hobby, untested, 12V, 5, etc. (7M3619)	2.00	300 for 2.01	
150	QUARTER WATTERS, resistors, metal film, marked (7M3413)	2.00	300 for 2.01	
100	PLASTIC TRANSISTORS, untested, TO-92 (7M2504)	2.00	200 for 2.01	
200	PREFORMED RESISTORS, 1/4, 1/2, 1W, marked, ass'd (7M2608)	2.00		

The only REALLY NEW 80-10 meter vertical design in 20 years!

Completely automatic bandswitching 80 through 10m (160-10m with optional TBR-160 add-on unit.)

Low V.S.W.R. over entire 40, 20, 15, & 10m bands plus ANY 60-100 KHZ segment of 80/75 m. NO ANTENNA TUNER NEEDED! ENTIRE 26 ft length active on 80, 40, 20, & 10m with full 1/4 wave resonance on 15m for greater bandwidth & superior DX performance. Ground, roof, or tower mount—no guys needed.

HIGHEST QUALITY CONSTRUCTION & WORKMANSHIP THROUGHOUT. HIGH STRENGTH ALUMINUM ALLOY AND FIBERGLASS DESIGN. Complete with 1 1/8 in. O.D. tubular mounting post, RG-11/U matching line, and connector for PL-259. Use any length of 50-52Ω coax.

V.S.W.R. at resonance: 1.5:1 or less; all bands.
Power rating: Legal limit SSB/CW 40-10m; 1200 W.
P.E.R./500 W. CW on 80/75m.

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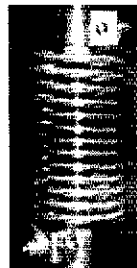
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(3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied.

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(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc. 1409 Cooper Drive, Irving TX 75061.

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FREE Sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P. O. Box 173, Huntington NY 11743.

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RADIO Museum now open. Free admission, 15,000 pieces of equipment from 1850 telegraph instruments to amateur and commercial transmitters of the 1920s. Amateur station W2AN. Write for information: Antique Wireless Assn., Main St., Holcomb, NY 14469.

RADIO Expo '78. Special dates, this year only, are September 30, October 1. Lake County, Illinois, Fairgrounds, between Chicago and Milwaukee. Over 4000 attended last year. Dozens of manufacturer and distributor exhibits, indoor/outdoor flea market areas, seminars. Free camping. Flea market open Friday for set-up. Tickets \$2 advance, \$3 at gate. Exhibitor space still available. Call the Expo answering machine (312-690-1177). For tickets and info, write: Radio Expo '78, P. O. Box 305, Maywood, IL 60135.

WARREN, Ohio Hamfest — Sunday, August 20, 1978; Trumbull K.S.U. Campus, Route 45 at Warren, Outerbelt. 21st Big year with the famous flea market. All close-in parking; lakes and parks nearby. Commercial displays, talk-in stations. \$2 door registration. Arrow signs lead from I-80; I-90; Ohio Routes 5, 11 & 45. Details? QSL: Hamfest, Box 809, Warren, OH 44482.

32ND ANNUAL Turkey Run hamfest. Vigo County Fairgrounds mile south I-70 on U.S. 41. For overnight campers only — open Saturday July 15, 12 noon EST. For general public, open Sunday, July 16, 0800 EST. Free outdoor fleamarket, covered fleamarket \$3 — some available, food and refreshments, giant shopping mall nearby. Advance sale tickets \$1.50 4 for \$5, gate tickets, \$2/3 for \$5, children under 12 free. Talk-in 25/85 and 52 simplex. For tickets and information s.a.s.e. to WVARA Hamfest, P. O. Box 81, Terre Haute, IN 47808.

HAMFESTERS 44th Annual Picnic and Hamfest, Sunday, August 13, 1978 at Santa Fe Park, 91st and Wolf Road, Willow Springs, Illinois, Southwest suburb of Chicago. Exhibits for OM's and XYL's, Famous Swappers Row. Tickets at gate \$2, advance \$1.50. For Hamfest info or advance tickets (send check or money order, s.a.s.e. appreciated) to Bob Hayes W9KXW, 18931 Cedar Ave., Country Club Hills, IL 60477.

Goodies, Electronics & More. Tri Club Hamfest July 16 Allentown. Information s.a.s.e. K3AI R1 Box 104, Emmaus, PA 18049.

MISSOURI: Indian Foothills ARC Third Annual Hamfest, Sunday, July 23, 1978 at the Saline County Fairground's air-conditioned multi-purpose building in Marshall. Registration \$2.00 in advance; \$2.50 at the door. Morning coffee and breakfast rolls and noon lunch for a nominal fee. Flea markets for the OM and XYL. Tables for a small charge. For information and advance tickets

