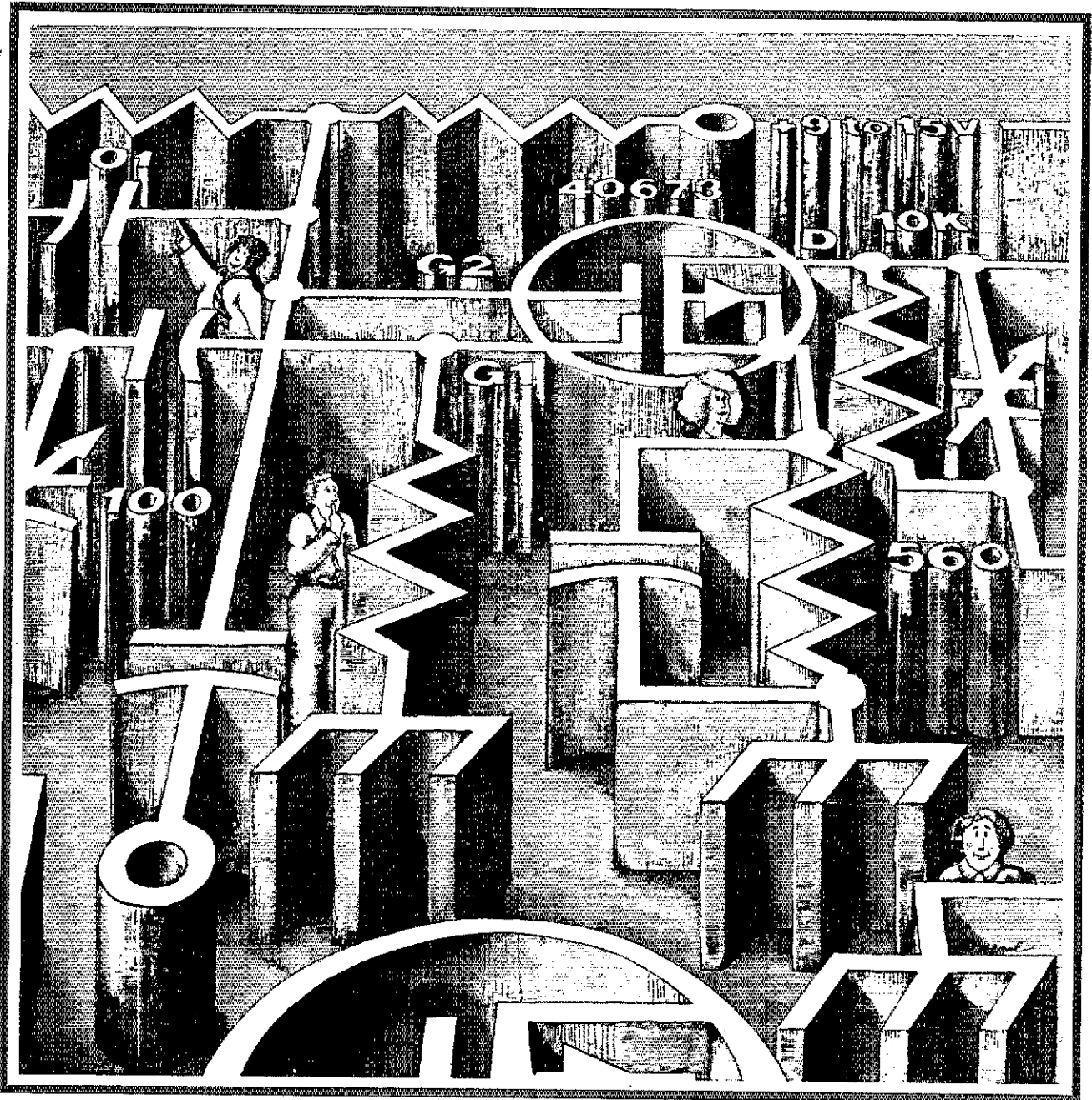


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devoted entirely to Amateur Radio

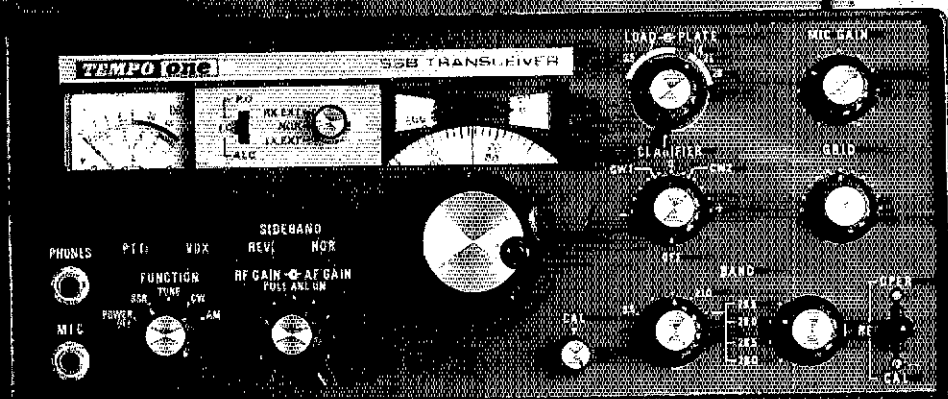
September 1977

\$1.50



Lost in a maze of electronic symbols? Say goodbye to confusion.

don't let
the low
price fool
you...



the Tempo ONE is much more than just an inexpensive transceiver

The Tempo ONE is a highly reliable, excellent quality HF transceiver. It has proven itself in worldwide use by thousands of General and Advanced Class amateurs for more than six years. And now under the new FCC regulations the Tempo ONE has become the ideal rig for the Novice and Technician Class also. Study its specifications, talk to any of the thousands of owners, compare the Tempo ONE with other transceivers... and we know you can't beat the price. We're sure the Tempo ONE will prove itself to be the "value leader" for you also.

Frequency Range: 80 through 10 meters (28.5-29.0 10M. xtal supplied)
Modes of Operation: SSB upper and lower sideband, CW and AM.
Solid State VFO: Very stable Colpitts circuit
Receiver Offset Tuning (Clarifier): Provides .5 khz. variation of receiver tuning when switched ON.

Frequency Stability: Less than 100 cycles after warm-up, and less than 100 cycles for plus or minus 10% line voltage change.
Input Power: 300 watts PEP, 240 watts CW.
AF Bandwidth: 300-2700 cps
Receiver Sensitivity: 1/2 μ v input S/N 10dB
AGC: Fast attack slow decay for SSB and CW.
Selectivity: 2.3 khz. (-6 dB), 4 khz. (-60 dB)
Image Rejection: More than 50 dB.
Audio Output: 1 watt at 10% distortion.
Audio Output Impedance: 8 ohms and 600 ohms
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Antenna Impedance: 50-75 ohms
Carrier Suppression: -40 dB or better
Sideband Suppression: -50 dB at 1000 CPS
Third Order Intermodulation Products: -30 dB (PEP)

| | |
|---------------------------|-----------------|
| TEMPO "ONE" TRANSCEIVER | \$399.00 |
| AC/ONE POWER SUPPLY | \$99.00 |
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This is the amplifier you have been waiting for



The new 2KD-5 linear amplifier... a one piece desk model with the power and reliability of a console

At Henry Radio, we know how to build only one kind of amplifier ... the best. We want you to compare the 2KD-5 with any other desk model at any price.

Remember, the 2KD-5 is only one model in the world's broadest line of amplifiers ... both vacuum tube and solid state ... for HF, VHF and UHF ... fixed station and mobile ... low power and high power.

Never before has any one company offered such a cornucopia of high power RF amplifiers.

Remember also that Henry Radio offers a broad line of commercial and FCC type accepted amplifiers covering the range of 3 MHz to 500 MHz. Henry amplifiers are

in use all around the world. Commercial and export inquiries are invited.

- The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, 15 and 10 meter amateur bands.
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- Pi-L plate circuit with a rotary silver plated tank coil for greatest efficiency and maximum attenuation of unwanted harmonics.
- Full legal input in all modes. 2000 watts PEP input for SSB. 1000 watts DC input for CW, RTTY and AM.
- Jumper for 115 or 230 VAC, 3 wire single phase.
- 10.5" high x 15" wide x 17.5" deep
- Price ... \$895.00

2K-4...LINEAR AMPLIFIER. Offers engineering, construction and features second to none. Provides a long life of reliable service, while its heavy duty components allow it to loaf along even at full legal power. Operates on all amateur bands, 80 thru 10 meters. If you want to put that strong clear signal on the air that you've probably heard from other 2K users, now is the time. Move up to the 2K-4. Floor console...\$995.00

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TEMPO 2002. The same fine specs and features as the 6N2, but for 2 meter operation only. ...\$745.00

TEMPO 2006. Like the 2002, but for 6 meter operation. ...\$795.00

TEMPO VHF/UHF AMPLIFIERS. Solid state power amplifiers for use in most land mobile applications. Increases the range, clarity, reliability and speed of two-way communications. FCC type accepted also.

| Model | Drive Power | Output Power | Price |
|-------|-------------|--------------|-------|
|-------|-------------|--------------|-------|

LOW BAND VHF AMPLIFIERS (35 to 75 MHz)

| | | | |
|--------------|-----|------|--------|
| Tempo 100C30 | 30W | 100W | \$159. |
| Tempo 100C02 | 2W | 100W | \$179. |
| Tempo 100C10 | 10W | 100W | \$149. |

HIGH BAND VHF AMPLIFIERS (135 to 175 MHz)

| | | | |
|--------------|-----|------|--------|
| Tempo 130A30 | 30W | 130W | \$189. |
| Tempo 130A10 | 10W | 130W | \$179. |
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| Tempo 80A30 | 30W | 80W | \$149. |
| Tempo 80A10 | 10W | 80W | \$139. |
| Tempo 80A02 | 2W | 80W | \$159. |
| Tempo 50A10 | 10W | 50W | \$ 99. |
| Tempo 50A02 | 2W | 50W | \$119. |
| Tempo 30A10 | 10W | 30W | \$ 69. |
| Tempo 30A02 | 2W | 30W | \$ 89. |

UHF AMPLIFIERS (400 to 512 MHz)

| | | | |
|-------------|-----|-----|--------|
| Tempo 70D30 | 30W | 70W | \$210. |
| Tempo 70D10 | 10W | 70W | \$240. |
| Tempo 70D02 | 2W | 70W | \$270. |

| | | | |
|-------------|-----|-----|--------|
| Tempo 40D10 | 10W | 40W | \$145. |
| Tempo 40D02 | 2W | 40W | \$165. |
| Tempo 40D01 | 1W | 40W | \$185. |
| Tempo 25D02 | 2W | 25W | \$125. |
| Tempo 10D02 | 2W | 10W | \$ 85 |
| Tempo 10D01 | 1W | 10W | \$125. |

TEMPO 100AL10 VHF LINEAR AMPLIFIER. Completely solid state, 144-148 MHz. Power output of 100 watts (nom.) with only 10 watts (nom.) in. Reliable and compact ...\$199.00

TEMPO 100AL10/B BASE AMPLIFIER ...\$349.00

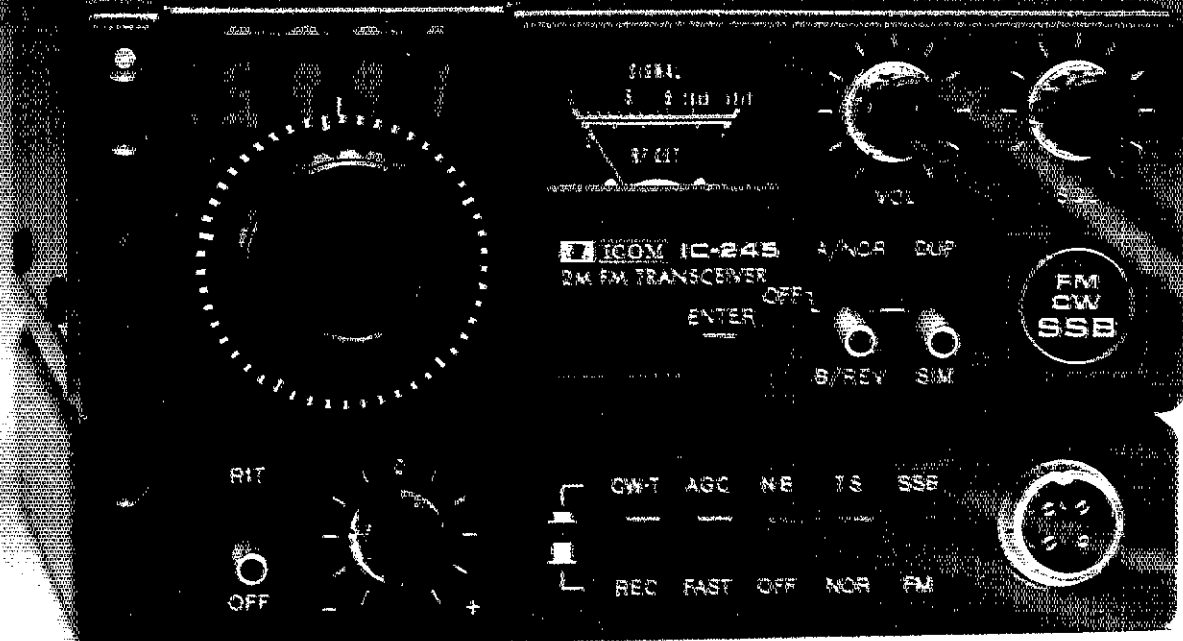
Tempo solid state amplifiers are available at Tempo dealers throughout the U.S.

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Prices subject to change without notice.



That's all, Folks!

All you need for All Mode Mobile, that is.

All Mode Mobile is now yours in a superior ICOM radio that is a generation ahead of all others. The new, fully synthesized **IC-245/SSB** puts you into FM, SSB and CW operation with a very compact dash-mounted transceiver like none you've ever seen.

- **Single knob frequency selection:** The **IC-245/SSB** is the only fully synthesized mobile unit with convenient single knob frequency selection over the entire band. No more fussing with two or more knobs just to check what is going on around the band. One easy spin of the 50-position detent knob does it all. This very important user oriented feature is exclusively ICOM.
- **Remote programming:** The **IC-245/SSB** LSI chip provides for the input of programming digits from a remote key pad which can be combined with Touch Tone* circuitry to provide simultaneous remote program and tone. Computer control from a PIA interface is also possible.
- **FM stability on SSB and CW:** The **IC-245/SSB** synthesis of 100 Hz steps makes mobile SSB as stable as FM. This extended range of operation is attracting many FM'ers who have been operating on the direct channels and have discovered SSB.
- **Variable offset:** Any offset from 10 KHz through 4 MHz in multiples of 10 KHz can be programmed with the LSI Synthesizer.

The **IC-245/SSB** is the very best and most versatile mobile radio made: that's all. For more information and your own hands-on demonstration see your ICOM dealer. When you mount your **IC-245/SSB** you'll have all you need for All Mode Mobile.

SPECIFICATIONS

GENERAL

Frequency Coverage 144.00 to 148.00 MHz

FM (F3)

Modes *SSB (A3J), CW (A1)

Supply Voltage DC 13.8V - 15%

Size (mm) 90H x 155W x 23SD

Weight (kg) 2.7

TRANSMITTER

PX Output FT 10W

*A3J 10W (PLP), A1 10W

Carrier Suppression 40 dB or better

Spurious Radiation

60 dB or less below carrier

Maximum Frequency Deviation

-5 kHz

Microphone Impedance

600 ohms

RECEIVER:

Sensitivity *A3J, A1 0.3 microvolt input

tones 10 dB S+N/N

F3 0.3 microvolt or less for

20 dB quieting

S - N + 0.5N at 1 microvolt

input, 30 dB

Squelch Threshold

5 dB or less (F3)

60 dB or better

SYNTHESIZER:

Frequency Range

144 MHz to 148 MHz

5 kHz for FM

*100 Hz or 3 kHz for

SSB

per C in the range of

10 to -60 C.

0.000145%

* Valid with SSB only

VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

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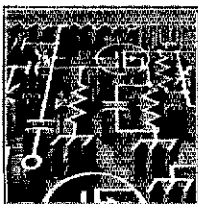
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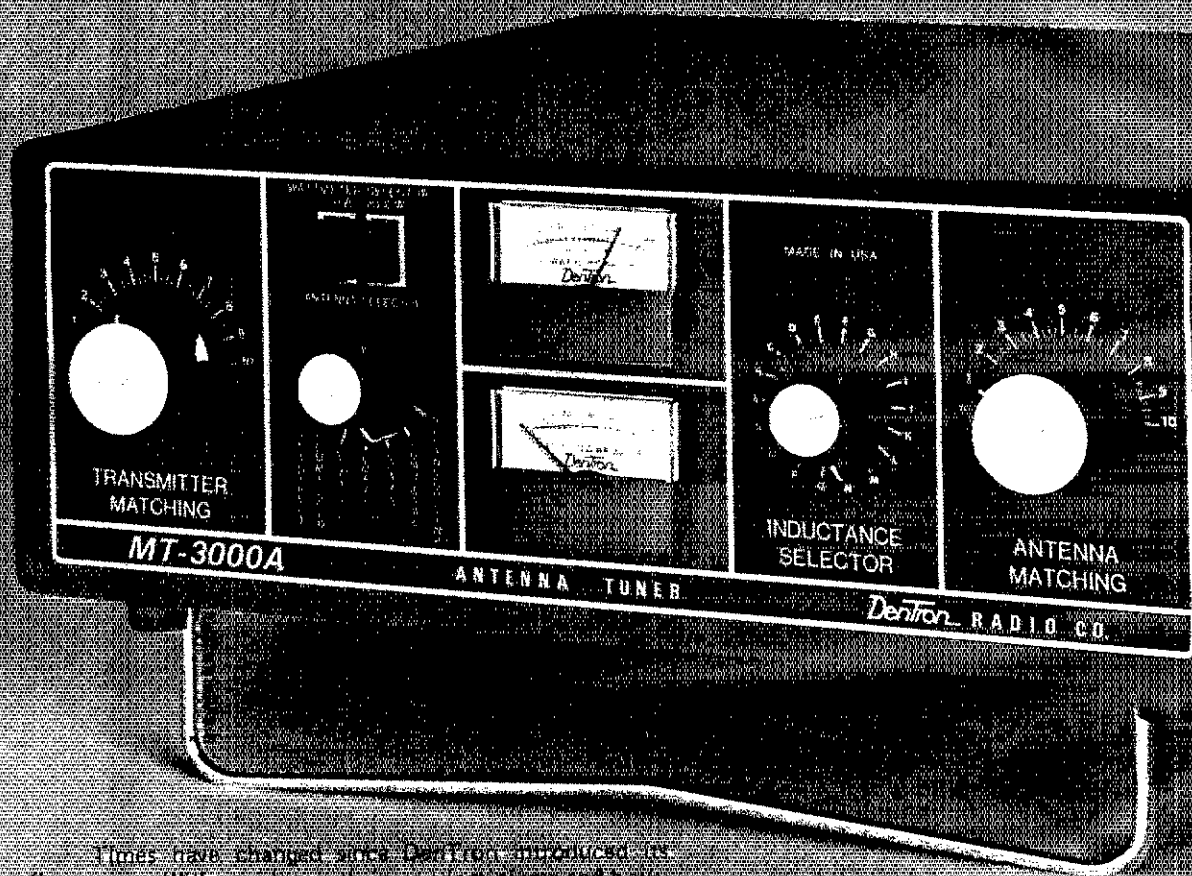
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Look closely at the new MT-3000A. You've never seen anything like it.



Times have changed since DenTron introduced its first tuner. With rapid growth in condominiums and housing developments, we have new problems that require new solutions.

DenTron decided to rethink the tuner and what its total capabilities should be.

The MT-3000A is a capsulized solution to many problems. It incorporates 4 unique features to give you the most versatile antenna tuner ever built.

First, as a rugged antenna tuner the MT-3000A easily handles a full 3KW pep. It is continuous tuning 1.8-30mc. It matches everything between 160 and 10 meters.

Second, the MT-3000A has built-in dual watt meters.

Third, it has a built-in 50 ohm dummy load for proper exciter adjustment.

Fourth, the antenna selector switch: (a) enables you to by-pass the tuner direct; (b) select the dummy load or 5 other antenna systems, including random wire or balanced feed.

The cabinet size alone of the MT-3000A (6 1/2" x 14" x 14") makes it revolutionary. Combine that with its four built-in accessories and we're sure you'll agree that the MT-3000A is one of the most innovative and exciting instruments offered for amateur use.

At \$349.50 the MT-3000A is not inexpensive. But it is less than you'd expect to pay for each of these accessories separately.

As unique as this tuner is, there are many things it shares with all DenTron products. It is built with the same meticulous attention to detail and American craftsmanship that is synonymous with DenTron.

After seeing the outstanding MT-3000A, wouldn't you rather have your problems solved by DenTron?

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(216) 225-3173

THESE TWO WORDS SHOULD ALWAYS BE USED TOGETHER:

Wilson ... and 2-Meter!

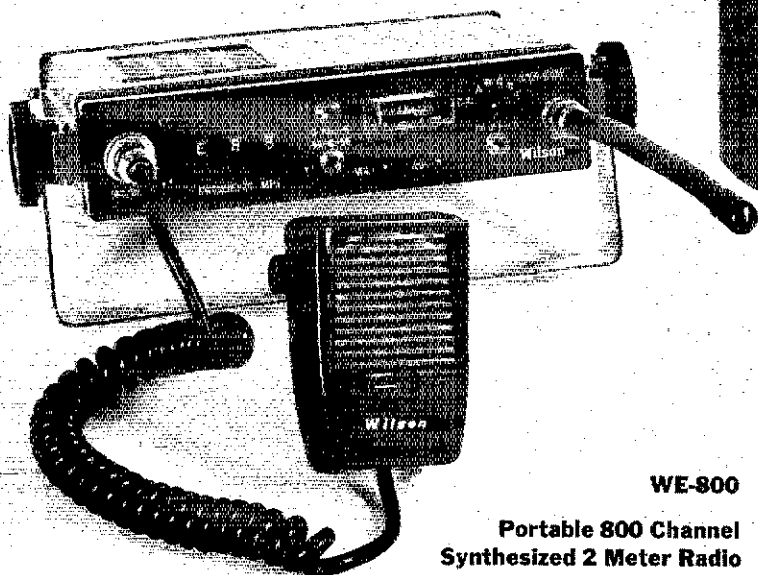
The newest and hottest 2-Meter rig, is the Wilson WE-800 . . .

It is totally portable, powered by internal rechargeable Ni-Cad batteries, and weighs less than 4 lbs.

The C-MOS synthesizer allows 800 channel selections, and the unit has the feature of a Hi/Lo 1 or 12 watt power option switch (when used as a mobile or base).

Additional features include 600 KHz offset up or down. 2 additional offsets available for non-standard repeaters, and five channel pre-programmed matrix selector.

The WE-800 is truly the ideal equipment for the discriminating amateur who wants a "go anywhere" radio. The Wilson WE-800 is priced under \$400.00.



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Portable 800 Channel Synthesized 2 Meter Radio



Isn't it about time you afford yourself the best in two-meter equipment? The Wilson gear is quite affordable.

For example, the 2-Meter Hand-Held Model 1405 SM is a switchable 1 and 5 watt, six channel unit powered by 10 "AA" rechargeable nickel cadmium batteries.

Tough? You bet . . . the Lexan® outer housing will allow rough and rugged use. 500 milli-watts of audio power will get the signal through even in high noise areas.



1405 SM



Through efficient engineering, the unit provides 60 dB intermodulation protection in heavy RF traffic areas. Separate speaker and microphone are built into the design of the radio.

Wilson 2-Meter Hand-Helds are priced from \$192.95 and a complete line of accessories and tone options are available.

Join the thousands of Hams now on the air world-wide with the affordable Wilson portables.

Other Quality Amateur Equipment from Wilson includes Antennas, Rotors, Towers

Want more information and specifications on these products? Contact:

Your Local Dealer or the Consumer Products Division,

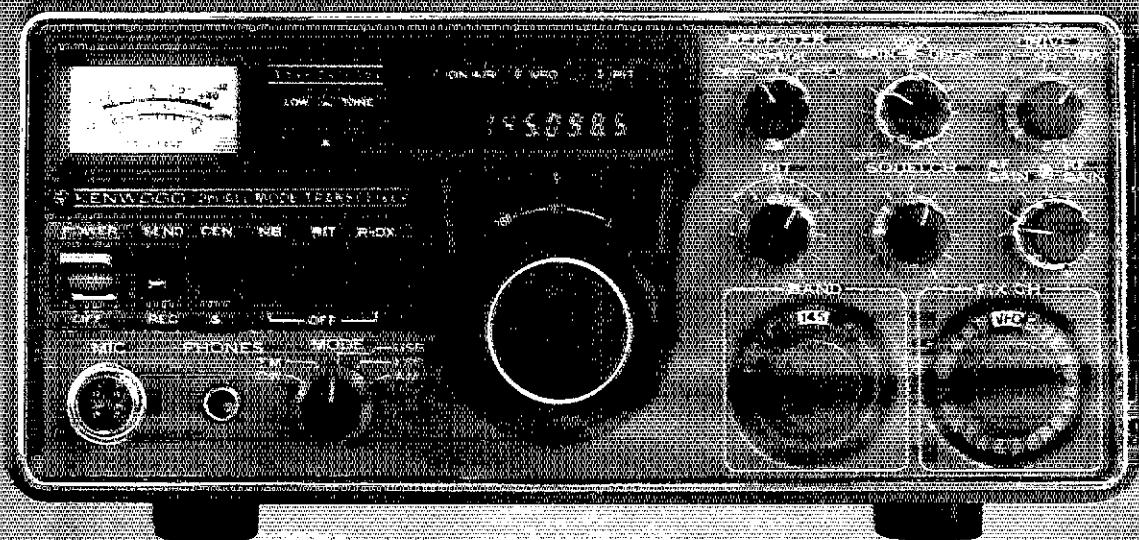


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NEW TS-700S WITH DIGITAL FREQUENCY DISPLAY



Kenwood has done it again! We've combined the fine, time-proven characteristics of the original TS-700A together with many of the ideas and comments for improvement from amateurs worldwide. Check out the new "built-ins": digital readout, receiver pre-amp, VOX, semi-break in, and CW sidetone! Of course, it's still all mode, 144-148 MHz and VFO controlled.

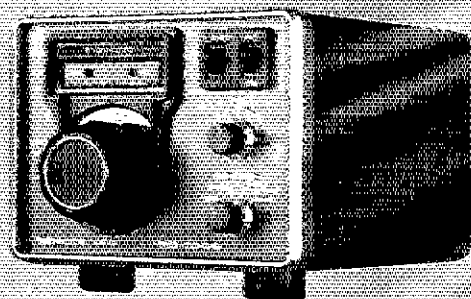
Features: Digital readout with "Kenwood Blue" digits • high gain receiver pre-amp • 1 watt low power switch • built in VOX • semi-break in on CW • CW sidetone • Operates all modes: SSB (upper & lower), FM, AM and CW • Completely solid state circuitry provides stable, long lasting, trouble-free operation • AC and DC capability (operate from your car, boat, or as a base station through its built-in power supply) • 4 MHz band coverage (144 to 148 MHz) • Automatically switches transmit frequency 600 KHz for repeater operation. Simply dial in your receive fre-

quency and the radio does the rest... simplex, repeater, reverse • Or accomplish the same by plugging a single crystal into one of the 11 crystal positions for your favorite channel • Transmit/Receive capability on 44 channels with 11 crystals.

VFO-700S

The perfect companion to the TS-700S! This handsomely styled unit provides you with extra versatility and the luxury of having a second VFO in your shack. Great for split frequency operation and for tuning off frequency to check the band.

The function switch on the VFO-700S selects the VFO in use and the appropriate frequency is displayed on the digital readout in the TS-700S. In addition, a momentary contact "frequency check" switch allows you to spot check the frequency of the VFO not in use.



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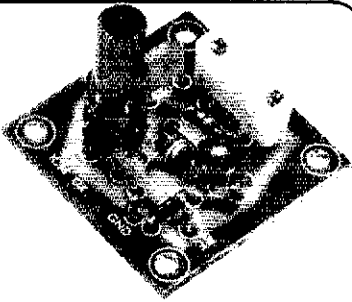


KENWOOD

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for the experimenter!

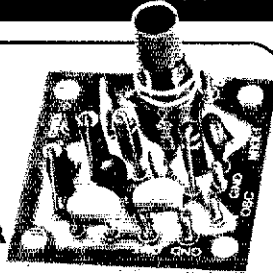
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 OSCILLATORS • RF MIXER • RF AMPLIFIER • POWER AMPLIFIER



OX OSCILLATOR

Crystal controlled transistor type. 3 to 20 MHz, OX-Lo, Cat. No. 035100. 20 to 60 MHz, OX-Hi, Cat. No. 035101
Specify when ordering.

\$3.95 ea.



MXX-1 TRANSISTOR RF MIXER

A single tuned circuit intended for signal conversion in the 30 to 170 MHz range. Harmonics of the OX or OF-1 oscillator are used for injection in the 60 to 179 MHz range. 3 to 20 MHz, Lo Kit, Cat. No. 035105. 20 to 170 MHz, Hi Kit, Cat. No. 035106
Specify when ordering.

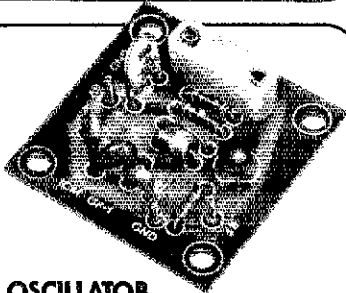
\$4.50 ea.



PAX-1 TRANSISTOR RF POWER AMP

A single tuned output amplifier designed to follow the OX or OF-1 oscillator. Outputs up to 200 mw, depending on frequency and voltage. Amplifier can be amplitude modulated. 3 to 30 MHz, Cat. No. 035104
Specify when ordering.

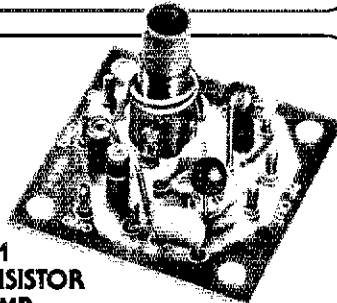
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OF-1 OSCILLATOR

Resistor/capacitor circuit provides osc over a range of freq with the desired crystal. 2 to 22 MHz, OF-1 LO, Cat. No. 035108. 18 to 60 MHz, OF-1 HI, Cat. No. 035109
Specify when ordering.

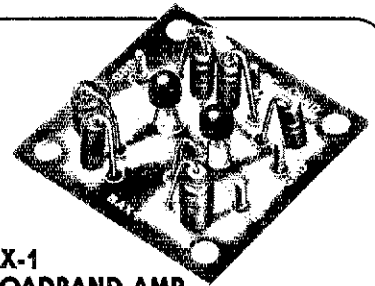
\$3.25 ea.



SAX-1 TRANSISTOR RF AMP

A small signal amplifier to drive the MXX-1 Mixer. Single tuned input and link output. 3 to 20 MHz, Lo Kit, Cat. No. 035102. 20 to 170 MHz, Hi Kit, Cat. No. 035103.
Specify when ordering.

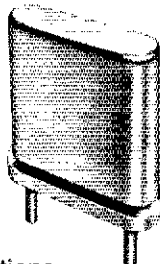
\$4.50 ea.



BAX-1 BROADBAND AMP

General purpose amplifier which may be used as a tuned or untuned unit in RF and audio applications. 20 Hz to 150 MHz with 6 to 30 db gain. Cat No. 035107
Specify when ordering

\$4.75 ea.



.02% Calibration Tolerance EXPERIMENTER CRYSTALS (HC 6/U Holder)

| Cat. No. | Specifications | |
|----------|-------------------------------------|------------|
| 031080 | 3 to 20 MHz — for use in OX OSC Lo | \$4.95 ea. |
| | <i>Specify when ordering</i> | |
| 031081 | 20 to 60 MHz — For use in OX OSC Hi | \$4.95 ea. |
| | <i>Specify when ordering</i> | |
| 031300 | 3 to 20 MHz — For use in OF-1L OSC | \$4.25 ea. |
| | <i>Specify when ordering</i> | |
| 031310 | 20 to 60 MHz — For use in OF-1H OSC | \$4.25 ea. |
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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 worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

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

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

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"It Seems to Us..."

In Search of Ethics

Severely injured animals will often bite their own wounds. Perhaps it's done in a feeling of desperation. The source of the desperation that prompts some amateur radio retailers to bite the hand that feeds them, however, is a subject perhaps best left to the analyst's couch. The motivating factor is, of course, GREED. Pure and simple. Never mind the consequences. "If I don't do it, someone else will."

We've all seen the ads in the local newspapers. "Drive your car in to our well-equipped service center. No waiting." "Our expert technicians know just what you need to increase your range." If the words and accompanying illustrations of the amplifiers seem strange to you, don't worry. They're not meant for you. These ads are aimed squarely at the illegal CB op who wants some "heat" in his car or at his base.

It was one thing when these illegal ops confined their funny business to the CB channels. They've ruined that band for themselves and for everyone else, perhaps for all time, but they haven't been a threat to us. At least they weren't as long as they kept to their 23 channels, and they had no one to move the crystals around for them. When they learned how easy it was to change crystals, some of the more brazen ops moved into what they call "HF" — that area just below the amateur 10-meter band. Then, a few amateur radio retailers began to see the pot of gold at the end of the rainbow. And they were not alone. At least one large corporation formed a sister division to its amateur radio division to exploit this market with what was touted as an "amateur" transceiver. The fact that it only covered one amateur band and sold for \$500 was beside the point. The important thing was that it covered the CB channels on receive, and with a simple modification could transmit on them as well.

A new era in lawlessness had begun, aided and abetted by some of the very people who were supplying amateurs with equipment, but with one big difference as far as amateurs were concerned. The illegal ops were now using amateur transceivers and linears, and it wasn't too long before some of them

began showing up on amateur bands, hurling abuse and obscenities at everyone who asked them to leave.

The result of this illegal operation has been a determined effort by the FCC to deny 10-meter linears to CBers by doing away with such equipment altogether (Docket 21116), and a move to require type acceptance of all amateur gear to insure that it cannot easily be modified for use on 11 meters (Docket 21117).

Amateurs have had to bear the brunt of these Commission actions, and the end is not yet in sight. The results are likely to be higher equipment costs to meet the more stringent government requirements, and the virtual extinction of commercially made linear amplifiers covering 10 meters. And who is largely responsible for this? Who will have contributed most to the higher costs you will have to pay for amateur gear? You guessed it. Some of the same retailers who are now trying to sell you some new amateur gear. The greedy and hungry ones who couldn't resist the opportunity to make a buck. The irony of the situation is that most of these people got their start via amateur radio, and have made their livings (and some, their fortunes) for many years from amateur radio. Then they spit on it.

A retailer can easily tell the difference between a ham and a CBer in person, if he wants to. It is a little different when the transaction takes place via the mails; there is no law that requires proof of an amateur license when purchasing amateur gear, and an impersonal mail-order transaction of this type is easily dismissed from one's conscience. In any event, if a retailer is willing to sell equipment indiscriminately, in person, mail order is not going to change the routine. In both instances it's easy for the retailer to convince himself that he has done nothing wrong. And he hasn't — legally.

Now let's consider the retailer who has the service facilities to do just about any job required. He *solicits* business in sales of communications gear from individuals he *knows* are not authorized to operate it legally. To further compound his action, he will, for a few measly dollars, convert the equipment

to do just about anything the purchaser wants. No questions asked. This retailer hasn't done anything wrong legally, either. However, the *moral* implications for both retailers are many.

This situation exists from coast to coast, in small towns and large cities. In radio stores in the East we've *observed* sales of amateur gear to, and the modification of such equipment for, non-amateurs. We have *seen* a copy of a work order issued by a large western dealer, where for \$25, including crystals, he modified a well-known make of amateur transceiver for "11-meter operation." That dealer has made a living from amateur radio for about 40 years.

The ARRL cannot condone such moral weakness at the expense of amateur radio. We ask all amateurs to join with us in censuring the retailers who offer goods and services to unlicensed persons with full knowledge that illegal operation will result.

At its meeting in July the ARRL Board of Directors voted to endorse the proposal of the General Manager to establish a Code of Ethics for advertisers and others who deal with radio amateurs. See Minute 22.

Everyone, regardless of whether or not he is a *QST* advertiser, will be invited to subscribe to this Code of Ethics. You'll hear more from us about this later. For now, the Code is not yet chiseled in stone. You have a chance to tell us how you feel about it. We would like to know. Let's hear from you. -- *WISE*

RFI UPDATE

RFI legislation is getting to be rather popular on Capitol Hill this year. A few months ago it was the Goldwater Bill, S-864. This month in "Happenings" we report on the Benjamin Bill, HR-8079 (see page 64). At press time word was received that Representative Vanik of Ohio has introduced a bill similar to the one he sponsored in the last session of Congress. This year's Vanik Bill is HR-8496. It's clear that the enormity of the RFI problem is beginning to come to the attention of our legislators. All three of these bills recognize the fact that in the vast majority of cases of RFI, the fault actually lies with the receiving device (be it a TV, stereo, or electronic organ) which has not been properly shielded or filtered against unwanted radio signals. These bills would authorize the FCC to set reasonable standards for the rejection of RFI in such home-entertainment devices. Amateurs who favor passage of these bills should be in touch with their own Representatives and Senators to express their support. -- *K1FHN*

League Lines...

ARRL is seeking price quotations for a research program conducted by qualified laboratories or individuals whose test methods and results will serve as scientific evidence in a court of law. A compilation of test data is needed to indicate near-field signal levels in volts or microvolts at ground level below amateur Yagi and cubical-quad beam antennas at elevation increments from 20 to 100 feet. The frequency range of interest is between 7 and 147 MHz (amateur bands only). The information obtained from this research program will be used in the defense of amateurs who are faced with litigation concerning tower height. Hopefully, results will indicate that RFI and TVI will diminish as the antenna height is increased. Those interested in submitting a cost estimate or desiring more information should contact W1RU at ARRL hq.

Last Call! Deadline for receipt of nomination as candidate for director or vice director in elections currently being conducted in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions is noon, September 10. Nominations must bear the signatures of 10 (or preferably more) Full Members. Complete details - including "absentee balloting" - appeared in "Happenings," July and August issues of *QST*.

Egypt, Israel and the U.S. have agreed for the exchange of third-party traffic between amateur stations K7FPX/SU and K4SQT/SU at the Sinai Field Mission and stateside amateurs, effective immediately.

We've had an opportunity to peruse a copy of K6DXK's The French Atlantic Affair which was not available to us or W6NAZ when the article in August *QST* was prepared. It's a contemporary book with some passages and language that suggest discretion in exposing it to family audiences.

OSCAR program manager position open at ARRL hq. Full-time, entry-level opening for an experienced OSCAR communicator. Contact Chod Harris at ARRL hq. for more details.

During the July 13 New York power failure, amateurs supplied the New York City Police Department with vitaly needed emergency communications with WR2ACD handling much of the load. Hams manned stations at precinct houses, accompanied patrol cars, reported any crime or looting and used their own emergency generators to back up those used by police. Amateur radio received good publicity from both print and broadcast media. More later.

In celebration of Her Majesty Queen Elizabeth's Silver Jubilee, Canadian amateurs with a VE prefix may use CY and those with a VO prefix may use CK for the remainder of the jubilee year.

The Schematic Diagram — A Maze or a Road Map?

If you've ever looked at the circuit diagram for your rig and wondered what all those squiggly lines, circles, arrows and dots represented, then you're a candidate for this quickie course in schematic diagrams!

By Jim Bartlett,* WB9VAV

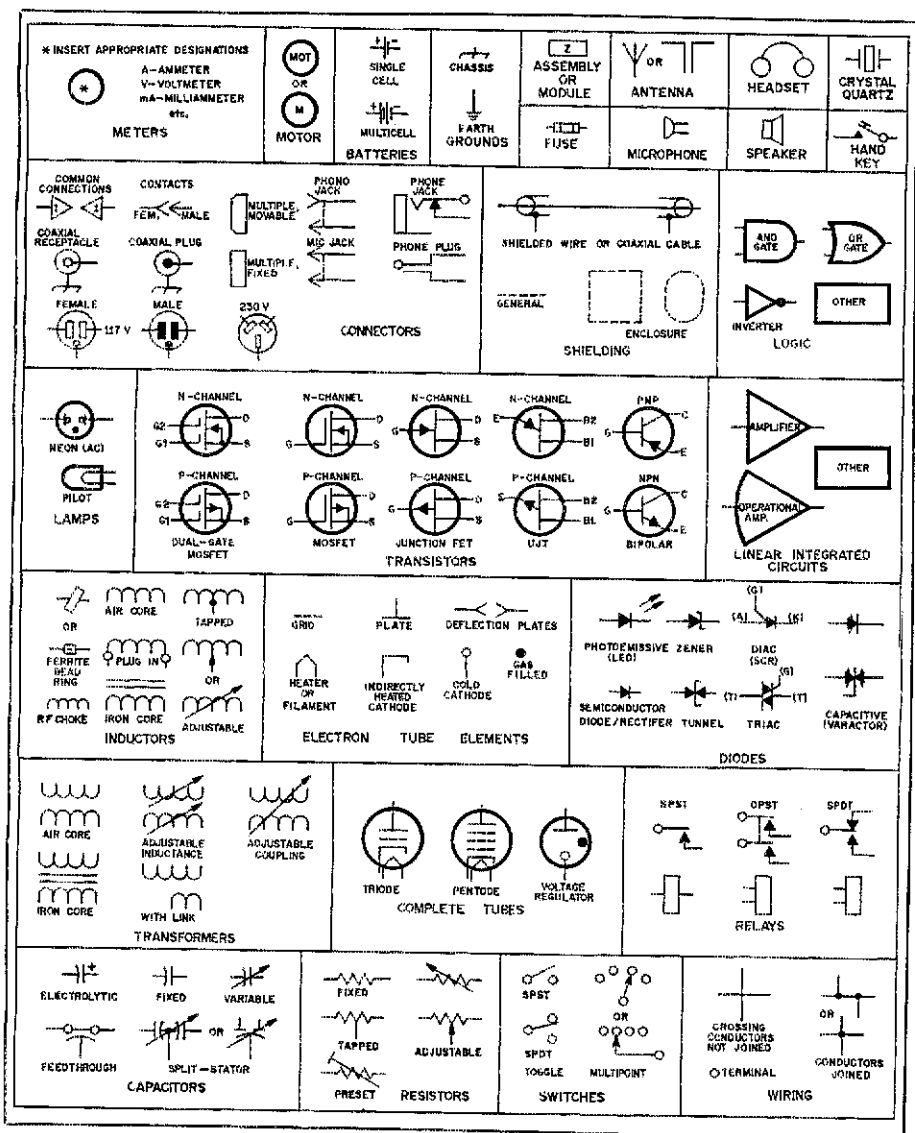


Fig. 1 — Schematic diagrams use these symbols most frequently.

A diagram is like a road map; it shows routes the signals can take. The purpose of this article is not to explain the workings of a circuit or its individual components, but to show you how to read a schematic diagram easily and correctly. Some terms we will use here may be unfamiliar to the beginner, but they can be found with detailed explanations in ARRL publications, *A Course in Radio Fundamentals* or *Understanding Amateur Radio*.

Fig. 1 shows the electronic symbols most commonly used in schematic diagrams. This information is also printed in *The Radio Amateur's Handbook*.

When you first look at a diagram, take it all in. Look at the schematic as a whole and note the various components it contains; then, look for the input or "starting point" if there is one (such as a microphone, crystal oscillator or first amplifier stage). Follow the signal flow from stage to stage. In most schematics you will find the input end at the left and the output at the right, so you might say reading a schematic is like reading a book. You will almost always read from left to right and from top to bottom.

As you trace the flow of electrons, remember that capacitors block dc but pass ac. If you come to a place where lines cross but are not "connected" with a dot, then they in fact are not connected in the circuit.

If keeping all those components straight seems hard, then you might want to try using a few memory tricks to help you correlate the symbols with

*Basic Radio Editor, QST

Caution! Detour Ahead!

Notice anything different about *QST* this month? If you haven't yet flipped to the pages which follow, probably not. But when you do thumb through this issue, the changes may jump right out and grab your attention. We're referring to the different look of the schematic diagrams.

In an article describing an equipment project for construction at home, the circuit diagram is a very important key. If the project uses point-to-point wiring, the diagram tells the builder how to interconnect all the components. Or if a circuit-board etching pattern is published, the diagram permits the builder to check the board layout. The diagram also lets the knowledgeable amateur understand how all the various components work together to do the job intended. In this way he can eliminate guesswork in incorporating his own innovations and making parts substitutions.

Yes, the schematic diagram is important. But to try to understand some of those diagrams — wow! Have you ever had the feeling that you're like a rat in an experimental laboratory, trying to get from one end of the maze to the other? It's a rather common feeling, es-

pecially if you're not yet experienced at reading schematics. (And if you're not, the accompanying article was written for you.) The changes we've made in *QST* drawings were done to help get away from that "maze" look, and to make the information easier to comprehend. The diagrams themselves may not be any simpler, but the intent was to make them look simpler in their overall appearance.

For example, past style has required that we place circles around *some* kinds of diodes — Zeners, LEDs, and the like. But *not all* diodes were required to have circles; rectifier and small-signal diodes weren't. Why give the diagram a cluttered look by adding circles which have no real meaning, we asked ourselves. Result? No more circles around any diodes. And for further simplification, all diodes will be identified in diagrams and parts lists with a D prefix, rather than our past assortment of CR, VR and DS prefixes.

Another change you'll note is an occasional four-way connection — two lines crossing at right angles with a connection dot. This has been a *QST* no-no in the past, our requirement being that all such connections would be offset to provide two three-way connections instead. That way, there'd be no confusion if the connection dot were inadvertently omitted; when two lines joined to form a T

there had to be a connection, whether the dot was there or not. You couldn't be sure about two lines crossing to form an X. But let's face it, the human eye likes symmetry. A long straight line looks better to the eye than a continuous group of shorter offset lines running in the same direction. Permitting four-way connections results in a more pleasing (and less cluttered) look than our old style did. We'll just have to double-check ourselves on those connection dots before we allow the drawing to be printed.

In some cases we've changed the shapes of the symbols for various components, coaxial jacks in particular. The "new look" more accurately portrays the actual component itself. Our new method of showing a shielded conductor or coaxial line is a step in this same direction.

The idea behind these changes was to make it easier for a newcomer to amateur radio (and the old-timer, too) to follow and understand the diagrams. Future issues of *QST* will continue to follow this new style. Other ARRL publications, such as the *Handbook*, *Antenna Book*, and so forth, will continue in the old style for a while so each will be consistent in itself. As each book is revised, these same style changes will be incorporated. Happy traveling! — *K1TD*

the right components. A resistor offers resistance to current flow, just as a stairway would to a person running. Thus the $\text{---}\text{W}\text{---}$ that symbolizes a resistor makes sense, right? Similarly, the $\text{---}| \text{---}$ that stands for a capacitor might represent the plates in the capacitor! It's really not so bad once you see the reasoning behind the symbol used.

Arrows on bipolar transistors gave me a rough time when I first started reading schematics, until someone suggested thinking of p-n-p as meaning *pointing in proudly*, and n-p-n as *not pointing in*. It may sound corny, but it set me straight on that right away.

If in your schematic reading you run across a little rectangular box, which represents an integrated circuit or IC, don't worry about the dozens of discrete transistors built into the chip. Just think of the whole IC as a building block or one device. There's no real need to be concerned with the circuitry inside; just find out the function of the chip and continue reading the schematic.

Block Diagrams

Just like Morse code, proficiency at reading schematics takes practice. The best way to start practicing is with schematics that have accompanying block diagrams. A block diagram shows the circuit sections as blocks. Interconnecting lines and arrows indicate the signal flow from section to section (see Fig. 2). Each block is labeled to show its function in the circuit (rf amp., local osc., i-f amp., first mixer, second i-f amp., detector, doubler, driver, power amp., etc.).

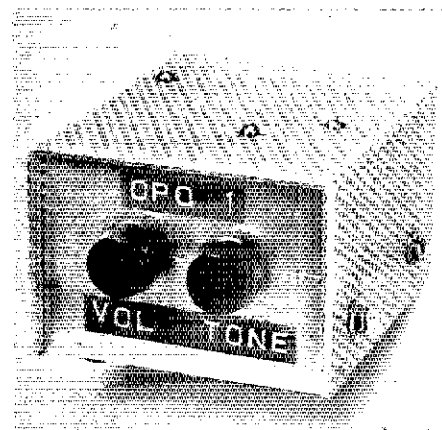
Comparison of block and schematic diagrams can shed considerable light on a complicated circuit. Some schematics have labels on each general section, usually above the main active component (see Fig. 3).

To start you off on your practice, we'll run through a simple diagram of a regulated power supply (see Fig. 4). In this circuit the 117-V ac is available at the receptacle and is fed to the primary of the transformer, T1, through an in-line fuse. A switch, S1, completes the circuit, and pilot light DS1 is in parallel with the transformer primary winding to show when the power is on. Output of the secondary winding goes to a full-wave bridge-rectifier circuit, consisting of four diodes. Pulsating dc from the bridge is filtered by a capacitor, C1.

The filtered dc now goes to the regulator transistor, Q1, which is biased by voltage from Zener diode D1. S2 is provided to allow selection of up to five different diodes, giving five different possible bias voltages for Q1. A resistor, R1, completes the path from the Zener

diode to the negative side of the bridge, creating a voltage drop equal to the Zener voltage as bias for Q1.

The value of R1 is chosen to establish a safe maximum Zener current. Regulated voltage out of Q1 is fed to the output terminals with R2 and C2 across the output. R2 is used to load the



A finished view of the CPO-1.

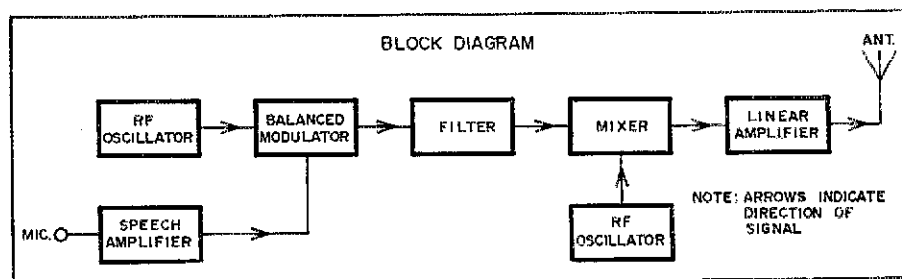


Fig. 2 — An example of a block diagram of an electronic circuit.

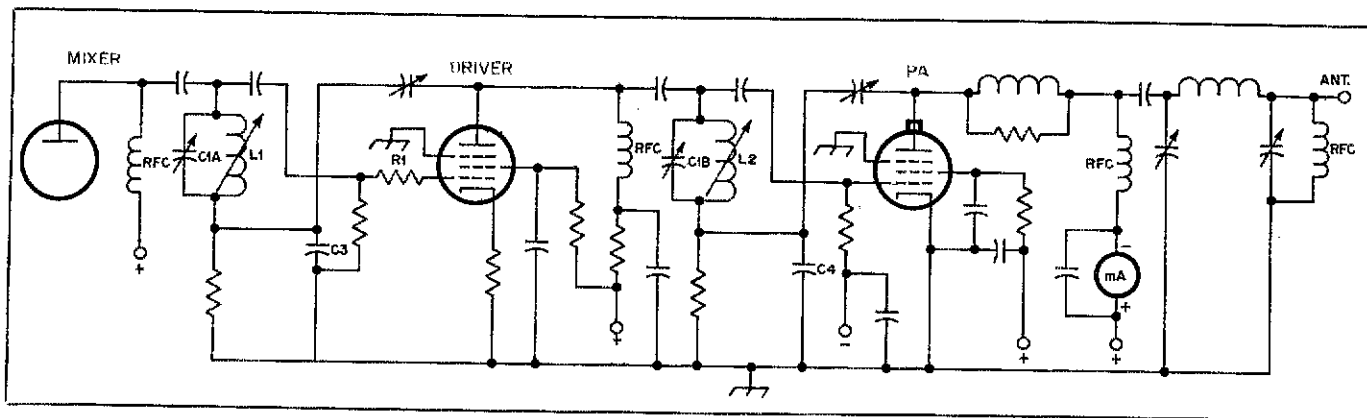


Fig. 3 — Section labeling in some schematic diagrams helps the reader see the functions of the various stages.

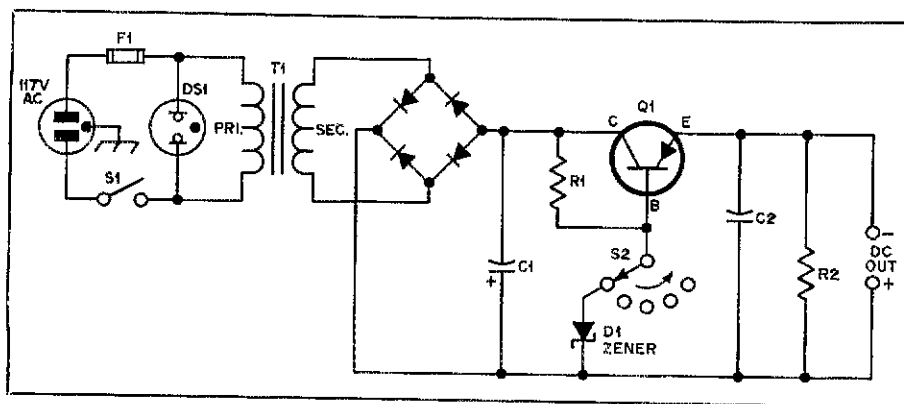


Fig. 4 — A schematic diagram of the regulated power supply.

regulator and C2 is an rf bypass capacitor.