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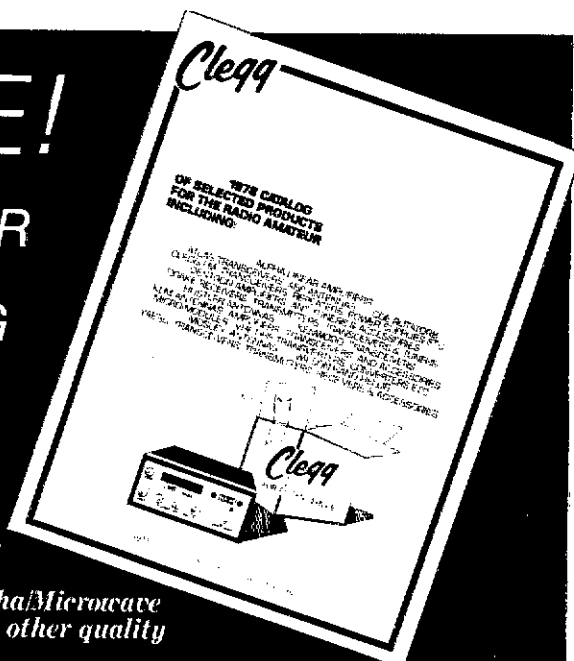
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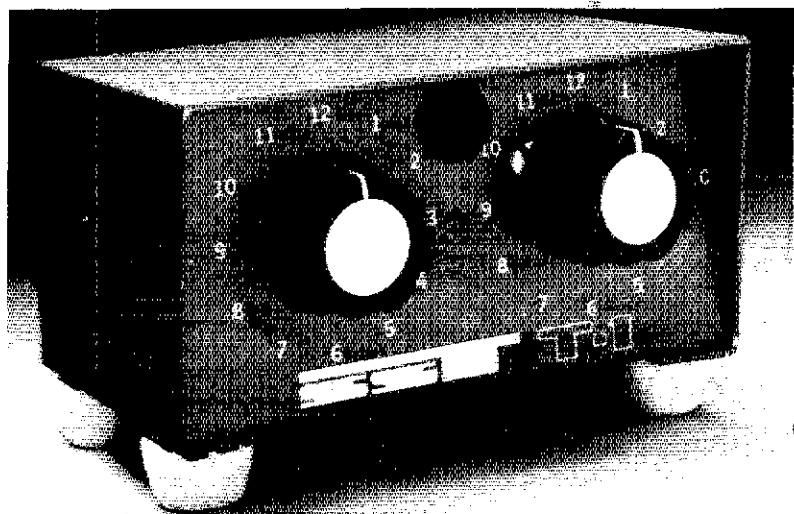
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All band operation (160-10 meters) with any random length of wire. 200 watt output power capability—will work with virtually any transceiver. Ideal for portable or home operation. Great for apartments and hotel rooms—simply run a wire inside, out a window, or anyplace available. Efficient toroid inductor for small size: 4-1/4" x 2-3/8" x 3", and negligible loss. Built-in neon tune-up indicator. SO-239 connector. Attractive bronze finished enclosure.

only **\$29.95**

THE ORIGINAL Random Wire Antenna Tuner. . . in use by amateurs for 6 years.

SST T-2 ULTRA TUNER

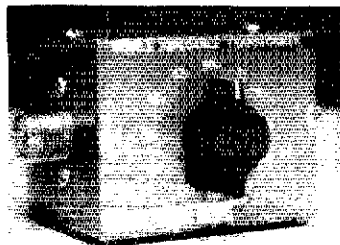
Tunes out SWR on any coax fed antenna as well as random wires. Works great on all bands (80-10 meters) with any transceiver running up to 200 watts power output.

Increases usable bandwidth of any antenna. Tunes out SWR on mobile whips from inside your car.

Uses efficient toroid inductor and specially made capacitors for small size: 5-1/4" x 2-1/4" x 2-1/2". Rugged, yet compact. Negligible line loss. Attractive bronze finished enclosure. SO-239 coax connectors are used for transmitter input and coax fed antennas. Convenient binding posts are provided for random wire and ground connections.



only **\$39.95**

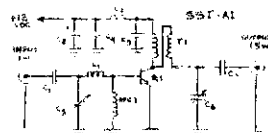


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Mobile Impedance Transformer

Matches 52 ohm coax to the lower impedance of a mobile whip or vertical. 13-position switch with taps spread between 3 and 52 ohms. Broadband from 1-30 Mhz. Will work with virtually any transceiver—300 watt output power capability. SO-239 connectors. Toroid inductor for small size: 2-3/4" x 2" x 2-1/4". Attractive bronze finish.



only **\$29.95**

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1 watt input gives you 15 watts output across the entire 2 meter band without re-tuning. This easy-to-build kit (approx. 1/2 hr. assembly) includes everything you need for a complete amplifier. All top quality components. Compatible with all 1-3 watt 2-meter transceivers. Short and open protected—not damaged by high SWR.

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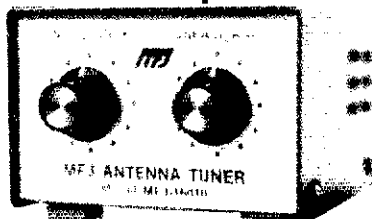


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This MFJ Antenna Tuner...

lets you operate all bands — 160 thru 10 Meters — with a simple random wire. Use virtually any transceiver — up to 200 watts RF power OUTPUT.



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contact Jim Little, WD0BPG, 405 East Rosehill, Marshall, Missouri 65340, 816-896-8583.

PEORIA: 21st Hamfest, September 17, same place as last year. For further details, see September Hamfest Calendar or write John Sutton WD9BJJ, 808 W. Teton Drive, Peoria, Illinois 61614. Advance tickets \$1.50; Door tickets \$2.00. All manufacturers, suppliers and forums inside — Write for table reservation forms.

FOX RIVER Radio League Hamfest. New location: Indoors — Kane County Fairgrounds St. Charles, Illinois — Sunday, August 27th Tickets: \$2 at gate, \$1.50 advance. Contact: Don Berridge, WB9PAC, 2303 Deerfield Way, Geneva, IL 60134.

BYTE, Drink and be merry at the Tidewater Hamfest, Flea Market and Computer show, Norfolk, Virginia. September 23-24. Over 60,000 sq. ft. of exhibit and flea market space. All indoors. All air conditioned. Write THCI, P. O. Box 9371, Norfolk, VA 23505.

BLUEFIELD West Virginia Hamfest August 27th. Indoor and outdoor flea market space for individuals and dealers \$5. For more information, contact "Fuzz" WA8RHT, Washington St., Bluefield, WV 24701.

LITTLE Rock Ham-A-Rama — August 5-6, Arkansas State Fair Grounds, Little Rock, 2 miles west of I-30 on Roosevelt. Dealer displays in air conditioned building. Giant flea market area. \$1 registration. ARRL forum and MARS meeting. RV hookups on fair grounds. Talk in on 146.52, 146.34/94, and 3995. For info call 501-753-3450 or write GAREN, c/o Don Gephardt, WB5TSH, P. O. Box 2644, Little Rock, AR 72203.

WWII graduates of Gallups Island last chance for reunion in Boston July 8th. Contact Ed Hayden, K3OKL, 16 Decatur Ave., Annapolis, MD 21403.

THE SAGAMON Valley Radio Club of Springfield, Illinois holds its Third Annual Hamfest on Sunday, September 24th. Location — Sangamon Co. Fairgrounds in New Berlin, 16 miles west of Springfield. Indoor display area and covered pavilion. Hear Hugh Vandegriff WA4WME talk on the Clipperton Atoll Expedition! Various exhibits, kids activities and food available. Overnight camping. Tickets: \$1.50 advance, \$2 at gate. Information — Al K9QFR; Tickets — Carol WB9QWR, write c/o 1025 S. Sixth, Springfield, IL 62703.

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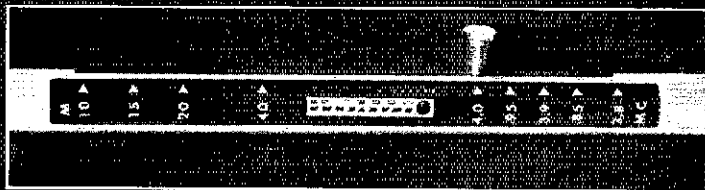
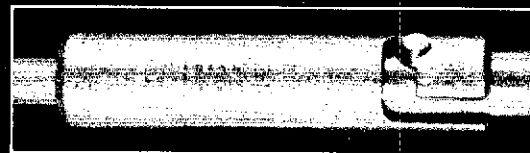
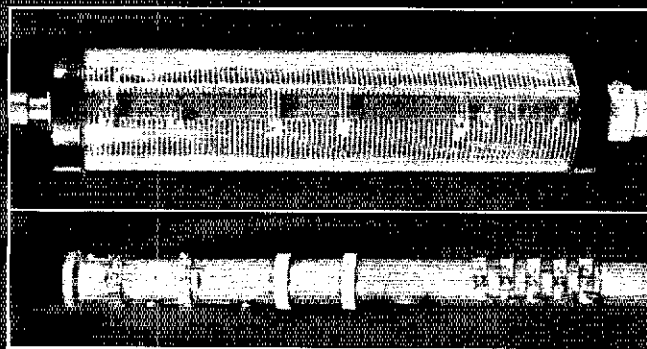
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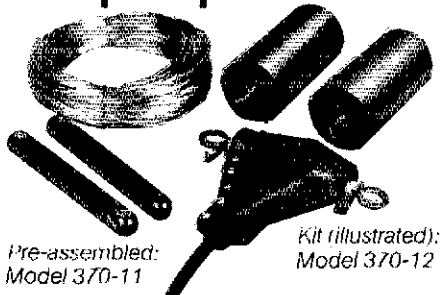
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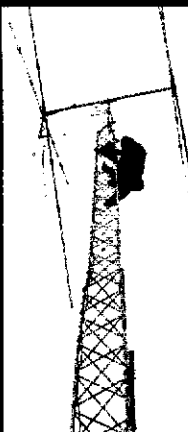
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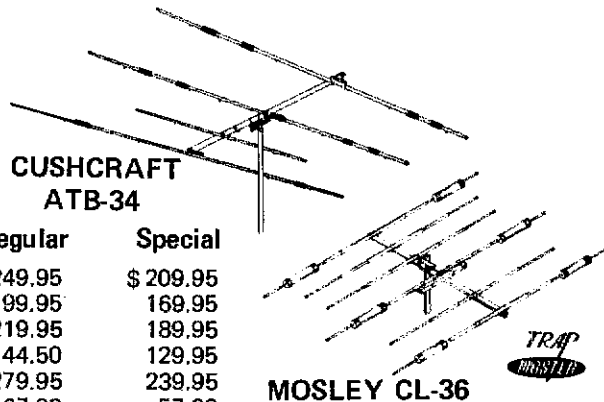
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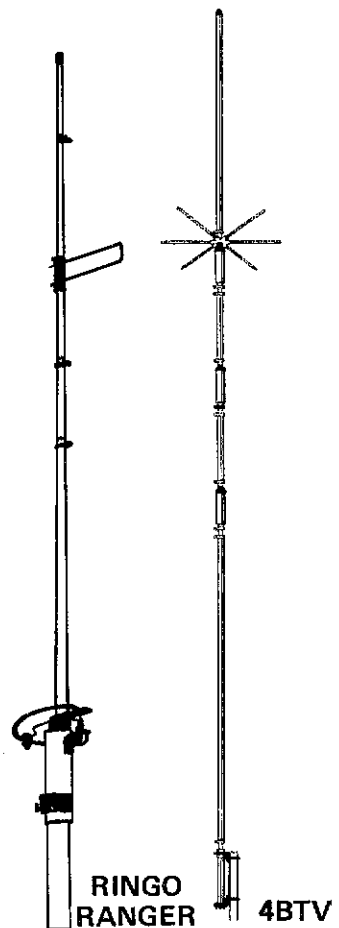
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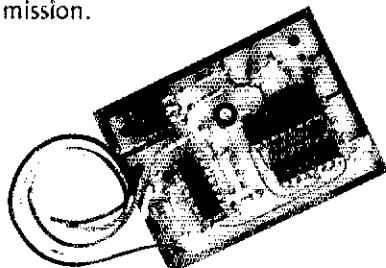