So from left to right we step down the voltage, rectify it, filter it, then regulate it. Simple, right? Sure it's a simple circuit, but even the difficult ones get easier once you learn how to read them.

Pictorial Diagrams

Another kind of "picture" of a circuit that you might run into is a pictorial diagram, usually referred to as just pictorial, because it is a sketch, drawing or photograph of the circuit the way it actually looks! This helps you find a particular circuit component after you have located it on the schematic diagram. Let's say you received a notice from an equipment manufacturer saying that you can improve the performance

... a pictorial diagram ... shows the circuit the way it actually looks!

of your YUK-930 transmitter by replacing R37 (now 27 k Ω) with a 22-k Ω resistor. You might be able to find R37 on the schematic, but finding it in your hand-wired WWI surplus special might

be like trying to find WWV on 11 meters!

Now you could make use of those pictorials of your YUK-930, right? Just find R37 in the margin and follow the line from it that points to your 27-k Ω resistor hiding between a disk capacitor and an rf choke on the tube base of V4. Now just find it on the bottom side of *your* transmitter!

The CPO-1

To bring schematic, block and pictorial diagrams together so that you can

... you might say reading a schematic is like reading a book.

see them all at work on a common circuit, we built a simple code-practice oscillator (CPO) using an integrated circuit and a handful of other parts. Fig. 5 shows the schematic diagram of this project and lists the parts needed to duplicate it. Fig. 6 is the block diagram.

Construction details will be kept short here, but those wishing to build this project can find complete information in *The Radio Amateur's Handbook*, 1976 edition. A circuit-board template

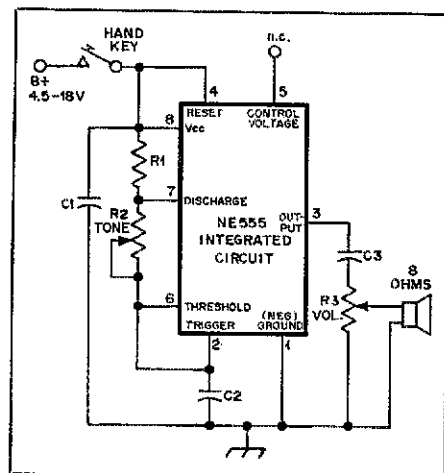


Fig. 5 — Code-practice oscillator using NE555 integrated circuit. Note schematic diagram shows input (key and B plus) at upper left, and output (speaker and ground bus) at lower right. Below is a parts list for the CPO. All part numbers in parentheses are Radio Shack stock numbers.

- C1 — 0.1- μ F capacitor (272-135).
- C2 — 0.02- μ F capacitor (272-1066).
- C3 — 25- μ F 25-V electrolytic cap. (272-1026).
- LS1 — 8- Ω speaker, 2 inch.
- R1 — 2200- Ω 1/4-watt resistor.
- R2 — 100-k Ω linear-taper potentiometer.
- R3 — 10-k Ω audio-taper potentiometer with switch.
- TB1 — Terminal strip (274-315).
- U1 — NE555 timer IC (276-1723).
- Enclosure, 2 X 3 X 4 inches (270-251).
- Breadboard, (276-1395).
- 8-pin DIP socket (276-1995).
- Misc. — battery, knobs and wire.

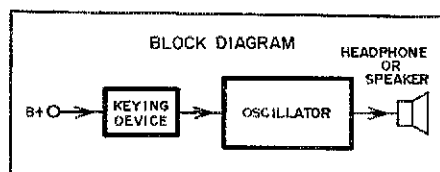


Fig. 6 — Block diagram of code-practice oscillator. Note that individual components are not shown, but flow of energy is indicated by the use of arrows and lines. Compare this block diagram with the schematic diagram shown in Fig. 5. Both read from left to right.

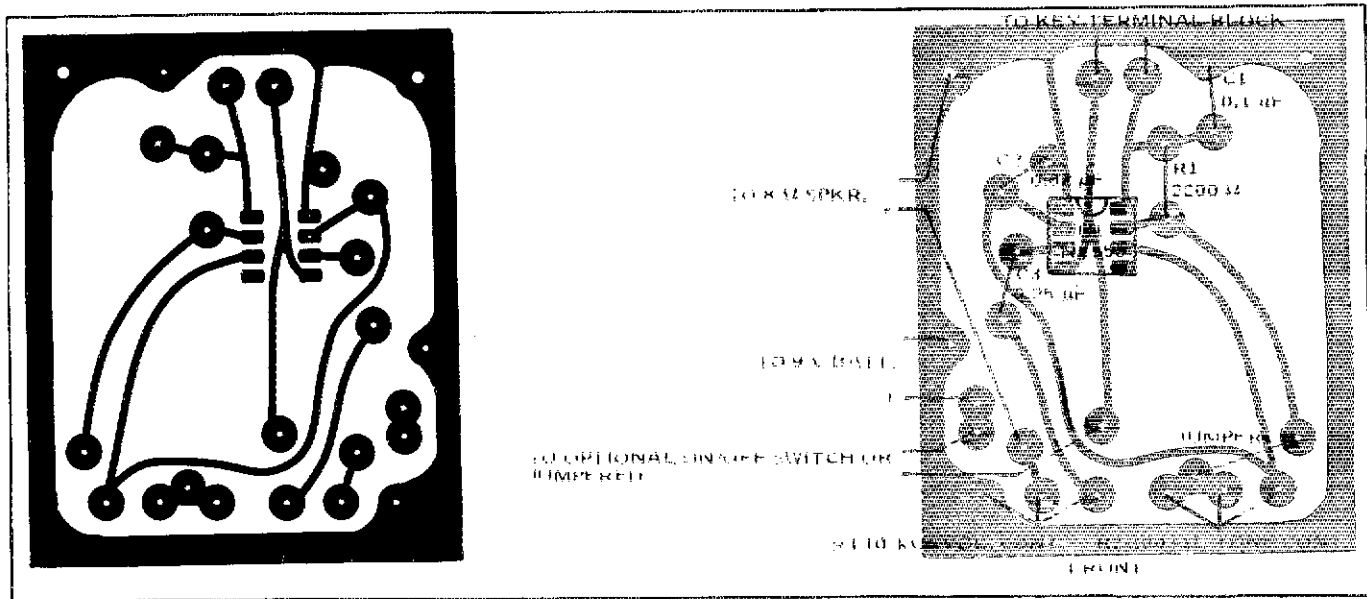


Fig. 7 — Circuit-board template and parts layout for the CPO-1, shown from foil side of board at left, parts side at right. Pattern is shown at actual size with black representing copper. Decimal-value numbers alone represent capacitance in microfarads. Whole-number values with no units represent resistances in ohms: k = 1,000. J = wire jumper. All components are mounted on the nonfoil side of the board.

and parts layout are shown in Fig. 7.

Although the prototype shown in the photos was built on a printed-circuit board, it would be more economical and much quicker to use a small piece of perf board and wire the circuit in point-to-point fashion. The enclosure used was built in the lab, but anything large enough would suffice, such as a cigar box or plastic freezer box.

The heart of our CPO is a 555 timer IC which supplies a signal to the speaker. The tone and volume can be varied by R2 and R3, respectively. Keying the voltage to pin 8 on the IC chip gives an interrupted tone at the speaker . . . or cw! If you wish, the oscillator can be wired to run constantly by applying voltage to pin 8 through the on-off switch, and the audio keyed on and off at the speaker lead. This method can lead to a somewhat cleaner keyed note, but with the oscillator running all the time (between words and sentences) the battery life will be shorter.

It was decided that for the prototype we would sacrifice a small amount of audio quality for economy, and thus the keyed voltage at pin 8. Also note that if the operator is called away suddenly and the oscillator is not "turned off," the voltage-keying method leaves the unit effectively off as long as the key is up.

Fig. 8 shows a close-up view of the circuit-board layout in the lab prototype. The use of an IC socket is not necessary but nevertheless a good idea, as it protects the IC from direct heat during soldering and makes removal of U1 quick and easy.

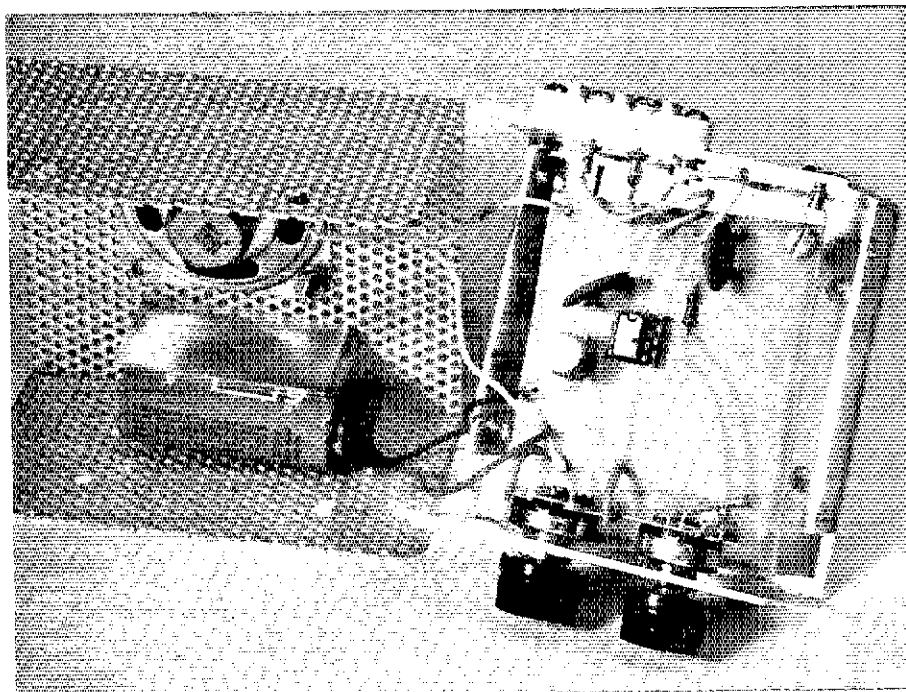


Fig. 8 — A close-up view of the circuit board construction used on the CPO-1. Both potentiometers were mounted directly on the circuit board.

Now you have seen all three types of diagrams — schematics, block and pictorial (photo) of the CPO, and the relationship between all three diagrams. Block and pictorial diagrams can be a great aid to the schematic diagram reader by helping him to better understand the equipment with which he is working, but the schematic is the only diagram that gives a complete picture of the circuit at a glance, allowing us to quickly trace problems to individual

components. So the next time you see squiggly lines, circles and arrows on a piece of paper, don't run . . . just "dig in" on that schematic!

References

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- McCoy, "How to Read Circuit Diagrams — Part I," *QST* for August, 1963.
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QST

Designing Solid-State RF Power Circuits

Part 2: Microstriplines — neither capacitor nor inductor nor resistor, but a combination of all three. They are transmission lines etched on circuit boards, designed for specific impedance requirements.†

By Richard K. Olsen,* N6NR

Circuits containing microstrips are not uncommon at uhf. But to the uninitiated, a microstripline might not look much different from any of the other conductors running their various ways to interconnect the many parts on the circuit board. A bit wider, perhaps, and generally running in straight lines where other conductors might curve about. However, there is much more than meets the eye in these miniature transmission lines. They can be used to transform impedances. A shorted or an open line can be used to simulate an inductor or a capacitor. Combinations of microstriplines can be used to do all sorts of clever designs.

There are many advantages to using microstrip as a series transformation element. An important one is greater repeatability from circuit to circuit. The microstrip, however, cannot be thought of as being just an inductor, capacitor or resistor; it possesses the properties of all three. What microstrip is, on the other hand, is a transmission line. Transmission lines make very good transformation components. If you were to cut a transmission line at a given point and measure its impedance at that point with respect to the starting point, you would observe a very definite transformation from one point to the other. Fig. 12A shows a simple circuit containing the same basic components as Fig. 10A (Part 1) except that LI has been replaced by a length of microstrip (W1).

To evaluate properly the amount of transformation represented by W1, we must first know the following things: (1) dielectric thickness of the board material (h), (2) thickness of the con-

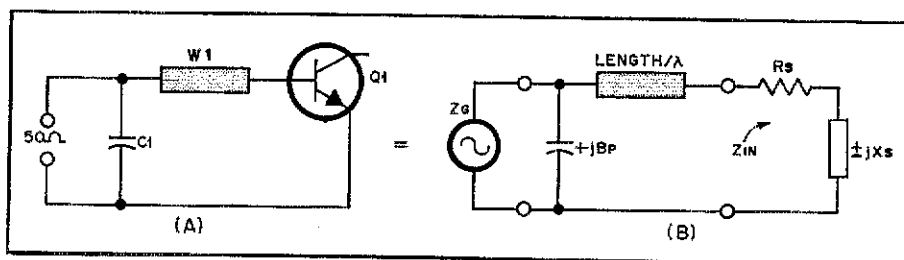


Fig. 12 — Input circuit using the microstrip technique.

ductor (t), (3) width of the line (W) and its effective electrical width (W_{eff}), (4) wavelength at the operating frequency (f_o) of this type of microstrip (λ_{W1}), and (5) dielectric constant of board material (ϵ_r).

For this example, assume our f_o is 146 MHz. The type of board commonly used is G10 double-clad copper printed-circuit board. It has a dielectric constant of approximately 4.8, a dielectric thickness of 59.2 mils (1 mil = 0.001 inch), and a conductor thickness of 1.4 mils. Let us say the line width is 100 mils. The effective width is calculated from the formula

$$W_{eff} = W + \frac{t}{\pi} \left[\left(\ln \frac{2h}{t} \right) + 1 \right]$$

$$= 100 + \frac{1.4}{3.14} \left[\left(\ln \frac{2 \times 59.2}{1.4} \right) + 1 \right]$$

$$= 102.42 \text{ mils} \quad (\text{Eq. 8})$$

Next we must determine the wavelength of our board material at f_o . We do this with the following formula, where $C = 300 \times 10^6$ meters/second.

$$\lambda_o = \frac{C}{f} = \frac{300 \times 10^6}{146 \times 10^6} = 2.05 \text{ meters} \quad (\text{Eq. 9})$$

Because microstrip works in a modified transverse electric mode (TEM), we continue,

$$\lambda_{TEM} = \frac{\lambda_o}{\sqrt{\epsilon_r}} = \frac{2.05}{\sqrt{4.8}} = 0.936 \text{ meters} \quad (\text{Eq. 10})$$

The correction factor for G10 glass-epoxy circuit-board material is

$$K = \left(\frac{\epsilon_r}{1 + 0.63(\epsilon_r - 1) \left(\frac{W_{eff}}{h} \right)^{0.1225}} \right)^{1/2}$$

$$= \left(\frac{4.8}{1 + 0.63(4.8 - 1) \left(\frac{102.42}{59.2} \right)^{0.1225}} \right)^{1/2}$$

$$= 1.161$$

$$\lambda_{W1} = (\lambda_{TEM}) \cdot K$$

$$= 0.936 \times 1.161$$

$$= 1.087 \text{ m or } 1087 \text{ mm} \quad (\text{Eq. 11})$$

We can now determine the amount of transformation required and the electrical length of the stripline from mapping on the Smith Chart. Referring to Fig. 13, our Z_{in} is once again $10 + j0 \Omega$, so our starting Z_N is again $0.2 + j0 \Omega$. Next take a drawing compass, and with

†Part 1 of this article appeared in the August 1977 issue of QST.

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the point of the compass on the center point of the chart ($1 + j0$), draw an arc from $0.2 + j0$ in the $+X_S$ direction to intersect the 1.0 constant-conductance circle. This arc just drawn represents a constant-VSWR circle and intersects the 1.0 conductance circle at point A. Now we obtain a straightedge and draw a line from the center point through $0.2 + j0$ and on to the outer edge of the chart. Draw another straight line from the intersection (point A) to the center point of the chart, and extend that line to the edge of the chart. Next follow along the scale marked "wavelengths toward generator" and determine the scale distance between the two straight lines just drawn. This is found to be 0.066λ and represents the electrical length of the stripline. From Eq. 11, λ_{W1} has been found to be 1087 mm. The physical length of the stripline may be found from

$$L = n \cdot \lambda_{W1} = 0.066 \times 1087 = 71.7 \text{ mm} \\ = 2.8 \text{ inches} \quad (\text{Eq. 12})$$

We can now see from the Smith Chart that the line has transformed us from $0.2 + j0 \Omega$ to $0.24 + j0.42$. The impedance (Z_S) at this point is now $12 + j21 \Omega$. The value of R_S has increased along with X_S , which proves that the line does not contain pure reactance but rather behaves as a transmission line containing distributed amounts of both R_S and X_S . We can now ascertain the value of C1 with the Smith Chart. Draw an arc from $0.24 + j0.42 \Omega$ to $1.0 + j0 \Omega$ along the constant-conductance circle that intersects those points. Next we determine that the constant-susceptance circle intersecting $0.24 + j0.42 \Omega$ is that of $B_N = 1.8$. From Eq. 7C (Part 1) C1 has a $B_N = +j1.8$ mhos or $B_P = +j36$ mmhos. The capacitance can be calculated by

$$C = \frac{B_P}{\omega} = \frac{36 \times 10^{-3}}{2 \times \pi \times 146 \times 10^6} \\ = 39.2 \text{ pF} \quad (\text{Eq. 13})$$

It is important to understand that when mapping the magnitude of transformation of microstrip, the center point ($Z_N = 1.0$), which is the axis of rotation, must correspond to the characteristic impedance (Z_o) of the microstripline. This means that if we are using 35- Ω microstrip, the points $10 + j0$, $12 + j21$, and $50 + j0$ ohms will have to be renormalized to conform to the 35- Ω system requirement. It is therefore necessary to ascertain the Z_o of the line. Later in the design exercise we will see how this is done.

Microstrip Inductors and Capacitors

What we have seen so far explains the nature of microstrip transformation

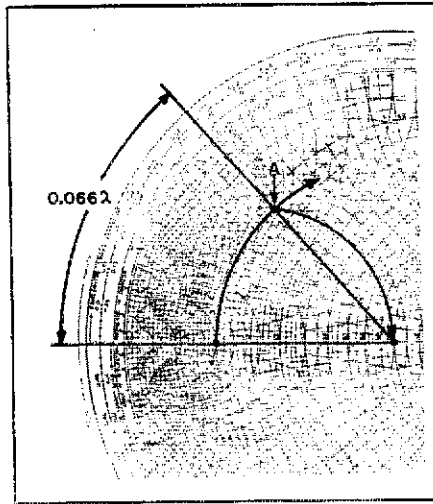


Fig. 13 — Solution of microstrip-transformation problem with the Smith Chart.

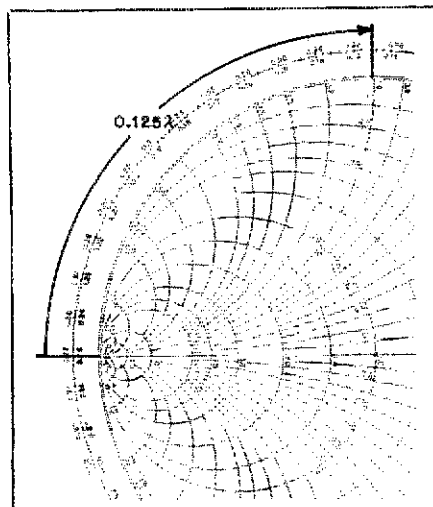


Fig. 14 — Reactance versus electrical length for shorted microstripline.

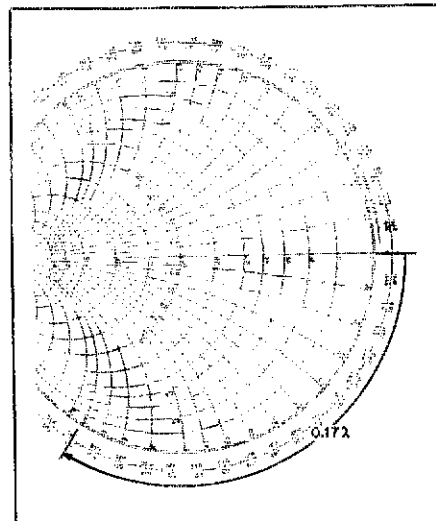


Fig. 15 — Reactance versus electrical length for open microstripline.

when it is terminated in a given complex impedance. Microstrip can also be used to synthesize a value of inductive or capacitive reactance depending upon whether it is terminated in a short or open. These properties can be extremely useful at microwave when a given L section requires a shunt capacitance of 0.3 pF. Such a capacitor is difficult to manufacture and consequently is very expensive. A piece of microstrip, terminated in an open, attached to the L network at that point, can also be used. The means of calculating this value is provided in the following formulas.

$$\text{Short: } X_L = Z_o \tan \theta \mid \theta < 90^\circ \quad (\text{Eq. 14})$$

$$\text{Open: } X_C = Z_o (-\cot \theta) \mid \theta < 90^\circ \quad (\text{Eq. 15})$$

where Z_o = characteristic microstripline impedance (ohms) and θ = electrical line length (degrees)

Transmission-line theory tells us that any given transmission line terminated in a short will, at a quarter wavelength down the line, exhibit the properties of an open circuit. The inverse also applies. And at an eighth wavelength away from either a short or open the line will exhibit a reactance equal in value to the characteristic impedance of the line. We will use Eq. 14 to demonstrate.

$$X_L = Z_o \tan \theta \mid \theta = 90 \cdot \left(\frac{\lambda/N}{\lambda/4} \right) \text{ degrees} \\ = 50 \tan \left[90 \cdot \left(\frac{0.125}{0.250} \right) \right] \\ = 50 \tan [90 (.5)] \\ = 50 \tan 45^\circ \\ = 50 (1) = 50 \text{ ohms}$$

Referring to Fig. 14 we can use the Smith Chart to demonstrate this very same thing. Starting at $X_N = 0 \Omega$ and moving 0.125λ toward the generator, we arrive at $+jX_N = 1$ or $X_L = 50 \Omega$.

We may now use this technique to design an open-ended line replacement for C1. C1 = 39.2 pF so $X_{C1} = -27.8 \Omega$ and $X_N = 0.556$. Referring to Fig. 15 we start at $X_N = \infty$ and move clockwise to $-jX_N = 0.556 \Omega$. This is equal to a distance of 0.17λ toward the generator. By using Eqs. 11 and 12 and a value of 0.17 for n , we arrive at a line length of 184.7 mm or 7.3 inches. Obviously, at 146 MHz it is more practical to use a shunt capacitor.

We have now seen through these examples how to plot or ascertain the amount of transformation presented by inductors, capacitors and microstrip-

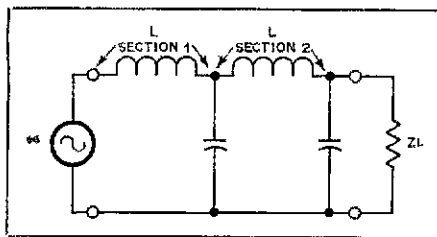


Fig. 16 — Double-L network.

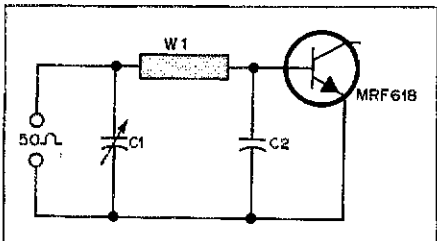


Fig. 17 — Input circuit.

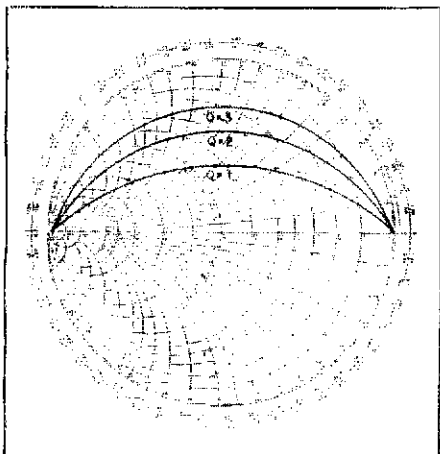


Fig. 18 — Lines of constant Q (figure of merit).

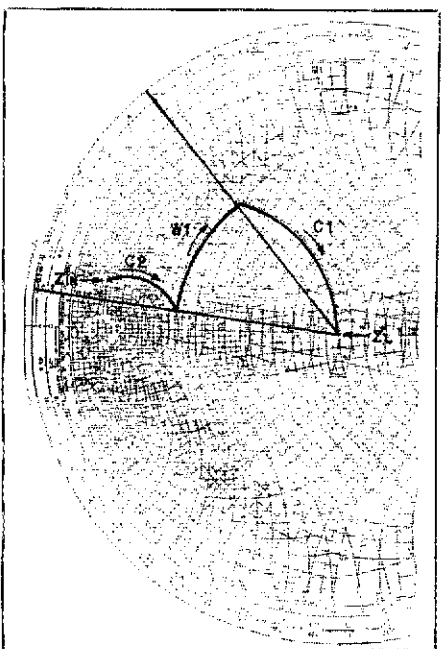


Fig. 19 — Input transformation.

lines: There are many, many more facets to the Smith Chart that will not be examined here. What we have learned, however, are the minimum facts necessary for the design and evaluation of an rf circuit using R , L , C and microstrip. We are now ready to move on the design of the input and output circuits in our uhf amplifier.

Z_{in} and Z_{OL} Circuit-Design Exercise

We must now address ourselves to the task of designing an input and an output circuit for our amplifier. In this design exercise we will dispense with working the formulas in the text and all impedances called out will be referenced to a 50-ohm system. These impedances will be defined in "real-world" values rather than as a normalized value as defined on our Smith Chart. Work the formulas out yourself. This design exercise is intended to solidify your knowledge of the concepts brought forth in earlier sections.

Let's start with the input circuit. Since we wish to have an amplifier with a medium broadband response, we will use what is known as double-L networks. Fig. 16 shows a typical double-L network. This type of circuit has a reasonably broad frequency response and has the capability of tuning a broad range of impedances. In this exercise we will use microstriplines instead of inductors as they are somewhat easier to deal with and reproduce at uhf. Fig. 17 is the basic schematic that we will deal with. Note that only one L section is drawn. This is because the MRF618, being an internally matched device, has one L section inside the device itself.

Before we go on, I must say something about figure of merit, or " Q ," as it is known. Q often plays a significant role in amplifier design, especially in a broadband circuit. Fig. 18 is a Smith Chart representation of lines of constant Q . Since $Q = X_L/R$ we can define an impedance of $10 + j20 \Omega$ as having a circuit Q of 2. Find $10 + j20 \Omega$ on the chart and you will see it fall on the $Q = 2$ line. Q is important to us in the formula

$$BW = \frac{f_0}{Q} \quad (\text{Eq. 16})$$

The bandwidth of the circuit, BW , is directly related to the relationship

between frequency and circuit Q . At 450 MHz, a circuit with a Q of 2 would have an effective 3-dB bandwidth of 225 MHz. It is advisable to design all transformations in a broadband circuit to fall within a Q of 2 or less.

Referring back to Fig. 4, Part 1, we find our device Z_{in} to be $3 + j5.5 \Omega$. Plotting that point on the Smith Chart, Fig. 19, we notice that it is a very low impedance. If we were to come straight off the base with a series line or inductor, we would soon propel the transformation to a point having a rather high circuit Q . Therefore, we use $C2$ to bring us closer to 50Ω without compromising BW . This capacitor should be a fixed value in most cases and of a common value. Let's try a 40-pF capacitor. $C2$ has a B_p of 113.1 mmhos. This transforms us to $11.5 + j3.1 \Omega$. Note our circuit inductance at this point is only 0.27 λ .

Next comes $W1$. Using the compass, draw an arc from $11.5 + j3.1 \Omega$ to the constant-conductance circle intersecting $50 + j0 \Omega$. The transformation of $W1$ should intersect this circle for $C1$ to properly transform the impedance to 50Ω . Using the outer scale we see that this line must be 0.06 wavelength long. For the sake of simplicity we will use 50- Ω microstrip. If when laying out the circuit board it was found that the line was too short to reach to the antenna connector, more line could be used simply as a 50- Ω transmission line. A line of about 100 mils wide will be suitable in this application. Its Z_0 can be approximated in the formula shown in Table 1. Using Eqs. 8, 9, 10 and 11, we can determine that λ of our 50- Ω line is 353 mm. $W1$ is 0.06λ or 21.2 mm. Converting to inches, our line is 0.835 inch long and 0.1 inch wide. Using the Smith Chart we see that our final transformation value must be 32.6 mmhos. From Eq. 13 our capacitor is 11.5 pF. A 1- to 20-pF variable will do nicely.

The collector side of the MRF618 does not afford us the luxury of internal matching, so in the interest of bandwidth, we will use two L sections in our Z_{OL} transformation.

Fig. 20 is the basic circuit we will use in our output transformation. Referring once again to Fig. 4, we find that our Z_{OL} is $3.2 + j2.5 \Omega$. Once again we will use a 40-pF capacitor. Fig. 21 is the map of our output circuit. $C1$, having a B_p of 113.1 mmhos, transforms us to $4.9 + j0.65 \Omega$. Once again we will use

Table 1
Calculation of Microstrip Impedance

$$Z_0 = \frac{377 h}{\sqrt{\epsilon_r} \cdot W_{eff} \left[1 + 1.735 \left(\epsilon_r^{-0.0724} \right) \left(\frac{W_{eff}}{h} \right)^{-0.835} \right]} \quad (\text{Eq. 17})$$

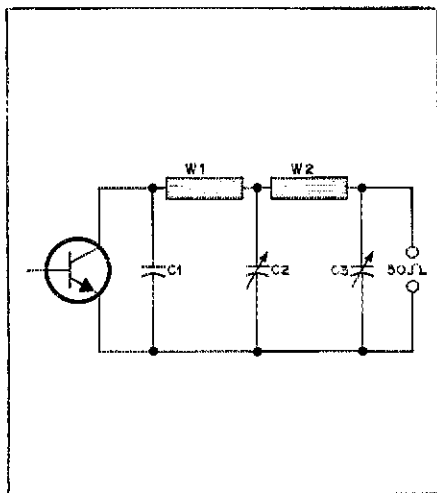


Fig. 20 — Output circuit.

50-Ω microstrip. We will allow W1 to transform us to a maximum circuit Q of 2. Draw a line through $4.9 + j0.65 \Omega$. Next draw an arc from that point in a clockwise direction. Notice that this arc passes through $5 + j10 \Omega$. Draw a line

through $5 + j10 \Omega$ and read the amount of wavelength this transformation represents; 0.029λ equals approximately 0.4 inch long by 0.1 inch wide. For convenience sake we will allow the C3 transformation to bring us back to the line through $5 + j10 \Omega$. This represents a B_P of 60.8 mmhos, or converting to capacitance, 21.5 pF. This brings us to the $21.5 + j6.5 \Omega$. For C2 we can then use a 2- to 40-pF variable.

W2 must bring us to a point which will allow C3 to transform us to $50 + j0 \Omega$. Draw an arc from $21.5 + j6.5 \Omega$ to the constant-conductance circle which intersects $50 + j0 \Omega$ and draw a line through the point of intersection. W2 must be 0.059λ or 0.82 inch. The remaining transformation is accomplished with a capacitance of 6.5 pF. C3 may be a 1- to 10-pF variable.

Don't be concerned with small variations in line length caused by a change in frequency. C2 and C3 have enough range to manipulate the transformation back to the desired load point.

All we have to do now is to design our collector and base biasing circuits

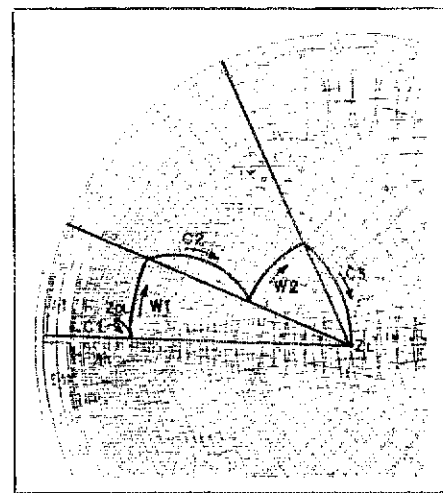
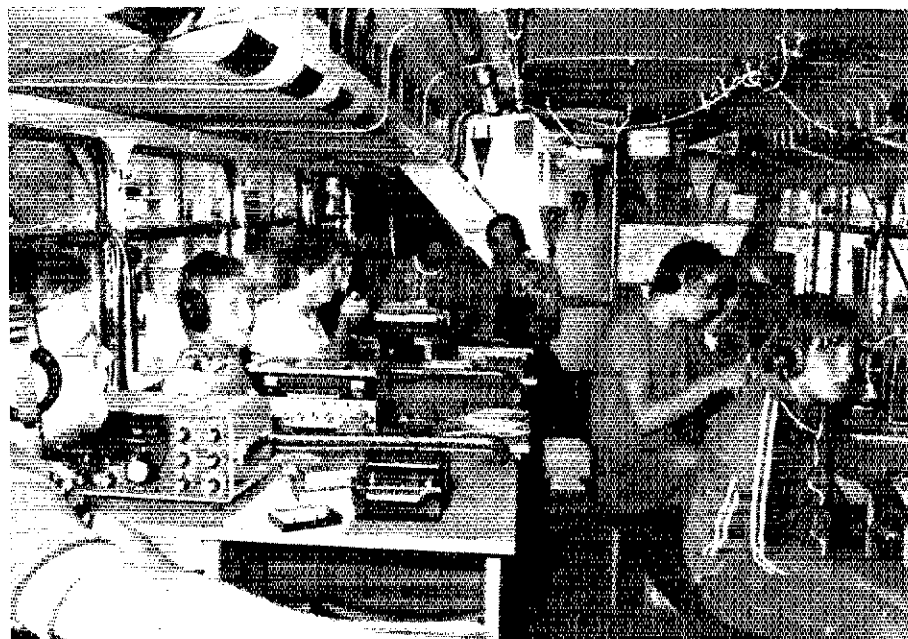


Fig. 21 — Output transformation.

and the design will be complete. Part 3 of this article will deal with biasing, mechanical considerations and some construction limits and will appear in a subsequent issue of *QST*. [ET]

Strays



The well-appointed ham shack aboard the double-decker bus that brings amateur radio to thousands of Austrian youngsters each year. Rescued from the Vienna city dump, the bus serves as an example of what hard work and enthusiasm can accomplish.

Over in Austria, an active and public-spirited amateur radio club is setting an example for others. As Wolf Harranth, OE1WHC, described its operations:

"Our QTH is a double-decker bus, rescued from the Vienna city dump and

converted into a mobile shack in countless hours of voluntary work. In the basement we have a number of communications receivers (for bc DXers and SWLers) and our ham station, OE8XBC, consisting of an FT-101, some 2-m gear

and an RTTY section. Upstairs is our dormitory and lecture room. This mobile shack is now situated in Dobriach on Lake Millstatt (Carinthia, Austria), where we do public relations for amateur radio in a youth summer camp. We offer information to 1,800 young people every year - and have done so for the past 10 years. We also run a license class there.

"We have a second station, OE1XBC, operating in Vienna's largest youth center, where all training for social workers takes place. We rely entirely on donations and contributions, both in time and money. And it seems we are here to stay."

Let's hope so.

HOWZAT?

The mailroom probably puzzled for a while over a piece of mail addressed thusly: "American Radio Relay League, Attn.: *QST* Exciting Events Editor." Now, who could that be? — *W1YL*

RATHER FREQ-Y

Bob, WA2JDU, is a 36-year-old sales representative for a drug company. So is Bob, WB2JDU. As a matter of fact, they've been best friends for 20 years. Their last names begin with the same letter, B, and they have similar speaking voices and habits. When anyone calls them, it's usually, "Is one of the JDUs on freq?"

Add Variable-Bandwidth Tuning to Your Fixed-Bandwidth Receiver

Wish you could slice the QRM away when you're trying to work that 3A2 station? Maybe what you need is a narrower bandwidth i-f!

By Timothy P. Hulick,* Ph.D., W9QQ/4

Some modern ham-band communication receivers are noted for their fixed i-f bandwidth available for use in a particular mode of operation. For ssb the bandwidth is commonly set at 2.1 kHz, while cw reception calls for bandwidths of 800, 400 or sometimes 200 Hz. Using fixed i-f bandwidths to cope with all QRM conditions, voice-tone levels (male and female) and a host of other conditions encountered is a compromise at best. And all too often it is inadequate. As a weak-signal DX chaser, I have found that 90 percent of the stations I pursue are among the weakest 10 percent of those on any given band. They are usually wedged in between two or more very strong signals originating from within the United States proper. Conditions such as these are almost as old as ham radio itself and require no further emphasis.

Providing a receiver containing a fixed-bandwidth crystal or mechanical filter with adjustable band-pass tuning can be accomplished, but only if you are willing to spend a few evenings working with pc-board etching solution and components from a well-stocked junk box. The variable-width band-pass modification described here was designed for use with the Heath SB-303 receiver and, therefore deals with the mixing- and intermediate-frequency scheme offered in the '303. But the technique is universal if the receiver to be modified is a superhet type with one i-f filter.

How It Works

The block diagram of the variable-width band-pass unit, Fig. 1, illustrates the signal path as it would be with the modification installed in the receiver.

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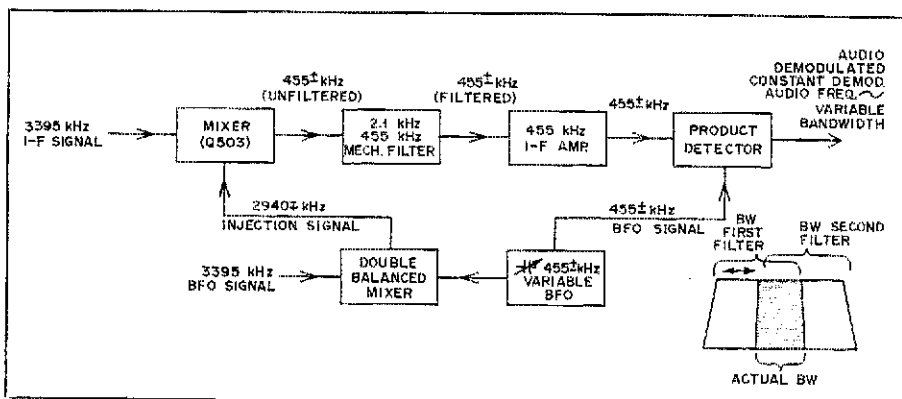


Fig. 1 — Block diagram of variable-bandwidth modification used with the author's Heath SB-303 receiver.

One more signal conversion is required in the receiver to facilitate the installation of an additional crystal or mechanical filter. The filter should have a bandwidth similar to that of the original filter contained in the receiver, but with a center frequency above or below the center frequency of the original i-f.

System operation can best be described by beginning with the variable-frequency BFO. (See Fig. 1.) The frequency of the BFO is $455 \pm \text{kHz}$. In the original '303 conversion scheme, output from the BFO is coupled to a doubly balanced mixer, along with the output from the 3395-kHz BFO. The output circuit of the balanced mixer is tuned to the difference frequency of the two input signals, $2940 \mp \text{kHz}$ (note the reversal of the \pm to \mp). The third i-f amplifier stage of the SB-303, Q503, is modified to function as a mixer, combining the 3395-kHz i-f signal of the '303 with the $2940 \mp \text{kHz}$ output from the doubly balanced mixer to produce an i-f signal at the difference frequency, $455 \pm \text{kHz}$. The new i-f signal is passed

through a 455-kHz Collins mechanical filter (2.1-kHz bandwidth), then to a single-stage i-f amplifier (to make up for insertion loss of the filter), and finally to the product detector. Here the signal is mixed with the output of the adjustable $455 \pm \text{kHz}$ BFO to produce an audio signal. Variable bandwidth is achieved by "sliding" the filtered 3395-kHz i-f signal selectively through the 455-kHz filter with the adjustable BFO. Demodulation tracking is right on, because the 455-kHz BFO is supplying the same frequency to mixer Q503 and the product detector. Therefore, what is being varied is the *overlapped* passband of the two filters.

If the frequency bandwidth of both filters is such that their absolute frequency limits can be heterodyned to any desired frequencies (in this case 3394 to 3396 kHz is heterodyned to $454 \pm$ to $456 \pm \text{kHz}$ by Q503), then the mixer output frequencies can be adjusted to coincide with the fixed-frequency limits of the 455-kHz filter to any degree desired. The amount of overlap

Table 1

| Variable BFO Frequency (kHz) | Bandwidth (Hz) |
|------------------------------|----------------|
| 453.0 | 0 |
| 453.1 | 100 |
| 453.5 | 500 |
| 454.0 | 1000 |
| 454.5 | 1500 |
| 455.0 | 2000 |
| 455.5 | 1500 |
| 456.0 | 1000 |
| 456.5 | 500 |
| 456.9 | 100 |
| 457.0 | 0 |

Equation 1

$$(3395_{i-f} \text{ center}) - (3395_{osc} - f_{VBFO}) - f_{VBFO} = f_{audio}$$

doubly balanced mixer
mixer (Q503)
product detector

or

$$3395_{i-f} \text{ center} - 3395_{osc} + f_{VBFO} - f_{VBFO} = f_{audio}$$

determines the actual cascaded bandwidth. For example, if the variable BFO is adjusted for 456 kHz then the 3394- to 3396-kHz bandwidth i-f signal to Q503 is converted to the range 453 to 455 kHz and not 454 to 456 kHz. The second filter is tuned for 454 to 456 kHz. The result is that the bandwidth out of the second filter is 454 to 455 kHz, only 1 kHz and not 2 kHz. If the

variable BFO is tunable between 453 and 457 kHz, it becomes apparent that the bandwidth can be varied from 0 to ± 2 kHz. The shift would swing through one sideband, then through center providing symmetrical filtering around the center frequency, and cross over to the opposite sideband. Table 1 lists bandwidths for several BFO frequencies; 3395 kHz is used as the original BFO

frequency of the receiver even though it is actually 3396.4 or 3394.6 kHz depending on the mode of operation.

It is shown that the audio frequency demodulated in the product detector is not a function of the variable BFO frequency. See Eq. 1.

Stated in words, the effects of the variable BFO in the doubly balanced mixer, Q503 and the product detector

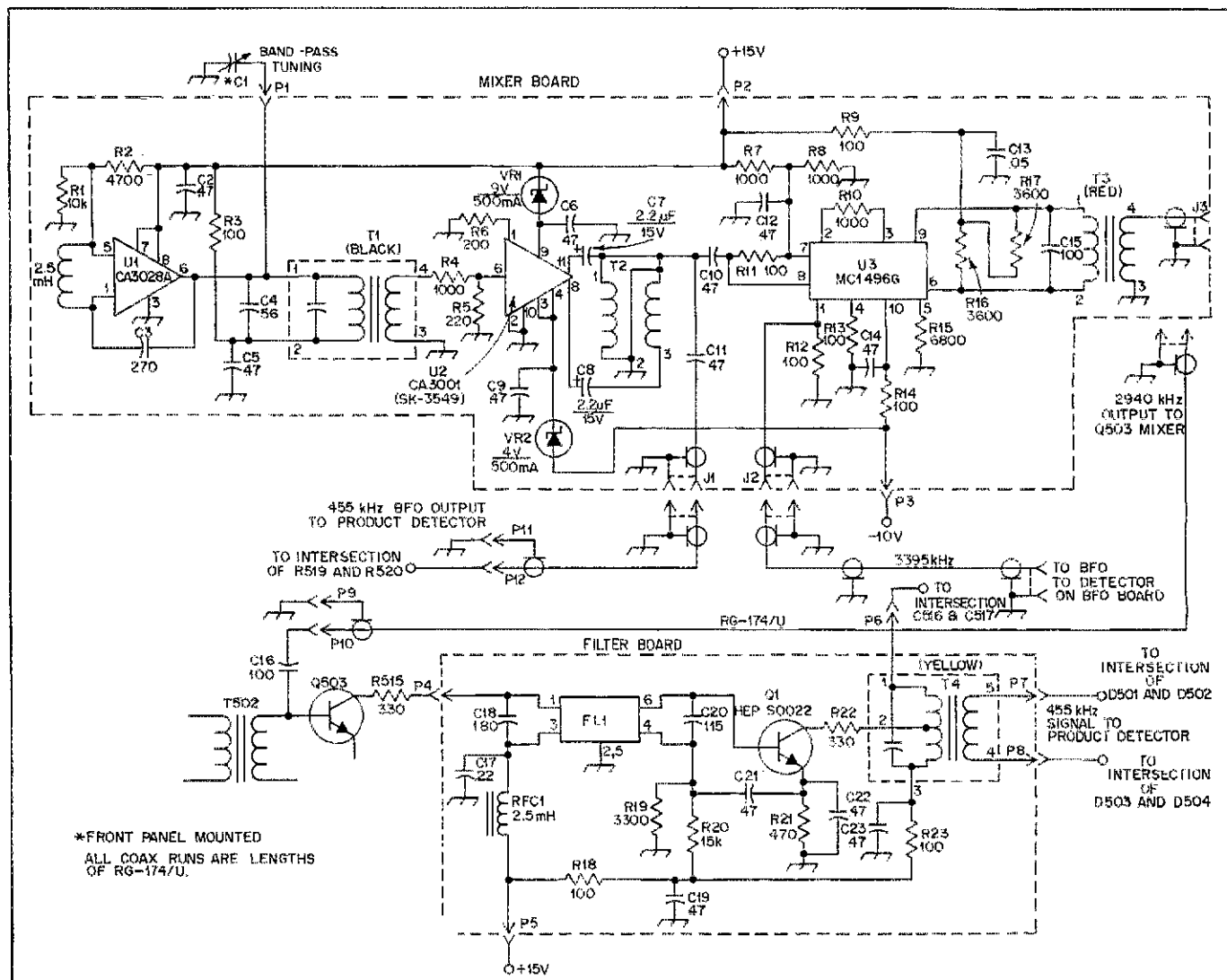


Fig. 2 -- Schematic diagram of the variable-bandwidth modification circuit. Part numbers in the 500 series (T502, Q503, D501, etc.) are original Heath part numbers. See text for discussion of other parts. Except as indicated, decimal values of capacitance are in microfarads (μF); others are in picofarads (pF or μμF); resistances are in ohms; k = 1,000; M = 1,000,000.

cancel and the audio-frequency output is a function of the frequencies of the original receiver, the 3395 kHz i-f signal and 3395-kHz fixed BFO.

Circuit Description

Fig. 2 is the schematic diagram of the modification to the receiver, showing all interconnecting leads between the two new pc boards and the basic receiver. The mixer board contains the variable-frequency BFO, U1, and makes use of a "black dot" subminiature transistor i-f transformer (one color in a package of four, sold for a dollar at Radio Shack stores). A 56-pF capacitor was added across the primary winding of the transformer in the oscillator circuit so the circuit would operate at 455 kHz. Make sure that the transformer you purchase has a capacitor already built in. The capacitor will be visible through a small slot on the underside of the i-f can. The transformer is unmodified. U2 serves as a high- to low-impedance amplifier/buffer at $455 \pm$ kHz and functions as the variable-BFO signal source to the doubly balanced mixer, U3, and the product detector output signal at J1. Because the CA3001 has a balanced output, T2 was used as an untuned 1:4 balun, giving a full-wave signal at J1 and the input of U3. Actually, any toroidal coil form is usable here as long as 455 kHz is within its useful operating-frequency range. The dimensions of the toroidal form used at T2 are 1/2 inch \times 1/4 inch thick. Approximately 100 turns of No. 32 wire as a twisted pair are wound on the toroid, the end of one wire from a pair is connected to the start of the other pair to form a 1:4 balun. (See construction note 8.)

A doubly balanced mixer was chosen to produce the required $2940 \pm$ kHz signal so that neither the 3395 nor 455 \pm kHz oscillator signals would appear in the output. The 3395-kHz frequency is so close to the 2940-kHz frequency that, without sophisticated filtering, the 455-kHz mixer product would saturate the following i-f amplifier stage. The $2940 \pm$ kHz signal at J3 contains no significant components of either undesired signal.

T3 provides an unbalanced $2940 \pm$ kHz signal from the balanced output of U3. A modified oscillator transformer from the same i-f transformer package mentioned earlier (red dot in mine) is used for T3. (See construction note 7.) The third i-f amplifier stage, Q503, in the '303 is modified to function as a mixer; removing it from the original operation as a 3395-kHz i-f amplifier. This modification is easy to perform and should not discourage anyone from doing it since the modification of this stage can easily be restored to the original i-f amplifier function, if desired.

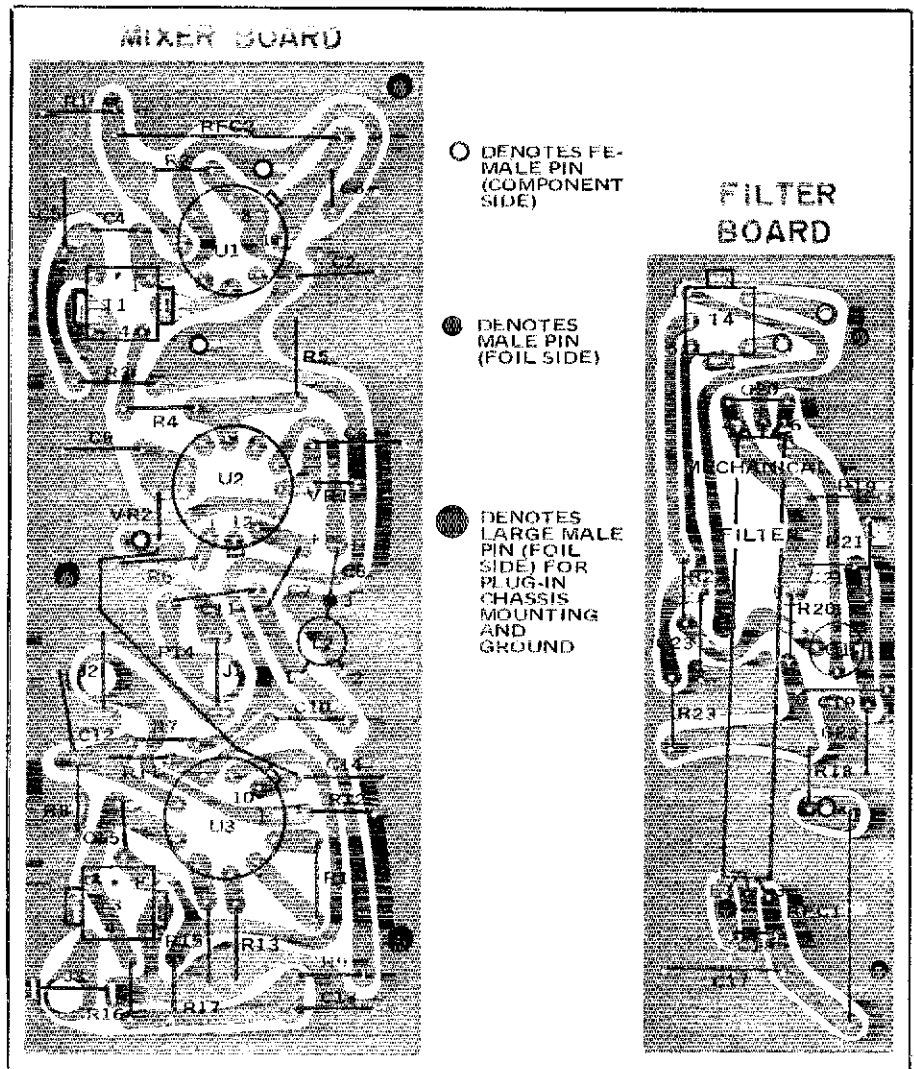


Fig. 3 — Circuit-board etching patterns for mixer board (left) and filter board (right). The patterns are shown at actual size from the foil side of the board with gray representing copper.

T503 in the Heath receiver must be removed, however, since it tunes 3395 kHz (see construction note 2). The modification consists simply of the addition of C16 and the removal of T503. The input transformer of the 455-kHz mechanical filter will perform as the new output transformer for the new Q503 mixer stage. Although identifying marks on the mechanical filter I use are scarce, stating that it is a 2.1-kHz Collins cylindrically shaped mechanical filter about 2 inches long and 1/2 inch in diameter should be adequate for the purpose of locating one. It has a balanced input and output with built-in pretuned i-f "transducers" and should not be difficult to locate since it is a very popular filter.

The 455-kHz i-f amplifier, Q1, is an HEP S0022 Motorola transistor, but almost any small-signal transistor designed for low-frequency i-f amplifier applications should work. T4 is another i-f transformer included in the package

from Radio Shack and also requires no modification for use. The output of this transformer provides the $455 \pm$ kHz i-f signal for product detection in the '303. With this modification installed in the '303, the receiver product-detector functions at $455 \pm$ kHz instead of 3395 kHz. Two voltages (+15 and -10) are required to power the mixer and filter pc boards used in the modification. Both voltages are available from the receiver power bus.

Construction

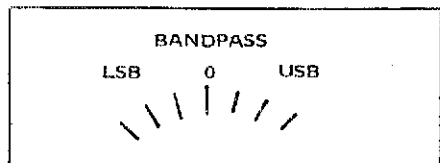
Small component holes on the pc boards are made with a No. 60 drill bit, and the larger holes (for pins, etc.) are drilled to fit whatever pin types are used. In the prototype boards, the pins used were gold-plated types extracted from Amphenol miniature rectangular connectors of the 126 series. These pins were easily extracted from their sockets by removal of a tiny C ring from around each pin; the C rings are not used. In

general, female pins are used on the boards while male pins are used on the ends of the interconnecting wires, external to the boards.

Note that no holes need be drilled in the front panel of the SB-303 receiver if one of the less useful panel functions is eliminated. I concluded that the CONVERTER control would never be missed in my operation.

Additional Construction Notes

- 1) Remove original cable at point K on the foil side of the i-f audio board in the '303.
- 2) Remove T503. Break the foil leading away from terminal 2 at the T503 location.
- 3) Remove the 1/4-inch shaft to the front panel at the CONVERTER location. Leave the switch in the HF position.
- 4) Relabel the CONVERTER switch location.



5) With C1 at its midrange position, the knob pointer should be at 0. Be mindful that the passband tuning will be reversed if the C1 center position is 180° from where it should be. If this happens, rotate C1 180° (see text).

6) T1 and T4 are unmodified sub-miniature i-f transformers (see text).

7) T3 is the oscillator coil (contained in the set of four as are T1 and T4). For T3, remove all wire from the core. Rewind about five inches of the wire removed from the coil between terminals 1 and 2. Rewind about two inches of the wire between terminals 3 and 4. Refit and reseal the red core and

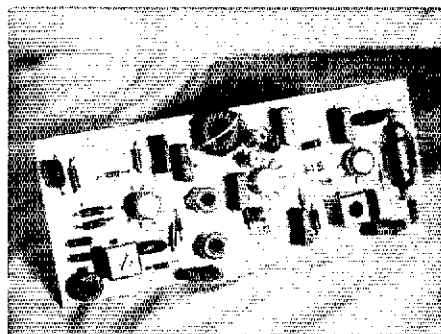
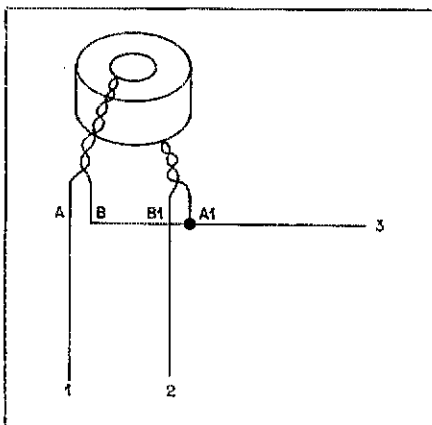


Fig. 4 — View of the component side of the mixer pc board. Location of T1, T2, T3 and U1, U2 and U3 can be seen in this photograph.

slug. Before mounting, temporarily connect C15 and check with grid-dip oscillator for resonance at 2940 kHz. Readjust the value of the fixed capacitance across C15 (not the coil) to achieve resonance. (This is easier than rewinding the coil.)

8) T2 — Q1-material toroid core or any toroid core designed for 1.5 MHz operation and measuring about 1/2-inch OD. Fill the form with No. 32 enamel twisted pair. About 100 turns should be adequate. Connect ends as shown. (See text.)

The modification mixer board is



mounted on the inside of the left sidewall of the receiver as viewed from the front panel, its position just above the receiver-mixer pc board of the '303. There is ample room in the existing grommets for feeding all additional cables. The mixer board is mounted with 5/8-inch long hardware, lock-washers and 1/4-inch spacers at three or four convenient points through the ground foils of the board or large ground pins from the Amphenol 126 series. See Fig. 4.

Fig. 5 is a photograph of the filter board. It is mounted by means of male pins at location P4, P6 and the two ground pins. These four pins must line up with their mates on the i-f board in the receiver. The location of the ground-pin mates will become apparent if

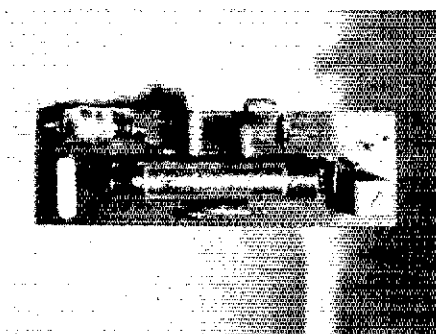


Fig. 5 — Variable bandwidth is realized by the degree of band-pass overlap of the crystal filter in the '303 and the mechanical filter shown here.

they're drilled first on the filter board. The filter board is plugged into the receiver i-f board, and after initial tune-up, the two-layer combination is tucked away into the original position.

C1 is front-panel mounted in the position formerly occupied by the CONVERTER switch, and the panel should be appropriately relabeled (see construction notes 3, 4 and 5).

Tune-Up Procedure

The tune-up procedure is uncomplicated and should not require more than a few minutes to complete. With the receiver turned on and all appropriate controls set for any band, tune the slug in T1 until a "swoosh" is heard in the speaker. Until T1 is properly tuned, the receiver may appear to be dead since the 3395-kHz i-f is not producing an i-f signal within the passband of the second filter. Position the slug of T1 until the center of the "swoosh" is located. Peak up T3, T4 and T502 in the '303 for maximum S-meter reading on the noise or any constant signal. Rotate C1 noting that the tonal quality of the noise will go from low to high and disappear completely as the bandwidth goes to zero. Pay close attention to which sideband is being tuned as C1 is turned in a specific direction.

If the opposite sideband is tuned and it is not the one that it should be, rotate C1 180° and reposition the C1 knob (see construction note 5). Tune-up is complete.

Operation

Operation of the receiver is the same as before, but always offset the variable-bandwidth tuning slightly in the proper direction for the sideband type being received. As QRM conditions vary, adjustment of C1 will provide the versatility to reduce most of it while maintaining enough bandwidth to retain signal intelligibility. When receiving cw, the bandwidth can be made so narrow that ringing will be severe enough to obliterate intelligibility. Notice that the very narrow bandwidths are located at the bottom or top edges of the passband so that only high or low pitches can be heard. If signals seem to be too strong and make your receiver audio output louder (not more sensitive) than before, detune T3 slightly so that the general behavior of the receiver is more or less the same as before the modification.

Added Attraction — Notch Filter

If you're not an RTTY fan, your SB-303 has most of the ingredients to give it an effective notch filter. The 3392.11-kHz RTTY BFO crystal can be removed from its position and re-mounted on the flange holding the MS-2F wafer. An HC-6/U socket can be

mounted so that the crystal faces the front panel. A second parallel-resonant frequency of the crystal can be tuned within the passband of the 3394- to 3396-kHz i-f by placing a 170- μ H inductor in parallel with the crystal. The position of the resonant frequency can be changed by connecting a small variable capacitor in parallel with the crystal and the inductor. The very high impedance of the parallel-resonance circuit is in series with the 3395-kHz i-f signal between MS-2F10 and the i-f IN point on the i-f/audio board. The notch, although not adjustable in width, is extremely sharp and effective against heterodynes or unwanted cw signals without noticeably affecting ssb or cw reception. The notch feature has been a worthwhile addition to the receiver and coupled with the variable-bandwidth tuning modification makes for an unbeatable combination.

To make the notch-filter modification, the POWER/AUDIO LEVEL con-

trol is moved to the RF ATTENUATION position on the receiver front panel. I decided that this feature on the original receiver could be sacrificed. Reroute all leads at the AUDIO LEVEL control to the other side of the panel. This calls for additional wire lengths.

An E. F. Johnson 167-2 capacitor is mounted on the edge of the flange holding MS-2F and is lined up with the vacant front-panel hole. Also, the capacitor must be mounted at the front panel with fiber washers as both rotor and stator must be insulated from the chassis. A 1/4-inch wooden dowel can serve as the additional shaft needed to extend to the front panel if an insulated coupling and metal shaft cannot be located.

Results

The combined results of the variable-bandwidth tuning and the notch filter have proved to be a winning combination in every circumstance thus far

encountered. The only operating inconvenience is that as an ssb signal is received, the bandwidth required to eliminate adjacent-channel QRM may be too narrow to allow intelligibility of the desired signal. This is a condition that cannot be improved upon, but for most male voices, the condition is rare. In some cases, if you're not concerned with the quality of reproduction but rather intelligibility, a 2.1-kHz bandwidth is much too wide and serves only to decrease receiver sensitivity by passing more noise power, not to mention the man-made QRM. It seems that for the average male voice, a bandwidth of about 1.6 kHz is optimum and theoretically could yield an increased receiver-sensitivity ratio of 1.72 to 1, or almost 3 dB. Having these two types of versatility at your disposal removes the helpless feeling of not being able to do anything about the QRM except turn the main-tuning knob. Thanks to K4EFQ for all photography. QST

Strays



Mary Ed Killitz, WA6EJP, accepts bumper sticker urging compliance with the 55-mph speed limit. Hams have been encouraged to sign "55 and 73" as a new form of life-and-fuel saving public service following a resolution by the L. A. Council of Amateur Radio Clubs. (W6VGO photo)

□ "73 and 55!" No, it's not an improvement of 88. It means "Drive 55 — Stay Alive!" The slogan was originated by Cy Kahn, W6PHX, as part of a program in cooperation with the California Highway Patrol. In California alone, several hundred fewer persons have died in traffic accidents since the 55-mph limit went into effect three years ago, and there have been 10,400 fewer injuries. As an added bonus (as if one were needed), Californians in one month could save an estimated 12-million gallons of fuel by staying under the limit. Just think of how much the rest of us could save. Spread the word! — W6NAZ



This CB antenna in Virginia hit a nearby power line in a windstorm, with unfortunate — but all too predictable — results. A few words to the wise should be sufficient: When you take one antenna and add a 4,500-volt power line, the results will be anything but pleasant. This house didn't burn to the ground, but yours could! — WB4PVT



Gar Anderson, K0GA, Director of Dakota Division, presents Joe Tomczyk, W0DBC, with the ARRL 50-Year Member plaque at a recent OCWA meeting. Joe's membership and amateur activity has been continuous since he was licensed January 12, 1926.

□ The Radio Amateur Society of Norwich, CT, celebrated the 13th annual Rose Arts Festival by operating special-events station N1RAF one weekend in June. On the air for 48 hours, the station worked all 50 states plus many DX stations including those in Kenya, South Africa, Sweden, Germany, Denmark, Norway, England, Canada and South America. The station was set up in a c.d. trailer on the parade grounds and amateurs manned an information booth and distributed handouts. Stations that worked N1RAF are eligible to receive a commemorative certificate if contact is confirmed. — WAIWIR

Tweenies

Troubled by a family problem? Incompatibility? If the problem concerns your family of electronic equipment and it's the interconnecting devices that are not compatible, then here is advice you can use.

By Milton Drake,* W2JPN

In the winter of '59 on a cold night, I sat before the microphone. Surrounding me was a shackful of my cranky neighbor's relatives who were excitedly anticipating a radio reunion with a branch of their family in faraway Alaska. My trusty 35Ts were glowing, the rig was tuned and the VSWR was 1:1. The Yagi even seemed to bristle with gain and directivity. And then, minutes before sked time, the loudspeaker on the receiver developed terminal laryngitis! Disaster loomed like an atomic cloud.

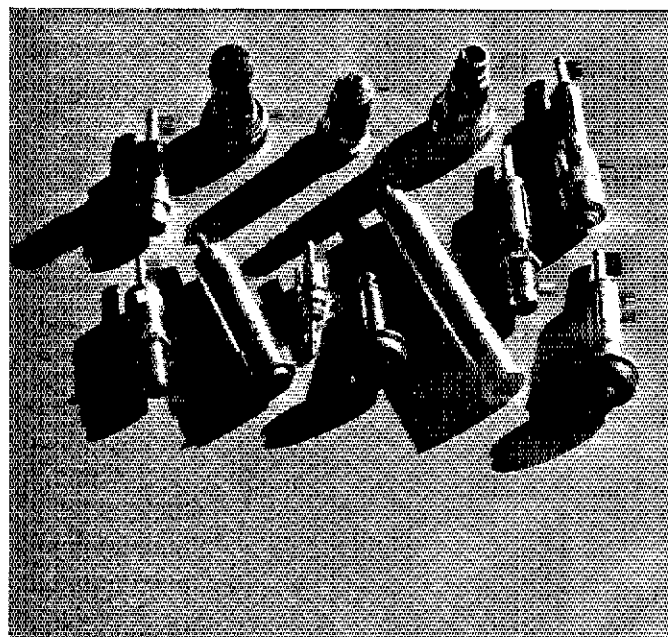
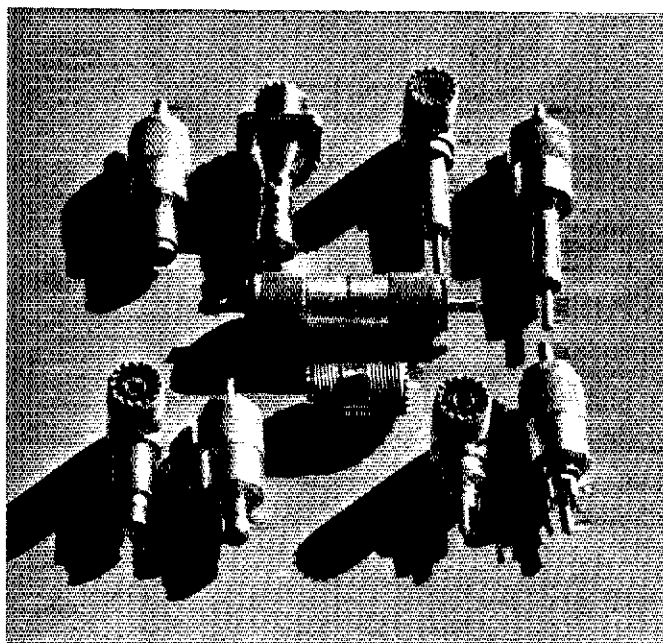
Suddenly, in those dark moments, I recalled that three conjoinable items were gathering dust in my junk boxes. There was an old blunderbuss of a

portable radio with a good loudspeaker and a mini-phone jack designed for an earphone. Tucked in the back of a shelf was a 3-foot patch cord with a 1/4-inch phone plug at each end. And somewhere in a box there was a tiny gizmo that I had once concocted consisting of a mini-phone plug Siamese-twinned to a 1/4-inch phone jack! Quickly assembling all three, I promptly put the emergency speaker system into operation, and the neighbor's relatives were able to enjoy their scheduled communication. W2JPN came out, ready to be admired like a rose. Ever since then I have maintained the highest respect for "go-betweens" that mate incompatible connectors. Adele calls them "tweenies."

Semantically speaking, such devices should not be called "adapters." Adapting connotes making a change in the adapted connector itself. Couplers may be better. But that word is used to describe many other types of components such as antenna couplers, waveguide couplers and shaft couplers. That could be confusing.

Whenever a tweenie is needed, I no longer slap it together for one-time use only. Rather, I build it ruggedly and when the immediate emergency has passed, I carefully store it for possible future applications. The result is a Drawer full of tweenies — at least 60. They couple BNCs, TNCs, PL-259s, SO-239s, RCA types, Motorola types, phone, mini-phone, submini-phone,

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Some useful tweenie combinations are shown in these two photographs. At the left PL-259s and SO-239s are Siamese-twinned with audio types. Male and female coaxial connectors are also shown. The picture at the right shows some audio tweenies.

coax mic cable, and other series of connectors to one another in an incredible number of combinations. There are also many plug-to-plug and jack-to-jack units, plus Ts, Ys, elbows — you name it.

Tweenie Parts from the Junk Box and Surplus

Everything in the tweenie collection was made from junk-box and surplus-store parts, a few short lengths of 1/4-inch diameter and 1/2-inch diameter copper and brass tubing, plus some washers. Every unit should be shielded for rf and use in high-impedance audio service. Although there are various adapters for sale in many parts stores, most are not shielded. Those that are may be priced four to five times higher than the cost of those that are home-made. Of the more than 60 tweenies in my drawer, fewer than 10 are available commercially.

Because generally tweenies are emergency components, there is no practical plan for preparing them in advance. But every shack should have the "makin's" on hand. Look for surplus bargains in male and female connectors of all types. Keep a sort of Noah's Ark stock of material for tweenie building. Such an arsenal will prepare you to handle many emergencies which may arise from the unforeseen use of test instruments, borrowed transceivers, mobile rigs in the shack, repair jigs, noise bridges, pre-amps, keys, speech processors and the like.

Mating some combinations will take a bit of imagination. Construction of tweenies requires a hacksaw, a soldering iron or gun rated at at least 100 watts (or a small butane torch), some solder, a pair of pliers, and various sizes of fabric-content spaghetti tubing for internal insulation. A bench vise is desirable. And, when working on the smaller components, a jeweler's loupe with headband is most helpful.

As the tweenies are being made, check each operation carefully with an ohmmeter or continuity checker. When each unit is completed a fine file and some Scotch Brite (available in many hardware and grocery stores) will be useful for giving the tweenie a shiny appearance. If steel wool is used instead of Scotch Brite, one must be careful to prevent slivers from entering the unit. These could be difficult to locate and remove.

Typical Situations

Here are some examples of connector tricks that can remedy annoying situations. Problem: Connect a single-circuit 1/4-inch phone plug to the RCA type of microphone jack on a 2-meter handheld transceiver. Solution: Remove a JK-26 (Signal Corps) cable type of

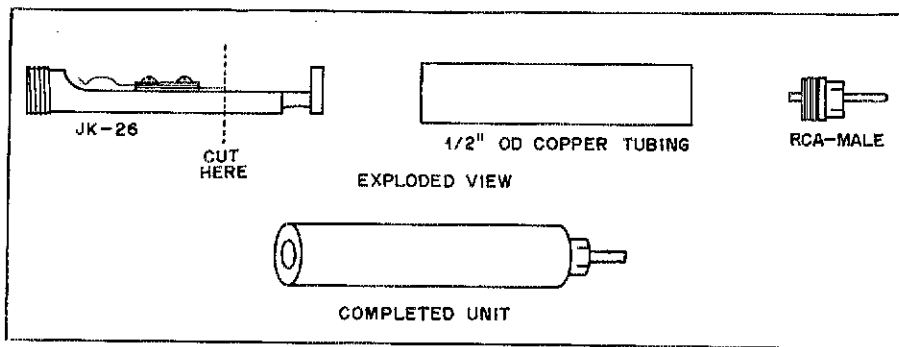


Fig. 1 — A tweenie for connecting a single-circuit microphone plug to an RCA type microphone jack.

1/4-inch jack from the plastic body. With a hacksaw, shorten the jack down to the hot lead terminal. (See Fig. 1.) Any RCA type plug may be used for the male end. Saw a length of 1/2-inch outside-diameter copper or brass tubing to accommodate the entire length of the sawed-off JK-26 plus whatever portion of the RCA plug will be recessed into the tubing (about 2-1/2 inches or 64 mm). Apply a thin film of solder to the inside of each end of the tubing for a depth of about 1/8 inch (3 mm). Tin the outside of the jack and the plug where contact will be made with the inner-soldered tubing. If the RCA plug will not fit snugly, solder a 1/2-inch (13 mm) diameter washer with an appropriate size hole to one end of the tubing and then solder the cable end of the plug to the washer.

Next, solder a three-inch (75 mm) length of No. 20 bare copper wire to the JK-26 hot-side lug. Thread this wire through the tubing and out through the pin of the mounted plug while slipping the JK-26 snugly into the tubing. When the entrance end of the jack and the tubing end are flush, sweat some solder onto the tiny space between them. Solder and trim the wire projecting from the plug, and the job is done.

Problem: Mate a single-circuit phone plug with a three-wire jack for use where the switching function can be operated by a panel control. Solution: Evenly grind a notch of about 3/32-inch (2.5 mm) width and 1/32-inch (1-mm) depth completely around the bulb-like tip of the plug using a triangular file. (See Fig. 2.) Insert the remodeled plug into the jack until the newly filed detent is held by the middle tongue of the jack. It works like a charm, and your plug can still be used for the usual duties.

Problem: Connect a PL-259 male cable plug to a TNC (UG-87/U) panel receptacle. Solution: Use a UG-85/U male cable plug and an SO-239, available at many surplus supply stores. Discard all UG-85/U hardware except the pin. Solder into the pin the end of a

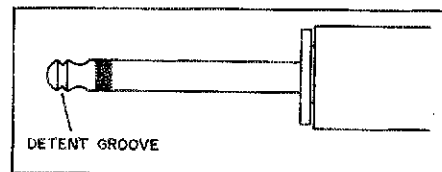


Fig. 2 — For mating a single-circuit plug with a three-wire jack, a groove is cut in the tip of the plug as shown here.

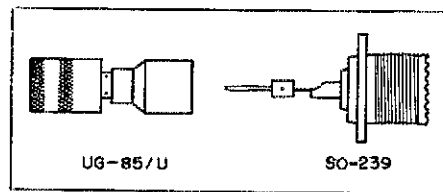


Fig. 3 — The construction of a tweenie for connecting a male cable plug to a TNC (UG-87/U) panel receptacle is shown in this illustration.

1-1/2-inch length of No. 20 bare or tinned solid wire. Solder the other end into the rear cylindrical lug of the SO-239. Push the pin into the normal position in the UG-85/U. (See Fig. 3.) It will be seen that the wire is too long and the bodies of the two connectors do not meet.

Now, carefully measure the distance separating the rear orifice of the plug from the rear metal ring of the SO-239. Withdraw the pin from the plug. Unsolder the wire at the lug end, and clip off exactly a length corresponding to the distance measured above. Insert the wire back into the lug and resolder. The pin should then seat properly just as the two bodies make contact. While they are so contacted, tighten the two together in a vise placing them perpendicular to the vise jaws. Now apply heat around the seam between the two components and flow a thin film of solder into the seam — all 360 degrees

of it. Allow to cool, remove from the vise, and the tweeie is ready for service.

Some Useful Containers

Several drug store products such as deodorants, throat medications, breath refreshers and colognes are packaged in pocket-size spray containers. These are typically made of tubular aluminum, 7/8-inch (22-mm) OD, and are about two inches (50 mm) long. When the contents of the can have been used up, these make good barrels for female phone tweeies. Saw off the spray head and remove the decorative lacquer. (See Fig. 4.) **Warning:** Do not cut or saw the spray can until the contents have been completely emptied and there is no longer any spray pressure evident when the nozzle is depressed.

To prepare one of these containers for use, drill a 3/8-inch hole at the

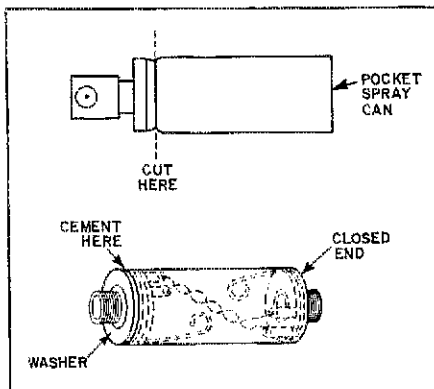



Fig. 4 — This drawing shows an x-ray view of a completed tweeie containing two phone jacks mounted in a used pocket-size spray can.

closed end. Use a 7/8-inch (22-mm) metal washer with a 3/8-inch hole to be placed at the open end. Line the interior

wall with a thin insulating material. Secure one jack to the washer. Wire the jacks together with just enough wire between them for the length of the barrel. Mount the jack without washer inside the closed end of the barrel. The washer may then be drawn against the open end. Clamp the whole assembly in a vise so that the washer is pressed against the barrel end. The vise pressure should be firm but not enough to crush the thin aluminum. Then flow a small amount of cyanoacrylate (such as Krazy Glue) all around the seam where the washer meets the barrel. Leave the device secured for about 15 minutes and then the operation is complete.

If you have ever experienced the frustration of not having the appropriate connecting devices for interfacing two or more pieces of equipment, then plan for the future. It's sensible to join the tweeie-age crowd now! 

Strays



VE1ASJ hopes WICKK finds no problems with his "600 Club" confirmations.

THE "600 CLUB"

□ Hoping his cards pass inspection for the new 6-meter operating award, Andy McLellan, VE1ASJ, watches closely as WICKK checks his 50-MHz QSO confirmations. In fact, Andy drove all the way down to Hq. from St. John, NB, for the occasion! The cards came through in good fashion: Andy now holds the number 10 spot. VE1ASJ made a total of 334 contacts during a five-month period. This included two countries and

39 ARRL sections, thus bringing him above the 600 points needed for the "600 Club."

QST for January, 1977, contains complete details on how to secure the award. If that issue is not available to you, drop a line to Hq. for an application form and instructions. — WICKK

STRAWBERRIES PRESERVE MEMBERSHIP

□ This tidbit was attached to a QST renewal notice: "I'd like you to know that I picked over 10,000 strawberries to renew membership. The ARRL is well worth it, though. (signed) John Milton, WB7DPU, age 14." Thanks, John!

WAR OF THE WORLDS

□ When UFOs were sighted in southern New York at 6 P.M. one recent evening, the entire state was placed in an emergency readiness condition. All Navy-Marine Corps MARS emergency teams served as observers to help track their progress. With sightings reported in eight eastern states, personnel in all affected areas were mobilized at 7:30. The emergency was terminated two hours later when the director of the Navy MARS net, RMC Robert Hudspeth, announced that the aliens were friendly.

It turned out to be a surprise drill scheduled by MARS District Staff Officers. They're not totally convinced the

drill may not turn into the real thing some day. Their last exercise took place in February during some of the heaviest snowstorms of the century, and soon became a genuine emergency. — W3KVN

FIRST PRESIDENT HONORED

□ One of the country's oldest amateurs, Charles W. Hollister, W1EDL, holds the plaque awarded him by the Manchester (CT) Radio Club, one of the oldest active clubs in the U.S. W1EDL served as the club's first president — beginning in 1912! — K1AAF



Standing, l to r: WA1DOI, president; W1CDC, vice president; WA1WOX; K1AAF, secretary. Seated: W1EDL, Charles W. Hollister.

The 160-Meter Monster Antenna

How large should an antenna be for the top band? Ask around and you'll find various answers. For a response that is "in the ball park" read about this Iowa special!

By Joe Ratkiewicz, * NØEL, ex-WØIS

There was a time, just a few years ago, when if you said you operated on the 160-meter band, you would very likely be asked superciliously, "What is that?" With changing times, manufacturers began to include the 160-meter range in their equipment again, giving rise to new popularity for this band. Interest may eventually reach the high level of pre-World War II days. Sample the activity during a DX contest such as the one last winter and you, too, may catch the 160-meter fever.

Once the temptation to get on 160 has a firm grasp on you, the next phase is where you get hooked . . . sky hooked, that is. An effective antenna is every bit as important on 160 as any other band. Then what about the antenna? Could antenna size have some proportional relationship to the score you may hope to achieve in the next DX contest? Maybe. Let me tell you about what the Quad City Radio Club did in Davenport, IA, this past winter. For two years prior to the 1976 event, we used the ARRL 160-meter contest for performance tests on big antennas. The bash for 1976 would be no different.

In the fall, our antenna committee gathered around the drawing board to consider and act upon the matter of an effective system. The problem: If given all the room required and eight tall

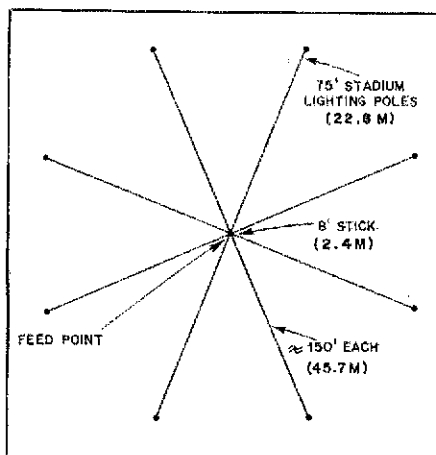


Fig. 1 - A top view of the Monster antenna.

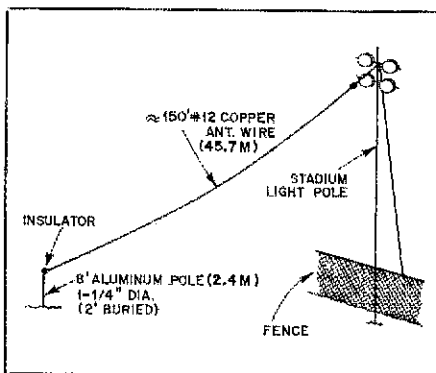


Fig. 2 - This view shows how one of the antenna elements is supported. The arrangement is identical for all eight segments.

wooden electric-light poles equally spaced around a baseball park, what type of antenna should be erected? The first time that we had used the park we constructed a two-element full-size 160-m quad with about 100 feet of spacing between the elements! The orientation gave our array an east-west directivity. The second year, we had a simple one-element delta loop.

Something bigger and hopefully better was the objective for the forthcoming event. We had ample time so this installation would be done in first-class style. Picture, if you will, this ball park with the 75-foot-tall illumination poles on the periphery. What was the final plan? The committee decided to string a wire to the top of each pole with all eight radiators converging at the center of the field where we would place an eight-foot supporting mast made of 1-1/4-inch aluminum pipe.

To get the antenna to the top of the poles required the services of a Robin Hood in our ranks. A monofilament fishing line attached to an arrow would be shot over each pole. In turn, this line would be used to pull a length of 400-pound-test nylon rope over each pole. The choice for the antenna wire was No. 12 plastic-covered copper wire. Each 150-foot length would be attached to the nylon rope and pulled to within one foot of the top of each pole. The rope would also serve as the insulator. All radiating elements would be tied

together at the transmitting end and fastened to an insulator atop the aluminum post at the center of the field. Once each element was drawn to full height, the nylon rope would be secured at the bottom of each pole.

Two trailers were to be moved to the park. One would serve as a bull pen, the other strictly for the operating position. Power would be furnished by two Field Day generators. As for the park use, that had been previously arranged without complication with the park commission. Dick Slattery and the Iowa Park Board were most cooperative on this occasion, as for the last three 160-meter contests.

When the day for installation arrived, erection of the 160-meter Monster took place with little difficulty. We strung some 1200 feet of wire from the poles. Work was well-coordinated. While one team worked on the antenna, another strung out more than 15,000 feet of radials, some of which extended outside the field. The transmission line consisted of a 200-foot roll of 3/4-inch aluminum coaxial TV cable. Finally the massive Monster was completed.

As with most all Field Day antenna installations, the first test signals from the transmitter hit the airwaves minutes

before the zero hour. With a flick of the antenna tuner the SWR was reduced from 1.5:1 to a level close to 1:1 and away our Drake Twins went, quacking up a storm. The first two shifts of operators did not move the dial in six hours. The only reason the third shift changed frequency was for an attempt to reach the KH6 area, something we had failed to accomplish for three years running.

After the dust of the contest activity had settled, our operation had netted 421 contacts. WØIS became the Midwest division leader and ranked 12th in the nation for multiop classification. With 150 to 200 watts power we were satisfied with the results from the various areas. Most reports we received were 599. These were consistently better than reports we gave. Nearly all sections

of the U.S. and Canada were worked. A good collection of W6 stations was represented while W4s seemed most prolific this year. Were there just more W4s in the contest than before, or did the Monster favor that district? That's a matter of conjecture. We do know the antenna performed as well as the quad or the delta loop antennas employed for previous contests.

We believe the distribution of contacts for a station located in the central part of the U.S. was fairly good. The actual spread is given in Table 1.

Our antenna could be given many names. Some might be a conical monopole, slopers with a ground screen, inverted umbrella, or a big ground-plane. We'll let you make the choice. But, by any name, the Monster was just that. Was this huge spider worth the effort? Yes, we think so. Perhaps the results did not bring top billing in the contest, but aside from the fellowship involved there were the inherent pleasures of planning, installing and operating. Already, we are looking forward to the 1977 contest. The splendid teamwork of a fine radio club made the 1976 160-Meter Contest one to be remembered. It was a "Monster" of an event!

Table 1
Distribution of 160-M Contest Contacts by Call Area

| | | |
|--------|--------|--------|
| W1: 34 | W7: 19 | VE3: 8 |
| W2: 39 | W8: 62 | VE4: 2 |
| W3: 23 | W9: 75 | VE5: 2 |
| W4: 59 | W0: 43 | VE6: 0 |
| W5: 35 | VE1: 2 | VE7: 0 |
| W6: 12 | VE2: 5 | KP4: 1 |

Strays

AMSAT-OSCAR 7

| Ref. Orbit | Date | Time (UTC) | Long W |
|------------|----------|------------|--------|
| 12783B | 1 Sept. | 0122 | 74.8 |
| 12795A | 2 Sept. | 0022 | 59.7 |
| 12808B | 3 Sept. | 0116 | 73.3 |
| 12820A | 4 Sept. | 0015 | 58.1 |
| 12833B | 5 Sept. | 0109 | 71.7 |
| 12845A | 6 Sept. | 0009 | 56.5 |
| 12858X | 7 Sept. | 0103 | 70.1 |
| 12870A | 8 Sept. | 0002 | 55.0 |
| 12883B | 9 Sept. | 0057 | 68.6 |
| 12896A | 10 Sept. | 0151 | 82.1 |
| 12908B | 11 Sept. | 0050 | 67.0 |
| 12921A | 12 Sept. | 0145 | 80.6 |
| 12933B | 13 Sept. | 0044 | 65.4 |
| 12946X | 14 Sept. | 0138 | 79.0 |
| 12958B | 15 Sept. | 0038 | 63.8 |
| 12971A | 16 Sept. | 0132 | 77.4 |
| 12983B | 17 Sept. | 0031 | 62.3 |
| 12996A | 18 Sept. | 0126 | 75.9 |
| 13008B | 19 Sept. | 0025 | 60.7 |
| 13021A | 20 Sept. | 0119 | 74.3 |
| 13033X | 21 Sept. | 0019 | 59.1 |
| 13046A | 22 Sept. | 0113 | 72.7 |
| 13058B | 23 Sept. | 0012 | 57.6 |
| 13071A | 24 Sept. | 0106 | 71.1 |
| 13083B | 25 Sept. | 0006 | 56.0 |
| 13096A | 26 Sept. | 0100 | 69.6 |
| 13109B | 27 Sept. | 0154 | 83.2 |
| 13121X | 28 Sept. | 0054 | 68.0 |
| 13134B | 29 Sept. | 0148 | 81.6 |
| 13146A | 30 Sept. | 0047 | 66.4 |

NOTES

- 1) All time and date references are in UTC.
- 2) A-O 7 is operational on Mode A on odd days of the year, and on Mode B on even days of the year. Wednesdays are reserved for special experiments; authorized users only.
- 3) The Mode B transponder inverts signals. Upper sideband on 432 MHz becomes lower sideband on 146 MHz.
- 4) All orbits scheduled for Mondays are reserved for QRP use only. Use a *maximum* of 10 watts of erp.

The operating schedule of AMSAT-OSCAR 6 has been discontinued indefinitely. Presently operating at one-half its design voltage, it is difficult to command and is not transmitting telemetry. A-O 7, however, continues to function reliably.

To keep abreast of latest developments, tune into the regular phone and cw bulletins over W1AW (see schedule in "Operating News," page 89), AMSAT bulletins transmitted over the beacon frequencies on A-O 7 reference orbits, and AMSAT nets (East Coast at 0100 UTC Wednesdays on 3850 kHz LSB; Mid-States at 0200 UTC; West Coast 0300 UTC).

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 |

This schedule of orbits for AMSAT-OSCAR 7 will be a regular feature of QST. Further information on the amateur satellite program can be obtained free of charge from ARRL hq. The ARRL OSCARLOCATOR, a simple satellite tracking aid (see page 51, QST for November, 1976), is available for \$1, while the popular and informative series of

QST articles for the beginner has been reprinted in book form. *OSCAR from the Ground Up* covers OSCAR 6, OSCAR 7 and the newest satellite, A-O D, to be launched early next year. It is now available for \$3 ppd. from the ARRL.

The W1NG Accu-Repeat

This next step in the evolution of the WB4VVF Accu-Memory takes over the station while the operator catches up on whatever needs catching up on.

By Kenneth N. Bolin,* W1NG

During the contests of the past two years, it was found that by having a "CQ machine" on both phone and cw, there was less wear and tear on the operator. On phone, a cassette tape recorder was used with a 20- or 30-second tape loop. On cw, the same setup was used with the cw recorded on the tape; when the tape was played back, the audio signal was rectified and the dc level was used to power a relay driver. A simple reed relay, which was wired in parallel with a key, bug or keyer, would key the transmitter. The advantages of this system are that it is simple and, since a tape loop is employed, it will call CQ, pause, call CQ, pause and continue to repeat this cycle until the recorder is turned off. This gives the operator a chance to leave the operating position for a cup of coffee or whatever and the machine continues to call CQ until there is a reply. The major disadvantage is that there is no control of the code speed or the pause length.

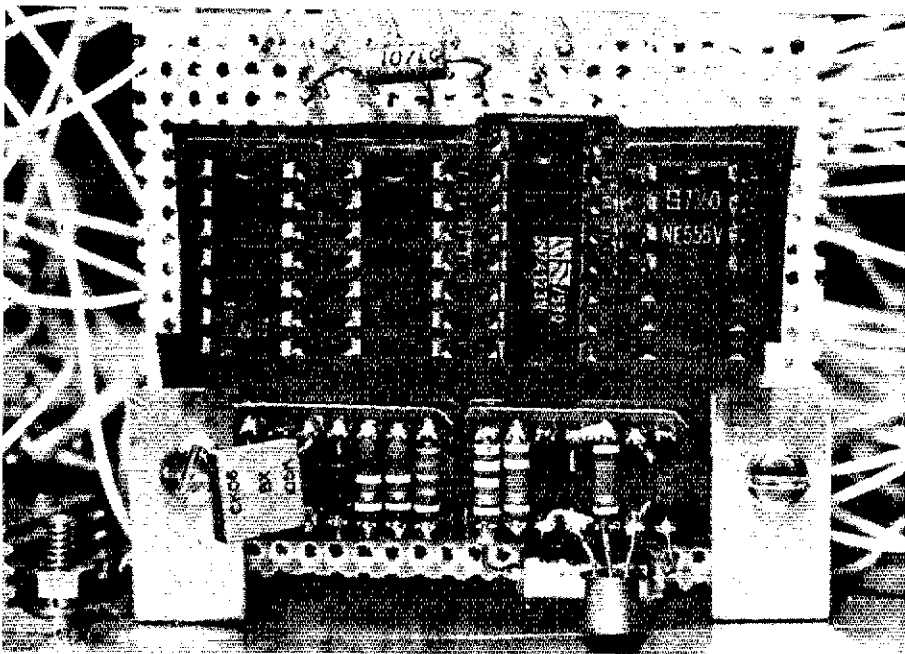
Circuit Description

When I decided to build the Accu-Memory Keyer,^{1,2,3} it looked like an excellent opportunity to incorporate the CQ, pause, CQ, pause feature into it. The heart of the circuit is a 555 timer used to vary the pause between messages in the repeat mode. Two one-shot multivibrators, two 7402 gates and four 7400 gates are used as control logic. The two remaining 7402 gates are used to incorporate the Accu-Stop⁴ modification into the circuit.

The gates U3A, U3B and U4A form a set-reset flip-flop. When the REPEAT button is pressed, it sets the flip-flop and enables the circuitry. When the STOP button is pressed or the paddle is

actuated, it resets the flip-flop and disables the circuit. The input to the U1A one-shot is connected to pin 8 of U3C on the memory board. Pin 8 is at a logic one when the memory is running and goes to a logic zero when the memory stops. The transition from a logic one to a logic zero triggers the one-shot and it generates a short pulse. If the flip-flop is in a set state, pin 4 of the 555 will be at a logic one and the timer will start on the negative-going transition from the U1A one-shot. At the beginning of the timing cycle, the output of the timer, pin 3, will go to a logic one and will remain at a logic one until the end of the pause cycle is

reached and will then return to a logic zero. The length of the pause is given as $T = 1.1 \times (R1 + R2) \times C1$, where T is the length of the pause in seconds, resistance is in ohms, and capacitance is in farads. If pin 4 of the 555 is at a logic zero, the timing function will be inhibited. On the negative-going transition from the timer, the U1B one-shot would be triggered, generating a short pulse that would reset and start the first memory. A positive-going pulse from the flip-flop into pin 10 of the U1B one-shot will trigger the one-shot and will start the first memory for the first time. This will occur when the REPEAT button is pressed. The U1B one-shot



Parts placement for the W1NG Accu-Repeat, using Vectorbord construction.

*21 Pleasant Rise Circle, Brookfield, CT 06804

¹ Footnotes appear on page 31.

Table 1

Interconnections. U3-11 is used to indicate pin 11 of U3; U3-5 indicates pin 5 of U3, and so on.

| Terminal | Connection to Accu-Memory Or | Connection to Front Panel Switch Or | Connection to Wire Number Or | Miscellaneous Connections |
|----------|---------------------------------|--|---------------------------------|---------------------------------------|
| 1 | U3-11 on memory board | Reset common | 18 | — |
| 2 | U3-5, 8 on memory board | — | — | — |
| 3 | — | Repeat | — | — |
| 4 | U7-6, 7 on memory board | Stop | 19 | — |
| 5 | U3-1 on memory board | Wire 6 on load send | 6 | — |
| 6 | U6-3, 9 on keyer board | Wire From U6 on ACS | — | — |
| 7 | — | — | — | +5 volts |
| 8 | — | — | — | Ground |
| 9 | U6-2, 4 on memory board | Reset 1 | 14 | — |
| 10 | — | — | — | Unused decimal point on display |
| 11 | — | Pause length pot | — | — |

would be inhibited if the input to pin 10 is at a logic zero.

The combination of U3C and U3D is used to prevent the memory from being reset when a message is being sent either manually or automatically. The \bar{Q} output of the flip-flop is connected to one of the decimal points on the display through a dropping resistor and indicates when the REPEAT function is operating. The REPEAT function can be terminated by either pressing the STOP button or by touching the paddle.

Construction

A Bud type RC-11100 chassis was used for the original Accu-Memory and a significant amount of space remained inside the box. A piece of epoxy glass Vectorbord measuring approximately 2.25 by 3 inches (57.2 x 76.2 mm) with a 0.1 x 0.1-inch hole pattern was used for the Accu-Repeat. Three 14-pin DIP sockets and one 16-pin DIP socket were used for the four ICs, and two additional 14-pin DIP sockets with component socket adapters were used to mount the five resistors, five capacitors and one transistor. The discrete components can be mounted on the board, but the component socket adapters make the layout more compact. Solder tab or wire-wrap sockets can be used. The pins on the wire-wrap sockets must be trimmed after construction to save space. Eleven terminal pins were mounted along the edge of the circuit board to interface signals with the rest of the Accu-Memory. Since these modifications will usually be made to an existing Accu-Memory, it is designed so that interconnections to the Accu-Memory would be as simple as possible. With the exception of the power supply and ground wires, all but one connection can be made to the control switches on the front panel, which are

generally more accessible than the circuit boards. See Table 1.

A problem did arise from the long leads connecting the Accu-Memory to the new circuit. Noise pickup on the input would cause false triggering of the circuit. The 1- μ F capacitor, C2, on the

input cured the problem; it may not be needed depending on the layout and how the interconnecting wires are run. The capacitor should be connected between input pin 2 and input pin 8 (ground).

Two additional controls are needed on the front panel, a REPEAT button and a miniature potentiometer; if some space remains on the front panel, they can be added where desired. However, if not enough space is left, two of the lesser used controls, such as, KEY-LOCK, SPEAKER ON/OFF, DISPLAY ON/OFF, can be moved to the back panel and replaced with the new controls.

The new circuitry will require approximately 100 mA of additional supply current. This brings the total current for the Accu-Memory to near the maximum current that can be delivered from the LM309 regulator at the power that it is dissipating. A 3.9- or 4.7-ohm, 10-watt resistor can be placed in series between the power-supply diode bridge and the input of the LM309. This will reduce the power that is being dissipated by the regulator and will increase the maximum current output. A Dale type RH-10 resistor was used. This

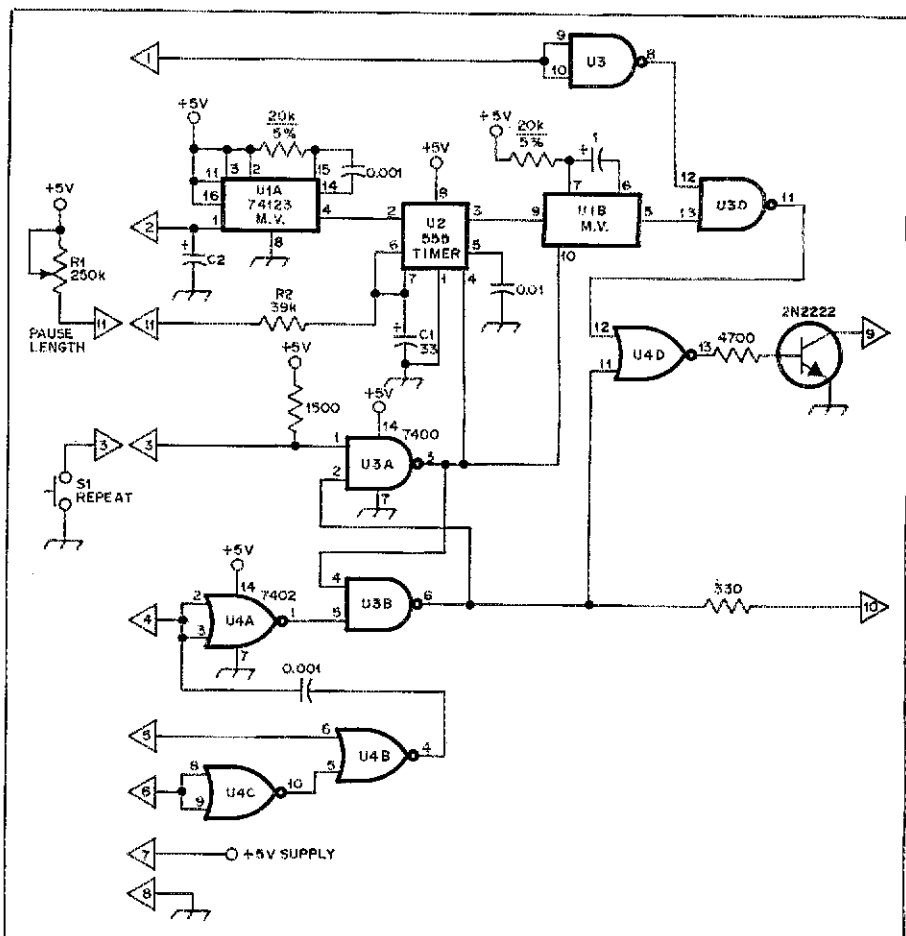
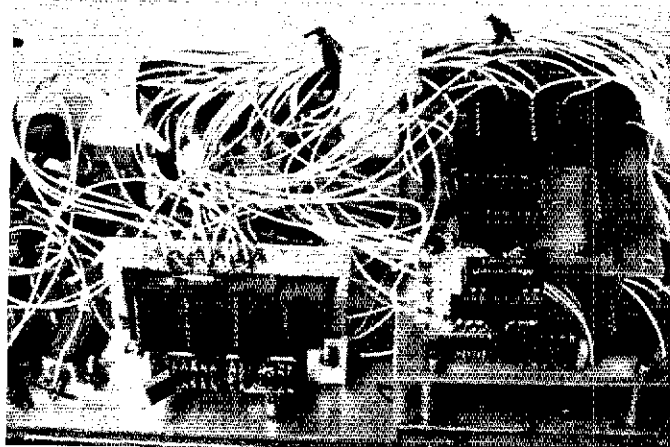
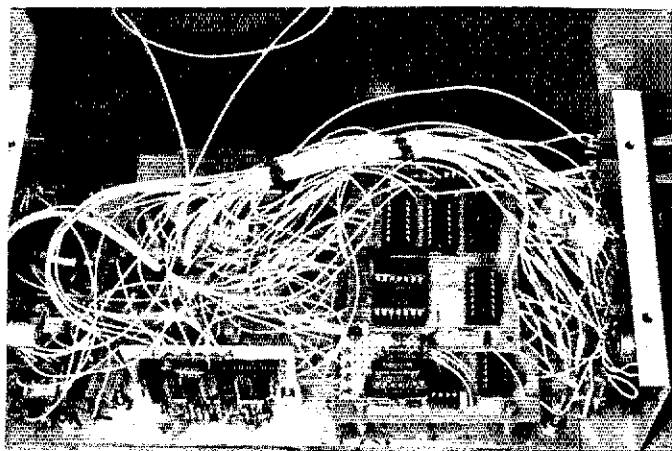


Fig. 1 — The W1NG Accu-Repeat. Numbers in triangles indicate input and output terminals. All resistances are 1/4 W, 5 percent carbon. All capacitances are in μ F, 25 V dc minimum.



At the left, the relationship of the Accu-Repeat board to the basic Accu-Keyer. The keying relay can be seen on the top board, right side. At the right, the entire unit, Accu-Memory and Accu-Repeat.



Note that nearly all interconnecting wires from the Accu-Repeat board are connected to front-panel controls, for convenience of adding the Accu-Repeat to an already built Accu-Memory.

is a small precision resistor which has its own heat sink and can be mounted directly to the chassis, The RH-10 is not necessary, only convenient, and any resistor in that resistance range, 10 watts or greater, will work.

Operation

Operation of the new circuitry is very simple. By pressing the REPEAT button, the message in the first memory may be sent. When the message is completed, the pause starts and is controlled by the potentiometer setting. With the values shown for R1 and R2, the pause can be varied from approximately 1.5 seconds to approximately 10 seconds. The Accu-Memory will continue to repeat until the STOP button is pressed or the paddle is touched. The extra decimal point will remain lit while the Accu-Memory is in the REPEAT function.

With a long pause, there is enough time to get back to the operating position if there is an answer to a CQ before the next CQ starts. With a short

pause, "HKØAA DE WING" can be programmed into the memory for "pile-ups."


Additional Notes on the Accu-Memory

In addition to the solid-state keying, a keying relay was added. This will assure that the keyer will work with any modern transmitter if the keyer should go to a Field Day or to a multi-multi contest operation. Good quality spst DIP reed relays are generally available from electronics supply houses and should be good for a minimum of 100-million operations at normal keying currents. The coil of the relay should be connected in parallel with R9 on the keyer board. If a relay with an internal suppression diode is *not* used, a diode should be added across the coil with the cathode attached to the +5-V supply.

Molex pins or IC sockets are a must. It is almost impossible to remove a 14-pin IC once it is soldered to the board without damaging the clad. Molex pins are recommended since the IC

sockets tend to cover some of the holes in the board for discrete components and interconnecting wires.

The bezel and filter assembly pictured in the Accu-Stop article⁴ is a Digibezel which is made by Nobex, a division of the Griffith Plastics Corp. The Digibezel used, model 915-60, is available from Greene-Shaw Co., 70 Bridge St., Newton, MA 02195 for \$5 postpaid. Other Digibezels range from 1.37 to 6.5 inches in length, with green, red, amber, neutral, nonpolarized and polarized filters. They are very useful in making nice-looking panels.

The Accu-Memory has already paid for itself by making the cw contests a pleasure to operate. 

Footnotes

¹ Garrett, "The WB4VVF Accu-Keyer," *QST*, August, 1973.

² Garrett and Contini, "The Accu-Memory," *QST*, August, 1975.

³ Garrett, "Enhance the Performance of Your Accu-Memory," *QST*, July, 1976.

⁴ Kalin, "The WA1JZC Accu-Stop," *QST*, July, 1976.

Strays

□ What do you do when you have to contact a vacationing physician in a remote part of Colombia, S.A.? Use amateur radio, of course.

After returning home to Florida from Houston, where their 18-year-old son David was receiving radiation treatments for leukemia, the Edward Carr family was faced with a dilemma. They needed authorization from their physician in Houston before the treatments could continue in Tampa, and he had left on vacation somewhere in Colombia. Carr, WB4SCO, called on fellow hams for assistance. If the physician couldn't be located soon, they would

have to fly David back to Houston.

A message sent out over the local MARS net produced the first tangible results: Bruce Ault, WA4UVG, agreed to begin searching for the doctor in Bogota. It took an entire night, but he finally managed to contact Rosemarie Higgins, WB6SEU/HK3, a registered nurse in that city. Since her husband was a pharmacist, they were familiar with the local medical facilities and began canvassing doctors, hospitals and hotels in the area. After countless telephone calls and skeds with WA4UVG, he was located — at Telima, a summer resort about 100 miles from Bogota. There were few amateurs and no telephone service in the area, though, so WB6SEU and WA4UVG continued

their vigil in the hope of contacting Telima through 40-meter nets.

As the Carrs began preparing to fly their son back to Houston, Mrs. Higgins received word from a relative in Bogota that the doctor would be returning to the U.S. soon. He arrived in Bogota that evening, and was immediately informed of the situation by WB6SEU/HK3. His response was relayed to the Carrs through WA4UVG. It took 24 hours of nearly constant monitoring from the initial plea for help to get the doctor's permission to have David Carr continue his radiation treatments near his home. Amateur radio — and a network of dedicated operators — came through again when other forms of communication could not. — WA4UVG

A Quarter-Wavelength Vertical for 75 Meters

Got a teeny-weeny backyard? Wanna get on 75 with a good signal? This almost full-size, high-performance vertical might be the answer to your dilemma.