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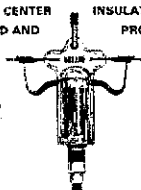
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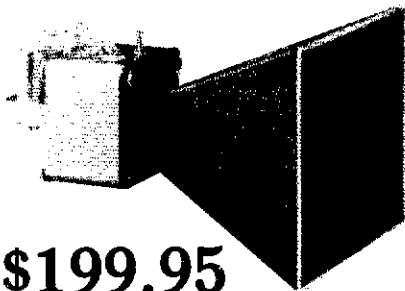
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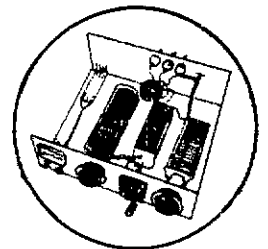
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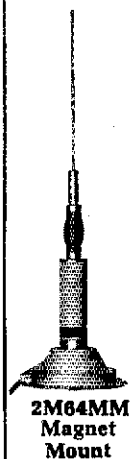
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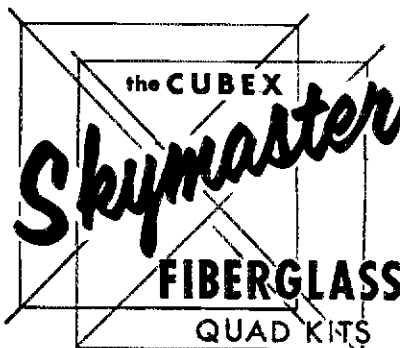
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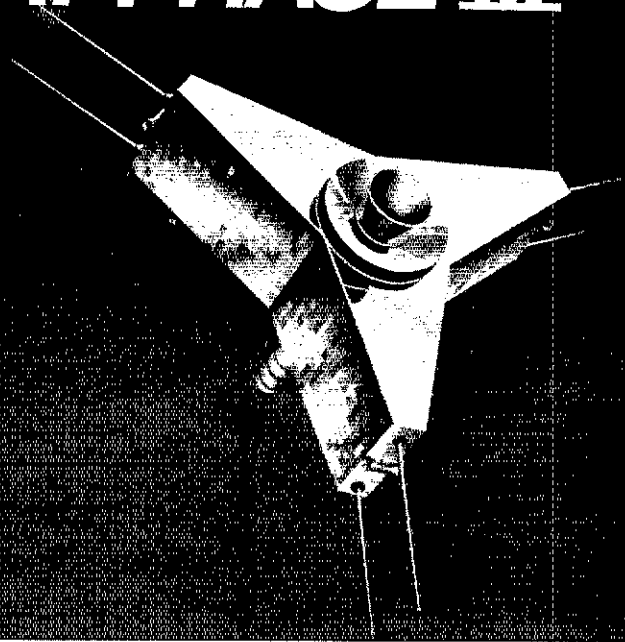
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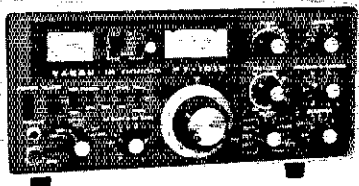
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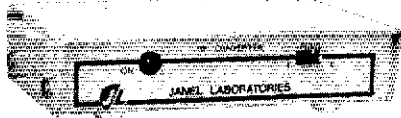
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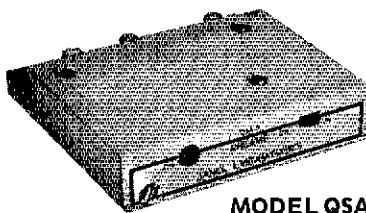
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COLLINS KWS-1 wanted, unmodified, S/N 1000-up. Also want Squires Sanders URR-58, and National R1490/GRF — 17 receivers, parts, modules, etc. All replies answered. T. Lee, 1217 Westerly Terrace 2, Los Angeles, CA 90026, 213-666-5832.

WANTED: SB-610 Heath signal monitor scope. Will pay any reasonable price for SB-610 in clean and good operating condition. Pat Rose, W5OZI, Box 393, Junction, TX 76849. 915-446-2252.

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SB-110 with ac/dc supply, mic., etc. Excellent condition. First check for \$225 takes it. K1TH6 31 Stockade Path, Duxbury, MA 02332.

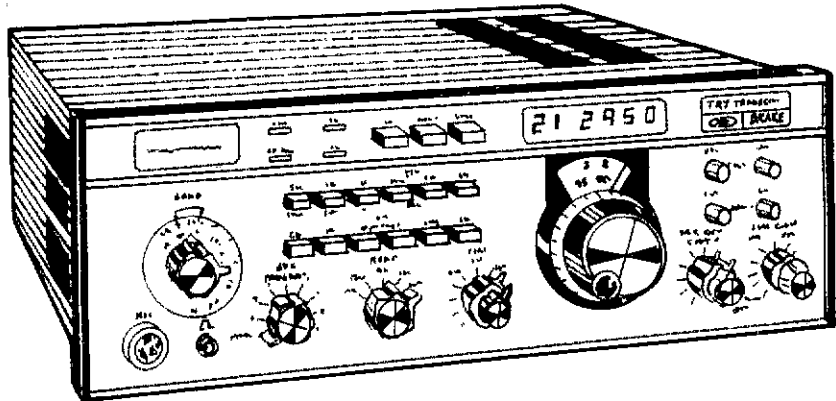
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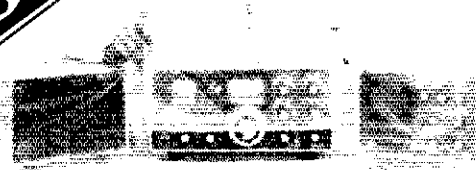