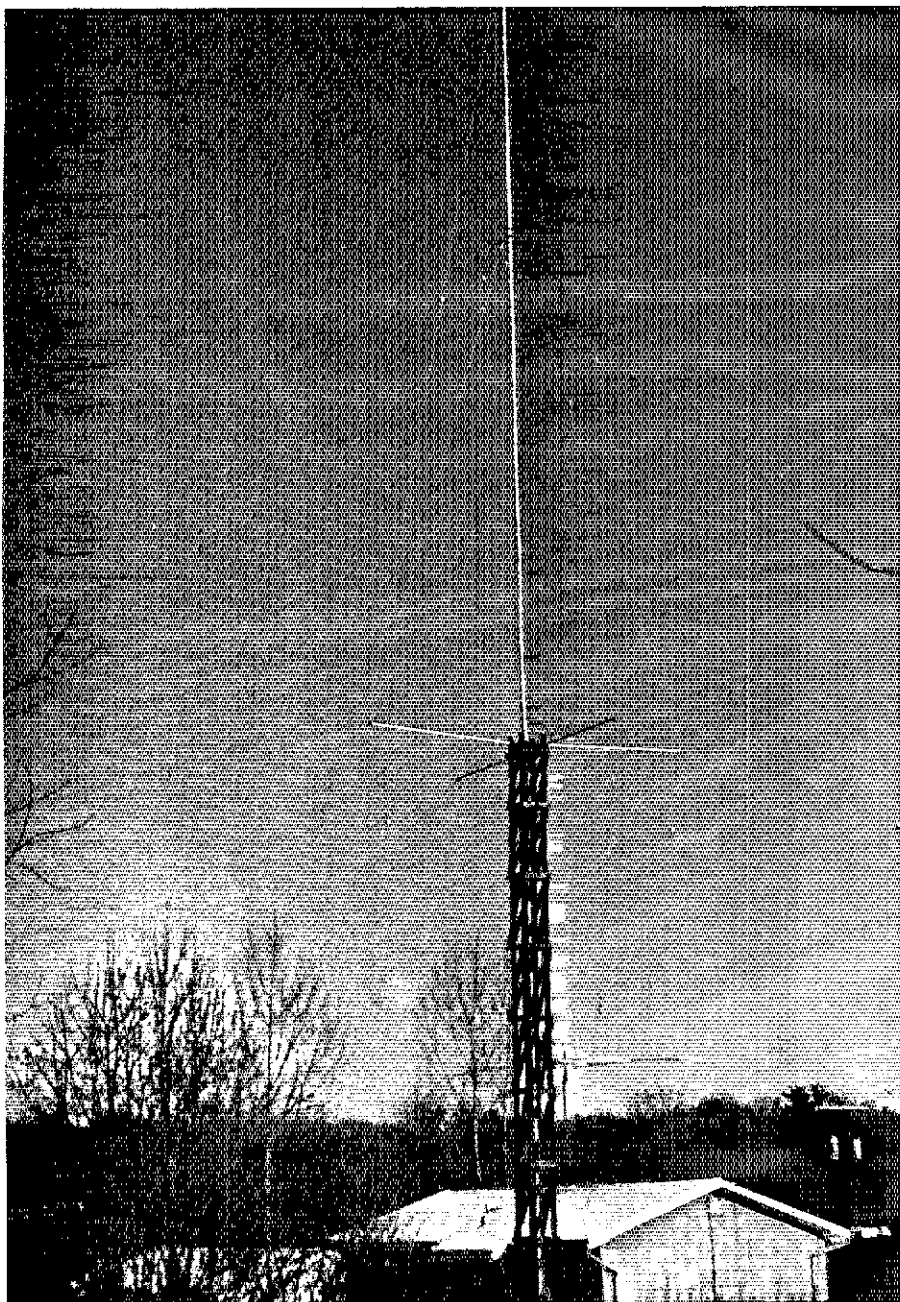
By James H. Frasier,* K2ANJ

Frustration in amateur radio can be defined as being a 75-meter buff and having a small backyard — too small for even an inverted V that is shortened and loaded. What to do? One answer to the problem is a good vertical. But a good vertical on 75 meters means something about 50 feet high. My approach to the problem is probably different than most and is, I feel, one worthwhile enough to pass on to my fellow amateurs.

The Concept

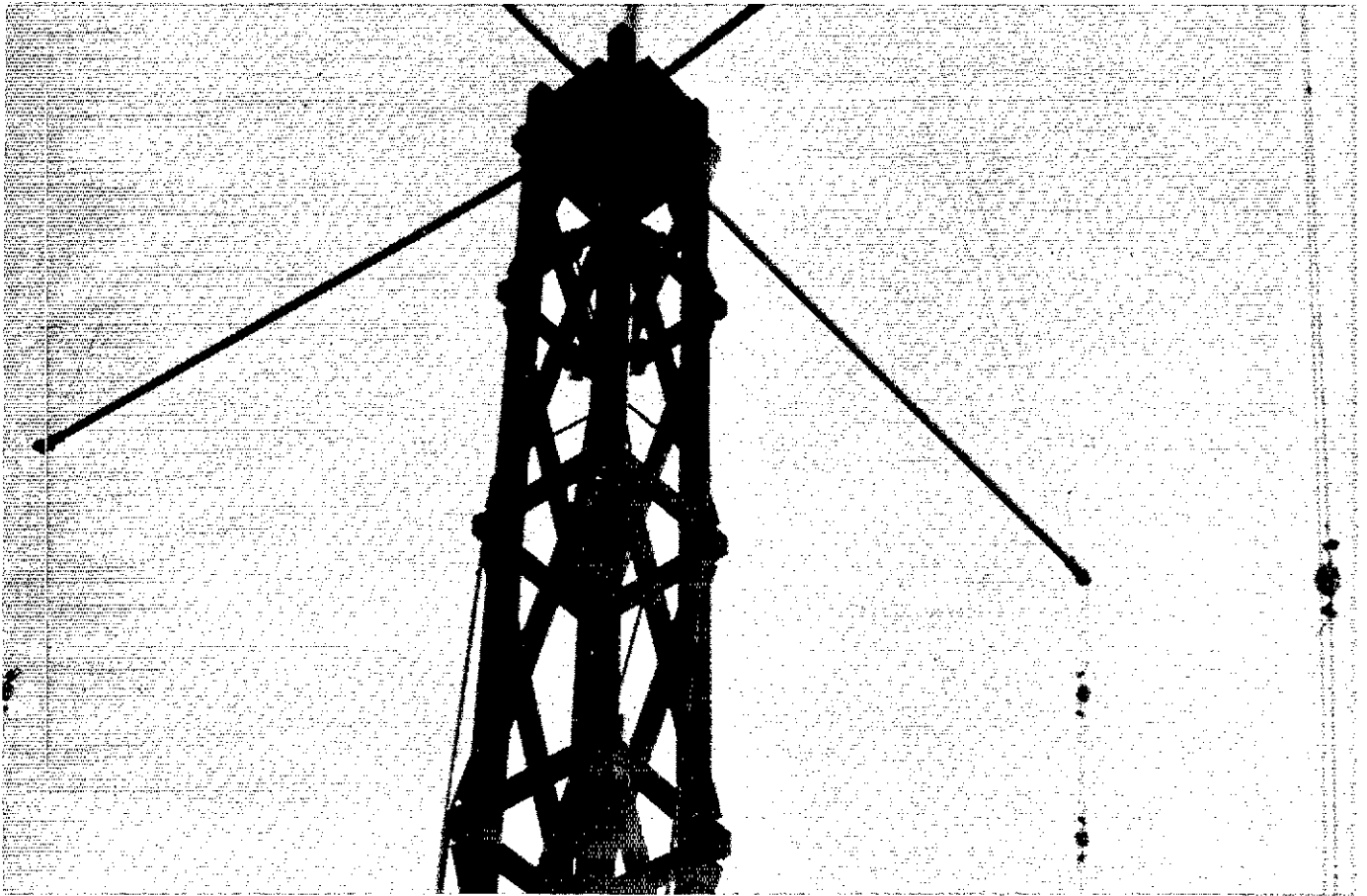
Before construction was undertaken, considerable thought was given to finding a feasible approach. My objectives then were to make the antenna as self-supporting as feasible, and as tall as possible. It appeared to me that the antenna could be built along two basic lines — either as a strong, heavy structure similar to that of a flag pole, or in some other less burdensome configuration. Ultimately, I had to decide on which of these two very general approaches to take: The choice was not easy for each had its good and bad features. If the flag-pole method were adopted, using large-diameter steel pipe for example, no guys would be required. But the problem of raising it up could be a monstrous one — to say nothing of the cost involved. If constructed with somewhat less weight involved, using aluminum tubing, then guy wires would probably be needed for support. This idea was especially undesirable because of the small size of my property. In the end, I elected to go the light route, feeling it was my only viable option. The big question remaining to be resolved, however, was finding some way of manipulating the guy lines so their spread over my backyard would be minimal. The method described here was the solution I came up with.

The system is comprised of two

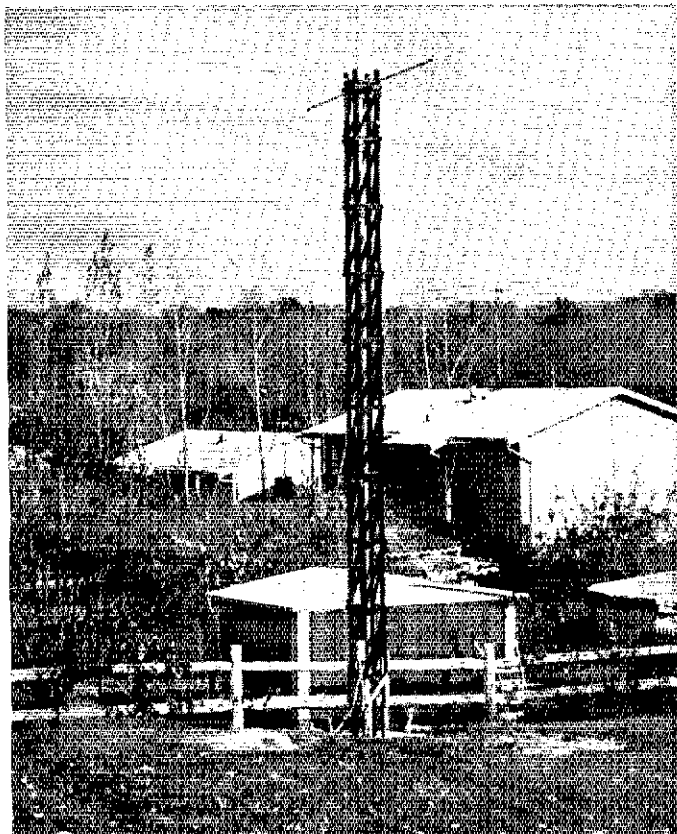


Here is an overall view, showing the installed guy lines.

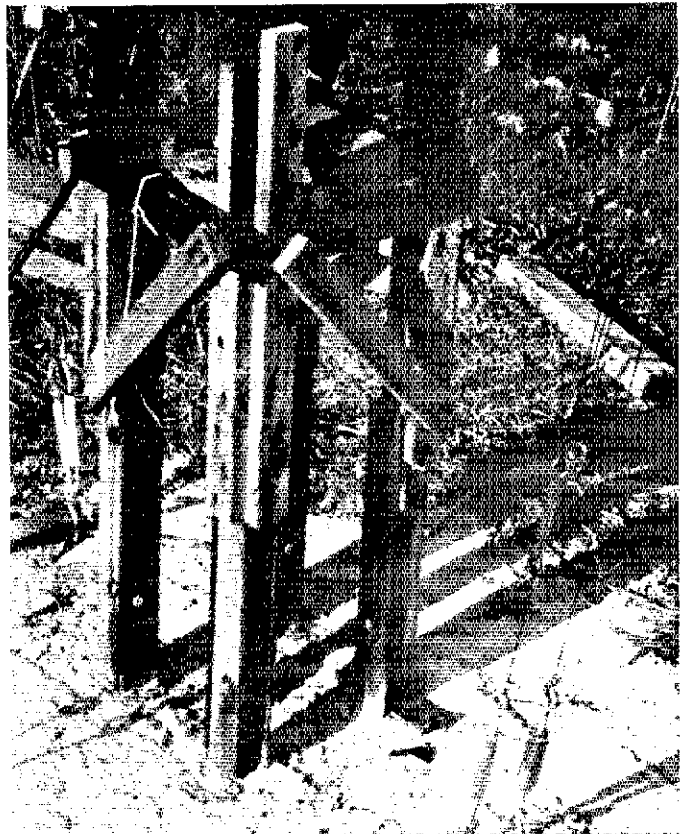
*3 Clive Place, Newton, NJ 07860



The guying support arms are mounted atop the wooden support tower.



This is the wooden supporting structure, completely finished. The mast is visible inside the wooden tower.



There is nothing fancy about the base construction, as can be seen in this view. Note the guy lines anchored in the cement.

essential components, a 20-foot (6-m) wooden tower which is anchored to angle irons extending out of the ground, and the antenna itself — adding up to a height of 50 feet (15 m).

The first 20-foot (6-m) portion of the antenna is supported by the tower. Projecting upward above the tower, the remaining 30 feet (9 m) are guyed at two elevation points — 35 feet (11 m) and 47 feet (14 m) respectively. The guy wires angling down from both of these points are routed through pulleys. The pulleys are fastened to the end of spreaders which are mounted on top of the tower and extend laterally from each side, a distance of 5 feet (1.5 m); see Fig. 1. Once through the pulleys, the guy lines are brought back to the base of the tower and secured to hooks embedded in the concrete foundation. Essentially freestanding, the system works very well.

Construction

The antenna portion was made by the coupling together of five, 10-foot lengths of aluminum conduit with diameter dimensions as follows: 1-1/2-inch dia — bottom two sections; 1-1/4-inch dia — middle two sections; 3/4-inch dia — top section.

The tower was constructed in a 10-inch-square (250 mm) configuration using 2 X 2 X 20-foot pine at the corners and Z braced on each side with strips of 1 X 2 fir. Nails were used throughout.

A question often asked is, "Why was wood chosen for building the tower?" I chose wood chiefly because it was readily available and within my capabilities of handling — my talents being somewhat limited. Fortunately, the tower had only to go up 20 feet, so excessive strength was not required.

I constructed two sides of the tower flat on the ground, spacing the 20-foot 2 X 2s 10 inches apart and nailing on the cross pieces. Before bolting the completed side sections to the angle irons, each was given a generous coating of black paint. With the two sides vertically mounted, I then proceeded to nail on the cross supports of the remaining sides starting from the base of the tower and inching my way slowly up. Above six feet (2 m) it became necessary to use a step ladder. When the step ladder was no longer usable (above 12 feet or 4 m), the tower had by then

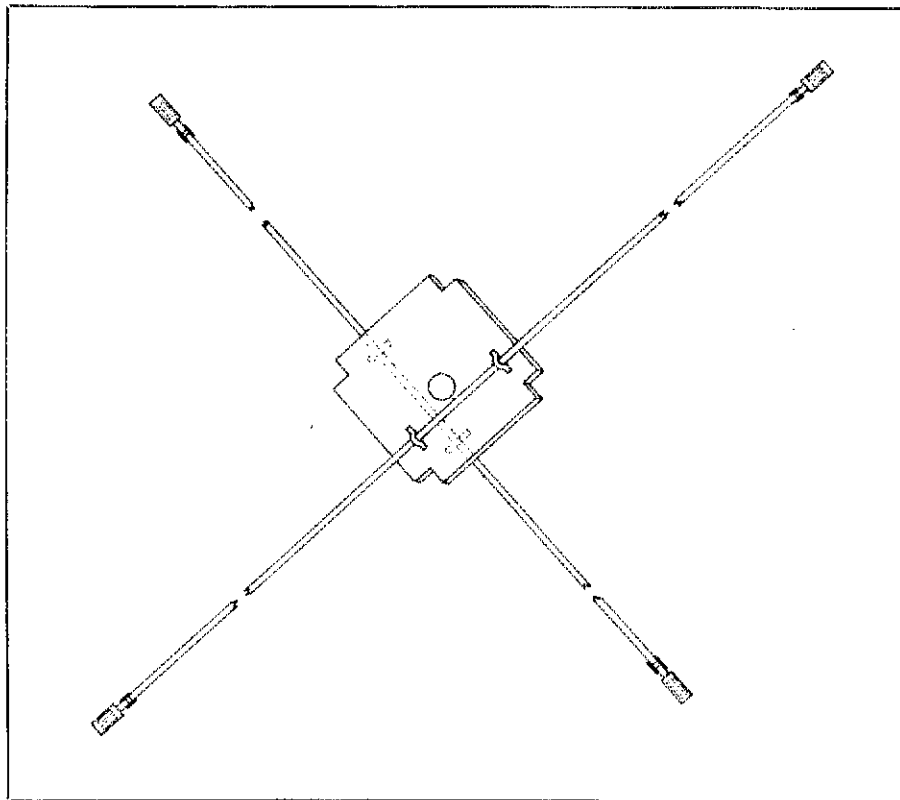


Fig. 1 — Details of the spreader assembly.

acquired enough rigidity to support an aluminum extension ladder. From the extension ladder, I was able to continue construction until the tower was finally completed.

The angle irons, to which the tower is bolted, are 2 inches across the flats and 1/4 inch in thickness. Each angle was cut to 4-1/2-foot lengths of which 3 feet were embedded in concrete. I used approximately 3/4 yard of concrete.

As shown in Fig. 1, the guy wire spreaders were made from two, 1/2-inch-dia 10-foot lengths of aluminum conduit mounted onto a one-inch thick pine board cut to accommodate the antenna and tower dimensions. Before placing the assembly on top of the tower, the guy lines were passed through the pulleys, coiled up, and temporarily lashed at a convenient point along the spreaders. At a later time, when putting up the pipe sections, I was then able to reach out and grab the guy lines, as needed, while perched on top of a ladder placed against the side of the tower.

To minimize adverse loading effects

introduced by the guy wires, each guy line was sectioned off into multiple lengths of 20 feet or less and spliced with egg insulators. Some top loading was provided by connecting the upper set of guys directly to the antenna.

The bottom section of the antenna rests inside a plastic flower pot filled with a high-resistance potting compound. The ground system consists of a 5-foot copper rod driven into the earth to which 12 radial wires are attached.

Wind velocities in the northern New Jersey area, while not normally high, become substantial at certain times of the year. Since the antenna was located close to my neighbor's property line and within range of his house, I was apprehensive whether the tower would have strength sufficient to withstand the buffeting of strong winter gusts, which occasionally reach velocities of 70 mi/h. To date, however, everything has stood up well, and except for having had to tighten occasionally a guy line or two, no major catastrophe has occurred. As of this writing, the system is into its third year of operation. QST

Strays

□ When WA2EUB loaned a copy of *Tune in the World* to co-worker WA2BJJ, he

had no idea it would end up halfway around the world. We'll let John tell it: "I loaned it to Cecil Burgin who is in our Novice class. He works for a stockbroker on the 33rd floor. He sent it back to me, addressing it to 'John Gambino 21' meaning on the 21st floor. The mailroom

saw the '21' as 'Z1' — our wire call for the Singapore office — so out she went to the blue Pacific. Luckily, the recipient in Singapore knew my name and location, and was kind enough to return it to me by registered mail." — from the Squelch Tale newsletter

Update Your HF MUF Predictions Daily

The next time you sit down to work DX, do it with up-to-the-minute predictions of band conditions.

By Howard J. Sartori,* W5DA

Daily transmission of solar-flux and geomagnetic information on WWV and WIAW and monthly muf propagation predictions in *QST* are major advances in getting up-to-date propagation data in the hands of amateurs. K1ZND's article, "Chart Your Way to Better DX" in *QST* for January, 1977, bridges the gap between merely having that propagation data and making it work to help amateurs attain better spectrum efficiency (and more DX!).

The problem until recently has been how to adequately disseminate the right kind of data to prospective users. The National Oceanographic and Atmospheric Administration (NOAA) and the ARRL (via WIAW) have solved that problem. Now the tricky twist is how can the predicted muf in the *QST* charts be updated for any day of the month and customized to a particular hf radio station. First, the solar flux almost always varies from the precalculated value used in the *QST* graphs, since that value is derived from a data base taken many weeks before the period of time in question. Second, a typical radio-station antenna usually has anything but a five-degree elevation angle of radiation. Finally, different types of geomagnetic storms can nullify an increased value of the solar flux above the precalculated value.

With the advent of WWV (and WIAW) announcements, these variables in hf propagation predictions can be corrected daily by amateurs for their individual stations. The charts and graphs in this article are an extension of the work of K1ZND (and others).

Needed: a method of updating the predictions in *QST* in keeping with the variables described above. Two ways of doing such updating will be described. The first is purely mathematical, derived from hf ionospheric-propagation ray-theory analysis, the end result being a

Table 1
A Typical Monthly Correction Chart for "Instant" Daily Updating of Propagation Predictions.

| Antenna A_{new} | Daily Average ϕ_{new} | | | |
|----------------------|----------------------------|------|------|------|
| | 70 | 75 | 80 | 85 |
| 2° | 0.95 | 1.00 | 1.05 | 1.11 |
| 5° | 0.91 | 0.96 | 1.01 | 1.07 |
| 8° | 0.88 | 0.93 | 0.98 | 1.03 |
| 12° | 0.81 | 0.85 | 0.89 | 0.94 |
| 15° | 0.75 | 0.79 | 0.82 | 0.88 |

"correction table" (Table 1). Later, an easier method using look-up graphs and requiring no computations will be described. A basic understanding of the math assists in making best use of the look-up graphs.

Building a Correction Table

Calculations for determining a "new" muf (hereafter referred to as muf_{new}) are shown; the muf_{new} represents the *QST* predicted 50-percent muf (termed muf_{base}) corrected for current solar conditions and for your best estimate of antenna radiation angle.

$$muf_{new} = muf_{base} \times \left(\frac{8.28 + 0.52\phi_{new}}{8.28 + 0.52\phi_{base}} \right) \times \frac{0.323}{\cos [\sin^{-1} 0.95 (\cos A_{new})]}$$

In This Issue: Improved Propagation Charts

Two changes have been made in the popular propagation charts which appear each month in "How's DX?". One is a minor adjustment: The predictions now assume a minimum antenna takeoff angle of 5° instead of 2°, so the charts will be more representative of the situation faced by most amateurs.

The second change is more significant. A third curve, for "highest possible frequency" or hpf, has been added to the chart. On 10 percent of the days of the month, or three days out of 30, communication should be possible according to the uppermost curve. In other words, if the hpf for the Midwest to

where:

- muf_{new} = new 50% muf corrected from *QST* base data by current solar-flux data and station antenna radiation angle.
- muf_{base} = base 50% muf published in *QST*
- ϕ_{new} = average of the past three days and current-day solar flux reported by WWV/WIAW
- ϕ_{base} = base solar flux published in *QST* (beneath the charts for that month)
- A_{new} = station antenna estimated angle of radiation¹

For use in this equation, the values of the previous three daily solar-flux numbers are averaged with the day-in-question value to obtain a "smoothed" flux number. This is because the net effect of any increase in the solar flux is

¹[Editor's Note: The 0.323 value in the equation assumes the predictions published in *QST* are based on an antenna radiation angle of five degrees, which holds true beginning with this issue. For predictions based on two degrees (January through August 1977 *QST*), use a value of 0.314. This would be the case if you wanted to "predict" what happened in those months. If your antenna radiation angle is the same as that for which the *QST* predictions were made, the final term of the equation (in parenthesis) will equal one.]

South America path is 29 MHz at 2100 UTC, the 10-meter band should be open between those two points at that time on three days of the month.

We are adding this information to our charts to encourage you to look for openings on the higher bands. Ten meters is open! Catching the openings may require some patience, but the results are well worth the effort. Do some CQ-calling on 10, too, especially in the directions in which the hpf curve shows the band may open. If everyone listens, and no one transmits, the band will *always* be "dead"! — K1ZZ

*Transmission Engineer, Microwave Div., Collins Radio, 721 James Dr., Richardson, TX 75080

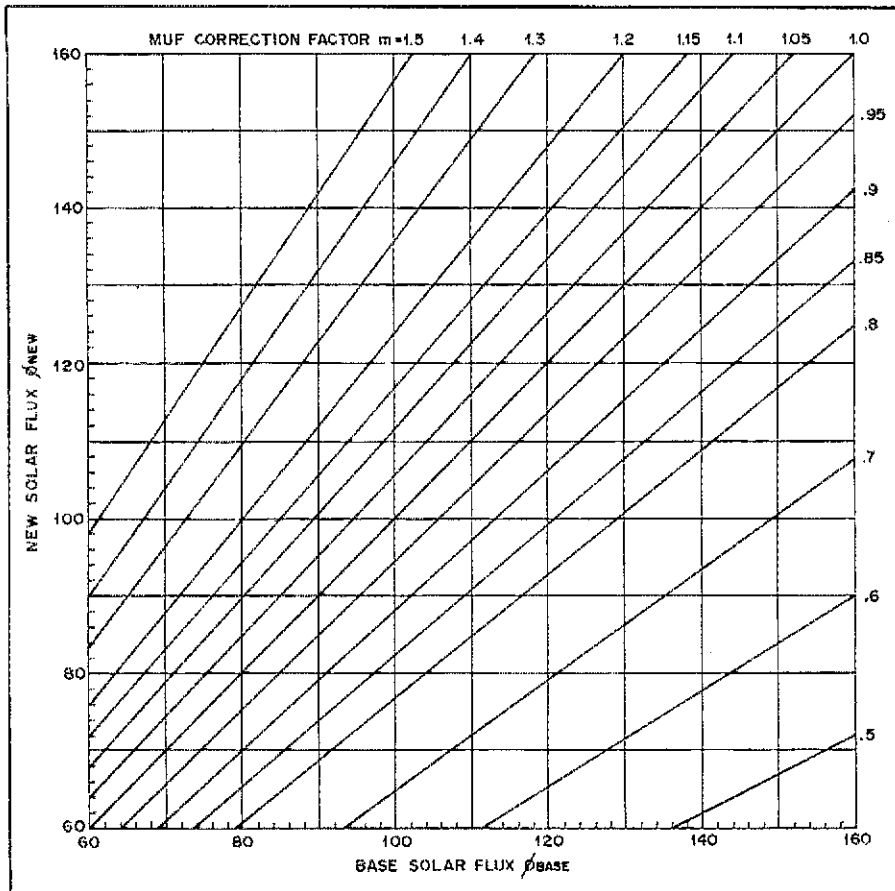


Fig. 1 — This chart enables the user to correct monthly *QST* muf graphs for current solar-flux information.

not realized for several days.

From the equation a chart may be tabulated to correct the published muf_{base} values to a local daily muf_{new} . Table 1 is an example of such a chart which the author has prepared monthly for use in his area; the example was for February, 1977, and used a ϕ_{base} of 73.

Finding Your MUF Graphically

Now that we have seen how the muf_{new} is calculated mathematically, graphs may be plotted to do the job more quickly and easily. Having the muf_{base} from *QST*, all we need are mathematical correction factors for the latest solar-flux information and antenna radiation angle (unless your antenna angle is close to five degrees). The equation looks like this

$$muf_{new} = muf_{base} \times \frac{\text{flux correction factor } m}{\text{antenna correction factor } n}$$

Determining the flux correction factor m is fairly simple; plug in the base solar-flux number (from the *QST* charts) on the X (horizontal) axis of Fig. 1, plot the new solar-flux figure (four-day average) on the Y (vertical) axis, and where the two cross follow the

diagonal line out to obtain the flux correction factor.

Determining your antenna radiation angle correction factor n is not so cut-and-dried but is also, happily, not too critical. A description of estimating antenna radiation angles can be found in recent editions of *The ARRL Antenna Book*, but as an approximation the radiation angle from a horizontal antenna can be found from this relationship: $A_{new} = \sin^{-1}(1/4h)$, where h is the antenna height in wavelengths. Fig. 2 may be used by plugging in your estimated angle of radiation on the X axis, following it out to where it meets the curve, then left to the corresponding intersection on the Y axis. Presto! There is the correction factor for your antenna.

If you are using a 10-meter beam at 70 feet, the correction factor will be so close to 1.00 as to make it hardly worth bothering with. If, on the other hand, your beam is 35 feet above ground (or 135!) the correction factor will bring the *QST* charts more closely in line with the performance you may reasonably expect.

Now for a 21-MHz example of use of the procedure. Suppose that the previous three daily solar-flux values were 78, 79 and 81, and today's flux level is 82. The smoothed solar-flux figure is

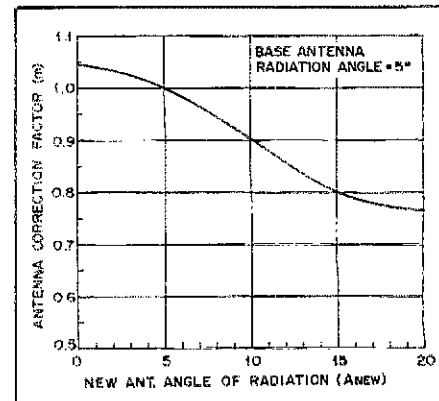


Fig. 2 — Correcting the *QST* predictions for your antenna.

therefore 80, and the *QST* predicted flux value for the month was 71. From Fig. 1, the flux correction factor is 1.1.

Next, the station antenna radiation angle, A_{new} is determined to be about 10 degrees. From Fig. 2 the antenna radiation angle correction factor is 0.9. The *QST* predicted muf_{base} for the path and time in question is 20 MHz. Thus

$$muf_{new} = muf_{base} (20 \text{ MHz}) \times \frac{\text{flux corr. factor } m (1.1) \times \text{ant. corr. factor } n (0.9)}{1} = 19.8 \text{ MHz}$$

In the above example, even though the up-to-date solar-flux figures are running higher than the *QST* prediction for the month, our low antenna with an estimated angle of radiation of 10 degrees is enough "down" from the *QST* assumed angle of five degrees to degrade our muf from 20 MHz to 19.8. In practice, of course, this difference may be too small to notice, although experienced DXers have witnessed one end of a band opening while the other end does not.

If our 15-meter antenna can be raised enough to lower the angle of radiation to, say, one degree, then the correction factor becomes 1.04, and the muf_{new} computes as 22.88 MHz. Thus, raising the antenna from 30 to 60 feet may make the difference on this particular day between the band being open for the path we wish to use and not being open. Since antenna correction factors will not change unless we change or raise antennas, the determining factor will usually be the latest solar-flux data. We may keep updating the *QST* predictions as often as we can obtain new solar-flux information.

Additional Considerations

All of the above would make the art of predicting hf muf an exact science, were it not for a few monkey wrenches which Old Sol can throw into the works. While the solar flux may indicate

a very favorable muf, a fact of life is the immediate effect of a sudden increase in solar-flux level: a dramatic increase in the D-region absorption. A general attenuation of signals below the muf results. D-region attenuation occurs much faster than the F region "warms up," although if the increased sunspot activity is sustained for about three days then increased F-region reflectivity will offset initial increased D-region absorption. Conditions will then show a real improvement, and the lower frequencies will tend to return to normal strength while the muf will be extended.

In addition, the effect of solar-flux variations decrease with increasing latitude. Finally, observations have indicated that as solar flux decreases to low levels, the frequency of magnetic storms tends to increase because of the complex nature in which the energy from the sun constrains the earth's magnetic field. Sorry about that.

During periods of very favorable muf associated with an increasing solar-flux level, magnetic storms may adversely affect hf communications. The lower limit of the usable frequencies is determined by ionospheric reflection and absorption, both of which generally increase with decreasing frequency. Two magnetic storm-induced types of absorption are polar-cap absorption

Table 2

Conversion Information for the Preferred K Index and the Occasionally Used A Index.

| | | | | | | | | | | |
|--------------------|---|---|---|----|----|----|----|-----|-----|-----|
| Virginia K Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Worldwide A Index: | 0 | 4 | 7 | 15 | 27 | 48 | 80 | 140 | 240 | 400 |

(PCA) and auroral absorption. PCA lasts up to several days, while auroral absorption is on the order of hours. PCA occurs most during the sunspot cycle peak, when there may be 10 or 12 events per year. During PCA, propagation conditions tend to be worse during the day than at night, and poorer at the higher latitudes than at the subauroral latitudes. Attenuations of 15 to 30 dB per hop up to 30 MHz are typical. Low angles of radiation are the best means of minimizing the absorption caused by PCA. In contrast to PCA, auroral absorption is of short duration and often quite localized. Auroral absorptions are generally on the order of a few dB.

Another bugaboo is solar particle radiation, causing the ionosphere (and signals) to vary as evidenced by fading, flutter and increased noise. Solar particle radiation effects the earth's magnetic field, causing magnetic storms which produce greater attenuation for paths close to the magnetic poles; this is why the 3-hour K index measured by the Fredericksburg, VA, laboratory is so important. WWV transmits this K-index value, which is related to the previously used A index in the manner shown by Table 2. When K is less than 3, little effect upon hf communications is observed. When K is greater than 4, storm conditions are indicated, with resultant poorer hf communications. When K is 3 or 4, conditions tend toward unsettled or unstable.

Dealing with Solar Storms

No technique is available for predicting how solar storms will affect hf communications at any particular location and time. However, a subjective method of evaluating the hf propagation quality has been developed based upon many years of hf propagation observations. The propagation-quality graph

shown in Fig. 3 is designed to give an evaluation of general hf communications quality based upon the effective current solar-flux level and the geomagnetic activity (storms). The quality of hf propagation is enhanced by an absence of solar storms. Daily quality-of-transmission factors may be estimated by using the A or K index (preferably the latter) and the smoothed current solar-flux value. For the 15-meter example used earlier, the ϕ_{new} was 80; suppose that WWV broadcast a K index of 4. Then, from Fig. 3, the propagation quality would be "below normal." Since the data from which Fig. 3 was developed were based on mid-latitude communications, conditions will tend to be more severe at polar latitudes, while the curves will be less steep toward the equator.

One term left for description is the "stratwarm report," broadcast by WWV. Stratwarms are high-altitude warming trends, measured by telemetered balloon instrumentation. Stratwarm effects are seen in the sporadic-E type of activity, as a result of the shear "inversion" layers at 50-100 kilometers, and have little effect on long-distance paths.

So there you have it. Published muf predictions together with WWV/WIAW broadcast propagation data and the station antenna radiation angle can be combined to give the radio amateur an up-to-date customized muf prediction for his station. Add to that the hf propagation quality evaluated from smoothed solar-flux levels and the 3-hour geomagnetic K index, and for the first time amateurs operating the hf bands have the capability to formulate personal propagation predictions. These, in turn, can aid in planning to utilize the hf spectrum segments granted to amateurs to a higher degree of efficiency than ever before.

QST

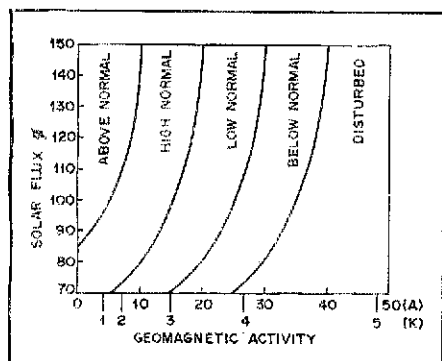


Fig. 3 — Propagation Quality Curve (Jacobs and Cohen, "A Breakthrough in Simplifying Ionospheric Propagation Forecasts," CQ, March, 1975).

The "Show Me" Skeptic

I had to try the method described in this article as soon as I read it. Rather than calculating today's muf and then rushing home to work some DX, an easier approach seemed to be to dig out a past contest log and see if what I had worked fit with a reconstruction of conditions at that time.

The weekend of February 19-20, 1977 (the first CW weekend of the ARRL DX Competition) had been a good one, propagationally speaking. After finding what the QST charts had predicted for February, I tied them together with the "Sartori method." My guess was that I must have missed at least part

of some fine band openings, but, undaunted, I continued.

Solar-flux indices were February 16 (88); 17 (93); 18 (89) and 19 (85). The QST prediction for February was 70, so, per Sartori, I corrected to the tune of a factor of 1.2.

In February, QST charts assumed an antenna radiation angle of two degrees elevation. Since I had used a four-element Yagi on 15 meters, 115 feet high, I decided my angle of radiation had to be close to zero. From Sartori's Fig. 2, I ascertained my antenna correction factor to be 1.02.

I checked the February chart for East Coast USA-to-Central Asia muf and found it was predicted to peak at about 1400 UTC

at 17 MHz. When I multiplied 17 times my two correction factors, the "updated" muf was 20.81 MHz!

I remembered working VU2TS (India) the first morning of the contest (the 19th) on 15 meters, so all that remained was to check my log for the time: 1516Z. Then it all fell into place. That first morning I had been happily "running" Europeans on 20 meters, and had switched to 15 somewhat late, as it turned out, not until about 1410Z. As a result, I can only wonder about the UL7 and other goodies I missed by not being on 15 a little earlier. Next year I'll have it all together, with a little help from Sartori! — K17N

Technical Correspondence

ULTRAMODERN AMPLIFIER FEEDBACK

□ Since you invoke my name in *QST* ("An Ultramodern Linear Amplifier," *QST*, May, 1977) perhaps some comments are in order. I feel complimented, as the amplifier circuit is basically the one shown in my *Radio Handbook*, 19th and 20th editions. However, some important points were missed, points that perhaps I did not stress enough in my *Handbook* material. Author W2AJH has inadvertently run afoul of some of them, and I hasten to point them out in case somebody duplicates this amplifier.

1) Refer to the power-supply circuit, Fig. 2, page 40 (this seems to be a version of the power-supply circuit in the Collins KWS-1, by the way). Note the 0.25-A fuse in the screen lead. First of all, the fuse is of no use; if the screen current reaches this value, you have ruined the tube, so the fuse protects nothing. Second, and worst of all, if the fuse does blow, the screen-to-ground path of the 4CX1500B opens. With plate voltage applied to the tube and no dc screen return, the screen instantaneously assumes the same potential as the plate, due to the internal electronic ballistics of the tube. This will probably blow out the screen bypass capacitor and the plate current of the tube will soar. The cathode of the tube will probably be damaged before overload relay K2A opens. Remedy: Place a resistance of low value between screen and cathode in the amplifier. In my design, I use a 3000- Ω 40-watt resistor. This also stabilizes the regulated screen supply. Many supplies do not like to work into a negative load impedance, such as is exhibited by a tetrode when it passes through areas of negative screen current (shown on the constant-current curves). I would suspect that this supply may make trouble if the screen current of the 4CX1500B goes highly negative, which it may do if the tube is lightly loaded.

2) The grid-to-ground dc impedance of a tetrode should be low. In my design, I use a low-impedance bias supply. The *QST* design has a 1000-ohm metering resistor in series with the grid circuit. When the meter is not across this, the grid-to-ground impedance is 1000 ohms higher than when the meter is in the "grid" position. Switching the meter back and forth, then, might cause instability because of the change in dc impedance to ground. It's better to meter across a 50-ohm resistor.

3) It is unwise not to show some form of parasitic suppression, or to not discuss it, especially in the case of a high-gain tetrode. My amplifier has a parasitic choke in the plate lead; it may not be necessary, but a copy of the amplifier can have altered parasitic paths in subtle ways. The original may be stable, but a copy may not. — William I. Orr, W6SAI, Eimac, 301 Industrial Way, San Carlos, CA 94070

QUESTIONS ON SOLID-TUBES ANSWERED

□ Response to my "Solid-Tubes — A New Life for Old Designs" article (*QST*, April, 1977) has been overwhelming. A majority of the questions about that article were similar so I'm taking this opportunity to answer them and at the same time give all of you the benefit of each others' inquiries.

Are there any corrections that should be made to the article? Fairly obvious is the omission of the 1/4-watt value for the size of the resistors specified on page 50, left column, 7th line.

As a cross reference between Fig. 2 and Table 1, write in Table 1 of the article just above the voltage values the Fig. 2 schematic/configuration letters (A) through (D) left to right.

What are the part values for the schematics in Fig. 2? Sorry, but the figures A through D are configurations for general-purpose application. That is, these schematics represent basic ideas. Table 1 summarizes the characteristics for each of these configurations from left to right for figures (A) through (D) respectively.

How can the four basic configurations of Fig. 2 be extended to other tube types and other equipment? First, try to match the function of the tube with one of the "Solid-Tube Characteristics" shown here in Table 1. Refer to the associated schematic of Fig. 2.

The dashed lines represent the interface between the solid-tube and the equipment. Second, circuitry is designed into these interfaces to match the solid-tube devices to the equipment. For example, FET operating-point biasing requires a normally higher resistance than provided by the tube cathode resistor. So, R_g is provided to accomplish this function as shown in Fig. 2A. And, of course, the resistor must be bypassed for ac by capacitor C_g . In summary, there is normally an offset voltage or current represented by the solid-tube active devices; circuitry and components are added to compensate for these electrical offsets.

Please design solid-tubes for my model XXXX equipment. Time does not permit me to even begin to do this; perhaps some of the information in this letter will help you.

Please design solid-tubes for the following list of vacuum tubes. Again, time does not permit. In addition, there is a basic problem. Take a moment to think about vacuum-tube parameters, i.e., the operating limits of the various elements. Most vacuum tubes have operating limits far in excess of required equipment performance. For example, the cathode-to-grid and cathode-to-plate voltage break-down values are extraordinarily high for most applications. However, for many transmitter circuits, the cathodes are tied to a control relay and then biased to cut the tube off. Because of directly applied or electro-

Table 1
Component Specifications

Series of capacitors used

| | | | | |
|-------------------------------|---------------|-----------|-----------------|--------|
| Ceramic Monolithics for 50 V, | 0.01 μ F | Centralab | CY15C103P | \$0.29 |
| | 0.047 μ F | Centralab | CY15C473M | 0.41 |
| Ceramic discs for 500 V, | 0.001 μ F | Centralab | CK6062BX102M | 0.27 |
| | 100 pF | Centralab | CK60BX101M | 0.21 |
| | 10 pF | Centralab | CK60BV100K | 0.21 |
| | 2.2 pF | Centralab | CK60BV2R2K | 0.21 |
| Dipped tantalums for 20 V, | 4.7 μ F | Sprague | 196D475X9020VA1 | 0.81 |
| 15 V, | 100 μ F | Sprague | 196D107X9015ZA3 | 3.19 |

What choke was used?

| | | | | |
|------------------------------|------|------------|---------|------|
| Molded Micro-Miniature choke | 1 mH | J W Miller | 9230-92 | 2.25 |
|------------------------------|------|------------|---------|------|

Table 2
Solid-Tube Semiconductor Data and Circuit Notes

| Transistor | V _{BR} | Case | Cost | |
|----------------|-----------------|-------|------|--------|
| Q1, Q4, Q13 | 2N5246 | 30 V | -92 | \$0.68 |
| Q2, Q3, Q5, Q8 | A5T6449 | 300 V | -92 | \$1.50 |
| Q6, Q16 | 2N5950 | 30 V | -92 | \$0.54 |
| Q7, Q9, Q12 | A5T5058 | 300 V | -92 | \$1.12 |
| Q10, Q14, Q17 | 3N206 | 25 V | -72 | \$1.07 |
| Q11, Q15, Q18 | TIS131 | 300 V | -220 | \$0.78 |

All diodes are 300 PIV general purpose (type 1N645).

All resistors are 1/4 W unless specified.

All capacitors in μ F unless specified.

Semiconductors are Texas Instruments devices.

Voltages indicate proper operating points; source resistors may require adjustment.

Transistors A5T5058 and TIS131 are electrically interchangeable.

statically induced high voltages, blocking diodes must be placed in the solid-tube circuitry to protect the low-voltage devices. The same problem applies to grid circuits. Also, screen voltages vary greatly, and this particular part of the circuit must be adapted to supply solid-tube voltage for configuration C that is reliable during both transmit and standby modes of operation.

How do these solid-tubes differ from the so-called Fetrons? Fetrons have been produced by a number of manufacturers. Basically, they are similar to the configuration of Fig. 2B. However, the two devices are matched electrically and are often placed on a single substrate. Further, they are designed for a typical 12AX7 type of tube, though some have a tube base wired for a 6AK5 type of application. In addition, most are limited to the lower end of the hf range.

Does anyone plan on manufacturing these solid-tubes? I've had a few inquiries. Most potential manufacturers think the amateur market is too small. Also, there are too many different solid-tube types needed to realize the efficiencies of large-scale production lines.

Is there any new work going on in this area? Yes, I am continuing the development I started two years ago, but it is entirely a home project. Look for some more articles in a year or so.

Do you have any precautions to guard against accidental destruction of the low-voltage devices by the transmitter high-voltage circuits? Here are some rules:

1) Don't plug or unplug the solid-tubes with the equipment power switch on.

2) Wait a minute or so after the equipment power switch has been turned off before removing the solid-tubes to permit the high voltage to discharge.

3) Measure the plate and screen voltages to ensure that they are not greatly in excess of the voltages shown in the schematics of the solid-tubes.

4) Ensure that the solid-tube pins are clean to avoid intermittent connection.

5) When first powering up, leave the plate and low-voltage device leads disconnected until the Zener voltage is checked for proper circuit operation.

6) Tube extenders are very helpful in measuring the voltages during the initial checkout of the solid-tubes.

What are the units of capacitance for the unmarked capacitors? Refer to Fig. 3 in the original article, lower left corner; all decimal values of capacitance are in microfarads, others in picofarads. One error is C15 of Fig. 6, which should be labeled 4.7 μ F.

What series of capacitors were used? See Table 1.

Can I substitute parts, particularly transistors? Resistors and capacitors as well as the Zener diodes were chosen to facilitate construction of the solid-tube circuits on top of the 7- and 9-pin service plugs. As long as the values are the same as those specified in the schematics, performance should be the same, barring some stray capacitance problems.

Substitution of transistors is a different story, however. The transistors were selected to provide equal performance within the variation of the device parameters from circuit to circuit. Of secondary importance was the goal of keeping the number of different devices to a minimum. Because of the problem of obtaining semiconductors, all devices

were selected from a single supplier. Trying to adhere to these guidelines was tough.

I would be interested in knowing of your successes in substituting the transistors, particularly the high-voltage transistor.

Table 2 supplies solid-tube semiconductor data and some circuit notes. Good luck! — Howard J. Sartori, W5DA, 721 James Drive, Richardson, TX 75080

CHOOSING YOUR FIRST RECEIVER

W1FB's article in May, 1977 *QST* on choosing a first receiver was a fine effort to fulfill a real need of beginning hams. I'd like to add a few comments.

General-Coverage Receivers — The article deals amply with the faults of general-coverage receivers, but what about their virtues? First, I've found them to be among the most useful pieces of test equipment in the shack. When an oscillator I've breadboarded doesn't come up on frequency right where the Lightning Calculator says it ought to, a quick spin of the dial tells me whether the little gadget is oscillating at all and if so where. The same is true of sleuthing out harmonics or checking the local oscillators of other receivers which don't (or at least shouldn't) fall in the ham bands. That big dial is easier to use than a grid-dip oscillator.

Finally, many of the older and better general-coverage receivers have good, solid front ends with a fair amount of rf stage selectivity and a pretty reasonable tolerance for an antenna mismatch. I wish some of the "ham-band only" jobs had as good an overload capability for out-of-band signals.

Vacuum Tubes — The observation that the better, modern solid-state receivers are as good or better than any tube-type receivers couldn't be more correct. It's long past time that some of us (including me) felt more at home with the silicon devices.

However, before the state of the art became the present state of the art, the solid-state rigs left a lot to be desired. A point to bear in mind when buying used equipment is that the tube designs of the 1960s were the culmination of 40 years' experience. The solid-state receivers of the same era were still real fledglings. I can remember (circa 1957) pawing through a batch of CK722s to find one with enough "upper register" to work as a broadcast-band local oscillator.

Another point for the beginner: Vacuum-tube equipment is easier to fix than solid-state gear when something goes *really* wrong. Even the most unsophisticated troubleshooter can test a "bottle" by substitution or, if all else fails, on a drugstore tube checker. Beyond that, the higher voltages in vacuum-tube equipment usually produce more obvious indications of other malfunctions — the leaking electrolytic, the bulging paper capacitor, or the subtly charred resistor. The older tube sets often have a fair amount of elbow room and their components are much more tolerant of a soldering iron tip that goes astray. Finally, if home repairs fail, even the local TV mechanic will wade with fair confidence and competence into a tube job, while a modern digital unit may leave him gaping in awe.

Tube-type malfunctions tend to isolate themselves to a single stage. Solid-state circuitry all too often degenerates into a seem-

ingly endless, "Well, if the Q2 bias is too high, then there will be too much current through the current sink, Q5, and that will of course drive down the bias on Q7, which is directly coupled to Q8, so a shorted bypass from the emitter of Q6 to ground will produce . . ." That's *not* for the beginner.

Surplus and Lesser Breeds — W1FB made his point in the article and even as a "surplus nut" I have to admit he's right. What went over big in a B-17 doesn't make it in a pileup on 40 meters and doesn't make it at all on 10. I do have a brace of carefully restored ARC-5s on the desk, one for the marine band and one apiece for 80 and 40 which I'll use if everything else in the shack fails. Even with a steady hand they're of only marginal utility under the best of conditions. All in all, I end up seconding what was said, plus:

1) Most surplus gear doesn't have anywhere near enough bandwidth for use on crowded amateur frequencies.

2) Hardly any surplus equipment has enough selectivity, though an audio filter can work wonders, provided the tuning rate is adequate and the unit is not prone to strong signal overload.

3) Surplus can be very deceptive. The R-392 looks like a world-beater, but the i-f strip is as broad as a barn door. What good is tuning accuracy to 1 kHz if you have to take the signals 10 kHz at a time?

So far as those "lesser breeds" are concerned, the real keys seem to be bandwidth and overload capability. Even something as relatively unsophisticated as an HQ-140 (single i-f of 455 kHz) can work fine on 80 and 40 cw with an audio filter on the output. The single conversion avoids second-mixer overload and birdies if you don't run the rf gain too high. Here are some general comments.

1) Whatever receiver you buy, be sure to get a manual for it, or at least a schematic. If you can't, measure and record the dc voltages at all the important points before something breaks; that way you'll at least have a point to start from when troubleshooting.

2) Since the basic requirement for a Novice receiver is utility on cw, make that your prime requirement when trying various units.

3) Buy good, but not *too* good. Say you're looking at a receiver that has good selectivity and overload immunity but is usable only on 80, 40 and maybe 20. It would be a lot better than one which compromises either of these parameters to achieve a good gain or noise figure on 15 and 10 or to avoid i-f images on the higher frequencies. Somewhere there is always a happy medium between a receiver that's good enough to keep us interested in the hobby and one that's expensive enough to force us out.

4) In buying used equipment, *QST* product reviews are of assistance. One thing to remember is those reviews must be read in historical perspective. Fifteen years ago, the greatest stress was laid on sensitivity and noise immunity on the higher frequencies. Five to ten years ago, birdies were a big issue until the designers learned to make more judicious choices of mixing frequencies. Under today's conditions, the main stress is on selectivity and overload immunity. It's a good idea to have the field narrowed to three or four possibilities before looking for a receiver in a dealer's showroom. Prices to look for can be determined by dealers' listings in *QST* or in "Ham Ads." — Miles B. Anderson, K2CBY, 3 Cornell Rd., Sag Harbor, NY 11963

Product Review

ICOM IC-245 2-METER TRANSCEIVER

Is a piece of commercial ham equipment supposed to be fun to use, a fine performer, or should it be both? I approached this equipment review with a few reservations, as for many years an aversion to commercial vhf rigs has been embedded in my mind. Manufactured vhf equipment from the former years carried with it a certain stigma — chirpy cw notes, frequency drift and all too often a tendency toward self-oscillation in the driver and/or PA stages.

When I unpacked the IC-245 with its ssb/cw adaptor assembly, I found myself contemplating the performance. Could anything that small really “play” well? After all, the designers had packed the facilities for fm, ssb and cw into a pretty small box, and there was also a synthesizer and digital frequency display in the cabinet!

Well, as far as the “fun” part of the operation goes, the night I fired up the '245 it was necessary to use a makeshift antenna system on 2 meters, as I had nothing available for that part of the spectrum. I did have a 10-meter, 4-element Yagi at 50 feet, fed with 0.5-inch aluminum-jacketed hardline. Why not give it a try on its fifth harmonic? The SWR checked out at less than 2:1 so the 10-meter beam became a 2-meter antenna! After making a few contacts through the local fm repeaters, I decided to explore the “other” part of the band. On 144.110 MHz I found a flurry of ssb activity. Of all things, a W0 station was being sought with vigor by a group of local fellows. I was convinced that I'd be unable to hear the DX station, but all at once there he was — S9 on the '245 receiver! It turned out to be W0KRX from Minneapolis coming through on sporadic-E skip! Did I dare call him with only 10 watts and a 10-meter beam? Why not? I punched the mic button and gave him a short call. I was amazed when he came back and gave me a 5 × 2 signal report. Now that was fun! Suddenly I had a feeling of respect for commercial vhf gear. A week later I tried my luck in the ARRL June VHF Contest — still using the 10-meter beam and 10 watts. I was amazed to work 11 ARRL sections from Connecticut, including Maine and Delaware. All stations, when asked for a signal-quality report, said the cw was free of hum and was chirpless. There were no reports of key clicks. Audio-quality reports on ssb and fm have all been outstanding.

The ICOM 245 is a synthesized transceiver. It covers the range from 144 to 148 MHz. On ssb it provides only the *upper* sideband. The operator has a choice of *quick* or *slow* tuning of the synthesizer. In the quick mode the tuning is in 5-kHz steps. In the slow mode the click stops on the tuning dial provide 100-Hz increments. A resolution of 100 Hz is entirely adequate for cw and ssb work, but if the operator wants greater resolution of the frequency he or she can employ the RIT for ssb and cw work. The click-stop knob is especially helpful during



mobile operation; it prevents vibration from shifting the operating frequency.

There is no break-in delay circuit for cw operation. To change from transmit to receive it is necessary to depress a small push-button switch on the front panel. Push-to-talk operation is available for fm and ssb work.

A programmable memory is contained in the IC-245. There are two VFOs, A/NORMAL and B/REVERSE. This feature permits using a variety of “splits” and allows for simplex, duplex or reverse repeater-frequency pairings. An external battery is required to keep the information stored in the

memories when the main power (+12 V) is removed from the transceiver. Without the battery it is necessary to reprogram the VFOs (memories) each time the transceiver is used.

Of interest to mobile operators is the automatic light sensor/dimmer. A photo sensor is located on the front panel of the unit. It responds to the level of light, and then dims or brightens the '245 LED readout and meter lamp accordingly. Specifically, during mobile operation at night the frequency display diminishes in intensity, but during the day it is made brighter for easy viewing. The panel meter serves as a relative-power indi-

ICOM IC-245 Transceiver

Dimensions (HWD) and weight: 4 x 6 x 9-1/2 inches, 7 pounds approximate.
Power requirements: 13.8 V dc at 2.8 A (transmit) and 0.8 A (receive).
Color: Dark gray.
Rf power output to 50 ohms: 10 W PEP (ssb), 10 W cw and fm.
Price class: Fm unit alone, \$500. With ssb/cw adaptor, \$600.
Distributor: ICOM West, Inc., Suite 3, 13256 Northrup Way, Bellevue, WA 98005 (also ICOM East and ICOM Canada).

icator during transmit. During the receive mode it functions as an S meter. The transceiver also has a squelch circuit which functions only during fm operation. Provisions exist for using an external 8-ohm speaker. The built-in speaker is inoperative when an external one is plugged in.