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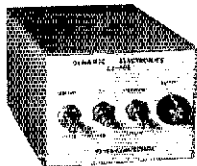
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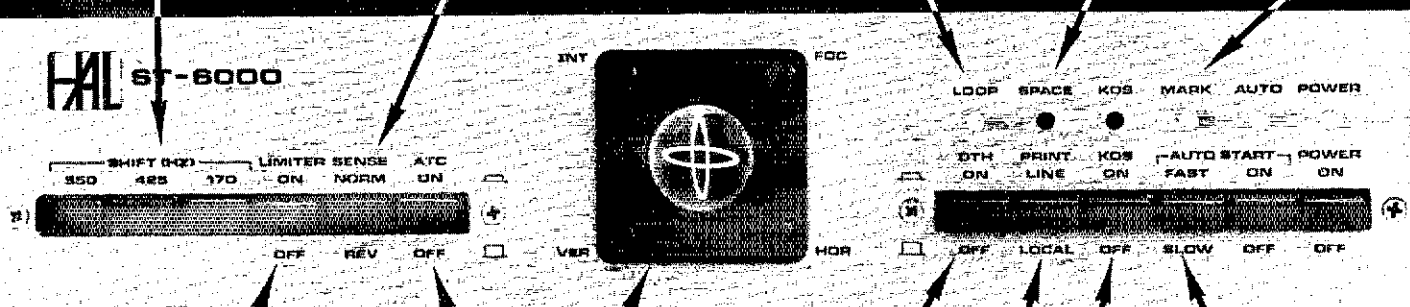
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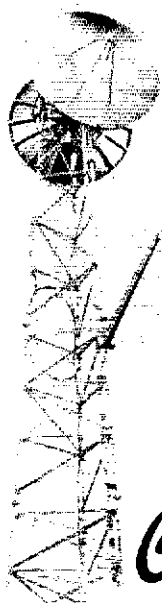
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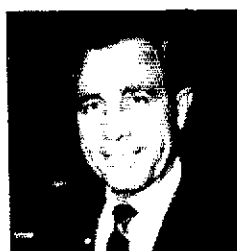
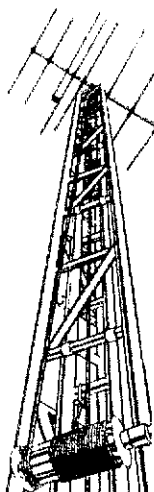
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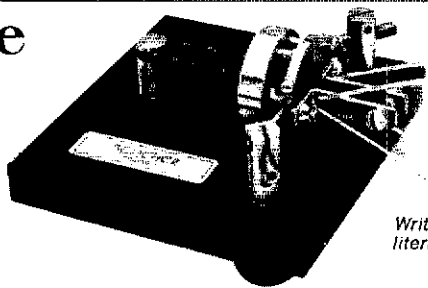
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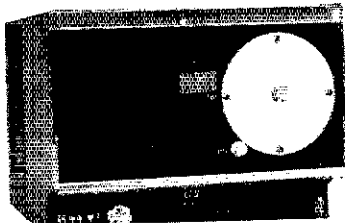
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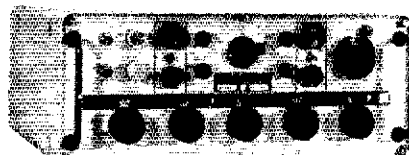
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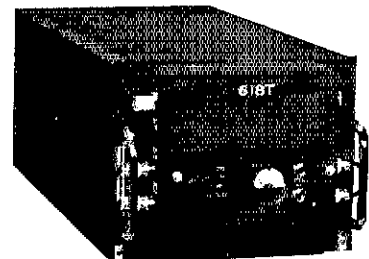
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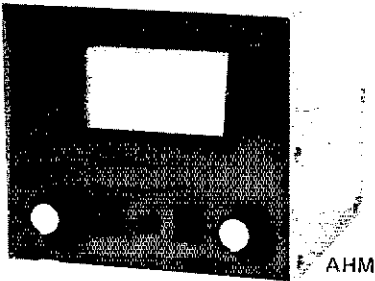
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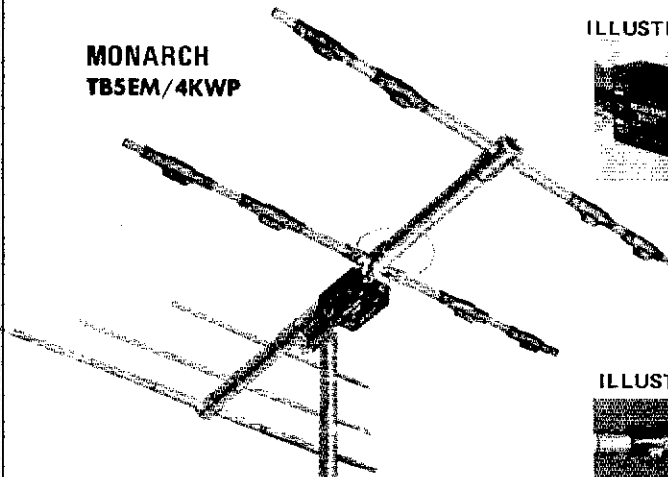


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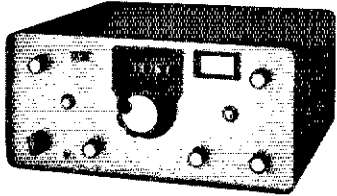


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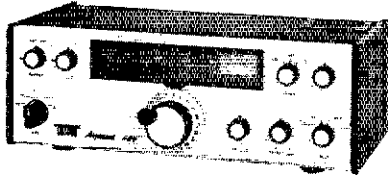
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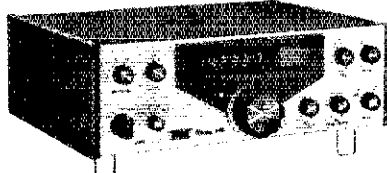
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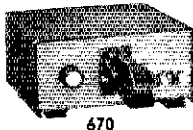
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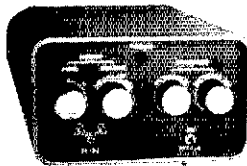
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SALE Motorola Educator II Microcomputer power supply and manual. J. Brashear, 3002 Boswell Dr., Huntsville, AL 35802.

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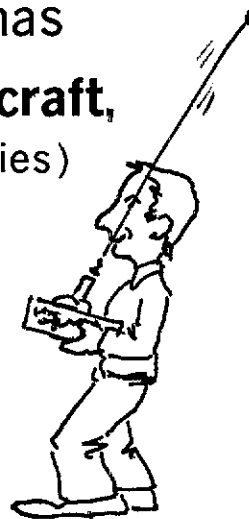


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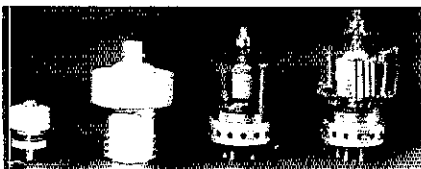
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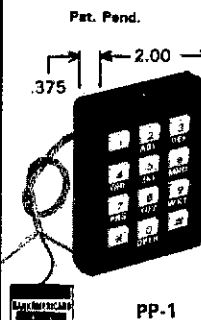
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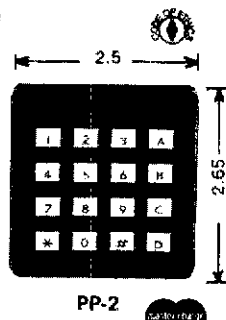
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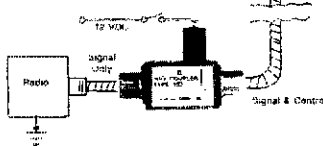
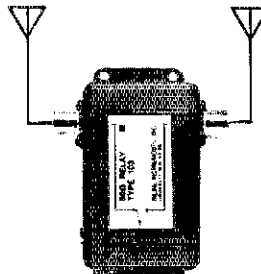
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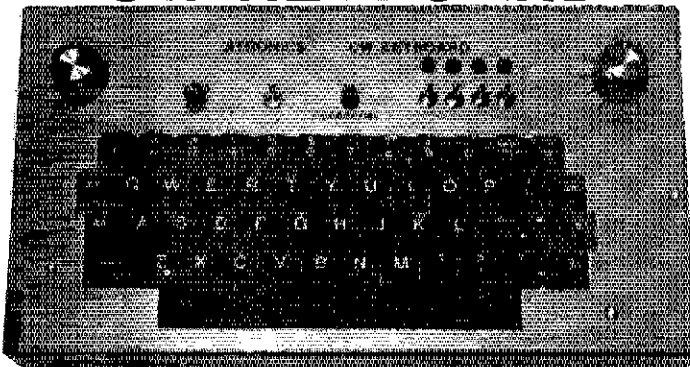
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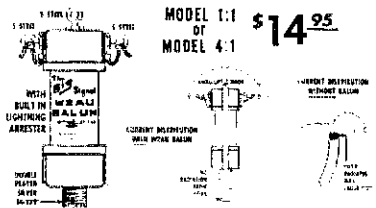
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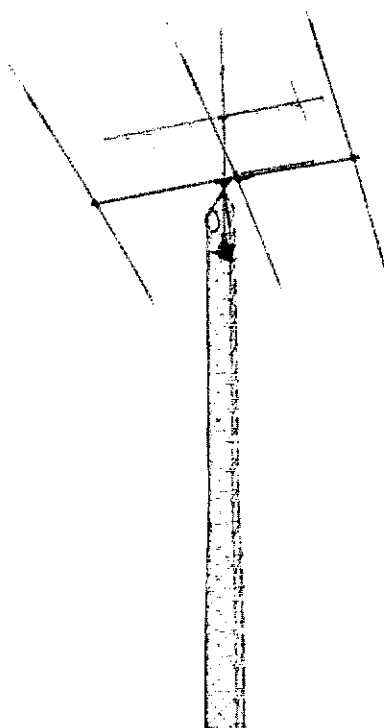
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WANT Fourth edition (Dec. 1928) ARRL Handbook. W9SSW9DDL.

REPLACE rusted antenna bolts with stainless steel bolts. Small quantities, free catalog. Elwick, Dept. 280, 230 Woods Lane, Somerdale, NJ 08083.

HQ180, \$325. W6BKY, Box 1457, Campbell, CA 95008.

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GLUB call pins 3 lines 1-1/4 x 3-1/4 \$1.25 each first name call and club. Colors black red or blue with white letters. (Catalogue) Arnold Linzner 2041 Linden St., Ridgewood NY 11227.