The built-in noise blanker works extremely well. During ssb/cw operation in the VHF Contest there were times when local QRN raised the S meter to a reading of eight. The blanker was actuated and the noise reading dropped to S1. Signals that couldn't be found, let alone copied in the noise, became Q5 with the blanker operating. There was no discernible degradation of the received signal with the blanker functioning.

A hefty collection of semiconductors is used in the IC-245. There are 47 bipolar transistors, 8 FETs, 24 ICs and 61 diodes! A comparable circuit in which vacuum tubes were employed would probably fill an entire ham shack and cost thousands of dollars.

During ssb and cw operation the receiver is a single-conversion type with an i-f of 10.7 MHz. Selectivity is 1.2 kHz at the -6 dB points on the response curve. It is 2.4 kHz at -60 dB. During fm reception the receiver becomes a double-conversion type. The first i-f is 10.7 MHz and the second i-f is 455 kHz. At 7.5 kHz the passband is -6 dB. At 15 kHz it is better than -60 dB. Audio output is greater than 1.5 watts into an 8-ohm load.

The squelch will open at signal levels less than 0.4 μ V. The review model provided 20 dB of quieting (on fm) for 2.8 μ V of signal input. The sensitivity during cw and ssb reception checked out at 0.5 μ V (S+N)/N to yield slightly better than 10 dB.

No unwanted responses have been heard in the receiver except during the VHF Contest when two local stations were operating. During those times there were some weak IMD responses heard in the tuning range, plus some LO noise which appeared in the i-f passband while the nearby stations were transmitting. At no time was the reception of weak signals ruined, nor was there any evidence of cross-modulation effects on the signal adjacent to the loud local one.

The best summarization I can offer is that the IC-245 is not only a good performer, but it is fun to use! I'm already looking forward to the next VHF Contest, at which time I hope to have a pair of "power boots" to drive with the '245. Of course there will be a 2-meter array residing atop the tower at that time, eliminating the need for assailing the band as a masochist. — *W1FB*

THE KENWOOD TR-7400A

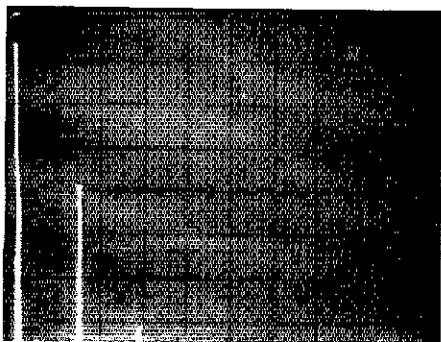
As soon as you remove the Kenwood TR-7400A from its carton, you are impressed by the good looks and feel of this 2-meter transceiver. You know that if the engineering and performance are on a par with what you see, you will have discovered an excellent piece of equipment.

This transceiver has been designed mainly for mobile use, but I was lucky to have an ac power supply capable of handling the

TR-7400A. Thus, I was able to check the equipment first at the home station prior to installation in the car. Like a good ham, I read the instruction manual (which is well written) first. This one was well laid out and easy to understand with one exception: It was not clear to me how to adjust the low-power output, between 5 and 15 watts. I had to hunt and finally determine how this was done by checking the circuit diagram.

After connecting the TR-7400A to the power supply, an antenna and pushing the power switch to the ON position, I was rewarded by the appearance of the receiver frequency in large 3/8-inch red LEDs (which read down to 5 kHz). In addition to this display there were several other visual indicators which provide information for the various operating or tuning stages of the equipment. One interesting indicator is a bipolar LED that shows the transmitter offset from the receiver frequency. When the bipolar LED shows green the transmitter is 600 kHz below the receiver frequency, and when it shows red the transmitter is 600 kHz above. A three-position toggle switch controls the transmitter offset. The middle position of the toggle switch is for simplex operation. At this setting the LED has no visible indication. Other LED displays indicate the squelch open and correct PLL operation.

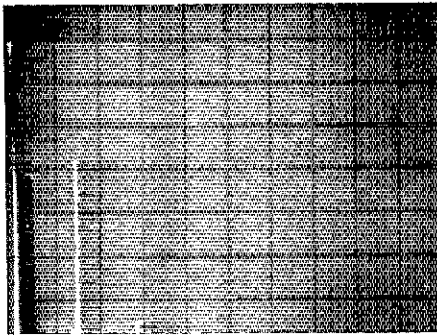
The frequency is selected by the use of three rotary switches. The leftmost is a four-position switch which sets the frequency in megahertz. The next two are 11-position rotary units that read from 0 through 9 and back to 0. One sets the frequency in 100-kHz steps and the other in 10-kHz steps. A pushbutton switch is used to select 5-kHz spacing. This system provides over 800 transmitting and receiving frequencies, covering 144 through 148 MHz.



The tall pip at the left is the marker pip showing zero frequency. Each horizontal division is 100 MHz so the next pip to the right is at 144 MHz. This carrier is attenuated approximately 38 dB to prevent overloading the analyzer. Only the second harmonic at 288 MHz is visible and it is down more than 70 dB from the zero level (top line). Each vertical gradation is 10 dB. This unit exceeds present FCC spurious emission requirements.



This is a close-up view of the front panel of the TR-7400A.



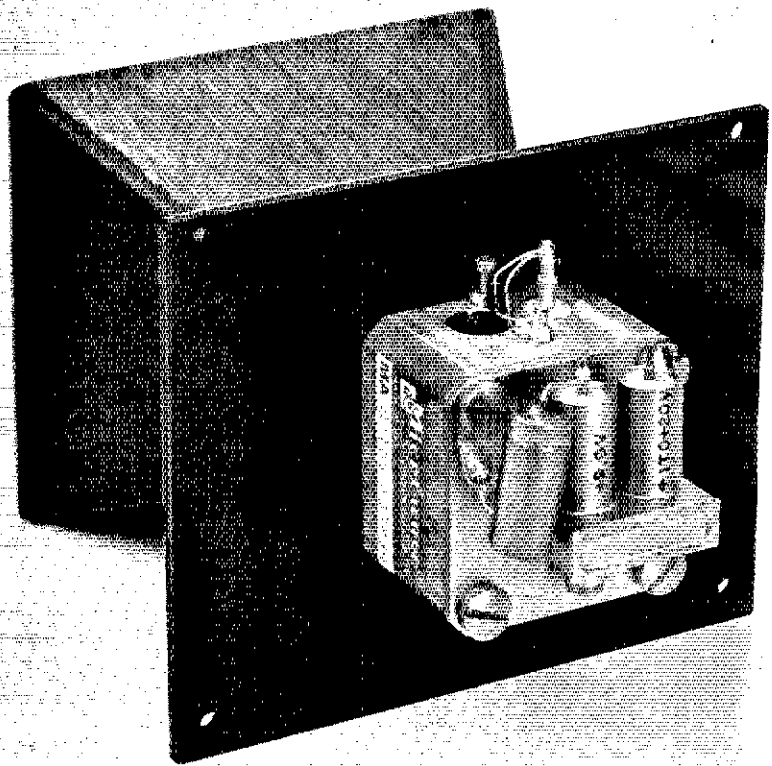
The tall pip on the left of the display is generated in the Hewlett-Packard analyzer and represents zero frequency. Each horizontal division is 50 MHz. The 144-Mhz carrier is notch filtered by approximately 40 dB to prevent overloading the analyzer. The second harmonic, at approximately 280 MHz, is down 75 dB. This display was with the TR-7400A in the high-power position; the low-power position showed equal attenuation. The TR-7400A exceeds current FCC spurious signal requirements.

While operating as a base station, I asked for critical reports and indicated a new piece of equipment was in use. Reports indicated excellent audio characteristics. All in all, the performance left little to be desired. Using the home-station antenna, which is a ground-plane, I was able to work into repeaters 30 and 40 miles away on the low-power setting without any difficulty.

I did get an uncomfortable feeling because of the small size of the furnished microphone. Several times during the first few days of operation I found myself wondering what became of the station I was listening to and found that unwittingly I had closed my hand on the mic, placing the equipment into the transmit mode. As one uses the mic and becomes accustomed to it, this doesn't happen. If one desires, the mic can be replaced with any good low-impedance microphone.

After installing the mobile mount which is provided, I found that when you insert the transceiver at night, in the dark, it is very easy to clamp your finger into the mount in lieu of the transmitter. But after a few blisters caused from pinched fingers, I soon learned to position the transmitter properly in the slide of the mount. The mount is easy to use after practice. It is a good idea to remove the equipment and either take it with you when leaving the car or lock it in the trunk, since the locking portion of the mount leaves a bit to be desired in the way of security. One nice feature about the mount is that it can be locked into one of three horizontal positions thus allowing you to adjust the TR-7400A for the particular vehicle in use.

Within a few days I found myself capable of changing operating frequencies without having to look at the equipment. As I mentioned previously, the two most-used frequency switches (100 and 10 kHz) are 11-position with a zero at either end. Thus one can move to zero at either end and then by feel count up or down to the desired frequency. The feel of these two switches is excellent and I like the redundancy of not only having a lighted frequency display but also lighted markings on the switches.



Rear view of the Microwave Associates 10-GHz transceiver with 17-dB gain horn.

Spacing of the controls is excellent and no problem was encountered in setting the frequency without the necessity of having to look at the knobs and levers. This provides greater driving safety because you don't have to remove your eyes from the road during changes of frequency.

In addition to the controls previously mentioned, there is the usual volume and squelch switch which has been combined in one unit. A four-position tone switch also allows one to use tone burst for repeater access or a continuous subaudible tone for the same purpose. There is also a position which requires a tone on the received frequency to activate your receiver. The equipment is enjoyable to use and the ease of operation together with the excellent on-the-air reports makes me believe that Kenwood has another winner in their TR-7400A.

Total weight of the unit is 6.2 pounds and it measures 7-3/16 inches wide, 10-5/8 inches deep and 2-7/8 inches high. Current drain is less than 1 ampere dc in receive; 4.5 A in the low-power transmit position. Operating voltage can range from 11.5 V dc to 16 V. Price class is \$400. The U.S. distributor is Trio-Kenwood Communications Inc., 1111 West Walnut, Compton, CA 90220. — W4WHN

THE MICROWAVE ASSOCIATES 89127 10-GHz TRANSCEIVER

It may come as a surprise to many hams, but amateur work in the higher microwave bands goes back over 30 years. For those hams of a

progressive bent, "store-bought" equipment operating on 10,000 MHz is now a reality. The Microwave Associates MA-87127 Gunn-diode transceiver doesn't put microwave experimenters in the appliance-operator category, but it does make working on the 3-cm band a little less far out.

A little dose of theory will help the reader understand the device. Basically, a Gunn-effect oscillator is nothing more than a type of semiconductor diode mounted in a resonant cavity. If the Gunn diode is characterized for operation at frequencies in the range of the cavity, it will set up oscillations within the cavity when a dc voltage is applied across the diode junction. Tuning may be accomplished in three ways. If the voltage applied to the Gunn diode is varied, the frequency of operation will shift markedly. This characteristic provides a simple means of frequency-modulating the oscillator. A modulating signal superimposed on the Gunn-diode supply will suffice. Frequency may also be adjusted by tuning the cavity in which the diode is mounted. This is accomplished by means of a tuning screw inserted through the wall of the cavity. Tuning the cavity is an excellent way of placing the operating frequency at some approximate point, but adjustment is somewhat critical. Mechanical adjustment of something as small as a microwave cavity is inconvenient, and might not be feasible if the cavity is mounted at a remote location.

A more convenient method of continuously adjusting frequency over a small range is used in the MA-87127 transceiver. A varactor diode is mounted in the same cavity as the Gunn diode. When the dc bias applied

to the varactor is varied, its junction capacitance changes. This has the effect of tuning the cavity over a small and repeatable range. When first setting up the unit, a fixed voltage is applied to the varactor diode, and the mechanical tuning adjustment is used to place the oscillator on frequency. In addition to allowing frequency adjustment by varying a dc bias, the varactor provides a practical means of applying automatic frequency control (afc) to the oscillator. More on this later.

Now we have a way to generate power on 10 GHz, and a rudimentary VFO. How do we receive? Rf energy from the cavity is propagated through a short piece of waveguide before coupling to the antenna. Mounted in this waveguide is a Schottky-barrier diode and a ferrite circulator. A finite amount of rf from the oscillator is injected into the Schottky diode, acting as a local-oscillator signal. A received signal entering the waveguide from the antenna will also be injected into the Schottky diode. Being a nonlinear device, the Schottky diode acts as a mixer, providing the usual outputs of the two original frequencies and their sum and difference. The circulator acts as a switch, preventing received signals from passing into the cavity. To derive superheterodyne action then, the two transceivers must be tuned apart by the frequency of the i-f system used. Intermediate frequency is optional and is chosen when ordering. For example, an i-f of 100 MHz would allow an fm broadcast-band receiver to be used for detection. It has become amateur practice to use an i-f of 30 MHz. The two units supplied to the ARRL were adjusted to this frequency offset. A 30-MHz i-f amplifier/detector system was proposed by the manufacturer, but not received at this writing. Similar systems have been described in *Radio Communications*, the journal of the RSGB, and reprinted in their "Vhf/Uhf Manual," third edition. A 30-MHz i-f system is under development at ARRL and will be published on completion.

The transceivers may be ordered with 17-dBi-gain horn antennas. These radiators will suffice for most local and moderate-distance work, but those intending to DX will want to use high-gain parabolic antennas, also available from Microwave Associates and other sources.

Gunn-diode oscillators are quite sensitive to temperature variations, and some type of afc will be required for all but the shortest paths. Without adequate afc, receiver bandwidth will necessarily be very, very broad and greatly limit maximum range. British amateurs have had outstanding success on 10 GHz using similar equipment, and ranges of 70 miles are not unreasonable. For linking repeaters, transmitting TV signals or conducting demonstrations over short paths, a less-critical afc requirement exists.

Old hands at amateur microwave work will recall the several potentials of high voltage required when using klystrons. The Gunn-diode supply is a nominal 9.6-V dc, and the varactor-diode bias should be adjustable over the range of 0- to 10-V dc. The Gunn-diode supply must deliver about 125 mA. Power output was measured at 15.5 mW. The MA-87127 Gunn-diode transceiver may be ordered directly from the factory. Microwave Associates, Inc., Burlington, MA 01803. Price class for a pair of transceivers, adjusted to the desired frequency and i-f, including 17-dBi-gain horns, is \$170. — WJXZ

THE MICROWAVE MODULES MMt432 TRANSVERTERS

For the amateur just getting interested in uhf, making the jump from the lower bands to 432 MHz appears to be a large hurdle. An OSCAR satellite user sooner or later wants to make the move to Mode B. OSCAR AOD, due to be orbited next spring, will have a transponder output in the 435-MHz portion of the 70-cm band. A duo of combination transmitting/receiving converters from Great Britain provide a simple approach to operation on this band at moderate cost.

Most persons setting up on 432 will want to use the 28-MHz amateur band as their intermediate frequency. For them, the MMt432-28S unit will suffice. Amateurs owning one of the new multimode 2-meter rigs might wish to consider using the MMt432-144, which has its i-f in the 2-meter band. To reduce problems caused by having the output of the transmit mixer operating on the third harmonic of the i-f, an input signal

| Unit | Freq. | Spurious Level at 10 Watts Output* |
|---------|----------------------|------------------------------------|
| 432-28 | 864 MHz ¹ | -45 dB |
| | 460 MHz ² | -48 dB |
| 432-144 | 864 MHz ¹ | -40 dB |
| | 432 MHz ³ | -46 dBm |

*Measured in the ARRL lab.

¹Second harmonic of operating frequency.

²Image of operating frequency (i-f plus LO).

³This spurious signal is visible at the antenna jack when the transverter is placed in the transmit mode with no drive applied. It appears that the receiver preamplifier transistor oscillates because it is not "seeing" a 50-ohm input impedance. A level of -46 dBm is equal to 0.00000025 watt, a very weak spurious. This should cause no problem in operation.

from the 2-meter driver is down-converted to 28 MHz, then up-converted to 432. A received signal at 432 MHz is converted directly to 2 meters.

Drive requirements from the transmitter used for excitation are minimal, ranging from 5 to 500 mW! In the 432/28 version, input attenuation is continuously adjustable with an internal potentiometer. Two-meter i-f versions have an external 15-dB attenuator pad for insertion between the transverter and a nominal 10-watt-output 2-meter transmitter or transverter.

Antenna transfer at uhf can be a costly proposition. This problem is alleviated in the transverters by using a PIN diode for antenna switching. The diode introduces perhaps 0.1 dB of insertion loss while receiving. This is a small price to pay for the peace of mind one gets from not worrying about whether or not a relay has been energized. A separate antenna jack is provided and provision made for separating the receive-input and transmit-output ports. This feature allows the use of external receive preamplifiers or transmit power amplifiers. I-f output/input ports are brought out separately. If the 10-meter-version transverter is used with a transceiver which does not have a separate receive-

antenna input, a separate antenna relay must be provided. This should pose no particular problem, because the relay will be switching low-level 28- or 144-MHz signals. Any good-quality coaxial relay will suffice. The MMt432-144 has a built-in relay so the problem doesn't exist here.

The transverters are completely solid state. Maximum power requirement is less than 2 A at a nominal 13.6 volts dc. To place the 2-meter i-f unit in the transmit mode, it is only necessary to ground one pin on the connector supplied. The 10-meter i-f version also has a circuit which senses the presence of drive and switches modes. Because of these simple connections, it is possible to mount the entire transverter at the top of a tower, just beneath a 432-MHz antenna. For OSCAR Mode B work, the 10-watt output from the unit would be adequate. Placing the transverter near the antenna (in some type of weatherproof enclosure, of course) eliminates the loss which would result from using the feed line to carry 432-MHz signals. As an example, foam-type RG-8/U coaxial cable has a loss of about 4 dB for a 100-foot (30.5-m) section. At 28 MHz, this same piece of cable would have a loss of less than 0.75 dB. Installing the transverter at the antenna would nearly double the strength of received signals!

To accommodate users of the new AM-SAT OSCAR AOD satellite, two separate crystal oscillators have been installed in the 28-MHz i-f versions now being shipped. The additional oscillator allows operation on either 432 MHz and up or 434 MHz and up, at the flick of an external switch. Older versions without this feature will be modified by the importer for a nominal fee.

Noise figure of an earlier single-frequency transverter with 28-MHz i-f was measured at 3.5 dB. This test was performed using an Airborne Instruments Labs model 74 noise-figure meter belonging to W1JR. Comparisons made using a gated noise source¹ indicate the noise figure of the newer unit is better, but a valid measurement could not be made. While being tested at W1XZ, the 432-MHz transverter was installed in the shack. It was connected to a high-performance Yagi antenna through about 50 feet of questionable coaxial cable. Sensitivity was more than adequate for all applications. For weak-signal DXing, a low-noise preamplifier would be required, but for tropo and OSCAR work the receive converter worked fine. Except for OSCAR use, the 10-watt output of the transmit converter will provide only marginal results. Amateurs interested in terrestrial work might do well to consider one of the several excellent 432-MHz linear amplifiers on the market. A solid-state amplifier described by K2OVS would also yield good results if part of the output from the transmit converter were absorbed in an attenuator.²

There can be no doubt that the solid-state revolution has firmly arrived on the shores of amateur uhf communications. Microwave Modules equipment is imported into the U.S. by Texas RF Distributors, 4800 West 34th St., Suite D12A, Houston, TX 77092. Price class for the MMt432-28S (10-meter i-f) is \$230. The MMt432-144 (2-meter i-f) is in the \$320 price class. — WJXZ

QST

¹Harrison, "The Gated Noise Source," *QST* for January, 1977, p. 22.

²Buscemi, "A Solid-State 432-MHz Linear Amplifier," *QST* for July, 1977, p. 42

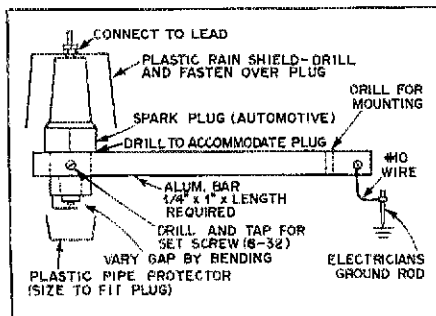
Hints and Kinks

AN OLD, BUT NOT FORGOTTEN, LIGHTNING-ARRESTOR IDEA

While many old-timers are familiar with this "Scotch" lightning-arrestor concept, some newer members of the amateur ranks may not have given thought to this inexpensive way of providing lightning protection for their equipment. This simple arrangement has protected my equipment for the past 35 years even though I live in an area having frequent electrical storms.

For single-conductor feed lines one automobile spark plug is used. For 300-ohm spaced feeders two spark plugs are employed with a single plug installed for each conductor. Purists may insist on new spark plugs but old ones that have been cleaned are satisfactory. The automotive type is not critical.

Construction details are shown in the drawing. The length of the aluminum mounting bar is determined by individual requirements. The rain shield may be made from a film container, pill bottle or cover from a spray paint can. To protect the bottom of the plug from dirt a short piece of plastic pipe may be slipped over the threads. The spark gap of the plug should be adjusted so that it will not arc under maximum rf output from the transmitter. A good earth ground is essential. — E. E. "Dutch" Zuch, W5PC



An economical lightning arrester using a spark plug mounted on an aluminum bar.

HINT FOR SB-101 OWNERS

Heath Company representatives supplied me with the following suggestions for improvement of my SB-101. It may be of help to other owners of this set. During alignment, peak T1 by turning the slug all the way to the top. There are two peak rf points and you should notice a significant increase in relative rf output. All driver grid and plate coils must be realigned also. I have been advised, furthermore, that where the problem of driver preselection offset between receive and transmit exists, one may order kit SBM-102-1 from the Heath Company. — D. B. Ellenberg, WAZKWP

OSCAR REMINDER

Tired of missing the OSCAR pass? A neat way to remind yourself is to set the oven timer on your kitchen range to sound off a few minutes before the orbit. Someone is bound to hear the timer and remind you! — Rob Sullivan, WØYVA/N4RS

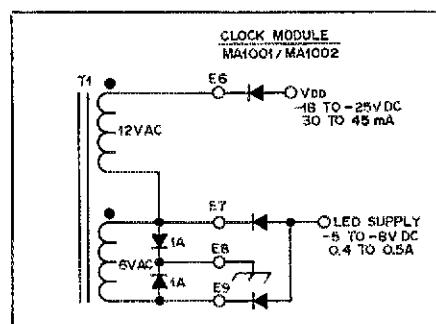
USING A CW FILTER WITH THE TS-520

In order to disengage my newly installed cw filter, which made reception on my Kenwood TS-520 annoying when the unit was not needed to reduce QRM, I decided to use the CH SELECT switch on the front panel for this purpose. This provided a simple solution since I did not use any fixed-frequency crystals. The changes were few and minor, requiring no wires or splicing.

After locating the FIXED CHANNEL-AVR board and the i-f board, transfer the purple wire from C on the AVR board to the sb terminal on the i-f board. Do not remove the orange wire. Next, transfer the green wire from terminal no. 4 on the AVR board to cw on the i-f board. Do not remove the brown wire. With these easy changes the cw filter may be disengaged by turning the selector switch to the fourth position. — Lyle Smithers, W5LW

TRANSFORMER FOR THE CLOCK WITH A NEW TWIST

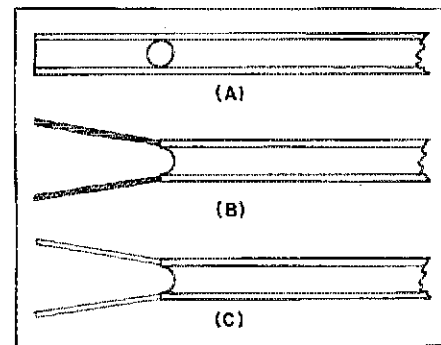
From experience in building several digital clocks, including some from kits, my opinion is that "The Clock with a New Twist," described in *QST* for October, 1976, is by far the best for the price. I did find that a suitable transformer is available for the power supply from the Digikey Corporation, Box 677, Thief River, MN 56701. This company also sells the National MA1001A clock module and the six required switches for under \$14.



A power transformer for the "Clock with a New Twist."

As an alternative, a dual-winding filament transformer may be used: 12 V at 50 mA and 6 V at 500 mA. If one is not found in the junk box, a comparable one may be ordered from Olsen's (part no. TF-048), 260 Forge St., Akron, OH 44327. To use a transformer of this type, one must add two 50-PIV 1-A diodes connected in the form of a bridge rectifier as shown in the diagram. Furthermore, the following precautions must be observed. Obtain proper phasing by making the connections as indicated in the drawing. Maximum voltage from E6 to E8 is 21 V rms. From either E7 or E9 to E8 the rms voltage underload is 7 V. If the 12-V winding is rated for 1/2 A or more the E6-E8 maximum may be exceeded. When this is so, the 12-V winding may be connected directly to E8 instead of the 6-V winding as shown. A dropping resistor may be added between the transformer and E6 to reduce the ac voltage and V_{dd} . It is important to test the transformer before attaching it to the clock module. A simulated load should be used during the test.

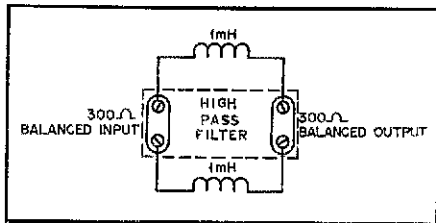
A study of the data sheets for the clock module may indicate in some cases possible variations of the circuit. Such variations will involve only the addition or removal of a jumper or resistor between terminals on the pc board. — D. F. Zawada, W9MJG



Twin-Lead insulation is easily removed by first making a hole as shown (A) with a paper punch. Remove the insulation (B) with a sharp knife. Tin the bare wires (C) without melting the remaining insulation.

STRIPPING TWIN LEAD

This TV repairman's trick of stripping 300-ohm Twin Lead may be helpful to some of the beginners in amateur radio. Use a paper punch to make a hole through the insulation, being careful to center it with the wires. Remove the insulation with a sharp knife and tin the bare wires. It's quick and easy. — R. B. Stoll, W7FYL



Modification of a high-pass TV filter for use with a vhf/uhf amplifier.

ANOTHER TVI HINT

I have a high-gain transistorized vhf/uhf amplifier located at the antenna for my TV system. With a high-pass filter at the input of this amplifier, fundamental overloading was still evident when operating my transmitter on any band higher than 40 meters. While I wanted to install a high-pass filter on the output of the amplifier, that was not practical since the leads from the amplifier carried 60-Hz ac.

My alternative was to place two Miller no. 4652 1-mH rf chokes across the high-pass filter as shown in the diagram. This arrangement permitted the installation of the filter at the output of the amplifier and at the same time the ac power could be passed to the amplifier. Troublesome rf interference was then adequately controlled. — *John C. Pelham, W1JA*

ADDITIONAL RF CONTROL FOR THE DRAKE R-4C

Fingering the little metal rf-gain lever on the Drake R-4C receiver is troublesome at times for persons with large hands. This problem may be avoided by installing an extra gain control. No drilling is necessary nor is there any other mechanical work that would mar the appearance of the unit. The new control may be installed in place of the headphone jack. Low-impedance phones may then be plugged into the speaker jack.

For the new control, obtain a Mallory U-19 Midgetrol with a resistance of 10 kΩ and a no. 2 taper. If this control is not available locally, it may be ordered from Newark Electronics, 500 N. Pulaski Rd., Chicago, IL 60624. The part stock number is 9F088.

To install the control, remove the top and bottom covers of the receiver. Turn the preselector fully cw or ccw. Pull off all knobs. Loosen the headphone-jack nut and remove the front panel. After disconnecting the headphone jack, solder the ground wire of the disconnected leads to the nearest ground. The two remaining leads are soldered together and covered with a small sleeve of spaghetti.

Cut the shaft of the U-10 potentiometer so that it extends 1/2 inch from the beginning of the threaded portion. Insert the potentiometer in the hole for the headphone jack. A 1/8-inch spacer should be used when the potentiometer is fastened in place. Next, remove the leads to R54 (the rf gain control). This potentiometer is the front unit of the dual gain control. The leads are connected in a similar fashion to the new control. Reassemble the receiver and the work is done. — *Klaus Doering, DL1RK*

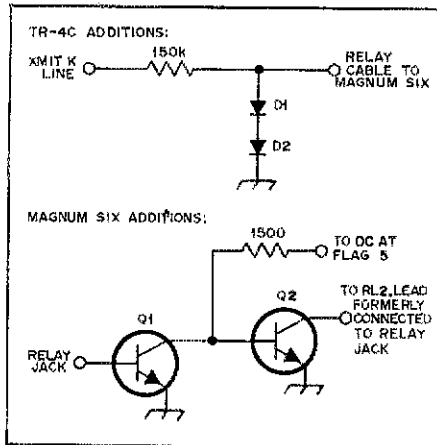
THOSE SMALL DRILLS

In *QST* for January, 1977, Glenn Jacobs suggested the use of a sewing machine needle for drilling small holes. I believe this method is impractical and potentially dangerous. Well stocked hobby shops and hardware stores have drill bits as small as No. 60 (0.04 inches diameter) and even No. 80 (0.0135 inches diameter). These are usually priced at less than a dollar. — *James Donohue*

IMPROVING THE TEMPO ONE S-METER CIRCUIT

Pinned S-meters during warm-up and poor meter sensitivity are two problems that I have experienced with several Tempo One sets that I have owned. This modification eliminates the initial pinning when the power is turned on and provides a greater meter movement to aid in pointing a beam antenna in the best direction for a weak signal.

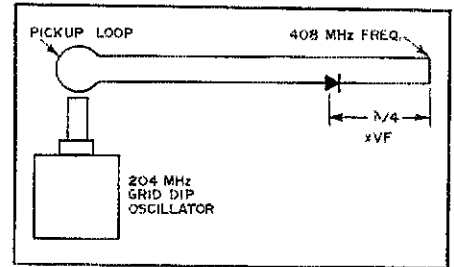
To make the circuit changes, remove R151 (47 kΩ). A lead is then connected between the zero control, R105, and the cathode of the audio output tube, V101 (6BM8). It is convenient to solder the new lead to the foil that originally connected R151 with R105. Remove R145 (330 ohms) and replace it with a jumper. After allowing the set to warm up, adjust R105 for zero meter reading with no signal input. Then set the sensitivity control, R104, for S9 + 40 dB while receiving a very strong, preferably local signal. — *Lyle T. Dysinger, W2JVO/WR4AYM*



A simple way to avoid an extra relay when using a Magnum Six with the Drake-TR-4C.

ELIMINATING RELAY WHEN USING THE MAGNUM SIX

When installed with certain transmitters, the Magnum Six speech processor requires an external relay for send/receive switching. This transistor switching circuit eliminates the need for the extra relay when the Magnum Six is used with the Drake TR-4C. A similar circuit could be used with any transmitter that keys a transmitting tube cathode. — *Mark Mandelker, K6BE*



This circuit extends the tuning range of a grid-dip oscillator.

EXTENDING GRID-DIP-METER RANGE

My interferometer radio telescope is designed to operate on 408 MHz. That is beyond the range of my grid-dip oscillator. I overcame this handicap (the upper limit of the GDO is 250 MHz) by inserting a 1N914 silicon diode in a length of 300-ohm Twin Lead at a point from one end determined by multiplying 1/4 of the wavelength of the desired frequency by the velocity factor. The procedure provided the necessary frequency doubling by means of which I was able to set the GDO to 204 MHz and get an indication at 408 MHz.

Other amateurs may find this idea useful for checking other frequencies beyond the range of a GDO by multiplying by 3 or a higher number. — *John McGhe, WA3YWX*

A SOURCE FOR NICADS

Tired of replacing "flashlight" style cells in equipment that uses this type of battery? Then pay a visit to the photography department the next time you're in a big discount store. NiCad replacements are available for the more popular sizes such as AA, C and D, along with holders that permit them to be connected to a single charger. (Cells are also available without holder.) Similar products are sold by large electronic outlets such as Radio Shack.

While the cost of such cells is not low (approximately \$2.50 apiece), the convenience of having the proper supply voltage at all times is worth the added expense. Also, in equipment that gets heavy usage, the initial cost of a rechargeable system is made up in a very short time. — *K1EM*

QRP WITH THE HW-12

Owners of Heathkit HW-12 transceivers who want low-power output for driving a transverter or running QRP will find this method simple and easily reversible. Remove both 6GE5 final-amplifier tubes. Plug the antenna into the receiver antenna jack. With the antenna connected in this manner the driver output is fed to the antenna through L3 which serves as the driver plate-load circuit and the receiver rf amplifier input coil.

An additional harmonic filter, however, should be provided. Avoid overdriving the stage, inasmuch as the alc circuit is disabled. This is a convenient way to keep on the air if your HW-12 final amplifier tubes blow out or if there is a failure in your high-voltage supply. — *Dale Hunt, WB6BYU*

Maritime Mobile Around South America

Planning to bring your rig aboard a cruise ship bound for distant, mysterious places? Be prepared for red tape, needling by fellow passengers — and the time of your life!

By C. H. Albaugh,* W6KOS

Ham radio was the farthest thing from my mind when my wife and I decided to fulfill a lifelong dream and take a cruise around South America. The holiday season seemed best, for in the Southern Hemisphere it would be early spring, the time Iguacu Falls, one of the world's great natural wonders, would be at its most spectacular.

Not until the reservations had been made did an old friend and fellow ham bring me up short with a straightforward question: "What rig are you taking?" The idea hadn't even occurred to me!

For the next few nights I didn't get much sleep, as all sorts of ideas ran through my head. Having sailed before, I realized that cabins are just steel boxes with one or two small sealed windows. There just isn't anywhere for rf to go. Where could a feed line be run? Somewhere I seemed to remember that many ships had dc; had that changed over the years? Discussions with ham friends reminded me that coupling through glass can be accomplished by the capacitance action of a plate of foil on either side of the window. Other apparent problems, though, seemed to defy solution, and I became skeptical of the whole idea. Just too many logistical and technical difficulties stood in the way. Besides, this was supposed to be a trip for fun and relaxation.

Up to My Ears

As days went by, my resolution weakened. Finally, I wrote to the shipping company to inquire about available current and to secure some idea of the ship's superstructure. I carefully reviewed regulations regarding maritime



A sample of the scenery the author and his wife experienced on their circumnavigation of South America. Here, a sister ship of the one they traveled on heads through the spectacular Strait of Magellan at the southern tip of the giant continent.

*321 N. Larchmont Blvd., Los Angeles, CA 90004

mobile operation. Before I knew it, I was into the project right up to my ears.

Our ship was the S.S. *Santa Maria*, a combined freight and passenger carrier, operated under the American flag by the Prudential Lines. She departs from Vancouver, BC, heads down the west coast of the U.S. and Mexico, navigates the Panama Canal, travels down the east coast of South America, traverses the Strait of Magellan and heads up the west coast of South America to the U.S. and Canada. One can take the whole cruise (52 days) or any part of it. We went for the whole cruise.

Living on the West Coast, I could visualize several definite advantages to hauling ham radio gear along. Contacts with the South Americans are not always easy and hookups with the Europeans and Africans are by no means routine. In addition, it would be great to be able to get messages home now and then. Passengers on a 52-day cruise aboard a relatively small ship tend to get on each other's nerves after a time. Ham radio would give me an excuse to remain somewhat aloof and also to avoid boredom. More importantly, the challenge of overcoming the difficulties of time, place and procedure seemed a worthy one indeed.

As you will see, it didn't quite work out all that way. I enjoyed it, I learned a lot, there was maddening frustration; in all, the experience of a lifetime, one that I wouldn't have missed.

The Stone Walls Crumble

It takes a mite of dealing to secure permission to take aboard and operate a ham station. Having run into some stone walls, I secured the help of a good friend who knows just about everyone in the shipping business in California. Thanks to her, all the hurdles were negotiated.

First, one must convince the shipping company that a ham station aboard will have some promotional value. Then, the captain's approval must be obtained. He will lay down rules to prevent interference with navigating instruments and his ship's own radio. He must be convinced that there will be no danger to the crew or to other passengers. The chief radio officer must assure the captain that the proposal is technically sound. He in turn must get the permission of the Radio Operators Union. After that, plans can begin in earnest.

Surprisingly, it is most difficult to get specific information about a ship before actual boarding. The folders say that it is possible to find 110 V ac in the bathrooms, so better take a good heavy extension cord — that is unless you want to operate from a bathroom! No one could tell me whether or not the galley used aluminum foil, so, to be on the safe side I took some along in our

baggage. I also took tape to hold the foil to the window, and hoped the cabin would be on a deck where the outside of the window can be reached.

Building modern electronic gadgetry is a breeze compared to stringing an antenna on a ship. Since you have promised the captain that your set will not endanger passengers or crew and will not interfere with ship operation, you can't string wire where some passenger can stick his finger on your bright and shiny copper wire carrying some high voltage. Free places on masts or stanchions are generally taken up by attachment of the ship's antennas, and other likely places are reserved for flag halyards.

How do you get that wire up into some free space so the ship won't absorb all the energy? Consult the crew member who can do and does just about anything — the bosun. He'll find a place for the antenna and will even help you to install it.

Be sure to have a few insulators along, as well as a center connector for use in a dipole. If you run a long wire, you'll need a matching device. It is best to bring along extra tubes or boards and some simple tools. Phones will make you more popular — steel partitions carry sound surprisingly well, and your neighbor will not be happy to hear the whistles, screeches and code you'll be receiving, particularly if you happen to be operating at three in the morning. I sorely regretted that I didn't bring along a *callbook*. (I missed the new edition by two days.) The ship's picture postcards make excellent QSL cards, especially if sent with stamps from exotic ports. Recipients will be more likely to answer MM calls in the future if the cards are attractive.

That "Radio Nut"

Fortunately, I anticipated most of the problems discussed above, plus a few others. When we left home we had 20 pieces of baggage to pile into the truck hired to take us to the dock. We slunk aboard under the scrutiny of our incredulous fellow passengers and caused the near collapse of the young purser who checked us in. Once aboard, unpacking and stowing away the suitcases and other containers took up the time usually devoted to *bon voyage* parties and meeting fellow passengers. Next morning, as we threaded our way through the dining room to our table, my wife and I were the object of hurried whispers and heavenward glances. I inhaled a considerable portion of my porridge when I overheard one of the stewards ask another if I was that "radio nut."

I let things quiet down a bit before confronting the captain with "ham radio," as he was pretty busy getting



The Archbishop's Palace, Lima, Peru — just one of many fascinating sights to be seen while on shore.

ship routine established. By the second day I was ready to "face the lion in his den." But he preempted me by very graciously asking if I would care to look over a suitable area for my equipment. This cooperation and assistance was to continue throughout the trip; I've never sailed with a finer man.

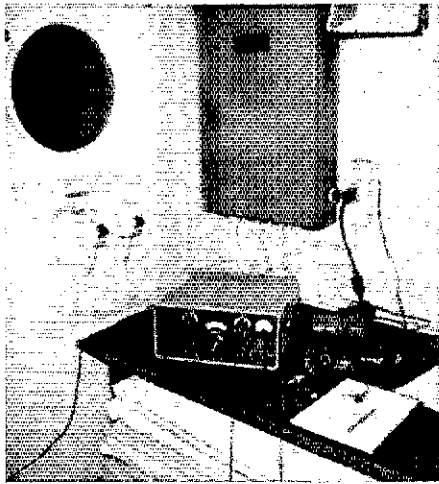
At the captain's request, the chief steward conducted me to the very top deck to a small steel room about 12 feet square. After the crew removed some storage items and put in a table, I had my shack. I was prepared to start stringing up an antenna with the help of the bosun when my eye caught a piece of coax coming in through a small opening. Imagine my delight when I followed it out to see it attached to a vertical whip on the top of the room. At about that time, the chief radio officer brought me a set of specifications regarding the antenna. With a happy heart, I set up the KWM-2, attached the power-SWR meter and hooked up the coax. According to the specs, there was no adjustment needed on the antenna, and I found current just behind the table. How lucky can one get?

A Lucky Break

My shack had at one time been a projection booth for 35-mm motion-picture projectors, so current of all types was available. I was told that one of the engineers, several trips back, had operated a ham station aboard. When he left the ship to work for another line, he simply left the antenna and coax. What a lucky break for me!

Finally, I carefully checked all connections and turned on the rig. Everything seemed to work perfectly — it loaded properly and the SWR was as predicted. I was in business!

As we headed for tropical waters, my shack displayed all the characteristics of a steel oven set on "broil."



My shipboard shack, once a projection booth. A vent directly above the operating table provided all the cool air my KWM-2 and I needed.

Leaving the door open was not practical because of the noise from both the stack and wind. After I had perspired to the point that I couldn't stand it any longer, it occurred to me that, as a former projection booth, this room must have some way of disposing of heat from the arc lamps. I suddenly realized that there was a faint stream of cool air coming from a sealed vent just above the operating table. When I unscrewed the cover, I was greeted by a strong blast of cold air, and the room was comfortable in minutes. Fortunately, the downblast directed itself onto the transceiver. In a few minutes, my rig and I had cooled down nicely. Believing all my problems had been solved, I contentedly made some good South American contacts. Going to the dining room that evening, I was walking on air.

Antenna + Salt = Trouble

I came down with a thud when I returned to the shack after dinner; the SWR had climbed to well over three to one. Finding nothing wrong inside, I checked the antenna connections and found the answer: The stiff wind was blowing salt-water spray over the top of the ship, and the antenna. The whole electrical configuration had changed! In addition, the wind had bent the upper section of the antenna back almost 45°. The lower section was held vertically by nylon guys attached to the stack of the ship. Just for the ducks of it, I tried the rig on 15 meters and was delighted to find that the SWR dropped to near unity. Now I had some ground rules: When the weather was good I used 20 meters; when it was bad, 15.

Equipment problems over, I began to run into some of the difficulties peculiar to operating maritime mobile. Never having used a vertical antenna, I didn't realize how omnidirectional it



The vertical antenna that proved to be a bit too omnidirectional at times, but ultimately did the job.

can be. The whole world seemed to be on the band! Signals were coming in from everywhere in such profusion that it was virtually impossible to find a clear spot to use for a CQ. Now and then I was able to sneak into a slot where I heard a QSO being terminated, but it's pretty difficult to muscle into the fray with a weak 120 watts of input to a vertical radiator — unless you are in an unusual area with DX value.

Furthermore, experience lead me to believe that most of the hams in the Northern Hemisphere have beams pointed in an east-west direction. Here I was trying to cut in on the side of the beams. Many times, a marginal QSO became a solid one when, after I announced my location, the ham on the other end swung his beam around to the southeast. I suppose that the reason for the east-west orientation is the language barrier between the hemispheres. If that is the case, I'm sure the situation will be corrected, as many South Americans now speak English.

Falls at Their Best

It would be wrong to believe that one could get bored on such a trip — with or without ham radio. Between the pool, good music for dancing and parties held almost continuously, there is little free time. In addition, casino nights, bridge or other card contests and outdoor deck games make the long days at sea interesting. At each port, a folklore troop comes aboard to provide a taste of the character of the local people, and special shore excursions are arranged at each port. And the food is fantastic; I added two inches to my waistline with no effort on my part.

We flew from Santos Brasil to and from Iguacu Falls. The run-off was heavy and so the Falls were at their very best. We had been flying over heavy jungle, just a uniform sea of dark green,

when suddenly the pilot banked to one side, revealing the Falls in all their glory. The aircraft cabin was deafening in its silence as every passenger was awe-struck by the magnificent scene. Later, we walked along the edge of the chasm, then down under the Falls, where we got soaked to the skin.

Because freight has priority, time spent in port varies sufficiently so that radio schedules cannot be firm; alternative times should be agreed upon. UTC is absolutely necessary for the preservation of sanity, as progressive time changes of six hours occurred both coming and going. Watching cargo being loaded and unloaded is sufficiently interesting to make the enforced radio silence while in port painless.

Shopping for gems in Brazil, gaúcho accessories in Argentina, copper and leather goods in Chile, gold, silver and woolen goods in Peru, and coffee and Panama hats in Colombia, makes trips ashore true adventure — especially for the ladies. Since port time is often disappointingly short, it is virtually impossible to locate and purchase spare radio parts. Such items should be brought from home.

Propagation, Southern Hemisphere-Style

The further eastward we cruised after leaving the Panama Canal, the more difficult it became to contact the U.S. West Coast. Although I realized that transmission is dependent on stratospheric reflection, I felt there must be some ground absorption by the land mass of the continent. Signals going to the West Coast had to cross the Amazon basin and the high Andes mountains that form a barrier from the tip of South America to the Aleutians. The theory seems valid because, as soon as we passed through the Strait of Magellan, signals increased tremendously in strength and number. A glance at the map reveals that at that point there is a clear shot entirely over water.

Another propagation mystery caused some cool relations between the captain and me for a time. He saw no reason why it shouldn't be easy to raise someone in the vicinity to provide a phone patch to his family in Fort Lauderdale, FL. While we were passing down the east coast of South America, I called CQ until I was hoarse (specifying Florida of course), without luck. Strangely enough, stations in the northeast U.S. coast and eastern Canada were coming in like gangbusters. I cannot explain the phenomenon.

As we approached Rio de Janeiro, we were three hours ahead of the East Coast and six hours ahead of the West Coast, so I had to do much of my hamming during the wee hours of the morning. During the day, Europeans

and Africans sounded like locals. Occasionally, at night, the band opened up to an almost unbelievable extent. I had put out a general CQ only to almost fall off my chair when a station in Moscow came back to me with a five and nine report. He seemed as pleased as I was, and told me I was his first maritime mobile contact and also his first W6. As soon as the contact was terminated, a Guam station gave me the same report. In rapid succession I hooked up with stations in Iran, Brazil, Argentina and the Falkland Islands. Half an hour later I had a very solid contact with Carson City, NV; solid enough, in fact, to have a very satisfying phone patch with my family in Los Angeles. It was one of those always hoped-for but rarely experienced radio banquets; the preparations were made worthwhile and the frustrations vanished.

"Shacking Up"

Meanwhile, I had upgraded from "radio nut" to phenomenon in the eyes of fellow passengers. As more and more of the passengers and the crew began to visit the station, banter in the dining room got to the point at which I was often asked which of the ladies would be "shacking up" with me that evening. Everyone enjoyed the joke. I found myself spending more time in the shack as more of the passengers and crew stopped by to enjoy listening to voices from all over the world.

Several showed an interest in becoming hams. One, a retired professor of physics at one of our great universities, had held a license in 1913 but dropped it during his teaching years. I was quite surprised that after all those years of inactivity, he copied five words a minute without difficulty, and will soon regain his license. He taught me much that doesn't appear in the common books on basic electronic theory and I was able to help him in return by bringing him up-to-date on equipment and operating techniques.

Another visitor, a retired movie star now living in a remote section of Oregon, was fascinated with amateur radio as a means to provide him with unprejudiced communication with the outside world as well as stimulation of his

intellectual interest in electronics. As I chatted with fellow passengers about it, I was able to clear up much misunderstanding about TVI.

During the first few periods I was operating, I became concerned when I heard the cw of the ship's radio, definitely audible all across the band. My fear that I might be in turn interfering with the ship's radio disappeared after all three radio officers assured me that they were not even aware of when I was transmitting. It turned out that the radio aboard the ship just didn't require such a high level of band-pass filtering, as normally there is nothing on board for the radio to interfere with.

An Unexpected Quiet

I had expected that a contact with a maritime mobile from the Strait of Magellan would constitute desirable DX, but apparently I was wrong. Although ready to send out specially prepared QSL cards from Punta Arenas, the southernmost city in the world, I sent very few. As it was, I spent much of my operating time talking with hams in Antarctica, the Falkland Islands and a few in the northeastern U.S. Certainly, there were no pile-ups. I have no explanation for the seeming lack of interest.

A really heartwarming part of the experience was the genuine and enthusiastic courtesy of hams all over South America. Many of them insisted I visit them in their home; some wanted to call special meetings of local ham clubs. Unfortunately, I could not accept these gracious invitations because ships don't stay in port long enough these days, what with containerized freight. I also discovered that South Americans are far more advanced in the art than I had expected. They are, if anything, more enthusiastic about 2-meter repeater operation than we in the U.S. Nearly all seemed to have very sophisticated equipment and excellent antenna arrays. The cw I heard was uniformly clean and precise. In general, they don't put as great a premium on speed as we do; perhaps that is why I enjoyed listening to them.

Unfortunately, my experiences with United States hams were not so satisfy-

ing. Most of them were courteous and friendly enough, but there were some who exhibited all the characteristics of the "ugly American." This was particularly true when a pile-up occurred in DX contacts. No wonder many of the choice DX hams turn away and avoid the Ws and Ks!


Patches Would Have Helped

When one is a long way from home it is comforting to be able to get through to the family with a phone patch, but few stations wanted any part of it. I might be having a very good contact with a United States station until I mentioned that a patch would be greatly appreciated. Many said that the patch wasn't working, others were honest enough to say that they didn't want to be bothered and a few simply went off the air. I didn't ask very many times, but did enough to decide finally that I would not embarrass myself or them by asking at all. There were no problems after that. I made a resolution that when I returned to Los Angeles I would devote time to offering the use of phone patch to those far from home.

I had to be very careful about setting up schedules because of the ship's location. At my request, the captain kept me informed of our proximity to ports: When we reached 30 miles from a port of entry, I suspended operations until we were the same distance out on our departure. All of this was to avoid any danger of operating under a jurisdiction for which I did not have a license. What the new 200-mile territorial limits will do to Maritime Mobile is yet to be determined.

In spite of all the difficulties, the frustrations and the occasional loss of sleep, to have gone MM was an incredible experience. It was fun, at times thrilling and unforgettable — both for me and some of my fellow seafarers.

If I had it to do again, I would carry more power, try to use a more directional and better antenna, and establish a few more firm schedules with hams back home whom I could really count on. Also, I would pray for a very good sunspot activity.

Try it yourself. You'll have the thrill of a lifetime. 

Strays

I would like to get in touch with . . .

□ anyone interested in corresponding with, or willing to send electronic textbooks and related materials to a prison inmate studying electronics with a sincere interest in amateur radio. Douglas

McGlamery 046631, Mail No. 192, P. O. Drawer 1072, Arcadia, FL 33821.

□ anyone knowing the whereabouts of Richard L. Hatcher, KC6AA. He moved from Yap Island in the Pacific, to near Kansas City, MO. William Raynore, 127

Temple Circle, Lynchburg, VA 24502.

□ original members of the Associated Police Commission (APCO). Dave Quagliana, K2MTW (formerly "BJ" KEB-23), 115 Los Robles St., Williamsville, NY 14221.

□ hams who are amateur astronomers and nets based around amateur astronomy. J. P. Prideaux, WA4ZDC, 4732 Whitestone Dr., Richmond, VA 23234.

Junk Box Foins Thieves

With a belief that his remote western town was relatively safe, this ham installed an alarm primarily for the novelty. It proved its worth after a visit from Midnight Amateur Radio Supply.

By Ron S. Harvey,* W8JZL/WB7CRW

More than a technical article, this is a story of personal experience. My two circuits are offered for what they are worth, but my message is DO something. In relating my experience to fellow hams, their reaction most often has been to realize how vulnerable they are and reply, "I ought to do something." But, they haven't. In just one month two hams known personally to me have had rigs stolen.

The theft of two-way radios here in Cheyenne is low (average three to four a day). Yet, I know personally of one ham gear loss in addition to the attempted theft of mine. Nearby Denver is also low when compared to a city like Detroit which averages 479 CB thefts a day.

I discussed the problem of CB radio theft with Detective Richard Jones of the Denver Police Department. He informed me that over 3,000 two-way radios have been stolen since January 1, 1976 (most are CB, some are amateur, but thieves don't distinguish). The average is 30 to 40 a day. Although they have broken up several large rings, the recovery rate has only been seven percent. It is most worthy to note that few incidents involved a car equipped with an alarm. Detective Jones also stated that CB radio theft is the biggest crime wave in the history of the country and over twofold what tape-deck theft was or is today.

Detective Jones recommends identification with your social-security number or a serial number to aid in the return, but with a seven-percent recovery rate and currently 60 unclaimed units in their property section there are still more than 2,700 of the

3,000 stolen radios unaccounted for. Prevention of the theft is the problem, and law enforcement agencies are powerless in this respect. This is up to the individual.

A year ago I bought a new car and was faced with the normal, but time-consuming, project of reinstalling my 2-meter mobile unit, a Touch-Tone pad, and a rooftop antenna.

As I sat the night before in my easy chair to plan the task ahead, the idea of a burglar alarm crept into my head. This concept was stimulated by the recent theft of a friend's car from a private underground garage in Detroit, and the "big business" of CB theft nationwide. Unfortunately, ham gear is often mistaken for CB, and losses are on the rise. I must admit, however, that the subsequent decision to install an alarm was more for the novelty than as a deterrent to theft. After all, in 25 years of automobile ownership complete with ham gear, I had never lost anything. Only in the last five years or so have I

even locked my car. For these reasons a commercially available unit costing \$20 to \$50 was out of the question.

The Original Circuit

A quick trip to the tinkers' supply depot (the junk box) turned up a relay enclosed in a can and mounted on a U-bracket. This would mount nicely under the dash. Settling back in my chair, I began to consider the operation of the burglar alarm.

The obvious intent would be to scare off the thief and alert any passerby. The horn should accomplish this. Forced entry to an automobile is usually attained by a coat hanger inserted through a window to unlock the door. Even if the window is smashed, the thief usually unlocks and opens the door rather than crawl through the broken window. Therefore, the simplest trigger for the alarm is the group of switches in the door that operate the interior lights.

The criteria in mind, the alarm of Fig. 1 was installed along with the radio equipment the following day. The use of diodes was dictated by the junk-box relay which had only one set of contacts. The alarm off-on switch is an out-of-sight toggle switch mounted between the hood and grille. A key type switch would be safer, but not as handy. The alarm is activated by the door switches for the inside light.

Since the whole idea was a novelty, the alarm was tested many times in the next several weeks by unsuspecting friends who were suckered into opening my car door as I stood by. The ultimate test came early one morning last spring.

A Real Attempt

I had gone out for pizza about 10 P.M. Upon returning home, I parked in



*120 El Dorado, Cheyenne, WY 82001

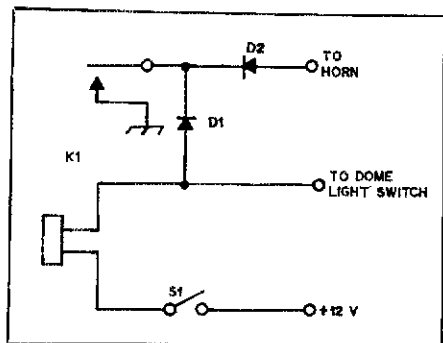


Fig. 1 — This original alarm circuit was manually set by switch S1. Opening the door would then sound the horn.
D1, D2 — 1 amp, 50 PIV silicon diode.
K1 — Spst relay, 12-V coil.
S1 — Key switch or toggle switch.


With this confirmation I reset the alarm and called the police. After the police left and I returned to bed, the adrenaline still flowing, I could not sleep. As I laid there I realized my alarm was no longer a novelty and that my off-on switch had been neglected many, many times. I don't even know why I turned it on that evening. I usually don't at home and at times don't even lock the car. It was time to make the alarm foolproof.

A Fail-Safe Revision

Thus far, my alarm had cost me less than \$1.50 and three hours of sleep. It was time to increase my investment. The next morning, over several cups of coffee, I sat with paper and pencil and came up with the revisions shown in Fig. 2.

The alarm is set at all times, with only a reset switch to turn it off after activation. That requires a time delay so the driver and passengers may enter the car, then close the doors before the alarm goes off. S1 is now a normally closed push-button type (for reset) in the door jamb so I can't forget to set the alarm. The time delay for entry is provided by the NE555 timer along with components R1 and C1. Going to my junk box again, I found that R1 could be 100 k Ω to 1 M Ω and C1 between 10-22 pF to yield a time value of 15-45 seconds.

The original assumption of opening the door has not been violated, only modified. In order for a person to remove any equipment from under the dash of my compact car, the door must remain open for leg room. Once the alarm has been operated, closing the door will not deactivate it.

My original premises that this sort of thing only happened to others and that the alarm was a mere novelty had been proved wrong. How about you? What do you think? How much will it cost you to be proven wrong? 

the rear lot. It is closed on two sides by townhouses and the third side is fenced. We live in the last unit from the street entrance and I parked next to the fence. Leaving the car, pizza in hand, I did not take time to lock the driver's side, but as I passed in front of the car I reached down and flipped the toggle switch to activate the alarm.

On finishing our late snack, Carol and I retired about 11 P.M. At 3:20 A.M. I was abruptly awakened by the obnoxious sound of a "stuck" car horn. I grabbed by robe, flew downstairs and out the back door to immediately turn off the alarm switch to silence that ridiculously loud horn. Then, I stood there and looked around that large parking lot with not a sign of life anywhere. No lights came on in the apartment complex so I walked back inside puzzled as to why that stupid alarm had gone off for no apparent reason. I was met by Carol, who had also been jarred out of a sound sleep. She had gone to her window, which overlooks the parking lot, in time to see two people jump into a car sitting in the middle of the lot and speed away.

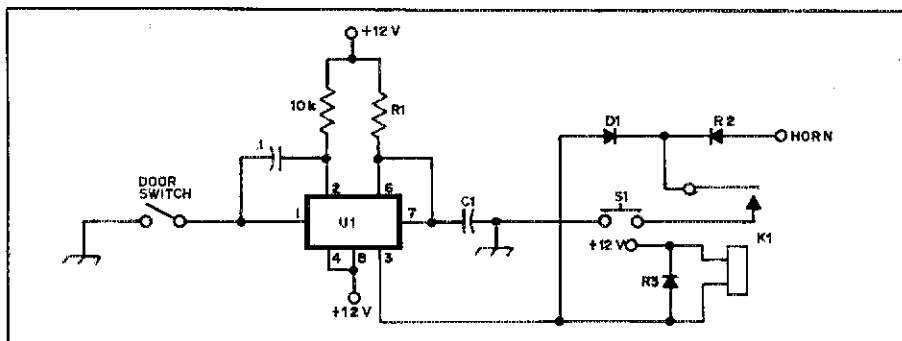


Fig. 2 — The revised alarm circuit is always "on." Before activating the horn, opening switch S1 starts the time delay, determined by R1 and C1.

C1 — See text.

D1-D3, incl. — 1 amp, 50 PIV silicon diode.

K1 — Spst relay, 12-V coil.

R1 — See text.

S1 — Normally closed push-button switch.

U1 — NE555 timer.

TURNED TABLES

□ A few years ago, not too long after I had upgraded from Novice to Advanced, a friend of mine became interested in amateur radio. I tutored him through the code and theory and later administered his Novice exam. With my assistance, he passed the Tech and only a few weeks later, the Advanced.

When I went to take my First Class Commercial Phone exam in Chicago recently, it was administered by none other than my friend, recently hired as the FCC examiner in Chicago. If he hadn't been ill when I took my Extra Class exam, he would have given me that one too. Can anyone else say that his First was administered by someone he had previously given a Novice exam? — *WB9IWO*, from *Squelch Tale*, July, 1977

□ We enjoy reading the items our readers send us — and we are always looking for good Stray material. Yours will have a better chance of being printed, though, if you type it, double spaced. If photos are enclosed, they should be black-and-white on glossy paper and the larger the better. Color photos will reproduce, but not as well as black-and-white. Send them to Strays Editor, *QST*, ARRL hq.

Feedback

□ In "More PEP — Less Paint" ("Hints and Kinks," *QST* for July), the diodes CR1 through CR4 were inadvertently drawn in reversed order. The correct form is shown on page 333 of *The Radio Amateur's Handbook* for 1977. WA2FIJ stresses importance of installing a back cover on the wattmeter. The LM1458 chip he used is an 8-pin version, not a 14-pin type. In Figs. 1 and 2 the +9-V and -9-V terminals should appear as in Fig. 2.

□ The transistor in the circuit permitting use of an electronic keyer with a DX-100 ("Hints and Kinks," *QST* for August) should be an npn, not a pnp as shown in the schematic. — *WB6CFM*

□ The circuit for the WWV modification of the HW-101, appearing in H & K, page 49 of *QST* for August, 1977, should have shown a dotted line from crystal Y503 (22.895 MHz) to contact no. 3 on the band switch, indicating that this connection should be eliminated.

Sometimes It Pays to Hold Two Licenses

An unusual signal on CB Channel 9 brought Dave McCollum into an adventure that underscored, once again, the value of the Morse code. Odds are, he'll never forget it!

By Bob Dyruff,* W6POU

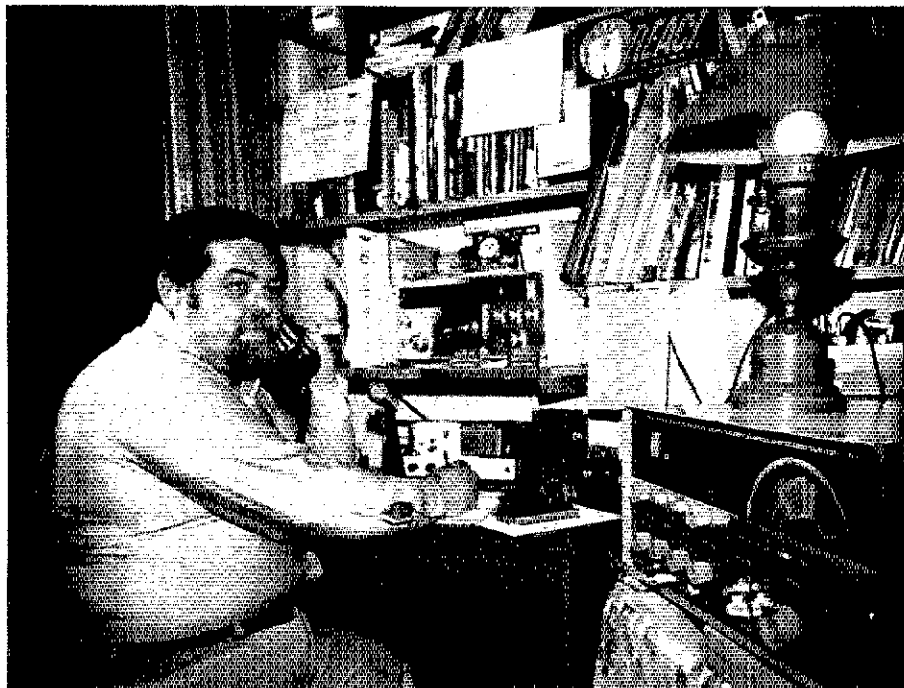
It was hardly a routine distress call on 27.065 MHz — Channel 9. But was it genuine?

Just minutes before, Dave McCollum, WA6RGJ, had idly flipped his citizens band receiver to the emergency channel, only to hear a click that sent the S-meter scurrying across the dial. There was a carrier on the frequency; but what did it mean?

As an officer of REACT, the Radio Emergency Associated Citizens Teams, Dave was painfully aware of the inadvertent or intentional misuse of the emergency channel by a few illegal CB operators. But he waited a few seconds, then switched on his CB transceiver to Channel 9 and said, "Is any station calling Santa Barbara REACT?" The S-meter again responded for a few seconds, then dropped to zero.

"This is Santa Barbara REACT KSX7459," he called. "If you have an emergency press your mic button twice for *yes* and once for *no*." Hearing two clicks, Dave envisioned a stranded motorist. "Can you flag a passing car or get to a telephone?" The response to each was a one-click negative. Dave had an idea. "Are you a marine station?" Two clicks — affirmative.

After Dave managed to determine the caller's general position in the 25-mile Santa Barbara Channel using the same "carrier-only" mode of communication, Jim Hall, KGK2586, came on the channel to suggest that Dave ask him if he knew Morse code. The former Navy cw operator's idea was a good one; to their surprise, the reply was affirma-



Two licenses are often better than one. Dave McCollum, WA6RGJ/KSX7459, knows this better than most, as his CB monitoring station and newly acquired Morse code prowess helped prevent a tragedy in Santa Barbara Channel recently.

tive! Tuning up his amateur receiver and BFO to 27.065, Dave began what was to become a unique situation — a rescue operation involving an amateur/CB operator using an A-1 emission on the citizens band.

Coast Guard Skeptical

Although he wasn't sure what to make of it himself, Dave explained what little he knew to the U.S. Coast Guard

Search and Rescue Coordination Center in Long Beach. Having become used to false distress calls, especially on 11 meters, which they may not monitor, the Guard representative was skeptical. But he asked Dave for details — the boat's name, precise position and registration number, and the skipper's name. Dave requested assistance from other CB operators to triangulate a position fix, but none were available with the

*c/o Santa Barbara Amateur Radio Club, Box 3232, Santa Barbara, CA 93105

required equipment. As the unusual transmission progressed, Channel 9 emergency traffic was shifted to adjacent channels by Doug Stanfield, KEW0160/WA6ATE.

At one point, a Coast Guard lieutenant asked Dave a logical question: "If he can't talk to you how do you know what he's saying?" As Dave described the cw conversation, the lieutenant commented, "This is certainly different from most of the CB calls we get!"

"At sea, . . . heading N. E.," Dave was copying. Heading from eastern end of Santa Cruz toward Ventura. "Engine Trouble." Skipper "Maj Tarr"; sailing on "Riki Tiki." "Do not understand nature of your emergency," Dave sent. "Do you still require a Coast Guard cutter?" The reply was two clicks — affirmative.

Other REACT monitors inquired about the strange unmodulated carrier as the boat approached Ventura, but Dave was able to avoid undue confusion on the busy channel. "Can you make

port?" was answered by a two-click affirmative, but the skipper still wanted the cutter.

In Danger of Sinking

The story unfolded about a half hour later, when the grateful skipper, Army Major Dick Tarr, called Dave on the landline. The victim of a nasty storm the previous weekend, Dick had been taking three friends back to Santa Cruz Island to recover the remains of their boats when a hole developed in the craft's discharge hose. At the same time, the mic circuit in his radio failed, leaving them with no way to call for assistance should they go down. For the time being, the boat's pumps were keeping the water level stable, but if one failed it might have meant disaster. That explained his insistence on having a Coast Guard vessel in close proximity.

"OK," Dave said, "but where did you learn Morse code?" The skipper's reply startled him: "As a Scout, when I was 17 years old, and I've never used it since!"

Neither Dave nor Dick knew it, but their emergency transmissions on Channel 9 were, in a strict sense, illegal. "A-1 emission is not currently permitted on citizens band," an FCC spokesman subsequently explained. But, he added, its use in an emergency would not be considered a violation of the rules.

Like fellow REACT member Doug Stanfield, Dave McCollum is a newcomer to the amateur ranks and a member of the Santa Barbara Amateur Radio Club. The potential tragedy — and the Morse code's role in preventing it — was not lost on Dave's family. Daughter Barbara holds the Novice call sign, WA6RGK, and wife Katherine will soon join them on the amateur bands.

The incident showed graphically how cooperation between three services — amateur, citizens band and the Coast Guard, can avert potential tragedies. But if Dick Tarr hadn't had the good fortune to have learned the Morse code, that cooperation would never have materialized. QST

Strays



I would like to get in touch with . . .

□ anyone active in a ham radio Christian net or anyone interested in starting one. Emery J. Mallory, K4ZNI, 3834 Bell Dr., Tallahassee, FL 32303.

□ any hams who would be interested in forming a club for hams under 16 years old. Please enclose s.a.s.e. Andrew V. Bowley, WA1ZNV, 4 La Forge Rd., Darien, CT 06820.

□ Novice and Technician cw ops interested in an emergency net, centered in Independence, CA. Saturday 0930 Pacific Local Time, 3,730 kHz. Wm. Baum, WA6YWS, Box 65, Independence, CA 93526.

□ anyone with information about or access to the typewritten list of Canadian amateurs in the Nova Scotia area who were active in the years 1920-23. L. J. Fader, VE1FQ, 892 No. 1 Highway, Lower Sackville, NS.

□ all amateurs and SWL operators who worked any 5N2 station from March 23 to April 30, 1977. You are qualified for the First All-Africa Boy Scout Jamboree Award. For information write 5N2NAS, P. O. Box 448, Apapa, Lagos, Nigeria.

□ other amateurs who are in Kiwanis clubs in the U.S. or abroad. Also any amateurs who are participating in the "Partners of the Americas." Hugh H. May, Sr., WA4KLQ, 1031 Northwood Rd., Augusta, GA 30909.

QST Congratulates

□ Bertus Backer, VE1AGH and Britt Fader, VE1FQ, who were honored recently by the captain and crew of HMCS *Protecteur* for relaying more than 200 messages back home while at sea. They received engraved plaques and some new equipment for their shacks. Both men live in Lower Sackville, NS.

□ the Southeastern Massachusetts Amateur Radio Association, which was presented the "Outstanding Service Award" by the National Foundation for the March of Dimes for communication service during walk-a-thons in New Bedford and Westport.

□ all the amateur radio associations and individuals, the publicized and the unpublicized, who have recently participated all across the land in the various walk-a-thons, bike-a-thons, and the other chari-

table events this spring. We were deluged with mail — everything from newspaper clippings to mayoral proclamations — congratulating those responsible for communications services during the various events. We would like to add our compliments.

□ James D. ("Doc") Fry, W9QHW, recently named instructor-electric at Northern Indiana Public Service Co.'s training and utilization center in LaPorte. A long-time resident of Valparaiso, Fry was the first president and one of the founders of the Duneland Amateur Radio Association.

HIGH-SPEED CODE

□ To those of you who burned out on cw during Field Day, consider this from the Toledo Morse Telegraph Club newsletter: "One of the records held by Press Wireless men at various official contests is held by A. E. Gerhard, who racked up 49-1/2 wpm with five errors in 1920. He beat his record in 1924 with six errors at 59-1/2 wpm, and topped that in 1925 with 56.1 wpm with not a single error. The code contests of those days used automatic (Wheatstone) transmitters. The code structure produced was mechanically exact, disclosing no personal touches, or slight changes of pace during combinations which were unusual or a little more difficult to copy." — Bro. Donald K. deNeuf, WA1SPM

CB to Ham in Two Easy Classes

This new ham will tell you there's a world of difference between CB and amateur radio. But he had no difficulty moving up — thanks to a top-notch volunteer instructor.

By Joel P. Kleinman,* WA1ZUY

A recent refugee from the 11-meter band, Ralph Rosselot, WB9ZJN, isn't typical of the 60,000 annual newcomers to amateur radio. It's been just over a year since his wife pasted a note on the bathroom mirror telling him that a ham radio class was starting soon, but he's already planned his retirement around his new hobby.

"In a few more years," he tells a visitor, "I can retire. Then I'll head to Florida, get an 80-foot tower and good beam, and rotate that thing around the world. I'll get up about 10 in the morning, drink two cups of coffee and get on the radio."

The man responsible for taking CBER Ralph Rosselot, and 18 others from idle curiosity to the amateur ranks is pleased with the outright enthusiasm his charges have displayed. Lured back to amateur radio by a co-worker after a 12-year lapse, Corwin ("Cork" to his friends) Kelly, WB9TUQ, soon found himself teaching a Novice class. From the results — all but two of his Novice and General class students have quickly upgraded to at least Technician — you'd have to suspect that he enjoyed himself every Sunday evening.

"Oh yeah," he says, "I really did like it. I got to meet all these guys." Although many of his former students work at the same Delco plant in Kokomo, IN, that he does, he knew only one of them before his Novice class started. It didn't take long for that situation to change.

As he recalls their names, the affection he feels for each of them comes through unmistakably. The 38-year-old electrician has become something of a folk hero to his ham co-workers, who often corner him at the coffee machine



Having his license hasn't stopped Ralph Rosselot (left) from seeking out his teacher for some welcome advice — or an evening's conversation.

for some quick advice, much as they did while their Novice and General classes were being held.

Explained It in Plain English

In the brief time since Kelly's Novice class ended, its graduates have made treks to Ft. Wayne, Chicago and nearby Indianapolis in search of Technician and General licenses. Ralph Rosselot thinks their instructor had something to do with providing this motivation.

"Cork would explain things in plain English if you had questions," he recalls. "You knew you had to study just a little more than what we had on the code-practice handouts. And he's got the knack of putting something into plain English; those kinds of people are hard to find."

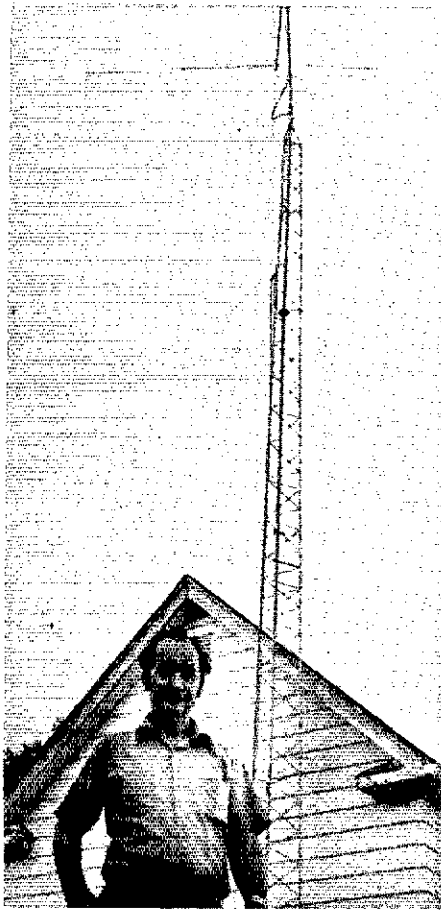
But teaching a first Novice class wasn't without its hazards. As Cork remembers it, the first night was a bit shaky. "I had everyone listen to code for a while; I think it scared some

people away."

He had planned to wait for the League's brand new Novice curriculum before beginning the class, but his prospective students would have none of it; once they heard that Kelly was thinking of organizing a class, they wanted to start immediately. "About a month after it started, the ARRL material arrived," the instructor recalls. "The introduction had some stuff I had already found out the hard way, like 'go easy on code at first.' You live and learn."

But it was smooth sailing from there, as he began to integrate much of the curriculum material into his classwork. One "problem" involved getting rid of his question-prone students each Sunday evening. "The class would end about 9, but the last guy usually was out at 10:30," Kelly recalls, smiling. "One night the class went to a quarter to 12; then I had to go to work the next day. I get up at 5."

*Editorial Assistant, QST



Ralph and his 40-foot tower stand proudly outside his Kokomo home. A tornado bowed his quad last year — and leveled his next door neighbor's house.

The enthusiasm his students had for the subject matter was apparent from the outset. "During class," Ralph recalls, "when you'd take a break, you didn't just sit there. Immediately a few of us would corner Cork."

As the two friends reminisce about the experience, it's not difficult to see what is behind the obvious enjoyment they get from their hobby — the friends they've made. They start naming people, chuckling over experiences they shared. "Yeah, he's as happy as a lark," Cork says, referring to a new General licensee.

The men and women who got their start from Cork Kelly's Novice class have become even better friends since it ended. "Even the ones who aren't over at the plant keep in touch; practically everyone has a '49 crystal," Kelly explains, looking at his watch. "If I turned the 2-meter rig on about now probably there'd be someone on there."

"Since the class," he continues, "we've seen each other at Dayton, helped each other with getting antennas up, we've quaffed a beer — it's like our own little club just from this class. Ya sure make some friends . . ."



Conflicting messages come across on the back of this new ham's car. "You've got a friend on .31/.91" might be more appropriate these days.

Other Kellys couldn't help but get involved with amateur radio. Cork's wife Sharon was a guiding force behind her husband's first teaching experience. "One of the places she helped was in recording parts of the ARRL's Novice curriculum. If there was a little talk on a diagram, she'd record it. I just turned it on in class and asked for questions. If it weren't for her, nobody'd have a license," he says.

His 14-year-old daughter began the class, but competing interests soon won out. Kelly hasn't given up hope on either of them becoming licensed, but he also has hopes for his 7-year-old. Right now, fishing comes first, though. "She can drown worms all day," her father says.

He Enjoyed It

Though he has no plans to leave his job with Delco, where he tests calibrating equipment, Cork Kelly has discovered that he loves to tell others what he knows. "Before the radio class, I substituted down at the local technical school twice," he explains. "I taught physics and welding, which I knew almost nothing about; but I enjoyed it."

"Who said that half of teaching was learning? I think that ratio ought to be changed a little," he says.

Born and raised in Michigan, he now lives with his wife and three daughters in Russiaville (pronounced Rooshaville), a small town south and west of Kokomo. The personable, crew-cut ham instructor had his first exposure to electronics in the Air Force. When he was about to be discharged, a buddy suggested he come along while he applied for a job at Delco. "I figured,

'what the heck, I'll do it,'" Cork remembers, laughing. "It turned out that I got a job and he didn't." He's been there ever since, about 15 years.

Asked whether his newly rediscovered hobby has helped him on the job, Kelly says, "Oh yeah, it got me more interested in the building aspect." To prove his point, he displayed a QST Memory Keyer he and some new ham friends built for Field Day. It was a six-month project.

He has rented seven lots at a nearby park for Field Day. "We'll have everything but a dummy load," he says. Cork hopes to see a good turnout of his former students, and plans to give each of them a chance to operate a variety of stations. Earlier in the day we spoke, his resourcefulness had been put to a test when he had to try to get a wire antenna to go where he wanted it. He finally did — with the help of a bow and arrow and some fishing line. "Nobody who will be there has ever done anything like operate on Field Day before," he says. But with the operating interest his former students have demonstrated, it's not likely to be a bust.

Forced into Two Meters

Between licensing classes, Kelly has more time to enjoy his only hobby. "I operate mostly cw, but I've been on phone more lately," he says. "I was surprised I liked cw as much as I did when I first got into it again." Again the laughter comes as he explains, "I was forced into 2 meters. If I wanted to talk to them, I had to. Anyway, I had to get on to make sure I wasn't being talked about."

"I really have no favorite band, but

tried 10 meters recently and liked it," he says. "No, I haven't gotten into DXing yet; one of these days . . ."

He never forgot the code after learning it soon after starting his job at the plant. But he let his license expire, and didn't think much about amateur radio until an acquaintance just beginning to learn code tried to show off one night at a local nightspot. "He spelled 'BEST' in code and said, 'I bet you don't know what I just said.' I said, 'yeah I do, BEST.'" Co-workers who saw him tutoring his friend lost no time in volunteering for a Novice class, and amateur radio has occupied a great deal of Cork Kelly's time from there on in.

Licensed only a year and a half, he finds an advantage to not being an old-timer. "It's all real fresh to me," he explains. "I can see where they're at better."

His electronics background allowed him to upgrade quickly, although he failed his first Extra code exam. "I had passed 20 on W1AW, but got completely into shakes when I started copying. But I made it the next time in Indianapolis. It helps to have gone once and flunked."

Thinking ahead to the next licensing class opportunity, Cork says he would like to join forces with the local club and teach a Novice class with others. He'd like to make better use of demonstrations this time. "It's worth a thousand words," he says.

"My nephew wants to be a ham," he says. But it's obvious he needs no excuse to get back into teaching amateur radio.

"Hardly Any Comparison"

Ralph Rosselot is a painter at Delco, but didn't know his amateur instructor — or a resistor from a capacitor — before the first class meeting. "A friend of my son's told him about the class, and Jerry told my wife," he explains. "Since she worked nights, she pasted a note on the bathroom mirror telling me about it."

Although he had invested in quite a bit of CB equipment ("I heard that if you followed truckers you'd be safe on



When he was on CB, WB9ZJN could "never get air time." Adding that to a limited signal range made one frustrated operator. Reflecting on his welcomed switch to amateur radio, Ralph notes, "There's hardly any comparison."

long trips"), Ralph soon tired of the overcrowded — and unpredictable — 11-meter band. "You could never get air time," he says now. "It's crowded; you can't get on." He quickly sold and gave away his CB gear after starting Cork Kelly's Novice class.

"There's hardly any comparison," he says after experiencing both modes of operation. "There's courtesy and cooperation on the amateur bands; you know what's coming. You don't interrupt him, he don't interrupt you, and nobody interrupts both of you." Holding his hands apart for effect, he adds, "And there are so many frequencies."

Before he heard about the class, Ralph wasn't strong in radio theory. "The only thing I knew about a resistor is that it had two wires coming out of it."

Despite the code and theory requirements he had to master, Ralph Rosselot hasn't been disappointed by his switch to amateur radio. "When I finished the Novice class, it was a pleasant surprise to realize what I had," he says. "You can reach people you'd

normally never talk to in your life. With 150 or 180 watts you can talk halfway around the world. That's no more power than a couple of light bulbs!"

He makes no secret of his appreciation to Cork Kelly. "If it hadn't of been for that class," he says, "I'd probably have been sittin' here with the CB this past year."

Rosselot has been busy remodeling his Kokomo home for three years but the project has taken a new turn since he's become a ham. Showing a visitor his newly finished back room, with a long shelf and outlets every few feet apart, there's little doubt of its eventual use.

So Much to Get into

"I've got about an acre and a half," he explains. "Pretty soon I'll start playin' around with antennas. There are just so many things you can get into — DX, 20 meters, locally on fm; maybe someday I'll get interested in RTTY. You can pick almost any area and have a good time," he says.

Walking around his spacious yard, he

Anyone teaching an amateur radio class can send for the ARRL Club and Training Department's wealth of free material. Club affiliation is not required — just drop us a note requesting instructor and class registration cards and return them to us. The following material is presently available:

1) ARRL Instructor's Guide: a 200-page looseleaf notebook packed with hints and suggestions for the teacher. Designed to help even first-time instructors, the guide is the basis of most of the Novice license courses in the country. It includes complete Novice lesson plans.

2) General level course: similar to the Novice course, for both first-time and experi-

enced General-level instructors.

3) Student workbooks: the quizzes and visual material for the above courses, in a compact form for student use. Sent automatically upon receipt of a class registration card.

4) Slides and tapes: two complete sets of slides of the visual material accompanying the Novice and General courses, and a set of tapes of the Novice code-practice material. Sent automatically to classes using *Tune in the World* or the *ARRL License Manual*. Not available otherwise.

5) Graduation materials: graduation certificates, First Contact Club certificates, *New Ham News*, operating aids, *Operating an Amateur Radio Station*, W1AW schedule, form 610, and more. Sent automatically to all

registered classes.

6) *Instructor's Newsletter*: sent bimonthly to all registered instructors. Contains teaching hints and suggestions and latest amateur radio news of interest to instructors.

7) Also: posters, films, handouts, exhibit materials, OSCAR demonstration materials, teachers workshop ideas, and more. Just ask for what you need.

To obtain the above materials, complete an instructor registration card and return it to Club and Training Department, ARRL hq. For the class materials, send a class registration card for each year. If you hold five classes per year, we need five cards. — **WB2CHO**



Some of the uncommonly anxious (to upgrade, that is) group that first-time ham instructor Cork Kelly brought to the amateur bands.

explains how his beam received its unintentional bow. "A tornado leveled the house next door last year. It just bowed my antenna a bit."

Now primarily on 2 meters, Ralph expects that won't last for long. "That'll change once I get my station set up back there. If everything goes right, I'll probably get my General this fall, after I close up the pool."

Both he and Cork Kelly belong to the local repeater club, and enjoy the fellowship of the 2-meter band. "Wherever I drive I take the rig in the car with me," Rosselot says.

His son Jerry took the same classes he did, but still has his Novice. Wife Bev, on the other hand, has so far been so tied up with her ceramics and potted plant hobbies that she's resisted joining her husband on the air. "Eventually she'll get into it," her husband predicts. "I've gotta get far enough ahead so she don't catch up to me too quick."

Sailed Right Through

Rosselot failed his first Technician exam, but found that it "got my ner-

vousness over with." The next time, he sailed right through it.

"It's always a challenge," he says. "The more you know the more you realize you have to learn."

Until he and his wife each accumulate 30 years of seniority at Delco, Ralph Rosselot will stay in Kokomo, Florida and retirement aren't far from his mind, however. Meantime, living in the city he was born in 48 years ago has its advantages. "The handiest thing is you've got Cork at the same plant," he says. "If you don't catch him at the plant, you can always call him on the phone — or on 2 meters."

Cork and his friend laugh at the gentle jibe. "I was never on 2 meters until these guys got me going," Cork explains. "I told 'em the whole reason I got them licensed was so I could get on CB."

Judging from the amateur instructor's enthusiasm for his hobby, it's likely just another of the tall stories he became famous for when he was teaching code and radio theory to some of Indiana's most dedicated hams.

You hear it all the time in different ways. But the message is the same. "I could never have gotten my license without the help of my Elmer."

"My Elmer helped put up my antenna, check the SWR, and even stood by while I made my first contact with my new call."

"The most memorable contact I have ever had was talking to my Elmer in my first amateur QSO. I'll never forget the help he provided."

Elmer. The ubiquitous helping hand. The one who did so much to help you get your ham radio license, get on the air and make those first few contacts. Odds are, you'll never forget your Elmer, and years later you

will think back fondly on how much you gained, thanks to the invaluable assistance of this fellow ham.

The real reward for the Elmer is your expanding log book — and on-the-air prowess — as you make contact after contact. He or she may know that you greatly appreciate the help provided. But now you can give or send your Elmer a concrete token of that appreciation. New hams and even old can get an Elmer Award to honor that person who helped you get your start in ham radio. Send a self-addressed, stamped envelope to ARRL hq. for your award. Why not arrange to present it at the next club meeting? — **WB2CHO**

FALL CLASSIC RADIO EXCHANGE

□ Attention classic-radio enthusiasts. The Southeast Amateur Radio Club, K8EMY, of Cleveland, is sponsoring the Fall Classic Radio Exchange from 1800 UTC Sunday, September 25, to 0100 UTC Monday, September 26. The object is to work hams who enjoy restoring and operating classic radio — that is, equipment built since 1945 but at least 10 years old. You need not be using such equipment, however. No a-m phone below 21 MHz. Cw call "CQ CX"; phone call "CQ Exchange." The same station may be worked with different equipment combinations, and on each mode on each band. Suggested freqs.: Cw up 60 kHz from low-band edges; phone 3910, 7280, 14280, 21380, 28580; Novice/Techs 3720, 7120, 21120, 20120. Scoring: Add the numbers of different transmitters and receivers, states-provinces/countries contacted for each band. Multiply by number of QSOs. Multiply that total by classic multiplier: total years old of all transmitters and receivers; three QSOs minimum per unit. For transceivers, multiply years old by two. Awards for highest scores, longest DX, most equipment combinations, oldest equipment and "unusual achievements." Send logs, comments, pictures, anecdotes, etc. to Stu Stephens, K8SJ, 2386 Queenston Rd., Cleveland Heights, OH 44118. S.a.s.e. for *Classic Radio Newsletter*.

ITALIAN RADIO FEST

□ The 50th anniversary of the Associazione Radiotecnica Italiana will be celebrated in Florence during September. Highlights of the event will be an official inauguration in the Palazzo Vecchio, an historical exhibition of radio apparatus and an international competition for equipment designers, seminars on the most recent data transmission techniques, information on international EME and satellite transmissions, and a commemorative stamp to be issued. For further information and hotel reservations, contact A.R.I. Celebrazioni Del Cinquantenario; Segerreteria Generale; Via dell'Agnofo, 76; 50122 FIRENZE (Italia).

□ On May 17 MARS members from counties surrounding Washington, DC, assisted the Cystic Fibrosis Foundation in the coordination of eight bike-athons. With communications established in a 45-mile radius, Air Force and Navy-Marine Corps MARS members showed the general public how effective and useful amateur radio can be.

Hot New Programs for ARRL

Perhaps incubated by sizzling sidewalks, new League policies were hatched at Hartford during the July Board Meeting, July 21-22, 1977.

By Perry F. Williams,* W1UED

Outside, record heat prevailed with the mercury zooming past 100 degrees. Inside, cool logic led the League's directors to adopt a new attitude toward government relations, continue monitoring intensive preparations for WARC, and add new services — club accident insurance and policies to cover equipment loss for members. The scene was the Holiday Inn in Hartford, the dates July 21-22 and the occasion was the Second 1977 Meeting of the ARRL Board.

A subject being examined in Congress at the moment is a complete rewrite of the Communications Act of 1934, as amended. The Board wants Congress to permit delegation of FCC's examining and temporary license powers. It seeks authority for the Commission to require that transmitting equipment be sold only to those proving they are licensed. The Board feels that FCC should have the authority to enforce its rules with respect to unlicensed stations and operators as it can for those who have licenses. A confusing paragraph about secrecy (Section 605 of the present Act) should be clarified to exempt the Personal Radio Services, so that there could be self-policing in the citizens band, and so amateurs need have no doubt about their status in respect to secrecy. And, at least with respect to the Personal Radio Services including amateur, FCC should have authority to issue lifetime licenses for stations as well as operators.

Our contacts for Congressional liaison in these matters will be President Dannals, First Vice President Clark, General Manager Baldwin, and General Counsel Booth (see Minutes 41 and 66 in the "Moved and Seconded" column adjoining this article). The General Counsel is further required, at Minute 76, to "... take such steps as may be necessary to assure compliance with the Federal Regulation of Lobby Act of

1946, 2USC 261 *et seq.*, and to proceed with the registration of appropriate League officials if further study indicates the advisability of this step. . . ." The Board is also asking, in Minute 74, that the membership be given more information on the Goldwater Bill, S-864 and its new House companion, HR-8079. These bills, like the Vanik Bill earlier, would give FCC authority to regulate the manufacture and sale of consumer electronics devices so as to reduce their susceptibility to radio frequency interception. (HR-8079 is discussed in "Happenings," this issue.)

All this intensified government contact will be coordinated by a full-time staff member to be designated by the General Manager (Minute 26).

The Board has also renewed its requests to the Commission for: full use of 50-54 and 144-148 MHz by Technicians (Minute 36); the right to use ASCII eight-level code (Minute 42); exams in Spanish (Minute 53); and expansion of voice privileges (Minute 60) so that Advanced class licensees may use 21.25-21.27 MHz (additional to Extra Class who have that privilege now) and so that Extra Class licensees may use 14.175-14.2 MHz for A3. There is a new request that Novice privileges on 80 meters be expanded to 3675-3750 kHz, Minute 34. Another new request is for special temporary authorizations to permit microprocessor experiments by selected amateurs in a 30-kHz segment of 10 meters, Minute 30. The League will also explore the possibility of contracting with FCC to do licensing tasks (e.g., club and repeater calls, choice of call sign) which would otherwise be dropped by the Commission, Minute 61. We'll also ask that FCC examination schedules be made more flexible (Minute 58) and that there be an increase in the offering of examination programs at major ham-fests and conventions, Minute 25. On the other hand, the Board asked (at Minute 48) that the Novice licensing

program be continued and at its present level of difficulty.

Insurance Programs

A whole new dimension to membership services has been opened with the Board's adoption of two insurance programs and exploration of three others. In recent years, most insurance companies have taken mobile radio equipment off the list of things covered by comprehensive automobile policies, and set up separate policies or endorsements at extra cost, usually about \$20 for about \$200 of valuation. The League will now offer its U.S. and Canadian members the opportunity to obtain a policy covering named risks of fire, theft, lightning, overturn and collision and other nonexcluded perils, for both equipment used at home and that which is portable or mobile. Exclusions are loss of use, inherent vice, intentional damage, damage caused by repairing or mistuning, electrical charge other than lightning, and loss or damage to antennas. Claims will be settled by the insurance company on a replacement cost basis, subject to a 10-percent deductible (\$50 minimum per loss).

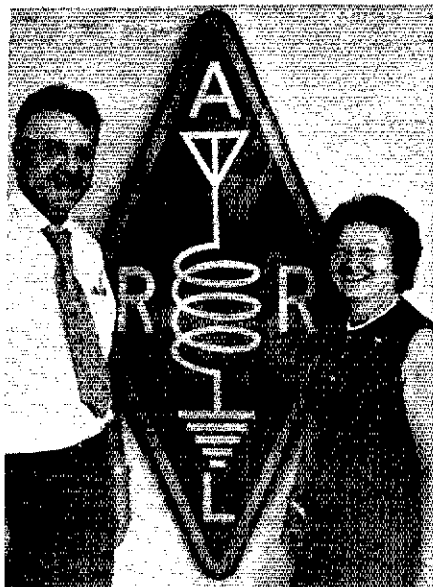
The basic rate in the United States will be \$1 of annual premium for each \$100 of equipment listed, with a minimum premium of \$10. Rates for members in Alaska, Puerto Rico, U.S. Virgin Islands, Guam and Canada will be determined on a case-by-case basis, but will be kept as low as possible.

Affiliated clubs will be able to obtain an accidental death, dismemberment and accident medical-costs policy (similar to those in use for Scout troops and schools). A club seeking this coverage will pay \$3.50 for each member on its roster at the start of the policy year; new members will be covered automatically. The accidental-death or dismemberment benefit is \$5,000 for each club member, \$2,500 for any guest of the club (including spouses and children of members) who are attending o

*Manager, Membership Services, ARRL



Great Lakes Division PRA Tom Williams, W8NSF (left), receiving a contribution of \$500 for ARRL WARC fund from Jim Hebert, K8SS, president of Livonia (MI) Amateur Radio Club.



W9NTP and his wife Sue log the traditional tourist pose at the entrance to Headquarters, before the board meeting.



W0SIN and W5GM holding an *ad hoc* pre-meeting conference.

traveling to or from a club function when an accident strikes. Medical expenses under similar circumstances will be paid up to \$1,000 for a club member, \$500 for a guest.

Bonn A. Gilbert, Jr., of Charlotte, North Carolina, and his firm, G & H Insurance Administrators, Inc., have been named to handle the plans. Gilbert is also working toward policies to reimburse amateurs who may have to go to court because of amateur activities; policies to protect club officers if they are sued by outsiders because of club activities (that is, public liability coverage) and policies offering prepaid legal coverage for individual amateurs. Two standing committees of the Board are empowered to review any of these plans and approve offering them to the members as they are developed. The enabling motions for these new programs are numbers 44 and 45.

Marketing Ethics

Both the President's and the General Manager's reports expressed concern for the integrity of the Amateur Radio Service and the need for a code of ethics for *QST* advertisers and all others engaged in the manufacture or marketing of amateur transmitting equipment, particularly with respect to sales of this gear to unlicensed persons and its use by such people. A broad motion, number 22, was adopted giving the General Manager the authority to set up the Code of Ethics and the procedure for its practical application.

On a similar matter, even closer to home, the Board called for *QST* articles giving amateurs step-by-step advice on what they may do when they hear repeated and flagrant violations within the amateur bands, Minute 28. The League will establish, responsive to Minute 9, a list of the serial numbers of equipment reported to have been stolen, and keep it up-to-date. It will be available to members and dealers on request. And another direct membership service

will be a guide for amateurs on how to deal with local officials and boards on issues involving antennas (but, Minute 31 says clearly, *not* encouraging amateurs to act as their own attorney!).

Volunteers Honored

The League runs to a very large extent on volunteer power. The Board, in recognition of that fact, adopted this resolution:

"Whereas, the Board of Directors recognizes the valuable work done by the many volunteers in the accomplishment of League activities; Whereas, those elected in the field organization, the SCMs and their appointees have donated many volunteer hours; Whereas, those in the instructors program have donated an untold number of hours in the Novice program; Whereas, those Advisory Committee members have donated many hours in the collection of valuable data upon which Board action has been formulated, now therefore, BE IT RESOLVED the Board of Directors does hereby express its sincere appreciation to all those individuals who have given of their time and effort in the operation of amateur activities as well as the promoting of League activities." (Minute 46) Specific thanks were expressed to Past Director Roy Albright, NSRA, for instigating the *Emergency Coordinator Workbook* and for following through to completion of the book; to the Emergency Communications Advisory Committee for its contributions to the *Workbook* and in revising the *Public Service Communications Manual*; and to the DX Advisory Committee for its thorough and comprehensive study of DXers' attitudes

and opinions (Minutes 16, 18 and 77). And a new form of recognition is to be established, an "ARRL Hall of Fame" honoring several categories of amateur radio achievement (Motions 12 and 35).

Two specific recommendations of advisory committees were adopted. At the Annual Meeting in January, Minute 49 had asked the Contest Advisory Committee to examine the possibility of changing contest rules so that transmitter power, antenna height and gain, and numbers of transmitters and receivers available would be factors in contest scoring. But CAC came back with a recommendation that no further consideration be given these ideas, and the Board endorsed this at Minute 13. Similarly, the DX Advisory Committee examined the idea that DXCC should begin again in January, 1980, with all comers on an equal footing. On advice of DXAC, however, the Board agreed to continue DXCC as at present and not begin anew three years hence (Minute 15).

Additional material to help Novices build low-cost gear is to be sought by the General Manager for presentation in *QST*. (Volunteer authors: Can you help?) A story on women in amateur radio is to be presented in *QST*. One question to be asked: Should amateurs abandon the term, 'XYL, for wives? Efforts are to continue to get Novices to join the League early on; volunteer instructors are already doing good work here, with the aid of a specific program of the Club and Training Department.

World Conference — WARC

In the officers' reports, summarized in Minutes 4, 5 and 7, one theme keeps recurring: the League has exerted a great deal of effort in preparation for the World Administrative Radio Conference to be held in Geneva in 1979. The effort continues, and will get still more intense as WARC draws near. Travel is heavy; help is being furnished national societies having limited resources; new groups are being formed and welcomed into the International Amateur Radio Union; the League is working closely with govern-

ment people in the U.S. and Canada to assure the best possible positions; special worldwide bulletins and meetings keep each amateur society informed of the work being done elsewhere. Members, too, can help with high operating standards and an active interest in the program. A gift from the Livonia, Michigan, Amateur Radio Club of \$500 in support of the WARC effort was announced during the meeting by Director Egbert of the Great Lakes Division.

Also on the organizational side, the allowance for Public Relations Assistants to use for postage and telephone was raised from \$150 to \$250 for each division each year. The allowance for travel by private automobile was raised from 15 cents per mile (and 13 cents per mile for distances greater than 1,000 miles) to a straight 17 cents, effective August 1. Minor changes were made in Bylaw 15, relieving an earlier requirement that a director serving on the Executive Committee must be one of the Tellers for League elections.

Bylaw 31 was amended to specify that Standing Committees be appointed by the president during January instead of during the annual meeting of the Board. This action clears the way for a possible shift in meeting dates now being studied by a special committee with a mail vote of the Board to follow in September. The standing instructions of the Board — open-ended motions adopted by the Board since 1949 — were examined, with some being dropped, a couple amended to fit current procedures, and the rest codified for inclusion in the *Directors' Workbook*. And the General Manager is directed to insure that approval of the Division Director is obtained prior to official travel by Headquarters employees to clubs, meetings, conventions and hamfests and to events of general public interest to promote amateur radio.

Not all of the work of the Board can be accomplished during the two days it meets twice each year. Much is done by standing and advisory committees. This time, studies were ordered concerning:

stimulation of amateur activity on microwave frequencies; indication of two-way communication by a common mode on QSL cards to be used in the single-mode DXCC awards programs; tighter procedures for use of ARRL mailing lists for organizational purposes (no commercial use is permitted nor is any proposed); two categories of club competition in League contests; guidelines for local antenna cases; WAS and 5B-WAS mileage limits; faster transcription and circulation of *QST* articles having time constraints, for the use of the blind and handicapped; and a review of band plans by the VHF/UHF Advisory Committee and the VHF Repeater Advisory Committee, keeping the technical requirements of specialist groups in mind.

There is more — much more — detail in the minutes which follow, under the heading "Moved and Seconded." The reactions of members to the actions taken in the meeting are welcomed; some may be used in "Correspondence" but all will be appreciated.

Moved and Seconded...

MINUTES OF EXECUTIVE COMMITTEE MEETING No. 364 July 20, 1977

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 3:12 P.M. on July 20, 1977, at the Holiday Inn in Hartford, Connecticut. Present: President Harry J. Dannals, W2HD, in the Chair; First Vice President Victor C. Clark, W4KFC; Directors Max Arnold, W4WHN, Richard A. Egbert, W8ETU, Ron Hesler, VE1SH, and Robert B. Thurston, W7PGY; and General Manager Richard L. Baldwin, W1RU. Also present were General Counsel Robert M. Booth, W3PS, Associate General Counsel Robert B. Benson, QC, VE2VW, and a number of other directors and vice directors.

On motion of Mr. Egbert, the Committee recognized the names of 169 individuals who had recently been elected to Life Membership, and instructed the General Manager to list their names in *QST*.*

On motion of Mr. Thurston, the Committee approved the affiliation with the League of the following amateur radio societies: Adirondack Amateur Radio Club, Glen Falls, NY; Ambassador Amateur Radio Association, Pasadena, CA; Brooklyn Post Office Amateur Radio Club, Brooklyn, NY; Carlton Webster Jr. High School ARC, Henrietta, NY; Cascades Amateur Radio Society, Jackson, MI; Central Florida DX Association, Holo-paw, FL; Cimarron Valley Amateur Radio Association, Ulysses, KS; Colquitt County Ham Society, Moultrie, GA; Coosa Valley Amateur Radio Club, Mt. Berry, GA; East Side Community School ARC, Chattanooga, TN; Eaton County Amateur Radio Club, Charlotte, MI; Explorer Post 296 ARC, Albuquerque, NM; Foxboro Company Amateur Radio Club, Foxboro, MA; Franklin Amateur Radio Club, Franklin, VA; Gaston County Amateur Radio Society, Gastonia, NC; Hernando County Amateur Radio Association, Brooksville, FL; Idaho Society of Radio Amateurs, Snake River Chptr., Burley, ID; Jefferson County Radio Amateur Club,

*A listing of Life Members will appear in a subsequent issue.

Watertown, NY; Juneau Amateur Radio Club, Juneau, AK; Kings County Repeater Association, Brooklyn, NY; Kingsville Amateur Radio Club, Kingsville, TX; Kodak Park Activities Assoc. Radio Comm. Club, Rochester, NY; Land of Lakes Amateur Radio Club, Sterling Hts., MI; Lumberton Amateur Radio Club, Lumberton, NC; Madison County Amateur Radio Club, Inc., Alexandria, IN; Maywood Intermediate School ARC, Maywood, NJ; Miami County Amateur Radio Club, Peru, IN; Mingus Amateur Radio Association, Chino Valley, AZ; Murphy's Marauders, Hartford, CT; New River Valley ARC, Montgomery Wythe County, VA; Northeastern Amateur Radio Contest Operators, Averill Park, NY; Okaw Valley Amateur Radio Club, Greenville, IL; Orange Park Amateur Radio Club, Green Cove Springs, FL; Pictou County Amateur Radio Club, Trenton, Nova Scotia, Canada; Radio Amateur Society of Norwich, Norwich, CT; Radio Central Amateur Radio Club, Miller Place, NY; Ridley North Jr. High School ARC, Folsom, PA; Ridley South Jr. High School ARC, Ridley Park, PA; Russell Sage Jr. High School Radio Club, Forest Hills, NY; Santiam Radio Club, Lebanon, OR; Seneca Repeater Association, Tiffin, OH; Sierra Amateur Radio Association, Truth or Consequences, NM; Sierra Nevada Amateur Radio Society, Inc., Reno, NV; Southside Amateur Radio Association, Farmville, VA; Thunder Bay Amateur Radio Club, Alpena, MI; Toccoa Amateur Radio Society, Toccoa, GA; University of Cincinnati ARC, Cincinnati, OH; Upper Valley Amateur Radio Club, St. Paris, OH; Yankee Clipper Contest Club, Wales, MA.

On motion of Mr. Arnold, the following convention dates were approved: New England Division, October 14-15, 1978, Boxboro, MA; Hudson Division, November 11-12, 1978, McAfee, NJ.

At this point, General Manager Baldwin reported the receipt of two written complaints concerning a mailing to League members in the Washington Section by a candidate for election to the office of Section Communication Manager (SCM), Mrs. Mary Lewis, W7QGP. At this point (3:24 P.M.) Director Thurston asked to be excused and left the room. Investigation disclosed that the Com-

munications Manager, George Hart, had advised Mrs. Lewis by letter of May 13, 1977, (1) that as the SCM for Washington she was entitled to obtain without charge one set of address labels of League members in the Section for the mailing of a newsletter, (2) that no electioneering could be permitted to advance her candidacy for reelection if the labels were furnished without charge for the mailing of a newsletter, and (3) that any request for labels should be submitted in writing with an explanation of the purpose for which the labels would be used. A mailgram bearing Mrs. Lewis' name as the sender requesting the labels without charge was received on May 24, 1977. The mailing made by Mrs. Lewis consisted of news about the forthcoming Northwestern Division Convention, information concerning certain Section appointments by Mrs. Lewis as SCM, and a statement to the effect that an SCM election was being held and that she was a candidate. The question discussed was whether the League had, even indirectly, paid some of the expenses of a candidate in advancing his quest for election.

Director Arnold moved that the Executive Committee hold Mrs. Lewis disqualified for reelection for having knowingly and intentionally failed to adhere to the limitations imposed by the Communications Manager upon the use of the mailing labels which were supplied. After extensive discussion, the motion was carried by a vote of four to two. The General Manager was directed by the President to advise Mrs. Lewis by letter of the action taken. At this point (4:35 P.M.) Mr. Thurston was invited to return to the room. There being no further business, the Committee adjourned at 4:38 P.M. Respectfully submitted, Richard L. Baldwin, W1RU Secretary

MINUTES OF THE 1977 SECOND MEETING OF THE BOARD OF DIRECTORS THE AMERICAN RADIO RELAY LEAGUE, INC.
July 21-22, 1977

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in second session at the

Holiday Inn, Hartford, Connecticut, on July 21, 1977. The meeting was called to order at 9:30 A.M., with President Harry J. Dannels, W2HD in the Chair, and the following directors present: Garfield A. Anderson, K0GA, Dakota Division; Max Arnold, W4WHN, Delta Division; Charles M. Cotterell, W0SIN, Rocky Mountain Division; Richard A. Egbert, W8ETU, Great Lakes Division; Jack D. Gant, W5GM, West Gulf Division; J. A. Gmelin, W6ZRJ, Pacific Division; Paul Grauer, W0EIR, Midwest Division; John R. Griggs, W6KW, Southwestern Division; Ron J. Hesler, VE1SH, Canadian Division; Harry A. McConaghy, W3SW, Atlantic Division; Don C. Miller, W9NTP, Central Division; Larry E. Price, W4RA, Southeastern Division; John C. Sullivan, W1HHR, New England Division; Robert B. Thurston, W7PGY, Northwestern Division; L. Phil Wicker, W4ACY, Roanoke Division; Stan Zak, K2SJO, Hudson Division. Also in attendance, as members of the Board without vote, were Victor C. Clark, W4KFC, First Vice President; Noel B. Eaton, VE3CJ, Vice President; Carl L. Smith, W0BWJ, Vice President; and Richard L. Baldwin, W1RU, General Manager. Also in attendance, at the invitation of the Board as nonparticipating observers, were the following Vice Directors: Jesse Bieberman, W3KT, Atlantic Division; Maurice O. Carpenter, K0HRZ, Rocky Mountain Division; Thomas W. Chance, Jr., K5YM, West Gulf Division; George Diehl, W2IHA, Hudson Division; C. Richard Dyas, W0JCP, Midwest Division; Fred Evans, W1JFF, New England Division; Edmond A. Metzger, W9PRN, Central Division; and Gay E. Milius, W4UG, Roanoke Division. There were also present Honorary Vice President Robert York Chapman, W1QV, Treasurer John Huntoon, W1RW, General Counsel Robert M. Booth, Jr., W3PS; Canadian Associate Counsel B. Robert Benson, QC, VE2VW; Communications Manager George Hart, W1NJM; Doug DeMaw, W1FB, Manager, Technical Department; Assistant General Managers Robert Myers, W1XT and David Sumner, K1ZZ; Senior Assistant Secretary Perry F. Williams, W1UED; and Public Relations Consultant Don Waters, WB1CUJ.