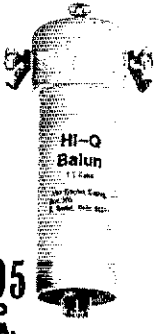
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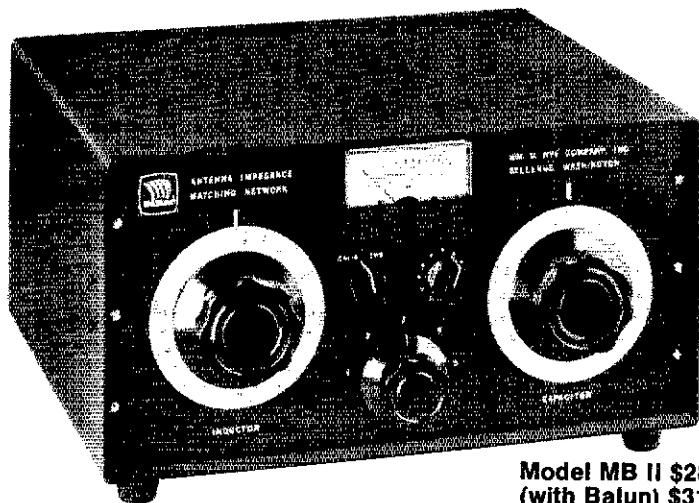


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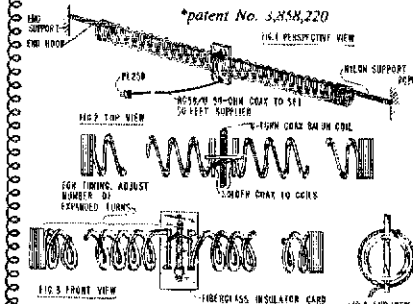
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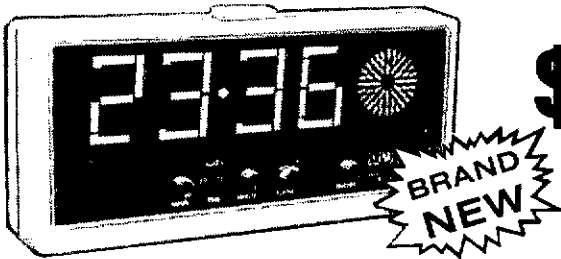
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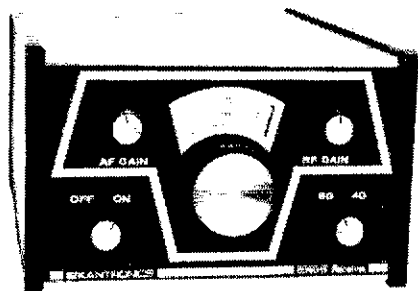
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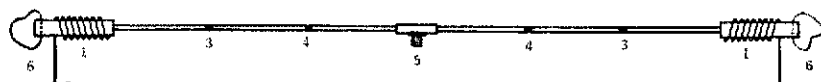
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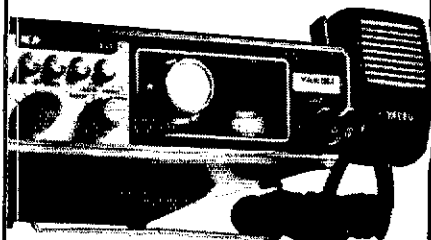


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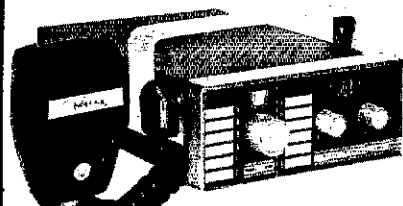
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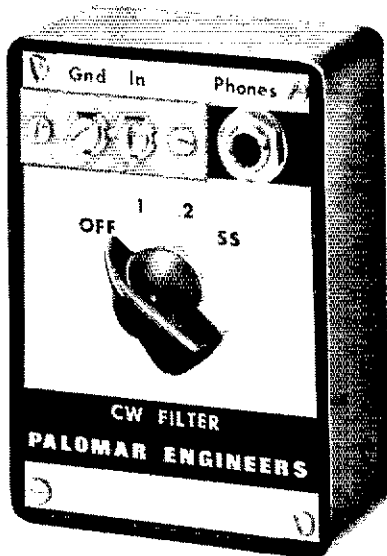
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HAMS Delight. 2BR2B home, finished utility room-workshop, large double garage, no care landscaping tower and quad. 220V line in shack. Located in active amateur community, no tower problems. XYL gets large light kitchen, family room, large living-dining room. Mid-70s. Would deal furniture and complete station. W7LOL, P. O. Box 1358, Sun City, AZ 85372.

WILSON 1402 modification and repair: Inventory of Wilson repair parts on hand. Installation of Data Signal TTP, BNC antenna connector, or external side mounted power jack. Returned UPS PPD. Area repeater crystals in stock. Communication Services, 521 East Eleventh, P. O. Box 370, Hutchinson, KS 67501. Call for quote, 316-682-7462. W#UY.

GLOBE Chief xmt'r & VFO \$100. Pick up Wilmington, DE. Stinger, 302-772-4713.

WILSON WE-800 synthesized 2 meter transceiver, excellent cond., nicads, with 2 mobile brackets, rubber duck ant., carrying case. \$370 cash or certified check. Will consider swap for Argonaut/405 linear or Triton. Pick up in NYC or you pay shipping. Mel Snyder 212-935-6440, 625-7430 eves.

CX7B Signal/One modified by Cunningham \$1295, Dentron 160-10AT \$100, 350XL Demonstrator with readout and AC \$1250, NCX-1000 good working condition \$450.

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TR3/AC3 \$400, SW700CX/117XC \$550, Atlas 180 with ac supply console just back from factory overhaul, \$500, ICOM IC-230 \$190, Regency HR-212 with 7 channels \$150, Kenwood Twins, T599/R599 in excellent condition \$500. Get your name on list for the ICOM 701 superlig. Full line accessories. Phone and ask for Bob, W5GEL, 512-883-5103. Douglas Electronics, 1118 South Staples, Corpus Christi, TX 78404.

PAGE 23 channel am GB converted to 10M, 4 channels supplied. \$85. WB4STF 205-661-9147.