2) On motion of Mr. Cotterell, seconded by Mr. Gmelin, unanimously VOTED that the agenda is adopted as presented.

3) On motion of Mr. Griggs, seconded by Mr. Thurston, unanimously VOTED that the Minutes of the 1977 Annual Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

4) At this point, extensive oral reports were offered by the officers of the League. President Dannels reported on the opportunities, and a few problems, arising from the rapid growth of the Amateur Service; the necessary and valuable services provided by volunteers; the effective work of the instructor corps during the past radio course season; the integrity of the Amateur Radio Service and the necessity for ethics on the part of those who make and distribute amateur radio equipment; the need to stimulate further amateur activity on the VHF, UHF and SHF; contacts with government agencies; and new developments in Docket 20282. First Vice President Clark reported on his activities as President of the Region II organization within IARU; preparations for the World Administrative Radio Conference (WARC); and relations between societies in the Western Hemisphere and their respective governments. Vice President Eaton, who is also President of the International Amateur Radio Union, reported on attendance at the Broadcast Satellite Conference of the International Telecommunication Union and subsequent visits by officers and staff members to France, England, Turkey, Israel, Greece, Portugal, Monaco, Netherlands, Mexico City, Colombia, Nicaragua, Panama, Venezuela, Curacao, Trinidad, Guyana, Surinam and Brazil; on future travel to Italy, Yugoslavia, Denmark, and Iceland; the important meeting of the International Working Group, comprising representatives from all three IARU Regions and attended by Messrs. Eaton, Clark and Baldwin; the new members of IARU in Sierra Leone, Bahrain, Botswana, Turkey, Papua New Guinea and Jordan; proposed new members in Cuba and Indonesia; the study program for IARU Society Officers at ARRL Headquarters; and the International Intruder Watch. Vice President Smith reported on the

visit of ON4UN to the United States; efforts to control rumors; and amateur participation in the Sister Cities Program.

5) General Manager Baldwin reported on growth of the League, with 155,592 members and of amateur radio with 317,223 licensees at the end of June; ways of improving internal communications; the Club & Training programs of the League; preparation for WARC, especially in connection with the Fifth Notice of Inquiry, Docket 20271; construction of the addition to the Headquarters building; an update of the League's financial status; a Code of Ethics for QST advertisers and others to address the problem of sale of amateur transmitting equipment to, and its use by, non-amateurs; staff matters; and representation in official Washington.

6) The Board was in recess from 10:45 to 11:05 A.M.

7) Treasurer Huntoon amplified on his written annual report with information on Life Membership funds. A report was also presented by General Counsel Booth, concerning FCC organizational matters; the proposed transfer by President Carter of activities of the Office of Telecommunications Policy to the Department of Commerce; current dockets pending before FCC; prospects for the reinstatement of license fees; current efforts to rewrite the Communications Act of 1934; local legal matters and antenna cases; and the Personal Communications Foundation. Associate Counsel Benson reported on Bill 43, the new Telecommunications Act in Canada; illegal operation by unlicensed people; and local legal matters and antenna cases in Canada. During the course of the above, the Board was in recess for luncheon from 12:30 to 1:20 P.M., reconvening with all persons herein before mentioned present except Mr. Hart; Ellen White, W1YL, Deputy Communications Manager, joined the meeting at this point.

8) Mr. Zak, as Chairman, presented the report of the International Affairs Committee. On his motion, seconded by Mr. Sullivan, it was unanimously VOTED that the philosophy of the response to the Fifth Notice of Inquiry, Docket 20271, as outlined in the General Manager's Report, is approved to form the basis for the League's submission to the FCC in support of the future frequency requirements of the Amateur Radio Service.

9) Mr. Arnold, as Chairman, presented the report of the Plans & Programs Committee. Mr. Wicker, as Chairman, presented the report of the Membership Affairs Committee. On motion of Mr. Gmelin, seconded by Mr. Cotterell, unanimously VOTED that the Board of Directors instructs the Headquarters staff to prepare a continually updated list of serial numbers of amateur radio equipment which has been reported as stolen; the list would be available on a continuous basis to radio amateurs and dealers on request, for a trial period of one year, with a suitable notice of this service to be published in QST.

10) Mr. Wicker moved, Mr. Gmelin seconded, that the mileage or location requirement for the Worked All States and 5-Band Worked All States awards be changed from "same location or from locations no two of which are more than 25 miles apart," etc., to "same location or from locations within the same state," etc. After extended discussion, on motion of Mr. Price, seconded by Mr. McConaghy, VOTED that the matter is laid on the table.

11) On motion of Mr. Cotterell, seconded by Mr. Griggs, VOTED that the General Manager poll the ARRL members of Ocean County, New Jersey, on the issue of that area being transferred from the Hudson Division to the Atlantic Division, as requested by a petition received at Headquarters on June 7, 1976.

12) Mr. Sullivan moved, Mr. McConaghy seconded, that the Board institute an ARRL hall of fame, using the proposal included in the report of the Membership Affairs Committee. Mr. Cotterell moved, Mr. Griggs seconded, that the motion be amended by adding, "with the procedure to begin May 20, 1978, under guidelines to be drawn up by the Headquarters Awards Committee." After extended discussion, on motion of Mr. Gmelin, seconded by Mr. Price, VOTED to lay the matter on the table.

13) Mr. Egbert, as Chairman, reported for the Management & Finance Committee. Mr.

McConaghy, as Chairman, presented the report of the Legal & Regulatory Committee. Mr. Smith, as Liaison, reported briefly for the VHF Repeater Advisory Committee. Mr. Zak, as Liaison, presented the report of the Contest Advisory Committee. On motion of Mr. Griggs, seconded by Mr. Zak, unanimously VOTED that the Board accepts the report of the Contest Advisory Committee and the recommendations contained therein that no further consideration be given to Minute 49 of the January 1977 Board Meeting, concerning contest rules.

14) Mr. Milius, as Liaison, read the report of the DX Advisory Committee. Mr. Wicker moved, Mr. Arnold seconded, that in the event that the DX Advisory Committee should disapprove an item duly placed on its agenda and in the event that the Headquarters staff, or one connected therewith, decides contrary to said approval, then the Board of Directors shall take that item under consideration at its next meeting and make the final decision or determination thereon, but the motion was lost.

15) On motion of Mr. Thurston, seconded by Mr. Egbert, unanimously VOTED that, in light of recommendations by the DX Advisory Committee and the Communications Department and reflecting membership preference, the DXCC Award is continued in its present form and the proposal to establish a new beginning as of January 1, 1980, is rejected. This does not preclude, by means of existing processes, any desirable revisions of country criteria or other rules changes that may become necessary. The Board was then in recess from 3:15 to 3:34 P.M.

16) Mr. Arnold, as Liaison, presented the report of the Emergency Communications Advisory Committee. On his motion, seconded by Mr. McConaghy, unanimously VOTED that this Board goes on record as commending former Director Roy Albright, W5EYB/N5RA, for his brilliant foresight in instigating the Emergency Coordinator Workbook, and for his doggedly insistent follow-through from the basic idea to the finished product now in the hands of Amateur Radio Emergency Service Leadership Officials.

17) Mr. Arnold moved, Mr. Zak seconded, that the General Manager is instructed to investigate the possible advantages of arriving at formal cooperative agreements with national CB organizations for operation during emergencies, and report at the next Board meeting. After discussion, on motion of Mr. Gmelin, seconded by Mr. McConaghy, unanimously VOTED that the matter is laid on the table.

18) On motion of Mr. Arnold, seconded by Mr. Wicker, unanimously VOTED that this Board goes on record as commending the efforts of and contributions by the Emergency Communications Advisory Committee in producing the Emergency Coordinator Workbook and revising the Public Service Communications Manual.

19) Mr. Griggs, as Liaison, reported for the VHF-UHF Advisory Committee. On his motion, seconded by Mr. Thurston, it was unanimously VOTED that the Board of Directors requests the VUAC to undertake a study leading to recommendations for a program to encourage and stimulate amateur radio activity in the microwave region.

20) Mr. Egbert moved, Mr. McConaghy seconded, that mailing labels and membership lists be made available in accordance with current rules and instructions except as follows: 1. All requests for labels and/or membership lists be made to ARRL Headquarters in writing. 2. Requests for labels and/or membership lists state the purpose to which the labels and/or membership lists will be put. 3. The General Manager or his designee approve the request prior to shipment of the labels and/or membership lists and signify his approval in writing. 4. The requester submit to Headquarters a copy of the material mailed. After extended discussion, on motion of Mr. Gmelin, seconded by Mr. Hesler, it was unanimously VOTED that the matter be laid on the table.

21) Moved, by Mr. Zak, seconded by Mr. Cotterell, to amend By-Law 15 to read as follows: "The Executive Committee shall appoint a committee of three tellers to include at least one director and shall arrange . . ." etc. A roll call being required, the question was decided in the affirmative, six-

teen votes in favor to none opposed. All the directors voted in favor, so the By-Law was AMENDED.

22) On motion of Mr. Grauer, seconded by Mr. Sullivan, unanimously VOTED that the Board of Directors endorse the proposal of the General Manager to establish a Code of Ethics for QST advertisers and others, and the procedure for its practical application.

23) Moved, by Mr. Sullivan, seconded by Mr. McConaghy, that QSLs for contacts made on or after January 1, 1978, for single mode DXCCs must clearly show two-way contacts, with each party using the same mode. On motion of Mr. Zak, seconded by Mr. Hesler, VOTED that the matter is referred to the DX Advisory Committee.

24) On motion of Mr. Gmelin, seconded by Mr. Sullivan, VOTED to lift from the table Mr. Egbert's motion concerning mailing labels and membership lists. On further motion of Mr. Gmelin, again seconded by Mr. Sullivan, VOTED that the matter is referred to the Membership Affairs Committee.

25) On motion of Mr. Wicker, seconded by Mr. McConaghy, unanimously VOTED, Mr. Hesler abstaining, that the ARRL Board of Directors encourages the practice of providing FCC-administered examination opportunities in conjunction with the major hamfests and conventions, and recommends that ways be explored to expand this service.

26) On motion of Mr. Price, seconded by Mr. Zak, VOTED, Mr. Hesler again abstaining, that the Board of Directors endorses the proposal of the General Manager to assign a full-time staff position as coordinator of ARRL activities in the Washington, DC, area.

27) On motion of Mr. Griggs, seconded by Mr. Arnold, unanimously VOTED that the Board directs the Headquarters staff to continue to assist clubs in enlisting Novice class licensees as members of the League.

28) On motion of Mr. Gant, seconded by Mr. Griggs, unanimously VOTED that QST print sound and step-by-step advice to the membership as to what they may do to take helpful action when they hear repeated and flagrant violations on the amateur bands.

29) Moved, by Mr. McConaghy, seconded by Mr. Wicker, that By-Law 20 be amended by changing the date of the annual Board meeting to the first Thursday in April of each year, and the second meeting to the first Thursday in October of each year, the change to be effective April 6, 1978. A roll call being required, the question was decided in the affirmative, thirteen votes in favor to three opposed. All of the directors voted in the affirmative except Messrs. Gmelin, Grauer and Zak, who voted in the negative. So the By-Law was AMENDED.

30) On motion of Mr. Miller, seconded by Mr. Griggs, unanimously VOTED, Mr. Hesler abstaining, that the General Manager in cooperation with the General Counsel support and seek expeditious granting of requests to the FCC by a selective group of amateurs for a one-year experimental authorization for narrow bandwidth television transmission in a 30 kHz portion of the 28 MHz band. The purpose of the experiment will be to test and report upon the feasibility of microprocessor narrow bandwidth video systems.

31) On motion of Mr. Anderson, seconded by Mr. Griggs, unanimously VOTED that the General Manager be directed to produce a guide for use by amateurs in dealing with antenna problems involving local zoning regulations or ordinances. (It is not intended that an amateur should act as his own attorney.)

32) The Board recessed for dinner at 5:33, reconvening at 8:15 P.M., with all persons herein before mentioned present except Mrs. White.

33) On motion of Mr. Zak, seconded by Mr. Grauer, in view of the lack of low priced Novice gear available, unanimously VOTED that the General Manager investigate appropriate means to make available construction information for low priced Novice gear by means of articles in QST.

34) On motion of Mr. Grauer, seconded by Mr. Sullivan, VOTED that, in light of the significant and continuing increase in the number of Novice Class licensees, the Board of Directors instructs the General Counsel to petition the Federal Communications Commission to extend the limits of the 80-meter

Novice Band to 3675-3750 kHz.

35) On motion of Mr. Sullivan, seconded by Mr. Gmelin, unanimously VOTED to lift from the table Mr. Sullivan's motion concerning establishment of an ARRL hall of fame. On further motion of Mr. Sullivan, again seconded by Mr. Gmelin, VOTED that the amendment by Mr. Cotterell for the procedure to begin May 20, 1978 under guidelines to be drawn up by the Headquarters Awards Committee, is amended to change the date to April 1, 1978. Whereupon, the question being on the amendment as amended, the same was adopted. The question then being on the motion to institute an ARRL hall of fame, as amended, the same was unanimously ADOPTED.

36) On motion of Mr. Gmelin, seconded by Mr. Thurston, unanimously VOTED, Mr. Hesler abstaining, that the ARRL file comments with the FCC, renewing the request for authorization of Technician Class amateurs to operate in any part of the 50 and 144 MHz amateur bands.

37) Moved, by Mr. Wicker, seconded by Mr. Gmelin, that the ARRL Board of Directors refer to the Membership Affairs Committee a study of the feasibility of creating two categories of ARRL club competition for a contest, one category for bona-fide local clubs and the other for regional groups or associations. Moved, by Mr. Price, seconded by Mr. Zak, that the motion be amended so as to specify a study by the Contest Advisory Committee, rather than Membership Affairs. Moved, by Mr. McConaghy, that the matter be laid on the table, but there was no second, so the motion was lost. Moved, by Mr. Gmelin, that the amendment be amended to call for a joint study by the Membership Affairs Committee and the Contest Advisory Committee, but there was no second, so the motion to amend the amendment was lost. The question being on Mr. Price's amendment, the same was adopted. The question then being on the motion as amended, it was unanimously ADOPTED.

38) On motion of Mr. Cotterell, seconded by Mr. Grauer, unanimously VOTED that the Board proceed to discuss Docket 20777, which concerns bandwidths, modes of emission, and purity and stability of emissions. An informal discussion progressed for several minutes, and then was terminated by common consent without formal action.

39) Mr. Griggs moved, Mr. Zak seconding, that the League shall undertake a cooperative program leading to voluntary restrictions by dealers, distributors and manufacturers, to limit the sale of transmitters, transceivers and linear power amplifiers to only those persons who can prove at the point of sale that they are properly licensed amateur radio operators. Moved by Mr. Sullivan, seconded by Mr. McConaghy, that the motion be amended to require this action at all ARRL conventions and hamfests. After further discussion, on motion of Mr. Price, seconded by Mr. Arnold, unanimously VOTED that, in view of the earlier adoption of a proposal by Mr. Grauer [Minute 22] which adequately covers the objectives of the League in the sale of equipment, the present motion is laid on the table.

40) On motion of Mr. Gant, seconded by Mr. Price, unanimously VOTED that, where necessary for clarification, Headquarters include a copy of the original letter from a member when sending copy of an answer by Headquarters personnel to the director of the Division involved.

41) On motion of Mr. McConaghy, seconded by Mr. Clark, after discussion, unanimously VOTED, Mr. Hesler abstaining, that the President, First Vice President, General Manager and General Counsel as conditions warrant represent the League until further notice at hearings held by committees and subcommittees of the Senate and House of Representatives of the United States Congress on matters of interest to radio amateurs, including the drafting and submission of proposals: (a) to permit the Federal Communications Commission to delegate, by contract or otherwise, the conducting of amateur operator examinations and the issuance of temporary operator and station licenses or permits to successful applicants; (b) to permit the Commission to adopt and enforce rules and regulations prohibiting the sale of manu-

factured equipment suitable for or capable of operation in amateur bands to persons not then holding a valid amateur operator's license; (c) to grant the Commission jurisdiction to enforce its rules and to impose cease and desist orders, fines and forfeitures on unlicensed stations and operators; (d) to modify and clarify the secrecy provisions of Section 605 of the Communications Act to specifically exclude from its terms all stations in the personal radio services including stations of the amateur radio service, and all unlicensed stations; (e) such other matters as may be appropriate at the time.

42) On motion of Mr. Miller, seconded by Mr. Price, unanimously VOTED that the Board of Directors, recognizing the dramatic growth of microprocessor experimentation and the pressing need to enable modern intercommunication techniques employing these devices, instructs the president to renew efforts to enable use of the ASCII eight level code by radio amateurs.

43) On motion of Mr. Anderson, seconded by Mr. Gmelin, unanimously VOTED that the Legal & Regulatory Committee is instructed to undertake a study in cooperation with the General Counsel leading to the establishment of practical guidelines governing the nature of antenna cases, in which ARRL can most effectively provide legal assistance and support. The Board recessed at 9:53 P.M., reconvening at the same place at 9:00 A.M. on July 22, with all persons herein before mentioned present except Mr. Hart. Mr. Sumner assumed the recording of minutes.

44) On motion of Mr. Egbert, seconded by Mr. Thurston, after discussion, unanimously VOTED that the League offer, on the basis of voluntary participation, the following group insurance programs: 1. Multi-Risk Fire and Theft Coverage - mobile and fixed station amateur radio equipment, available to individual ARRL members; 2. Accidental Death and Dismemberment and Blanket Medical Reimbursement Coverage available to affiliated clubs; 3. Such other voluntary insurance programs as may be recommended by the General Manager with the concurrence of the Membership Affairs and Management and Finance Committees.

45) On motion of Mr. Egbert, seconded by Mr. McConaghy, unanimously VOTED that Bonn A. Gilbert, Jr., be named as Group Administrator and Agent of Record for the League's member insurance programs.

46) On motion of Mr. Grauer, seconded by Mr. Sullivan, the following resolution was unanimously ADOPTED:

WHEREAS, the Board of Directors recognizes the valuable work done by the many volunteers in the accomplishment of League activities,

WHEREAS, those elected in the field organization, SCMs and their appointees have donated many volunteer hours,

WHEREAS, those in the instructors program have donated an untold number of hours in the Novice Program,

WHEREAS, those Advisory Committee members have donated many hours in the collection of valuable data upon which Board action has been formulated, now therefore,

BE IT RESOLVED the Board of Directors does hereby express its sincere appreciation to all those individuals who have given of their time and effort in the operation of amateur activities as well as the promoting of the League activities.

47) On motion of Mr. Sullivan, seconded by Mr. Gmelin, VOTED to remove from the table the motion concerning the mileage requirements for the Worked All States Award. Mr. Price requested to be recorded as voting opposed. It was moved by Mr. Sullivan, seconded by Mr. Wicker, to amend the motion to read, in part, "same location or from any location in the same state, province or from locations outside the U.S. or Canada, no two of which are more than 100 miles apart." But, after discussion, on motion of Mr. Gmelin, seconded by Mr. McConaghy, VOTED that the matter is referred to the Membership Affairs Committee for further study.

48) On motion of Mr. Wicker, seconded by Mr. Griggs, VOTED, Mr. Hesler abstaining, that the ARRL Board of Directors strongly endorses retention of the Novice class license and recommends that no changes be made in

the level of difficulty of the Novice examination.

49) On motion of Mr. Price, seconded by Mr. Egbert, unanimously VOTED that the Secretary and his staff are commended for their excellent and thorough work in preparing the comprehensive indexed list of standing instructions requested in Minute 40 of the July, 1976 meeting of the Board.

50) On motion of Mr. Price, seconded by Mr. McConaghy, unanimously VOTED the adoption of that portion of the Secretary's Report in response to Minute 40, July 1976 Board meeting entitled "Standing Instructions to Be Modified" and further identified as consisting of numbered items 78 and 79.

51) On motion of Mr. Price, seconded by Mr. Arnold, VOTED that the Secretary's Report entitled "Standing Instructions to Be Deleted from Directors' Workbook" is adopted as presented with the exception of items numbered 89, 116, 145, and 309, which are retained.

52) On motion of Mr. Price, seconded by Mr. Wicker, unanimously VOTED that the Secretary's Report entitled "Standing Instructions to Be Retained" is adopted as amended by earlier Board action, and, further, that the Secretary is directed to incorporate the report into the Director's Workbook.

53) On motion of Mr. Griggs, seconded by Mr. Clark, the following resolution was ADOPTED:

WHEREAS, the FCC has for some years provided in its Rules and Regulations for waivers to allow the issuance of Radiotelephone Third Class Operator Permits to Spanish-speaking persons in and around Puerto Rico who passed the examination requirement in their own language, and

WHEREAS, the FCC has given notice in Docket 21271 of their proposal to amend the Rules to provide for administration of the Radiotelephone Third Class Operator Permit in Spanish to bilingual persons who attest to a superior knowledge of Spanish, and

WHEREAS, this Board unanimously adopted on July 17, 1974 a Resolution endorsing the administration of amateur examinations in Spanish to residents of the Commonwealth of Puerto Rico, and

WHEREAS, the American Radio Relay League has filed a petition for Rule Making designated as RM-2757 seeking an amendment to the amateur rules to make available amateur examinations in Spanish at appropriate examining points, and

WHEREAS, no action on RM-2757 or on other petitions seeking similar relief has been forthcoming from the FCC, and

WHEREAS, the Commission's announced proposal to make commercial radio operator examinations available at field office examining points in the Spanish language, acknowledges the desirability of providing for increased participation in radio activities by persons with greater fluency in Spanish, now, therefore,

BE IT RESOLVED by the Board of Directors of the American Radio Relay League in regular meeting assembled that the President and General Manager are directed to exert all possible efforts to achieve favorable action by the FCC on RM-2757. Mr. Hesler abstained; Mr. Gmelin requested to be recorded as voting opposed.

54) The Board was in recess from 10:32 to 11:00 A.M., at which time Mr. Myers left the meeting.

55) Moved, by Mr. Gant, seconded by Mr. Griggs, that Headquarters set up and implement a logical and competitive method of paying for all material accepted for publication in *QST*, with the exception of news items and reports expected of elected and appointed League officials. But, a roll call vote being requested, the motion was LOST, 5 to 11. Messrs. Gant, Griggs, Hesler, Miller, and Zak voted in favor; all others voted opposed.

56) On motion of Mr. Miller, seconded by Mr. Gant, after discussion, VOTED that an article be published in *QST* requesting opinion on the ways that the image of women amateur radio operators can be enhanced, and also sampling their opinions on the use of the term "XYL" on the air. Mr. Gmelin requested to be recorded as voting opposed.

57) On motion of Mr. Egbert, seconded by Mr. Thurston, unanimously VOTED that automobile travel be reimbursed at the rate of 17 cents per mile, effective August 1, 1977.

58) On motion of Mr. Sullivan, seconded by Mr. Griggs, VOTED, Mr. Hesler abstaining, that the President and General Manager encourage the Federal Communications Commission to provide more flexible hours for amateur radio examinations.

59) On motion of Mr. Wicker, seconded by Mr. Arnold, unanimously VOTED that a South Carolina State Convention is approved for Greenville, SC, on March 18-19, 1978.

60) On motion of Mr. Price, seconded by Mr. McConaghy, unanimously VOTED that the ARRL petition the Federal Communications Commission renewing its request for the assignment of increased voice segments as set forth in comments submitted by the ARRL in Docket 20282. Mr. Hesler abstained.

61) On motion of Mr. McConaghy, seconded by Mr. Griggs, unanimously VOTED, Mr. Hesler abstaining, that the President, General Manager, and General Counsel explore the possibility of ARRL negotiating a cost plus fixed fee (CPFF) \$1.00 per year contract with the FCC to do processing that might otherwise be lost to amateur radio due to funding/personnel limits at FCC. Areas in question are (1) choice of call signs; (2) clubs and repeater licenses; and (3) WR call signs, etc.

62) Moved, by Mr. Miller, seconded by Mr. McConaghy, that the ARRL staff or suitable advisory committee publish in *QST* suggested channel frequencies in the 10-meter band for the use of AM or SSB CB rigs for legitimate ham use. After discussion, on motion of Mr. Cotterell, seconded by Mr. Sullivan, unanimously VOTED that the matter is laid on the table.

63) On motion of Mr. Egbert, seconded by Mr. Wicker, unanimously VOTED that the General Manager, in cooperation with the Plans & Programs Committee, investigate the feasibility of making articles from *QST* that have time value available to blind members on tape or braille on a more timely basis than the current Library of Congress arrangement provides.

64) Moved, by Mr. Sullivan, seconded by Mr. McConaghy, that a reduced rate for membership be established by the General Manager for League members above the age of 65, retired and without any supplementary income provided through employment, full or part-time, and having been a League member for each of the last 15 years, this membership to be available only on an annual basis. But after discussion, the motion was LOST. The Board was in recess from 12:26 to 1:17 P.M., at which time all persons herein before mentioned were present except Mr. Myers and Mrs. White.

65) On motion of Mr. Price, seconded by Mr. Grauer, VOTED, after discussion, that the General Manager is directed to take steps to insure that approval of the appropriate Division Director is obtained prior to official travel by Headquarters employees to clubs, conventions, hamfests, and the like as well as to events of general public interest designed to promote facets of amateur radio.

66) On motion of Mr. Gant, seconded by Mr. Griggs, VOTED, Mr. Hesler abstaining, that a proposal to provide for life-time station licenses in the amateur radio service be included in the legislative program to be submitted to Congress.

67) On motion of Mr. Miller, seconded by Mr. Griggs, unanimously VOTED that the application for a Central Division Convention to be held in Milwaukee, Wisconsin, June 15-16, 1979, is approved.

68) At this point, Mr. Egbert presented the \$500 contribution of the Livonia Amateur Radio Club (Michigan) to the League's World Administrative Radio Conference fund. (Applause)

69) On motion of Mr. Zak, seconded by Mr. Price, at 1:55 P.M., VOTED that the Board resolve itself into a Committee of the Whole to discuss Executive Committee actions. Mr. Thurston excused himself, and left the meeting. During its deliberations, the Committee was in recess from 2:00 to 2:07 P.M., and from 3:10 to 3:27 P.M. Mr. Smith left the meeting at 3:00 P.M. The Committee rose without action at 3:50 P.M. and reported to the Board at which point Mr. Thurston rejoined the meeting. Mr. Chapman left the meeting at 3:56 P.M.

70) On motion of Mr. Price, seconded by Mr. Egbert, VOTED that the Management &

Finance Committee is directed to study the applicability of the technique of zero base budgeting to the funds directly authorized by the Board from time to time.

71) Moved, by Mr. Price, seconded by Mr. Sullivan, that By-Law 31 is amended by deleting the phrase, "annual meetings of the Board of Directors," and substituting therefor the phrase, "The month of January." A roll call vote being required, all directors voted in favor but Mr. Cotterell, who voted opposed. Therefore, the motion was ADOPTED.

72) On motion of Mr. Price, seconded by Mr. Zak, VOTED that the Board reconsider its earlier action amending By-Law 20. Moved, by Mr. Price, seconded by Mr. Egbert, that the motion concerning By-Law 20 be amended by striking the text and substituting the following: Moved, that the President appoint a special committee for the purpose of studying By-Law 20. The Committee is directed to prepare a proposal for modifying By-Law 20 to suggest more suitable dates for the meetings of the Board, the proposed dates to be submitted in writing to the Directors not later than September 15, 1977. A roll call vote being requested, the amendment was ADOPTED, 15 votes in favor to 1 opposed. Mr. Cotterell voted opposed; all others voted in favor. The question then being on the motion as amended, a roll call vote being requested, the same was ADOPTED, 15 votes in favor to 1 opposed, Mr. Cotterell again voting opposed.

73) On motion of Mr. McConaghy, seconded by Mr. Griggs, VOTED that the Public Relations Assistant allotment of \$150.00 per Division be increased to \$250.00 per Division per year.

74) On motion of Mr. Clark, seconded by Mr. Griggs, unanimously VOTED that the Board of Directors, recognizing the growing seriousness of radio frequency interception problems being experienced by all of the radio services, calls for dissemination to the membership of complete information on the nature, purposes, and progress of Senate Bill S-864 and House Bill HR-8079.

75) On motion of Mr. Clark, seconded by Mr. Thurston, unanimously VOTED that the Board of Directors requests the VRAC and VDAC to conduct a joint review of ARRL Band Plans and to make appropriate recommendations for changes and/or additions for the 50, 144, 220, 420 and 1215 MHz amateur bands, with a report of the results to be made to the Board at its 1978 annual meeting, this review to accommodate the needs of the several modes of operation including, but not limited to repeaters, FM simplex, satellite, aurora and other weak signal modes, and moonbounce.

76) Moved, by Mr. Clark, seconded by Mr. Wicker, that the General Counsel take such steps as may be necessary to assure compliance with the "Federal Regulation of Lobby Act of 1946," 2 USC 261 *et seq.*, and to proceed with the registration of appropriate League officials if further study indicates the advisability of this step in order to accomplish the League's legislative objectives for amateur radio. A roll call vote being requested, the motion was ADOPTED, 14 votes in favor to 1 opposed, Mr. Grauer voted opposed; Mr. Hesler abstained; all other directors voted in favor.

77) On motion of Mr. Clark, seconded by Mr. McConaghy, unanimously VOTED that the Board of Directors expresses its appreciation to the Chairman and members of the DX Advisory Committee for the thorough and comprehensive study of June 1977, which analyzes the attitude and opinions of a selected group of DXCC members.

78) There followed informal remarks by all the members of the assembly. There being no further business, on motion of Mr. Gmelin, seconded by Mr. Eaton, the Board adjourned, *sine die* at 6:29 P.M. Total time in session as a Board, 14 hours, 17 minutes; as a Committee of the Whole; 1 hour, 31 minutes.

Respectfully submitted,

Perry F. Williams, W1UED
David Sumner, K1ZZ
Secretaries

QST

RFI Bill Introduced in House

The Teague Bill? Vanik Bill? Beard Bill? No, it's the Benjamin Bill! Using a text identical to the Goldwater Bill, S-864, Representative Adam Benjamin, Jr., of Indiana, has introduced HR-8079, which would give FCC authority over consumer electronic devices, in order to reduce their susceptibility to radio frequency interference.

The problem of radio frequency interception by consumer electronics devices of signals from nearby transmitters was at least twice as bad last year as the year before, and predictions are that formal complaints to FCC will again double this year in comparison to last. Even though all interception by stereos, cassettes, intercoms and the like is a fault of the audio device, and 90 percent of TV complaints are likewise traceable to design deficiencies in the TV receiver, the public lays the blame on the operator of the transmitter, usually a neighbor with either a CB or amateur set. As a result, more and more communities are attempting to regulate transmitters themselves through zoning rules applied to antenna supports, nuisance ordinances, or the "conditional use" permit process. The situation will get worse before it gets better - new kinds of consumer electronic products are coming on the market every day - and a start must be made at the national level. Passage of the Goldwater and Benjamin Bills should begin to ensure that all consumer devices have been designed and built to minimize interception of unwanted signals. The text common to both of these bills was printed on pages 64 and 65, *QST* for May, 1977. Amateurs favoring passage of these bills should be in touch with their representatives and Senators to ensure that hearings will be held and that the bills move forward to adoption.

Broadcast Engineers Back RFI Bills

The Society of Broadcast Engineers, Inc., through its Executive Committee, has given tentative backing to the RFI bills in Congress, appointing a special committee to study the text, make a recommendation to SBE and circulate it to the group's chapters.

A letter from Arthur Reis, chief engineer, WIVS, Crystal Lake, IL, printed in an SBE bulletin, contained these reasons why broadcast engineers should support the bills:

"1. It is a just solution to a very big problem. The rapidly growing personal communications field (CB and amateur radio) is already at odds with millions of users of consumer electronic equipment, such as TVs, stereos and radios. The right to operate a personal transmitter which is 'clean' should be as undeniable as the right to listen to your record player or watch your TV. However, in many cases, these rights are now mutually exclusive, due in large measure to the poor design and construction of the consumer electronic equipment itself. Restrictive state and local laws against personal communica-

tions can be expected in the near future unless the real problem is regulated at the Federal level.

"2. The quality of the broadcast signal is worthless if it is interfered with. This is particularly true of television, where SBE technicians strive for the state of the art in transmission of both picture and sound, only to have their work hobbled up by receivers which were not properly designed to begin with and which cannot discriminate between the desired and undesired signals. The television viewer should have the privilege of viewing, with full enjoyment, the fruits of the transmitter engineer's capabilities. . . ."

It is great to have the support of this professional group toward the passage of S-864 and HR-8079.

Forfeiture Bill, S-1547

The Forfeiture Bill, S-1547, which would make changes in FCC's procedures for fining violators, is currently under study by the Senate Subcommittee on Communications. The bill would consolidate all classes of forfeiture in Section 503; it would lengthen the time during which FCC could act from 90 days to one year; maximum forfeitures would be raised to \$5,000 for multiple offenses in a single year; and, most importantly, it would extend FCC's discipline to people operating without a license. (At present FCC can fine a CBER for operating on 27.5 MHz, but cannot fine an unlicensed "hfer"! It must, instead, enlist the aid of the Justice Department and go through the Federal Courts if it wishes to punish a "bootlegger.")

In supporting the bill, FCC Chairman Wiley said, in part, ". . . I am sure you are all aware of the increasing popularity of the Citizens Band Radio Service. However, with this increase in popularity, we have been faced with very difficult problems, including those associated with unlicensed operations. Interference, obscenity, over-power operations or other improper conduct, if allowed to continue, could seriously impair the usefulness of this service to responsible citizens.

"Except for the Commission's cease and desist authority, enforcement of the Act or Commission rules or orders against such persons now must be by judicial action under Section 401 or criminal prosecution under Sections 501 and 502. Forfeiture authority should prove to be a much more effective sanction for reaching these unlicensed operators. . . ."

There are also additional safeguards in the bill for the individual who may not be aware of the regulation he is violating. In such cases, a notice of violation would have to be served. Only if the person again violated the rule, after the warning, would he be subject to fine.

The ARRL Board of Directors, at its meeting in July, endorsed the idea of extending FCC authority to unlicensed persons. Members who agree may wish to be in touch with Senators and Congressmen.



Remember this photo, subject of a caption contest last March? The winning words: "Wacky Wicker wets his wick at the wicked Wicker Works," by Julian N. Phelps, WB2HKZ. Honorable mention to Richard C. High, W0HEP for "Wicker Works! Does he or doesn't he? The Roanoke Division knows!" and David V. Clack, W7AHZ, gets honorable mention for this limerick:

A man by the odd name of Wicker
Sat down in the large chair to dicker
At stake was his lunch,
To be bought by the bunch,
At the restaurant called Wicker Works Wicker.

WHAT'S YOUR SPECIALTY?

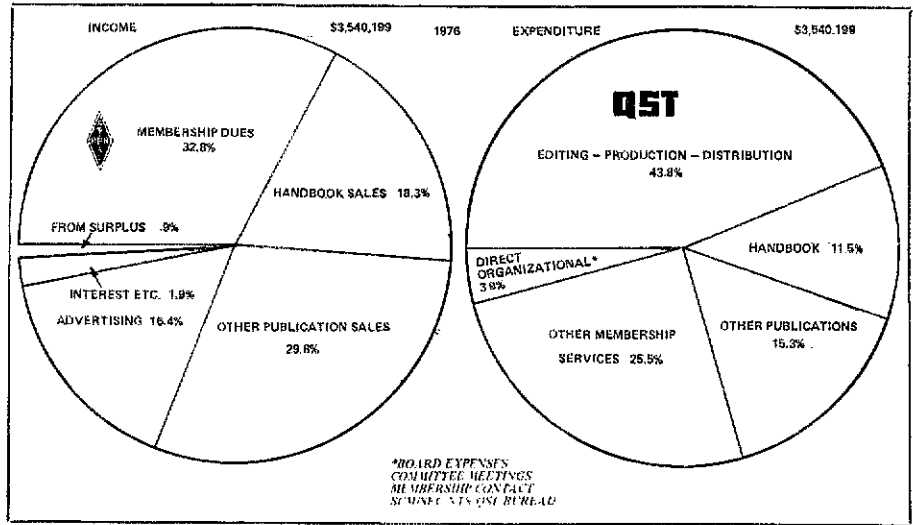
If you are active in and deeply familiar with the amateur radio specialty areas of DX, contests, emergency preparedness, vhf repeaters or the multimode world of vhf/uhf/shf, perhaps you belong on one of ARRL's advisory committees. Established 10 years ago by the Board, these committees provide membership input and expertise to the Board and to Headquarters on issues involving these particular interests.

Nominations are now open for the five advisory committees. Eleven members serve on each one, representing the 10 U.S. call areas plus Canada. Terms can be for two or three years. Later this autumn, President Dannels will pick replacements for members whose terms are expiring; he also has the option of reappointing a member for one additional term. The applications of those not chosen this time remain on file, to serve as a

bank from which to fill vacancies as they occur. Nominating forms are available from Hq. and should be signed by three Full Members of the League.

The candidate should have been a member of the League for the past two years, licensed as a Technician or higher for the past three years and should be currently active and knowledgeable in the field in which the committee operates. The complete rules governing the advisory committees are found in the same pamphlet with the Articles of Association and Bylaws of the League. (Copy available upon request, accompanied by a self-addressed stamped envelope marked ARRL.)

In addition to the 11 members of each committee, there is also a Board member and a staff member who serve as liaisons. A list of advisory committee members, with the date of expiration of their terms, comprises Table 1 elsewhere in this department. — *WIUED and WAITZK*



ARRL Revenues and Expenses, 1976.

NEW VICE DIRECTORS

President Dannals has appointed Ronald D. Mayer, K7BT, of Portland, OR, as vice director from the Northwest Division, and Fred E. Evans, W1JFF, of Newport, RI, as vice director from the New England Division.

Ron steps into the post vacated by Dale Justice, K7WWR, who resigned because of the pressures of his full-time employment. A retired U.S. postal supervisor, Ron enjoys hobbies of photography and printing in addition to ham radio. He's presently trustee of the Portland Amateur Radio Club, a past emergency coordinator, and has been affiliated in the past with MARS, RACES, the Navy and the Naval Reserve. He was originally licensed in 1949 as W7NGW.

Fred E. Evans, W1JFF, fills the vacancy caused by John Lindholm's resignation to become manager, administrative services: A separate story on W1XX will follow. Fred has retired from Raytheon's plant at Portsmouth, RI, where he was variously testman, technician, associate, lab foreman and electronic engineer, though he still helps with the Junior Achievement program there. Fred has served as an assistant director of the New England Division since 1974. Other credits: secretary, organizer, past president, past vice president, past treasurer, Newport County Radio Club; emergency coordinator; CD radio officer, city of Newport; communications officer, Newport County Chapter, American National Red Cross; first licensed in 1935. Fred went right to work in his new position; appointed on Tuesday, July 19, he attended the Board functions, beginning on Wednesday, the 20th!

LINDHOLM RETURNS TO HQ.

John F. Lindholm, W1XX, who was assistant communications manager at Hq. from 1959 to 1962, has again joined the staff, this time as manager, administrative services and office manager, the post just vacated by Bob Myers, W1XT, about whom you can read in "Behind

the Diamond." John was born in Port Chester, NY, but he considers Fitchburg, MA, as his home town. His B.S. in Education comes from the State College there, and was followed by a Master of Education degree from Florida and a "6th year certificate" from Fairfield. John's been teaching science at Bristol (CT) Central High School since 1962, has been tennis coach there, and sponsor of the radio club, SCM of Western Massachusetts in 1958-1959, John has been vice director from the New England Division since January 1975, resigning of course as of Tuesday, July 19, to move into the new post. Simultaneously he was section emergency coordinator for Connecticut. A past vice president of Connecticut Wireless Association, John serves currently as its communications manager and he's also trustee of W1LUNE, located in the Hq. of the Greater Hartford Chapter, American National Red Cross. First licensed in 1954 as WN1DGL, John's a Life Member of ARRL.

higher than \$3 is amended into the bill. Some sentiment exists for a rate of \$12. Those wishing to press for action on HB-1171 in the Senate, and HB-1443 either place, may get in touch with Rick Barrow, K3WPI, RD 3, Box 3277, Stroudsburg, PA 18360, to coordinate efforts.



Bob Myers, W1XT.

PENNSYLVANIA LICENSE PLATES

When a part of Pennsylvania's new vehicle code went into effect on July 1, 1977, it quietly canceled amateur radio call-letter license plates, unbeknown to most holders thereof! Previous sections in effect since 1955 were replaced by a new Section 1341 dealing only with "personal plates," commonly called vanity plates. Upon the urging of Rick Barrow, K3WPI, Representative Russell Kowalshyn introduced HB-1171 which provides that "... the department shall issue a registration plate which shall carry the call letters of the amateur radio station." This bill has passed the house, and is in the State Senate for action.

Fees for both personal and amateur plates in Pennsylvania under the new code are \$20 for the lifetime of the plate, in addition to the normal fee of \$24 per year; the plates are expected to last at least five years.

Another bill, HB-1443, has been introduced by Representatives Kowalshyn, Renwick, Stuban and Musto, which would reduce the initial charge from \$20 to \$3. It has been assigned to the Committee on Transportation, where it is given little chance unless a figure

BEHIND THE DIAMOND

ARRL headquarters is a place which, over the years, has just sort of grown as it needed to. When some new kind of office service was needed, the department most keenly feeling the need stepped in and provided it. The Circulation Department needed a copier, for instance. Okay, they bought one and placed it in the department. And so it went, pretty much, all around the place — until 1975, a new general manager and an in-house managerial performance course. One of the middle-level people attending that course was Bob Myers, W1FBY. Why should these little things be scattered all over the building? Wouldn't Hq. run smoother if we had a department charged with the housekeeping chores? With suggestions like these it wasn't long until we had just such a department, Administrative Services, with Bob at the helm. Copiers, mailroom, mimeographing, purchasing, the

supplying of pencils, printing and artistic services, contracting for maintenance -- yes, and coordinating a new addition to the Hq. building -- all came under Bob's guidance.

Aha, you've detected the past tense? Between the first and final drafts of this story, Bob got promoted to a new position: Assistant General Manager for Business Operations, keeping an eye on the Advertising, Circulation and Production Departments in addition to his "alma mater," Administrative Services.

Bob was born in Bethlehem, PA. His

pursuit of a degree in education at East Stroudsburg State College was interrupted for a three-year stint in the Navy, with duty at Guantanamo Bay and aboard the USS *Hornet* in the Pacific. Work at Barker & Williamson -- remember B & W coils and transmitters? -- followed the completion of Bob's teacher training. In 1968 Bob came to League Hq. as an assistant secretary, and three years later moved to the Technical Department where major duties included supervising the lab and editing *The Radio Amateur's Handbook*.

His ham history? First, WN3HGN in 1954;

W2CUT in 1965, W1FBY in 1968, and finally, W1XT this year with his main interests being long, long Yagis; tall, tall towers and contests: He has a reputation among Murphy's Marauders, even, as an avid contest op, and *that* club is known as a hotbed of the breed! As to the tall towers they number three, on a goodly hilltop in Wolcott, each supporting a monoband array.

Other residents of that antenna farm include his wife Barbara and two children, Robert, 9, and Jennifer, 4. -- W1UED and WA1TZK

Table 1

Emergency Communications Advisory Committee

- Monte "Bud" Cone, WA4PBG, acting chairman, 317 Van Buren St., Falls Church, VA 22046; December 31, 1978.
- Wm. A. Sencabaugh, K1UAQ, 10 Harold Ave., Wilmington, MA 01887; December 31, 1977.
- James P. Collinsworth, N2JC, 1040 W. Walworth Rd., Macedon, NY 14502; December 31, 1978.
- Ellwood "Woody" Haldeman, W3PST, 1732 Loney St., Philadelphia, PA 19111; December 31, 1977.
- William E. Mixon, K5SVD, 1007 Green Oaks Dr., Baton Rouge, LA 70815; December 31, 1978.
- Arthur R. Smith, W6INI, 4515 Melisa Way, San Diego, CA 98117; December 31, 1978.
- Robert L. Klepper, W7IEU, 7027 51st St., NE, Marysville, WA 98270; December 31, 1977.
- Delf A. Norona, WA8NDY, Box 523 Buckhannon, WV 26201; December 31, 1977.
- Robert J. Hajek, W9QBH, P. O. Drawer H, Riverside, IL 60546; December 31, 1977.
- Harry E. Legler, W0PB, 304 Miami St., Hiawatha KS 66434; December 31, 1978.
- W. H. Parker, VE5CU, 214 McMaster Crescent, Saskatoon, SK S7H 4E3 Canada; December 31, 1977.
- Board Liaison -- Max Arnold, W4WHN, 612 Hogan Rd., Nashville, TN 73220. Hq. Liaison -- Bob Halprin, K1XA.

VHF Repeater Advisory Committee

- John A. "Jack" Mason, W5NSQ, chairman, 7727 La Risa Dr., Dallas, TX 75420; December 31, 1977.
- Lewis D. Collins, W1GXT, 10 Marshall Terrace, Wayland, MA 01778; December 31, 1977.
- Frederick A. "Rick" Booth, WA2GCX, 206 Hillary Dr., Rochester, NY 14624; December 31, 1977.
- Jerry Horwitz, N3AA, 14413 Ansted Rd., Silver Spring, MD 20904; December 31, 1977.
- J. Jay O'Brien, W6GO, 6606 5th St., Rio Linda, CA 95673; December 31, 1977.
- Clay Freinwald, WA7WMC, 8515 Idlewood Dr., SE, Tacoma, WA 98498; December 31, 1977.
- Richmond B. "Pat" Shreve, W8GRG, 2842 Winthrop Rd., Shaker Heights, OH 44120; December 31, 1977.
- Jack D. Forbing, K9LSB, 1416 Lakewood Dr., Fort Wayne, IN 46819; December 31, 1977.
- Donald J. Manson, K0TVO, 2302 North

- Oakland, Columbia, MO 65201; December 31, 1977.
- George A. Davis, VE3BBW, 1 Longhope Pl., Willowdale, ON M2J 1Y1, Canada; December 31, 1977.
- Charles E. Durst, WA4WTX, 4407 Sunny Ct., Durham, NC 27705; December 31, 1977.
- Board Liaison -- Carl L. Smith, W0BWJ, 1070 Locust St., Denver, CO 80220. Hq. Liaison -- Lew McCoy, W1ICP.

VHF/UHF Advisory Committee

- Joe Reiser, W1JR, 17 Mansfield Dr., Chelmsford, MA 01824; December 31, 1979.
- Richard T. Knadle, Jr., K2RIW, 316 Vanderbilt Pkwy., Dix Hills, NY 11746; December 31, 1979.
- Anthony F. Souza, W3HMU, P. O. Box 169, Ottsville, PA 18942; December 31, 1979.
- Stuart G. Mitchell, WA0DYJ/4, 14761 Dodson St., Woodbridge, VA 22193; December 31, 1978.
- Roy A. Albright, W5EYB/N5RA, 107 Rosemary, San Antonio, TX 78227; December 31, 1979.
- Louis N. Anciaux, WB6NMT, P. O. Box 82183, San Diego, CA 92138; December 31, 1978.
- Don Roberts, W7FN, 6105 -- 92nd Ave., SE, Mercer Island, WA 98040; December 31, 1978.
- Ted E. Hartson, WABULG, 2444 W. Halbert Rd., Battle Creek, MI 49017; December 31, 1978.
- Jack Spencer, W9YYF, RR No. 1, Box 60, Minooka, IL 60447; December 31, 1978.
- John C. Fox, W0LER, 321 -- 109th Ln., NW, Minneapolis, MN 55433; December 31, 1979.
- J. Leslie Weir, VE3AIB, 42 Cobham Crescent, Toronto, Ontario, Canada M4A 1V6; December 31, 1978.
- Board Liaison -- John R. Griggs, W6KW, 1273 13th St., Baywood Pk., Los Osos, CA 93402.
- Hq. Liaison -- Jim Kearman, W1XZ, ARRL Headquarters, 225 Main St., Newington, CT 06111.

Contest Advisory Committee

- Wayne E. Overbeck, N6NB, chairman, 5113 Whitecap St., Oxnard Shores, CA 93030; December 31, 1977.
- Kenneth M. Bolin, W1NG, 21 Pleasant Rise, Cir., Brookfield, CT 06804; December 31, 1977.

- Dennis G. McAlpine, W2FVS, 901 Lexington Ave., New York, NY 10021; December 31, 1977.
- Alfred A. Laun III, K3ZD, P. O. Box 31097, Temple Hills, MD 20031; December 31, 1978.
- Melvin F. Wardell, K4PJ, 720 W. Vanderbilt Dr., Oak Ridge, TN 37630; December 31, 1978.
- Mike Badolato, W5MYA, 2 Country Pl., Bedford, TX 76201; December 31, 1977.
- Frederick D. Niswander, K7GM, 1227 South 4th, Apt. 6, Pocatello, ID 83201; December 31, 1978.
- Robert D. Epstein, K8IA, 21820 Ridge-dale Ave., Oak Park, MI 48237; December 31, 1978.
- Victor A. Shields, K9UIY, 1909 W. Revere St. Freeport, IL 61032; December 31, 1977.
- Albert W. Vitt, W0TR, 7820 W. 96th Ave., Broomfield, CO 80020; December 31, 1977.
- L. G. Sawkins, VE7CC, 25810 -- 102nd Ave., Whonnock, BC V0M 1S0 Canada; December 31, 1977.
- Director Liaison -- Stan Zak, K2SJO, 13 Jennifer Ln., Port Chester, NY 10573. Hq. Liaison -- Ellen White, W1YL.

DX Advisory Committee

- Louis A. Muhleisen, Jr., K5FVA, chairman, Box 927, Metairie, LA 70004; December 31, 1978.
- George E. Hitz, Jr., W1DA, 37 Easy St., Sudbury, MA 01776; December 31, 1977.
- Hayden W. Evans, K2BZT, 11 Holly Tree Ln., Little Silver, NJ 07739; December 31, 1977.
- James A. Douglas, W3ZNH, 22432 Goshen School Rd., Gaithersburg, MD 20760; December 31, 1978.
- John C. Kanode, N4MM, RFD 1, Box 73-A, Boyce, VA 22620; December 31, 1978.
- Gary Stillwell, W6NJU, 7632 Woodland Ln., Fair Oaks, CA 95628; December 31, 1978.
- Allen T. Clark, W7YTN, 2216 S. 120th St., Seattle, WA 98168; December 31, 1978.
- Dr. John R. Sheller, WA8ZDF, 4925 Hamilton Rd., Groveport, OH 43125; December 31, 1977.
- Robert C. Locher, Jr., K9AM, 1145 Osterman, Deerfield, IL 60015; December 31, 1977.
- Robert W. Wood, K0HUD, 1012 E. Main St., Vermillion, SD 57069; December 31, 1978.
- Harold E. Parsons, VE3QA, RR 3, Metcalfe, ON K0A 2P0 Canada; December 31, 1977.
- Board Liaison -- Gay E. Milius, W4UG, P. O. Box 62484, 524 Independence Blvd., Virginia Beach, VA 23462. Hq. Liaison -- Don Search, W3AZD.

Emergency-Oriented Repeaters

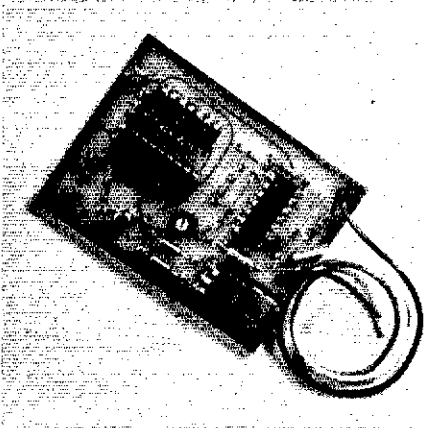
The latest edition of the *ARRL Repeater Directory*, (just out), lists over 3,000 repeaters. Of this number, a little better than 10 percent are equipped with emergency power, 379 to be exact. This is quite a jump over the previous year which showed only 43 emergency-powered machines being listed. While the number 379 isn't bad, it isn't worth getting excited about.

Without a doubt, the greatest emergency tool the radio amateur has at his disposal is a repeater. The repeater makes it possible for low-powered, battery-operated mobile and portable equipment to be used to provide coverage that would never be possible under

ordinary communications conditions. For years the amateur fraternity was hard pressed to provide good local coverage in the event of an emergency. Sure, we could get some rare serum out of Timbuctu because some enterprising DXer could do the job. However, if we were asked to field 20 or 30 or more equipped operators for a local emergency — forget it! Not any more though. Now we have the tools and we are equipped to handle local problems far better than *any other* communications group.

Ah, but here is the rub: Let a high wind come along and blow down a few power lines and where is our repeater? That's right gang,

you are now operating simplex. (Let's not knock simplex though, it is better than *no* communications.) So why all the fuss? Well, every repeater group should give serious thought to emergency power. We know we don't have to depend on commercial mains for our hand-helds or mobile rigs. One can operate for days off a car battery so we really don't have to worry about power. But let's face it, when we lose power up at the repeater we are severely handicapping ourselves. So let's look for alternatives be they gas generators, wind power or solar (see *QST* for August, 1977, for solar power). But whatever we do, let's discuss it and then act.