COLLINS: 75S3A — \$495, 75S3B — \$595, 32S3 — \$395, 516F2 — \$135, 312B3 — \$35, KWM-1 — \$225, MP-1 — \$75. K9DKU, Box 301, DePere, WI 54115. 1-414-532-6643.

160, 80, and 40. New TD-160 Trap Dipole. 104 feet length. Only 160 trap dipole on the market. \$45.95 plus \$2.50 UPS. Bankcards accepted. 25 other models. 1st class postage for complete catalog. Antenna Supermarket, P. O. Box 563, Palatine, IL 60067 312-359-7092.

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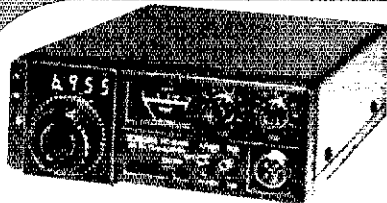
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FOR SALE: ICOM 22S with two mobile mounts. 14 channels programmed. \$200. John Knight, WA7ZXD, Star Route, Concho AZ 85924.

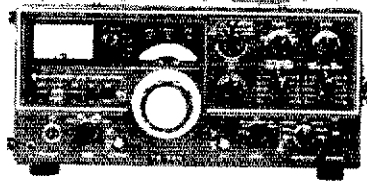
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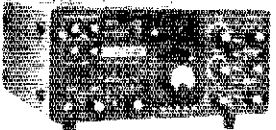


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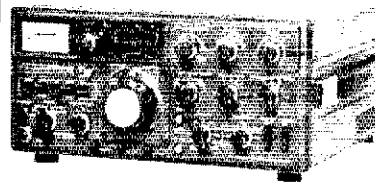
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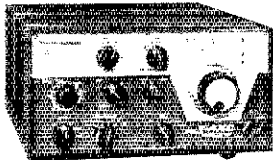
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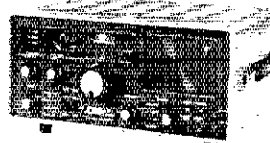
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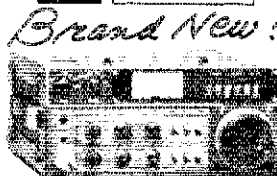
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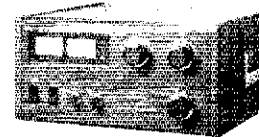
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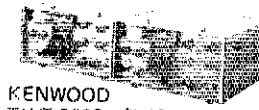
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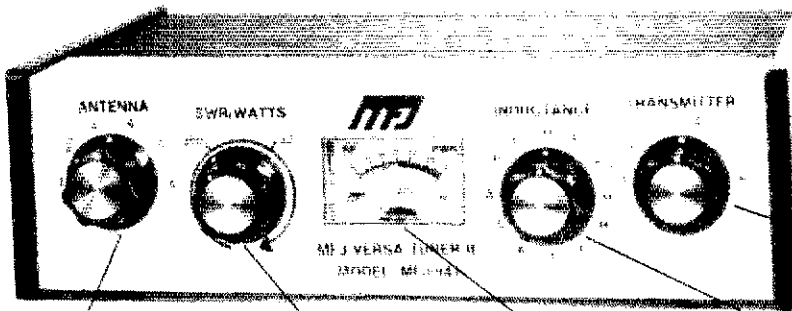
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This NEW MFJ Versa Tuner II . . .

has SWR and dual range wattmeter, antenna switch, efficient airwound inductor, built in balun. Up to 300 watts RF output. Matches everything from 160 thru 10 Meters: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balance lines, coax lines.



BRAND NEW

\$79⁹⁵

Antenna matching capacitor. 208 pf. 1000 volt spacing.

Sets power range, 300 and 30 watts. Pull for SWR.

Meter reads SWR and RF watts in 2 ranges.

Efficient airwound inductor gives more watts out and less losses.

Transmitter matching capacitor. 208 pf. 1000 volt spacing.

Only MFJ gives you this MFJ-941 Versa Tuner II with all these features at this price:

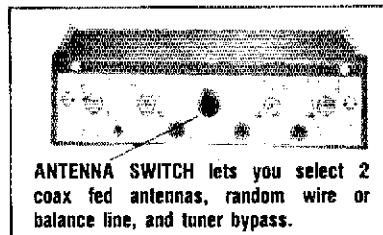
A SWR and dual range wattmeter (300 and 30 watts full scale) lets you measure RF power output for simplified tuning.

An antenna switch lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

A new efficient airwound inductor (12 positions) gives you less losses than a tapped toroid for more watts out.

A 1:4 balun for balance lines. 1000 volt capacitor spacing. Mounting brackets for mobile installations (not shown).

With the NEW MFJ Versa Tuner II you can run your full transceiver power output — up to 300 watts RF power output — and match your



ANTENNA SWITCH lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

transmitter to any feedline from 160 thru 10 Meters whether you have coax cable, balance line, or random wire.

You can tune out the SWR on your dipole, inverted vee, random wire, vertical, mobile whip, beam, quad, or whatever you have.

You can even operate all bands with just

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Increase the usable bandwidth of your mobile whip by tuning out the SWR from inside your car. Works great with all solid state rigs (like the Atlas) and with all tube type rigs.

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\$49⁹⁵

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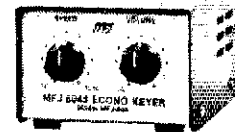
Same as MFJ-901 Versa Tuner, but does not have built-in balun for balance lines. Tunes coax lines and random lines.



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Operate 160 thru 10 Meters. Up to 200 watts RF output. Matches high and low impedances. 12 position inductor. SO-239 connectors. 2x3x4 inches. Matches 25 to 200 ohms at 1.8 MHz.



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