The Autocode won't keep your rig from being stolen, but it might help you retrieve it.

AUTOCODE

We see a lot of gadgets in our business: Some have merit but many don't. However, the one shown in the photograph is one that we consider real neat. This unit contains a couple of integrated circuits including a PROM, (programmable read-only memory). First, the unit is programmed with your call and then installed in your transceiver (only three leads). Whenever you press your mic button, your call is transmitted on cw at 20 wpm. The audio level of the cw is adjustable so that it can be set at a non-objectionable level. So your call is always *automatically* signed. However, the beauty of Autocode — as it is called — is that, if your rig should get ripped off, in all likelihood the clown that steals it will probably never realize that when he puts the rig on the air — presto, your call is being signed. And, the rig is identified. Pretty cute!

The unit measures 2 x 2-1/2 inches. Power requirements: 8 to 16 V dc at 100 mA, transmit only.

The device is available from Autocode, 8116 Glider Ave., Los Angeles, CA 90045. Price class \$40. Also, it can be reprogrammed with a new call for \$6.



"Paul Revere" (Beryl, WB0EJJ) assists his mighty steed with the operation of a 2-meter hand held. (Dale Monaghn photo)

KC HAMS REVERE PAUL

On June 5th over 175 Kansas City area 2-meter enthusiasts braved 97-degree heat to enjoy the third annual Paul Revere picnic. Plenty of refreshments, baseball, lots of nifty door prizes and "Paul" and his horse added much interest to this year's event. Since early in 1975, the Paul Revere net has been called each and every Saturday night at midnight on the 34/94 repeater — sort of a two-hundred-

year commemoration of the famous ride of 1775. On April 19, in 1975 (200 years plus one day after the first Paul did his thing), Beryl, WB0EJJ, instigator of the PR net, logged 209 stations with four checking in by telephone from Texas. On the eve of the Fourth of July, 1976, 121 stations answered the call for check-ins. The popularity of the Paul Revere net and picnic is a tribute to Beryl, one of the Heart of America's most famous hams. — W0A1B

*VRAC Liaison, ARRL hq.

Correspondence

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

LID LIST

□ I have always appreciated the A-1 Operator Club concept; however, I think it is about time we started a "Lid List." I am making reference to those "hams" (??) who haven't caught on to the A-1 operator concept, such as, the "Barge-in" (regardless of what's happening on the frequency they barge-in. Note: not to be confused with a "break-in"); the "W1AW Freak" (this type tries everything in the book to disrupt W1AW code sessions); the "Linear Looney" (a rare bird who finds it necessary to use a linear to work somebody in the next town) and the "DX Dummy" (found only on top of a DX QSO trying to call the DX station). — *Thomas F. Edwards, W2WQL, Northfield, NJ*

TEN FOR TECHS!

□ In view of the growing menace to 10 meters by the overwhelming flow of CB traffic from 11 meters and because FCC cannot possibly cope with the problem either today or in the foreseeable future, I firmly believe our time is exceptionally short in ourselves finding a solution that will benefit the majority of amateurs. Jack Anderson's article may be a small prelude of what to expect with all the votes that CBers can muster.

The proposal I make is flexible and can stand modification as necessary. I would recommend building a wall of much-used phone frequencies starting at 28 MHz up to about 28.4 MHz and would allow both Novice and Techs to use these frequencies with limited power of perhaps 100 watts. The impact of legal call signs and constant use of the lower 10-meter band would, I believe, deter illegal use of ham frequencies and encourage serious CBers to do it legally by taking the amateur tests. Remember, we have little to lose in allowing the Novice and Tech to use phone on these frequencies; we have plenty room otherwise.

Tomorrow linear amplifiers may be taken away. What next? Perhaps our transceivers and who knows! Ham gear is built to be easily serviced and converted. How can we keep equipment out of the hands of bootleggers without enforcement at the point of sale? — *David Perry, WB6KGL, Ridgecrest, CA*

JACK WHO?

□ Dan Worsencroft, a constituent of mine in Twin Falls, ID, wrote to me recently about the unwarranted attack Jack Anderson made against ham radio operators. He suggested that I relay my views to you.

First, the attack had little impact on Capitol Hill, so you need not concern yourself about swift passage of new legislation restricting the availability of radio frequencies to ham operators. Nevertheless, you should keep a watchful eye for any proposals in this field.

Both ham radio operators and those using citizens band radios have an extraordinary record of assisting their fellow Americans in time of crisis. What a shame it would be if Mr.

Anderson's column resulted in any kind of action that reduced the public-service contributions of either group.

The term "ham operator" is virtually synonymous with good citizenship. Those of us who serve in the Senate have heard many examples of this from the hobby's foremost exponent, Barry Goldwater. And in any legislative showdown, it is his opinion that is most likely to be listened to. — *James A. McClure, United States Senate*

□ Shortly after the Anderson column appeared on the newsstand, I wrote a letter to the local office of Mr. Elliott Levitas to get response or information regarding the confidential report that was referred to in the column.

For two months, I called the Levitas office at least once a week to determine the status of my request for information. It appeared that my request was not getting the attention that I wanted.

On Thursday, May 26, the secretary got a little upset with my insistence and persistence and said she would do something. The next morning, May 27, at 8:45 A.M. I received the word that Mr. Levitas would have time to see me at 10:30 A.M. the same day. I was overjoyed.

While driving to the appointment, I enlisted the aid of WA4MDS and K4PGI via the Atlanta Radio Club repeater (.22/.82). We appeared at the Levitas office on time and had a 40-minute session with our representative.

We all came away feeling that our time was well spent and that Mr. Levitas is not against ham radio in any way. He is aware of our concern and desires. His major concern with the top FCC personnel as well as other agencies is a conflict of interest.

It was also apparent from our discussion that we must continually keep in touch with our representatives, congressmen and senators. This will be of more importance as time goes on. I feel that each local amateur radio club should assign a committee to this job on a local basis. Frequent contacts must be made to insure that our representatives have no doubt in their minds of the value and intention of amateur radio. — *Joseph S. Burk, WA4MYP, Doraville, GA*

NOVICE EQUIPMENT

□ I am 15 years old and hold my Novice class license. I am writing in reference to why a lot of people may be quitting amateur radio as a hobby. I have seen at least 10 hams drop out because of one big thing . . . POOR EQUIPMENT!! They couldn't afford this new type of gear today, and there were just no hamfest or used places in our area for them to go to. Then one night I was reading how the League did this for hams and the League did that for hams but not too much for Novices and would-be hams in this field. So I thought of a way for the League to help.

The League should start an equipment shop for Novices. Hams could send you a list of gear they want to sell with a price and condition. You could type up a list and sell

this list for whatever printing and labor it takes. People would have to be in the League to use this service. If it becomes as popular as I think it will, more people would join the League. You could put little ads in QST to announce how to get this list and how to put used equipment on the list.

Please consider this and see what you can do about it. I and probably a lot of other hams and would-be hams are grateful. — *David A. Minster, WB2MAE, Wyckoff, NJ*

[Editor's Note: The general reaction to the idea from League staff members has been positive. We could use comments from other hams — address comments to Basic Radio Editor, QST. — WB9VAV]

FIRST CONTACT

□ My XYL, WB6TVX, had an interesting experience for a new ham. She had had her ticket one month and we had just gotten an antenna for 15 meters (had it up one hour). She heard a voice calling CQ on 21.196 MHz; she answered with cw and had a FB voice-cw QSO with JA7STE who was on a fishing boat near Truk Island. This was her first contact out of the States. — *Tom Foster, WB6VLN, Paradise, CA*

PLAIN BROWN WRAPPER DEPT.

□ I am a subscriber of QST: I regret to let you know that under the cover of the April issue, instead of the QST I found a copy of the FERTILITY and STERILITY Journal, which I am returning under separate cover.

Hope you will send me the missing copy. — *Adrian Jorge Homar del Rio, LU1AW, Argentina, South America*

TIED TO TUBES

□ Although QST seems to have completely forgotten the existence of tubes, I still enjoy reading it. All of my projects are tube-operated, and I have more than 200 new tubes on hand. Just to stress the point, I will insist on the fact that tubes are more alive, and it's always a pleasure to look at their pleasant glow. On the other hand, transistors are inanimated, expressionless and tricky. So much for tubes. — *Carlo Goia (ex-5U7BA), Liberia*

COMING SOON AT A MAIL BOX NEAR YOU

□ My ham friends and I await every QST anxiously. Why not break the monotony a little by printing in one month's issue, the highlights and titles of major articles of the next month's issue. Sort of a "Next Month" column would be a real help. After reading QST in a day or so, that means waiting another whole four weeks for the next issue. Or better yet, why not make QST bi-weekly, or weekly or . . . — *Scott Vanderbilt, WB6SIL, Anaheim, CA*

WARC-79: The Official Agenda

The Administrative Council of the International Telecommunication Union held its 32nd annual session in Geneva during May and June and modified the official agenda of the World Administrative Radio Conference. The WARC-79 agenda, decided upon last year by the Council, was reported in this column in October 1976 *QST*. Since the Council does have the right to modify and amend its decisions from year to year, it chose to exercise this authority at its 1977 meeting. Essentially, the modified agenda is more detailed, since various needs of radio services have become more clear since 1976. WARC-79 and its crucial importance to the future of the Amateur Radio Service have been no secret to concerned readers of *QST*; we have for the past several years been covering news of worldwide preparations for the WARC. Now, we know exactly what the delegates of the 153 participating countries will be focusing on during the Conference.

Convening on 24 September 1979, the WARC will meet daily at the modern Conference Center in Geneva, Switzerland, at which officially registered observers from ARRL and IARU headquarters will be on hand to confer with delegates concerning agenda items having an impact on amateur radio. The agenda of WARC-79 will be as follows:

To review and, where necessary, revise the provisions of the Radio Regulations relating to terminology, the allocation of frequency bands and the directly associated regulations (Articles 1 to 7).

To review and, where necessary, revise the provisions applicable to the coordination, notification and recording of frequency assignments except those Articles relating to a single Service (Articles 9 and 9A).

To review and, where necessary, revise the other articles applicable to more than one Service (Articles 12 to 20) and provisions applicable to miscellaneous stations and Services (Articles 41 to 44).

To make any necessary consequential editorial amendments to other provisions of the Radio Regulations and the Additional Radio Regulations which might arise out of the above reviews.

To review the report on the activity of the International Frequency Registration Board (IFRB) and revise, where necessary, the provisions relating to its methods of work and internal regulations (Articles 8 and 11).

To study the technical aspects of the use of radio communications for marking, identifying, locating and communicating with medical transportation vehicles protected under the 1949 Geneva Conventions, and any additional instruments of these Conventions.

To take account of Resolution No. Sat-10 of the World Broadcasting-Satellite Administrative Radio Conference (Geneva, February, 1977) on the possible rearrangement of the Radio Regulations, to make such consequen-

tial changes as may be necessary to harmonize the Radio Regulations (as well as the Additional Radio Regulations), and to undertake any further necessary refinement and deletion of superfluous or redundant provisions.

To consider the proposals based on the International Telegraph and Telephone Consultative Committee (CCITT) studies carried out in accordance with Resolutions Nos. Mar2-22 and 23.

To consider the Resolutions and Recommendations adopted by Administrative Radio Conferences, to take such action as may be considered necessary.


To propose to the Administrative Council and to the next Plenipotentiary Conference a program for convening future Administrative Radio Conferences to deal with specific Services.

To provide, for the benefit of future Administrative Radio Conferences, such guidelines as may be found necessary for optimum use of the radio frequency spectrum.

The 36 members of the Administrative Council effectively govern the activities of the ITU between the Plenipotentiary Conferences (held every six years or so).

You're going to be seeing more and more about WARC-79 in the pages of *QST*. And deservedly so -- for there's nothing more important to the future of the Amateur Radio Service.

A HANDSHAKE VIA AMATEUR RADIO

Completion of a third-party agreement between the governments of Jamaica and the United States (effective 12 June) was celebrated by an inaugural phone patch in which Jamaican Ambassador to the United States, The Honorable Alfred A. Rattray, spoke from his embassy office in Washington, DC, with Jamaica's Minister of Communications, Mr. Horace Clark in Kingston, on 14 July 1977. Ambassador Rattray noted that the new agreement would aid in bringing the peoples of Jamaica and the United States even closer together. He warmly praised the performance of amateur radio for its role in providing emergency communications, and cited the activities of Jamaican amateurs during past hurricane disasters. Taking part in the historic patch were 6Y5RS, 6Y5LA, W4KFC. 



The Radio Society of Great Britain International Radio Communications Exhibition and Convention at Alexandra Palace in London was reported to be an overwhelming success (6-8 May). With a total attendance of 5,000 (including W1HDQ, representing ARRL), conventioners enjoyed almost 40 commercial amateur exhibitors in the palace's huge halls; four films on amateur radio; talks ranging from getting started as an SWL to general microwave techniques; and golfing, boating and skating. There was even a live demonstration of London's 10-GHz beacon (GB3LBH). (*N3DF photo*)

*International Services Assistant, ARRL

Coming Conventions

September 24-25
New England Division, Hartford, CT

September 24-25*
Delta Division, New Orleans, LA

October 7-9
Midwest Division, Wichita, KS

October 7-9
Southwestern Division, Santa Maria, CA

October 8-9*
West Gulf Division, Austin, TX

October 15-16
Pacific Division, San Mateo, CA

November 19-20
South Florida Section, Clearwater, FL

*Date Change

DELTA DIVISION CONVENTION

September 24-25, New Orleans, LA

The ancient mysteries of Egypt and the modern secrets of technology will attract radio amateurs and computer hobbyists to the ARRL Delta Division convention at the New Orleans Hamfest-Computerfest, September 24-25. All activities will be at the Hilton Inn in Kenner, LA, across from the New Orleans International Airport. Convention sponsors, the Jefferson Amateur Radio Club and the Crescent City Computer Club, call it the "largest ham outing and the only computer-fest in the Deep South."

Victor C. Clark, W4KFC, ARRL first vice president, is scheduled to discuss the 1979 World Administrative Radio Conference. Tony Dorbeck, W1YNC, *QST* assistant technical editor, will talk on antennas and RFL.

For the computerist, Christopher P. Morgan, editor of *Byte* magazine, will speak on computer music; Mel Thomsen, field applications engineer with Zilog, microcomputer manufacturer, will discuss the Z-80 microcomputer and Donald Mills, a design engineer with Texas Instruments' computer group, will explain computer parts and systems.

New this year will be a homebrew contest. The FCC's local staff will give tests to all, but Novice, applicants at 9 A.M. Sunday.

Visitors at the convention may wish to view "The Treasures of Tutankhamun," in its only Southern showing, at the New Orleans Museum of Art or to tour the city from buses stopping at the hotel.

A hospitality room will open Friday evening. Flea market, exhibit, forum and meeting hours will be 9 A.M.-5 P.M. Saturday and 9 A.M.-4 P.M. Sunday. A luau is planned for Saturday evening.

Directions will be given through the 34/94 repeater. Entrance fee is \$1. The Hilton Inn has special hamfest rates. Write New Orleans Hamfest-Computerfest, P. O. Box 10111, Jefferson, LA 70181, for reservations and more details.

NEW ENGLAND DIVISION CONVENTION

September 24-25, 1977, Hartford, CT

Come help us celebrate the new Hq. building at the New England Division Convention in Hartford. The convention will be held at the Sheraton-Hartford Hotel, 315 Trumbull Street, and free bus transportation will be provided to Headquarters for a tour of the new building and WIAW. FCC will be administering exams, Technicians through Extra Class, in the new Hq. facility. Register by September 1 by sending a 610 form to John Sullivan, WIHHR, Whitney Road, Columbia, CT 06237. Appointments will be confirmed by the FCC within two weeks of the convention, and *no walk-ins will be accepted.*

At the convention you will find all kinds of goodies. For the *computer nut* we have Bob Suding from Digital Group, Bill Regan of Technico, Jim Schueckler on microprocessor basics, all ham radio oriented. *Antennas* will be covered by such greats as Jerry Sevick, Lew McCoy, Walt Maxwell, Jerry Hall, Les Cushman and Dana Atchley, with a special Q & A session on Sunday with *all* the speakers. Vhf/uhf will be covered by Tom McMullen, assisted by K1HTV on AMSAT/OSCAR and Dana Atchley with DX on 10 GHz. ARRL and FCC will have forums with guest speakers from both. With all the recent goings-on at FCC this could be a very lively discussion. And, of course, there will be a tremendous show from the manufacturers, with prizes galore.

For the ladies there will be free tours of downtown Hartford in a real English cab. Helen Monks of Monks Studio will present one of her popular lectures on miniatures. A free auction with prizes is in the works; pick up your special ticket at the registration area.

The Royal Order of the Wouff Hong will conduct a secret initiation ceremony late at night in a dark room. Like to live dangerously? This one is for hams only, an experience you won't forget.

The banquet features some incredible food: choice of lobster, sirloin or one-half roast stuffed duckling, with wine, salads, dessert and coffee. It will be held at the Cloister restaurant in the Sheraton-Hartford. A special grand prize to be given away at the banquet is a Midland synthesized transceiver. Banquet tickets at \$20 per person (*advance reservations only*) will be taken on a *first-come first-served basis based on postmark date.*

Advance registration is \$4.50, or \$6.50 at the door. Make checks payable to New England Division Convention Committee, and mail to Convention "77," P. O. Box 88, Buckland Sta., Manchester, CT 06040. If your special group is planning their own get-together, Carl Dane can arrange facilities for you by calling 203-693-8091. Banquet facilities are limited, so this may provide an alternative.

MIDWEST DIVISION CONVENTION

October 7-9, 1977, Wichita, KS

The Wichita Amateur Radio Club takes pleasure in hosting "Wichita - Ham Heaven in '77," at the Broadview Motor Hotel, 400 West Douglas,

FCC exams will be given at 1 P.M., Friday. Mail your Form 610 to Paul Grauer, W0FIR, Box 190, Wilson, KS 67490. Also at 1 P.M. there will be a tour of the world-famous Beech Aircraft Corp. Buses will leave from the hotel and preregistration is required. Friday evening will feature exhibitors, a social hour, sing-a-long, magician, and a Southwestern Bell Science demo.

On Saturday, QCWA breakfast at 8 A.M. The program features Lloyd and Iris Colvin, W6KG and W6QL, of California "Yasme! DXpedition fame. ARRL Hq. staffers Chou Harris, WB2CHO and Jay Kusgrove, W1VD, as well as ARRL officials Vic Clark, W4KFC, and Paul Grauer, W0FIR, are scheduled to speak. Sam Stelk, K0SS, and James Crowell, K0JC, will conduct the FCC forum. Other presentations will include "Amateur Radio History" by the QCWA Chapter (Sunflower) C. W. Wade, W0AM, "Emergency Communications"; Sam Knecht, "Hobby Computers in Action"; Vern Modeland, a "Public Relations Seminar."

Chinese and Microwave Cookery, Korean History, a Stretch & Sew style show and floral arranging are planned for the ladies.

On Sunday, Dennis Main, W0YMG, will present a "Propagation Seminar"; Jim Jaha, W0JG, "Radio Controlled Models"; Bernie Borst, W0LNZ, "Legal Towers and Antennas," and Robert Atkeisson, W0AT, Command MARS Director, will hold an A Force MARS meet.

Preregistration for the convention, banquet and dance is \$15 per person, tickets for the QCWA breakfast, \$4 and for the luncheon, \$3.75. Make checks (canceled check will be your receipt) payable to 1977 ARRL Midwest Division Convention, Box 13175, Wichita, KS 67217. For additional info send s.a.s.e. to same box number. Preregistration closes September 23. For room reservation (mention this convention for the reduced rates) at the Broadview Hotel, call 316-264-0171 (collect) before September 23.

SOUTHWESTERN DIVISION CONVENTION

October 7-9, 1977, Santa Maria, CA

The 1977 Southwestern Division ARRL Convention will be held in Santa Maria, CA, sponsored by the Satellite Amateur Radio Club, on October 7, 8 and 9, 1977. You may still remember the last Santa Maria Convention held in 1972, and if you do, we are sure you'll be back for this one.

Activities open Friday with registration starting at 4 P.M. Exhibits open Saturday at 8:30 A.M. Two simultaneous series of technical talks begin at 9 A.M. One series will be geared to the beginner in amateur radio.

Those who have never attended a convention before should get their feet wet with this one. Conventions are a lot of fun and informative too. You get to meet other amateurs plus see all the latest equipment on the market. Of course, there are contests, transmitter hunt on 146.88 and great prizes too.

A Santa Maria-style BBQ banquet will highlight the convention on Sunday afternoon at 2 P.M. This is a sit-down, served banquet.

for 1,000 people. Ties are optional. If you have never tried Santa Maria-style BBQ, you haven't eaten steak. We emphasize that this event will sell out! Please get your registration in now if you want to be assured of a seat for the BBQ. Charles A. Higginbotham, WB3DLT, chief of the Safety and Special Radio Service Bureau, FCC, will keynote the Convention and Harry Dannals, W2HD, president of ARRL, will be the main banquet speaker.

Over 300 recreational vehicle spaces are available at low cost on the grounds. See you in Santa Maria Oct. 7, 8 and 9.

WEST GULF DIVISION CONVENTION

October 8-9, Austin, TX

The 1977 ARRL West Gulf Division Conven-

tion will be held Oct. 8-9 at the Hilton Inn in Austin.

Program activities are plentiful and varied and have been integrated with our beautiful city and the surrounding Central Texas hill country into what will be our Division's best convention so far.

Speakers include Noel Eaton, VE3CJ, first vice president of ARRL and president of IARU. He is very much involved with preparations for the upcoming 1979 WARC and will have a lot to say about that. Joel Kleinman, WA1ZUY, will discuss present and future plans for OSCAR projects. Ed Tilton, W1HDQ, will have some interesting things to say about propagation and John Lawrence, W5CEG, will have a state-of-the-art presentation on the use of microprocessors in the amateur station along with considerable hardware for demonstrations. There will also be talks on radio frequency interference, an ARRL forum, contest operating forum, DX forum and many more.

Some super prizes are on tap, with some lucky ham winning a Kenwood TS-820, a Kenwood 7500, a Bird wattmeter, 2-meter antennas, noise bridges, and on and on. There will also be special prizes for the ladies, including a \$50 gift certificate to Neiman-Marcus along with a copy of their current catalog.

There are many other activities, but the one we are most proud of is a ride on the riverboat *Commodore* down Lake Austin with barbecue supper served on board. More details are available with a request for preregistration literature from Austin Amateur Radio Club, P. O. Box 13473, Austin, TX 78711. There will also be a banquet and dance, initiation ceremony for the Royal Order of Wouff Hong and others.

There has been a lot of planning and work put into this convention to make it both informative and interesting, and yet affordable. So if you don't want to miss a real ham happening — y'all come!



Hamfest Calendar

Arkansas: The Queen Wilhelmina Hamfest is on Rich Mountain in Mena on September 10, 11. Talk-in on 3995 kHz, 146.52, 19/79. Games and exhibits for everyone. For more info contact Steven W. Myers, WBSMFI, at 501-389-6791 or Rte. 1, Box 204, Hatfield, AR 71945.

Connecticut: The Meriden Amateur Radio Club, Inc.'s grand auction is Tuesday, October 4, from 6-10 P.M. at All Saints Church Auditorium, West Main St., Meriden.

***Florida:** The Platinum Coast Amateur Radio Society hamfest is at the Melbourne Civic Auditorium, Holiday Inn East and the Melbourne High School on September 10, 11. Write J. Chestnut, WA4PIN, 801 N. Ramona Ave., Indialantic, FL 32903.

Georgia: The Augusta, Georgia, Hamfest is September 18 at Julian Smith Casino Park. Flea market, hospitality room at Ramada Inn West on Saturday, September 17. Barbecue, talk-in 34/94.

Georgia: The Lanierland Amateur Radio Club's fourth annual Hamnic is at the Lanier Islands Dogwood pavilion, September 18. Two large covered pavilions and large parking area for swap-shop and exhibits. Food available. No entry charge for Hamnic; however, Lanier Islands charges \$2 entry fee per car. Picnic, hiking and swimming for the kids. Talk-in on W4IKR/4 on 3975 and 07/67. Write Terry Jones, WB4FMJ, Rte. 1, Box 298, Oakwood, GA 30566.

Georgia: The Northwest Georgia Amateur Radio Club's annual Rome Hamfest is at the Coosa Valley Fairgrounds on October 9. Gates open at 9 A.M. Talk-in 34/94. For info write WB4AEG, H.D. Dale, Box 274, Adairsville, GA 30103.

Illinois: Chicago's Radio Expo '77 is September 17 and 18. Manufacturers' exhibits, seminars on amateur radio and microprocessors. QCWA banquet Friday night at Mundelain Holiday Inn. Indoor/outdoor flea market open for setup Friday evening. Tickets \$2 advance, \$3 at gate. Radio Expo, P. O. Box 1014, Arlington Heights, IL 60006. Talk-in WR9ABY 16/76.

Illinois: The Peoria Area Amateur Radio Club's 20th annual hamfest is Sunday, September 18, at the Exposition Gardens. (The site is located on Northmoor Rd. just west of North University Avenue.) Free coffee and donuts 8:30 to 9 A.M. Free swapfest and free parking with free camping available Saturday night. Lunch available and a free bus trip to beautiful Northwoods Mall for the ladies. Talk-in on 146.94, W9UVI. Advance tickets \$1.50, door tickets \$2. For hamfest tickets write Bruce Funston, K9PWQ, 304 Indian Circle, East Peoria, IL 61611.

***Illinois:** The Sangamon Valley Radio Club's second annual hamfest is Sunday, September 25, at the Sangamon County Fairgrounds, New Berlin, 16 miles west of Springfield. Indoor display area and covered pavilion. Exhibits, food and ladies activities. Camping on grounds. Tickets \$1 advance, \$1.50 gate. Talk-in 28/88 & 146.52 MHz. For info write Carole Churchill, WB9QWR, 622 Magnolia St., Rochester, IL 62563.

Indiana: The Clinton County Amateur Radio Club's annual hamfest is Sunday, September 11, at the Clinton County Fairgrounds, Indiana 39 South, Frankfort. All manufacturers, suppliers and forums inside. Free flea market. Plenty of good food. Admission \$2, children under 12 free. Talk-in on 146.94, .52 and 01/61. For admission and advanced tickets write Clinton County Amateur Radio Club, 708 Delphi Ave., Frankfort, IN 46041.

Indiana: The Hoosier Hills Ham Club's annual hamfest is October 9, at the Lawrence County 4-H Fairgrounds (formerly Spring Mill State Park) 5 miles south of Bedford. For info write Hoosier Hills Ham Club, Inc., W9QYQ, P. O. Box 891, Bedford, IN 47421.

***Iowa:** The Cedar Valley Amateur Radio Club's annual hamfest is Sunday, October 2, in Cedar Rapids, Hawkeye Downs Exhibition Hall. Technical talks featuring Doug DeMaw, W1FB. Manufacturers and dealers welcome. Talk-in on 16/76, 146.52, 3.970 and 223.5 MHz. Advance tickets \$1.50, \$2 at the door. Write CVARC Hamfest, Box 994, Cedar Rapids, IA 52406.

***Kentucky:** The Seventh Annual Greater Louisville Hamfest is Sunday, September 25, at our new location, the Kentucky Fair & Exposition Center. Easy to find marked exits off either I-65 or I-264. The pavilion has 75,000 sq. ft. of floor space all enclosed and air-conditioned. Indoor exhibitors area and flea market, meetings and forums, free ladies afternoon bingo, outdoor flea market, hourly door prizes, refreshments available. Admission adults \$2, 12 and under free. Flea-market vendors pay admission price plus \$2 per space indoor and \$1 per space outdoors. Tables will

be available. For info or motel reservations contact Denny Schnurr, K4GOU, 2415 Concord Dr., Louisville, KY 40217, phone 502-634-0619.

Louisiana: The Jefferson Amateur Radio Club and the Crescent City Computer Club announce the New Orleans Hamfest/Computerfest at the Hilton Inn in Kenner (directly across from the New Orleans International Airport) on September 24-25. A banquet Saturday night with entertainment, two days of commercial exhibits, flea markets and forums. Also, a hospitality room, ladies events, FCC examinations and more. For info and reservations write The New Orleans Hamfest/Computerfest, P. O. Box 10111, Jefferson, LA 70181.

Maryland: The Radio Amateur Satellite Corporation (AMSAT) annual meeting is Saturday, October 8, at the Goddard Space Flight Center Employees Recreation Center in Greenbelt, MD. Everyone is invited. Great expansion of technical and general interest talks begins at 1 P.M. Later, an active demonstration and socializing period, a banquet at 7 P.M. and presentation of the annual meeting at 8 P.M. The meeting location is easily accessible by major highways; parking at the door. For map and lists of talks send s.a.s.e. to AMSAT, Box 27, Washington, DC 20044.

Massachusetts: The Northeastern States 160 Meter Amateur Radio Assoc.'s annual election and banquet is Saturday, October 8, at Kozel Tavern, 5 miles northeast of Hudson, NY, on Rte. 9 H. Flea market starting at 1 P.M. in rear parking lot. Dinner at 6 P.M. For further info write or contact W1EUB, sec./treas., on 160 meters.

Michigan: The Grand Rapids Amateur Radio Club's annual swap n' shop is Saturday, September 17, from 8 A.M. to 4 P.M. at the Hudsonville Fairgrounds in Hudsonville (12 miles southwest of Grand Rapids on M-21). Talk-in on 146.52 and 16/76. \$2 donation at the gate with plenty of refreshments and free tables available.

Michigan: The L'Anse Creuse Amateur Radio Club's fifth annual swap and shop, on Sunday, September 18. Hours are from 9 A.M.-3 P.M. at the L'Anse Creuse High School, Mt. Clemens. Tickets \$1 in advance, \$1.50 at the door. Talk-in on 146.52 and 146.94. For tickets and info write Harold Price, 32111 Harper, St. Clair Shores, MI 48082.

Michigan: The Adrian Hamfest is Sunday, September 25, Lenawee County Fairgrounds in Adrian from 8 'til 3. Flea market, trunk sales; tickets \$1.50 advance, \$2 at gate; tables \$2.50 half, \$4 full. Talk-in on 34/94 & 52. Write Adrian Amateur Radio Club, Box 26, Adrian, MI 49221, phone 517-265-8016.

New Jersey: The Knight Raiders VHF Club K2DEL's auction and flea market is at St. Joseph's Church of East Rutherford on Saturday, October 8, at 10 A.M. Free admission, free parking. Refreshments available. Advance full flea-market table \$5, at door \$6; for half table advance \$3, at door \$3.50. Reserve your tables in advance; first come first served. Talk-in on 146.52. For info call Bob Kovalski, evenings only 201-473-7113. Send reservations and checks payable to Knight Raiders VHF Club, Inc., P. O. Box 1054, Passaic, NJ 07055. Reservations close by Oct. 1.

New York: The Hamburg International Hamfest is Saturday, September 17, at the Erie County Fairgrounds. Rooms available at Leisureland Inn. Hamfest info from P. O. Box 306, Hamburg, NY 14075.

New York: New York City Flea Market is Sunday, September 25, 9 A.M. to 4 P.M. (rain date October 2) at the Hall of Science, 111th St. and 48th Ave., Queens. Museum, fun, sellers \$2; buyers \$1, parking \$1.25. For info call 212-699-9400.

New York: The 13th annual Radio Amateurs of Greater Syracuse (RAGS) Hamfest is Saturday, October 8, from 9 A.M. to 6 P.M. at the Syracuse Auto Auction (4 miles south of Syracuse on U.S. Rte. 11 between Nedrow and LaFayette). Flea market, cw and wiring contests, forums, panels and eyeball QSOs. Lunch counter, nearby campsite and Apple Festival for the family. Talk-in on 31/91. Tickets are \$1.50 before October 1 and \$2 at the gate. For info contact Roger Hamilton, WA2AEW, c/o RAGS, P. O. Box 88, Liverpool, NY 13088.

New York: The Yonkers Amateur Radio Club's first super hamfest '77 is at Redmond Field, Cooke Ave., Yonkers, October 9, from 9 A.M.-5 P.M. Food on premises, general

auction at 2 P.M. XYLs and harmonics free. For buyers \$3; \$1 for sellers. Bring your own table. Talk-in on 146.265, 146.865 repeat and 146.52 simplex. Further info from Doug McArtin, WA2AUJ, 411 Bellevue Ave., Yonkers, NY 10703.

Ohio: The 35th annual Findlay Hamfest is September 11 at the Riverside Park, Findlay. Advance tickets are \$1.50, \$2 at gate. For tickets and additional info send an s.a.s.e. to Clark Poltz, W8UN, 122 W. Hobart, Findlay, OH 45840.

Ohio: The 41st annual Cincinnati Hamfest is Sunday, September 18 at the improved Stricker's Grove on State Rte. 128, one mile west of Ross (Venice). Flea market, contests, model aircraft flying. Food and beverages all day. Advance ticket sales \$7.50; tickets at the gate \$8, covers everything. For further info write Lillian Abbott, K8CKI, 1424 Main St., Cincinnati, OH 45210.

Pennsylvania: The 28th annual Gabfest of Uniontown Amateur Radio Club on the club grounds on the Old Pittsburgh Rd., on September 10, the Saturday after Labor Day, afternoon and evening. Free coffee. Registration \$2. 50-50 club. (The turnover for the Old Pittsburgh Rd. is at the by-pass on Rte. 51, north of town, between Hills plaza and town.) Write Uniontown Amateur Radio Club, c/o Joseph M. Sofranko, sec., 438 Braddock Ave., Uniontown, PA 15401.

Pennsylvania: The 4th annual electronic swapfest of the Central Pennsylvania Repeater Assoc. is Sunday, September 18, park and shop garage, 200 block of Walnut St., Center City, Harrisburg. Indoor parking for 1100 cars, so come rain or shine. Starts at 8 A.M. Registration \$3. No charge for tailgating, wives or children. Talk-in on WA3KXG 16/76 and 52/52. For info contact Rodger Urbin, W3HUP, phone 717-761-7178.

Pennsylvania: The Skyview Swap n' Shop is on the club grounds at Turkey Ridge Rd., New Kensington, on Sunday, September 18, from noon to 4 P.M. Registration \$1 at entrance. Flea market. Check-in on 52/52 and 04/64. For info write Jim Jackson, K3VRU, RD No. 1, Box 7A, Apollo, PA 15613.

Pennsylvania: The 2nd annual HamJam is Sunday, September 25, at Rainbow Gardens, Waldameer Park. Forums, flea market, large indoor facilities. Write RAE "HamJam," Box 844, Erie, PA 16512.

Pennsylvania: The Pack Rats Hamarama '77 is Sunday, October 2 at the Bucks County Drive-in Theater, Rte. 611 (Easton Rd.), Warrington. 8 A.M. to 4 P.M. rain or shine. Registration \$1.50, \$2 tailgating. Bring your own tables. Advance registration to the Mid-Atlantic States VHF Conference includes admission to Hamarama. For info write WA3AXV, Ron Whitsel, chairman, P. O. Box 353, Southampton, PA 18966, phone 215-355-5730.

Pennsylvania: The Tamaqua Area Slide Band Amateur Radio Assoc.'s annual banquet is Saturday, October 8, at the South Ward Fire Co., Tamaqua. A country-style ham and turkey dinner will be served. Joseph D. Welsh, K3CT, FCC engineer, Philadelphia office, is the guest speaker. All reservations must be made in advance at \$7 each. Prior to the banquet the FCC will give Technician General, Advanced and Extra Class amateur examinations. All send advance form 610 or banquet reservations to A. J. Sarli, W3CMA, 164 Spruce St., Tamaqua, PA 18252. Dead line September 27.

***Tennessee:** The Greater Memphis Hamfest is October 1-2. For details contact K4NRV, Mid-South ARA.

*ARRL Hamfest

QST

Strays



AMSAT AREA COORDINATORS

If you have specific questions about OSCAR or need printed material for a local demonstration, contact the Area Coordinator nearest you. A list of several U.S. and Canadian Area Coordinators who were inadvertently omitted from the list in QST for August, p. 75, follows. Maryland residents please note: The official Area Coordinator for your state is Gary Tater, W3HUC. Joe Kasser, G3ZCZ/W3, who was listed as Area Coordinator for Maryland, is not currently providing information to the general public. In addition, the Zip code of Wisconsin Area Coordinator W9OII should be 53585.

ID Ron E. Moss, K7ENZ, Rte. 3, Box 400, Rexburg 83440
 MD Gary Tater, W3HUC, 7925 Nottingham Way, Ellicott City 21043
 PA E. F. (Buck) Ruperto, W3KH, RD 1 Box 166, W. Alexander 15376
 SC Richard C. Beerman, K4DBV, 400 Woodfern Circle, Anderson 29621
 AMSAT Canada c/o E. Welling, VE3HD, 165 Catalina Drive, Scarborough, ON M1E 1B3
 Serge Szpilfogel, VE1KG, P. O. Box 25, Armadale, Halifax, NS B3L 4J4
 Gordon Wightman, VE5XU, 3637 Victoria Ave., Regina, SK S4T 1M4
 Tony Craig, VE7XQ, 20691 45A Ave., Langley, BC V3A 3G3

The amateur satellite program is truly international, as activity is distributed across the face of the earth. The following list is of

AMSAT affiliate organizations and overseas country coordinators.

AMSAT Affiliate Organizations

AMSAT-Mexico c/o D. Liberman, XEITU, Bosque de Sayula No. 22, Mexico I.O., D.F.
 Japan AMSAT Assn. c/o H. Yoneda, JAIANG, 15-1305 Shimouma 2-Chome-26, Setagaya-ku, Tokyo 154
 WIA-Project Australis c/o D. Hull, VK3ZDH, 3 Oliphant Court, Mulgrave, Victoria, 3170, Australia
 AMSAT-Nederland c/o W. Dekker, PA0WLB, P. O. Box 87, Norwijk, 2460, The Netherlands
 AMSAT-Deutschland c/o A. Schoening, DC7AS, Maximiliankorso 52, 1 Berlin 28, West Germany
 AMSAT-UK c/o P. Gowen, G3IOR, 17 Heath Crescent, Helleston, Norwich, NOR 58N, England
 AMSAT-Italia c/o G. Giro, I3BMV, P. O. Box 372, 34100 Trieste, Italy.

Overseas Country Coordinators

Brazil Edmilson R. de O, PY7CPK, Caixa Postal 427, 58100 Campina Grande PB
 Chile Ralf Hucke, CE6EZ, Box 145, Temuco
 Costa Rica Eric Roy, TI2NA, Box 661, San Jose
 Cyprus Charles Pandehis, 5B4KP, P. O. Box 1152, Nicosia
 Denmark Claus Boedtscher-Hansen, OZ5FK, Box 55, 2750 Ballerup

France Francon Gerard, F6BEG, 17 Rue du Chauffour, 15130 Arpajon-Sur-Cere
 Greece George Vernardakis, SVIAB, 3 Kristali St., Peristeri, Athens
 Iceland Kristjan Benediktsson, TF3KB, Barmahlid 55, Reykjavik
 India V. Subramanian, VU2UV, 159/1 Silver Oak Ave., Hq. Trg. Command IAF, Hebbal Bangalore 560006
 Ireland Jim Malone, EI4N, 136 Mount Prospect Ave., Clontarf, Dublin 3
 Israel Dr. Alex Vilensky, 4X4MH, POB 6342 Haifa
 Ivory Coast Hugh Rylands, TU2EF, Douglas Aircraft Representative, AIR AFRIC-Direction-Technique, Boite Postale 21.017 Abidjan
 New Zealand Bruce Kowlings, ZL1WB, Massey Street, Oneahai, Whangarei, Northland
 Peru Paul Weyer, OA8V, Casilla 2492, Lima 100
 Philippines Dr. E. J. Garcia, DU6EG, 92 Lacson St., Bacolod City 60001
 Poland Adam Suchete, SP9DH, Box 73, 32-560 Kreszowice
 Romania Soli Iulius, YO2IS, c/o YO2 Radio Club, P. O. Box 100, 1900 Timisoara
 Seychelle Islands Billy Lane, VQ9L, Box 191 Mahe
 South Africa Gregory Roberts, ZS1BI, P. O. Box 9, Observatory 7935
 Switzerland Ted Vogel, HB9OP, 186 Route de la Capite, 1222 La Capite, Geneva
 Venezuela Edgar Mueller, YV5ZZ, Apartado 76093, Caracas 107
 Zambia Kanubhai Patel, 9J2KL, P. O. Box 233, Lusaka

BOOTLEGGERS

Q. What is the procedure to follow if one suspects his call is being bootlegged? Lately I've received QSL cards from people I've never worked or had people compliment me on my signal several days after the date of the alleged QSO when, in fact, I was out of town without any kind of rig available to me at all.

A. Bootlegging calls is a practice as old as amateur radio and will probably exist as long as there are those who are too lazy to get an amateur radio license. However, you should not automatically jump to the conclusion that your call is being bootlegged. If you receive a QSL card confirming a QSO that never took place, one logical reason might be that the sender of the QSL copied his contact's call wrong. If he then looked up the call in the *callbook*, he would mail the QSL card to the wrong address.

In very rare instances, for inexplicable reasons, the same call has been issued to two different stations. It is possible, also, that one might mistake a "WD" on a license for a "WB," especially if the ribbon hasn't been changed recently on FCC's printer. Such instances do not constitute bootlegging, but certainly give the appearance of bootlegging.

However, if you suspect that someone is bootlegging your call, we advise you to write your FCC District Engineer-in-Charge, and advise him of the circumstances. Also, keep an accurate log of your on-the-air activities. These two precautions could assist you in the event that you are cited for a violation which you never committed.

NEW CALLS

Q. I am somewhat confused by the changes and additions in U.S. call-sign prefixes lately. Can you say something about the WD prefixes we're hearing?

A. The FCC is no longer backtracking through WA and WB prefixes to pick up unused call signs. This eliminates one major cause of the same call sign being issued twice. Instead, after the computer has made one round of assigning calls alphabetically beginning with WA or WB, it will immediately start assigning calls with the WD prefix. WD calls are already being issued in the 4th, 5th, 6th, 8th, 9th and 0th call areas. Issuance of WDs began last summer. WC call signs, by the way, are reserved for stations in the RACES service.

MORE ON GRANDFATHERING

Q. I know you've touched on this before, but is there any way an old-timer like me can get

back into amateur radio without taking an exam? I'm 71 years old and don't think I could handle the written portion of the test with all that transistor theory and all. Has the FCC changed its mind on "grandfathering" former amateurs, that is, without requiring tests?

A. The "grandfather" clause applies *only* to people who held an amateur radio license prior to May, 1917, and who presently hold a General class license or higher, or who successfully pass the examination for the General class license. Those people can receive the Amateur Extra Class license without further examination upon presentation of proof of date of original licensing. This proof could be in the form of an original license, a photocopy of a page from an old *callbook*, or the original license itself. (97.25c)

Q. OK, so those of us who were licensed 20 or 30 years ago, and who let our licenses lapse, have to requalify for an amateur license. Can we at least receive our old calls back?

A. Yes, but there are a few conditions. First of all, the call your station once had must be available today. This means if it has been reassigned to someone else's station, you are out of luck. Second, you cannot receive counterpart call signs; that is, if you once held W1CER, that is the only call you could request, subject to availability. If W1CER were reassigned to someone else, you could not receive K1CER, WA1CER, W2CER, etc. (97.53h)

OOPS!

Q. I was a bit surprised, to say the least, the other day when, after passing my General class written exam, the examiner gave me the Novice written test and I failed by one question. He refused to give me a ham ticket. Why is this?

A. Simple, element 3 (written Technician/General exam) no longer covers material from element 2 (written Novice exam) as it once did. Element 2 covers basic law that must be understood by every amateur: Novice through Amateur Extra. Since you did not already have a Novice license when you took the exam for General, you had to take element 2 along with element 1B (13 wpm code test) and element 3 (97.23c). Element 2 was given last because FCC offices can only conduct element 2 examinations as part of an examination for Technician or higher class licenses; they cannot conduct examinations for the Novice class license. The Novice class license is available only through the mail examination procedure (97.28b). Therefore, depending upon the FCC office, they will either give you

element 3, followed by element 2, as in your case, or a combined element 2 and 3 exam of 80 questions. The combined test has 10 more questions so the scoring for the element 2 questions will be consistent with the regular element 3 exams.

So, if you walk into an FCC office without at least a Novice class license, you're going to have to pass element 2, in addition to the requirements for the higher class license you're applying for. Forewarned is forearmed.

BULK BALK

Q. Earlier this year the FCC was mailing Novice examinations in bulk to qualified examiners testing five or more applicants at a time. That program is no longer in effect. What happened?

A. The bulk mailing program has been stopped. FCC claimed: (1) the program created more work for the FCC than mailing Novice exams individually, (2) some examiners were asking for exams just to have "on hand" with no immediate need for them, (3) there were some abuses of the system, such as some examiners failing to return unused tests within the 30-day limit.¹

¹[Editor's note: By the way, the minimum age for volunteer examiners has recently been lowered to 18. The volunteer examiner must still be unrelated to the applicant, and possess a General or higher class license.]

OPERATING IN CANADA

Q. Does my U.S. amateur license allow me to operate in Canada?

A. U.S. amateurs of General class or higher may operate in Canada; however, prior permission must be obtained from the Canadian Department of Communications (DOC). DOC form 16-52 is used to request permission to operate in Canada and is available from ARRL hq.

Q. Can Canadian amateurs operate in the U.S.?

A. Yes. Again, prior permission is required. Canadian amateurs apply to the FCC on FCC form 410, which is also available from ARRL hq.

[Note: Questions appearing in this column are typical of those frequently asked of the FCC and other agencies. Answers, prepared at ARRL, have been approved by FCC staff. Interpretations contained herein concur with those of the Personal Radio Division of the FCC. Numbers in parentheses refer to specific sections of the FCC rules.]

*Asst. Manager, Membership Services, ARRL



SWARC, 1952-1977

The South African Women's Amateur Radio Club celebrated its 25th anniversary on June 2, 1977. From a starting membership of just 33 in June of 1952, the total had doubled by the year's end. Two years later the club became affiliated with the national organization, the South African Radio League, with whom SAWARC has since worked closely.

The club includes members from South Africa and Southwest Africa. The DX membership includes gals from England, Australia, New Zealand, Canada, Germany, Denmark, Japan and the United States — all of whom

are tied together through the official bi-monthly newsletter the *YL Beam*. The bulletin includes news and correspondence of the worldwide membership, as well as historical material to help familiarize the newer members with the background of this second oldest of national YL organizations.

The SAWARC constitution requires that responsibility for the activities and welfare of the membership be distributed fairly among all the licensed women operators. Through this unique planning, YLs from each of the divisions of South Africa hold office each

year in rotation.

Probably the best known award sponsored by SAWARC is the WAYL which is offered to all amateurs for contact with women in African countries and South Africa. The Key Keen Klub is awarded to cw YLs. And there are special awards for women who participate in the SARC contests: the Iris Hayes Phone 40 Meter Pearl, Edie Bennett 80 Meter Phone and the SAWARC ssb certificate.

"YL News and Views" congratulates SAWARC on its excellent record of the past 25 years.

AMATEUR RADIO'S SECOND "HELEN KELLER"

Kay, VE3KAY, received her license and also a special notice of commendation for her achievement in getting that license at the ARRL National Convention in Toronto in June. Both blind and deaf, Kay is the second YL able to pass the test and become one of the "Helen Kellers of Amateur Radio." The other gal is Mary Lou Stockstill, WB6SSZ. While Mary Lou is able to hear a single note of the audio spectrum, Kay reads the code through sensing the vibrations of the dots and dashes with her fingers. She is a member of CLARA and will be active on all the amateur cw frequencies.



Though deaf and blind, Kay is now very active on cw as VE3KAY. Supporting her efforts were gals from both the Ontario Trilliums and CLARA. (W2EEO photo)

WR3AKK FIRST ALL-YL REPEATER

The country's first all-YL repeater is on the air and is sponsored by the Laurel Lassies Amateur Radio Association. Located in Butler, PA, and working on 96/36, it is completely homebrew from the junkbox of K3ENM and OM W3MON. WA3YEQ and OM K3VFH built the cavities. The gals earned the money

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



One of the largest groups to attend any YL session at a National ARRL Convention. Women from the United States, Canada and several DX countries met for the CLARA miniconvention within the national meeting. (W2EEO photo)

for all parts that were not available from their personal junkboxes.

All YLs in the Western Pennsylvania area — whether located there or just traveling through the area — are invited to try the repeater.

WB5TOP, WB5WFZ, WD5BFP, WB5LXH, WBSJZU, WB5NOB and WB5MUF accounted for 302 contacts. The station was staffed at all times by three people and while some have not had their calls very long, everyone operated for part of the time.

QST-

USA YL SUFFIX INCREASING

The list of gals who hold that distinctive suffix has spread to six call areas adding W4YL held by Elsie McGraw from NC, K5YL by Margretta Chance from Texas, and Ellen White, W1YL, advises that Mary Keener of Cascade, IA, has recently been given K0YL. With W1YL, W8YL and W3YL, only the 9th call area is open for a feminine name for the call. Both W6 and W7 lands also have that YL suffix assigned.



The YLs of the Dallas Radio Club did all the work for 1977 Field Day themselves. They have planned for even more activity next year. (Photo courtesy WB5NOB)

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



The Polarization Question

Sparked by guest editor Bob Lucas, WAØDXZ, the debate over polarization for 2-meter work is becoming lively indeed. Many 2-meter hams have taken the trouble to express their thoughts on the subject. From the strict numerical standpoint, the tide is for horizontal by about a five to one factor. Here are excerpts from some of the letters received to date.

Changing 2-meter antennas to horizontal is not just turning them over as WAØDXZ suggests. For many of us this would involve five bands of antennas: 50, 144, 220, 432 and 1296. Tower loads of horizontal antennas are carefully arranged so every antenna works.

Horizontal antennas are quite superior in freedom of effects from the surroundings, much of which is vertical (trees, aluminum downspouts, and the tower and mast itself). My own experience with multiop portable contest efforts when we had tried to share antenna supports with other bands has been that the antennas which never have a good pattern and don't seem to work right are the vertical ones.

Over the years many tests by the professionals have shown horizontal to be superior.

On long tropo paths, especially over hilly and mountainous terrain, the waves that start out vertical end up horizontal anyway. Go back to some early 1950s QSTs and reread the vertical and horizontal arguments held then. There is much evidence of where one station is on vertical and one on horizontal (long path): the station with horizontal can hear the vertical station, but the vertical station cannot hear the horizontal station. Furthermore, if the horizontal station switches to vertical, nobody can hear anyone.

Since the only argument for vertical is that whips are easy to put on cars and since most of the communication with mobiles is through repeaters, the obvious solution is for the repeaters to have both polarizations, and everyone at home to go horizontal.

Most fm and casual ops never have the opportunity to hear man-made noise, but anyone who has a 20-dB gain antenna on 2 meters and a 1.5-dB front end and can already track ignition and power-line noise 10 miles away doesn't want to aggravate the problem by going vertical. — WA1FFO, East Hartford, CT

I run 10 watts using a TS-700 and Cushcraft twists at 65 feet. I have worked stations using *exactly* the same setup and we have tried vertical and horizontal polarization tests and found as much as 10 dB more gain in the horizontal position!! These aren't finite tests

but they certainly do well for me. — WB9TPV, Washington, IL

The polarization question was, in my opinion, adequately argued during the late 1940s and early 1950s. All one needs to do is research the literature (QST, January, 1950, page 15, "Antenna Polarization on 144 MHz," or 73, July, 1977, page 118, "Open New Frontiers," for instance) to determine why those who are interested in weak-signal extended range work on vhf and uhf use horizontal polarization. The question was resolved long ago, and I really doubt propagation has changed in character over the years. It is my opinion that the horizontal community would change to vertical overnight if *anything* were to be gained. The available evidence seems to indicate that for the type of work the "serious vhf'er" is involved in, horizontal polarization is superior to vertical.

A comment on the last paragraph by WAØDXZ: "Traditional ideas" are completely irrelevant. Results are relevant. — WQPW (ex-WØEYE), Boulder, CO

As the polarization problem is not one of "tradition," but one of S+N/N thresholds, I propose that the standard (assuming a standard is desired or needed) be horizontal. — WA2GFP, Latham, NY

I agree that the polarization issue should be settled, especially for those of us who cannot afford an antenna farm. I personally believe that it should be vertical, since portable and mobile operation is awkward with horizontal polarization. I know that I would be closer to a multimode rig if I didn't have to

put up two antenna systems to secure optimum performance. — W3BAF, Verona, PA

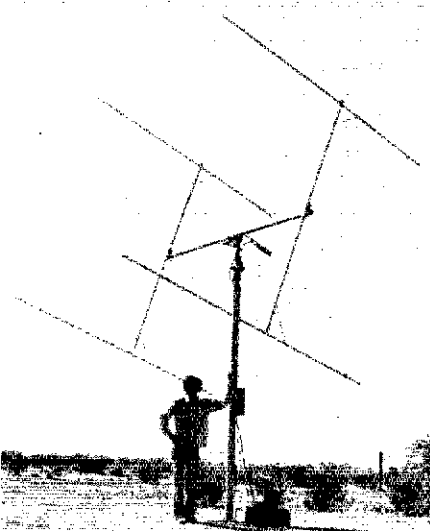
Most antennas tuned to 146-148 MHz won't work right at 144-145 MHz unless they're LPDAs or maybe a collinear. Most ssb/cw ops won't change polarization just for fm. With most guys, fm isn't a DX mode anyway so an omni at 60 feet on the tower is FB. — WA9OZC, Maple Park, IL

Your July guest editorial was "one man's opinion." Here's another opinion, for what it's worth. Frankly, I think vertical polarization is the worst possible choice, and for a variety of reasons. Perhaps the [following¹] will serve to clarify my position. — K4MSG, Petersburg, VA

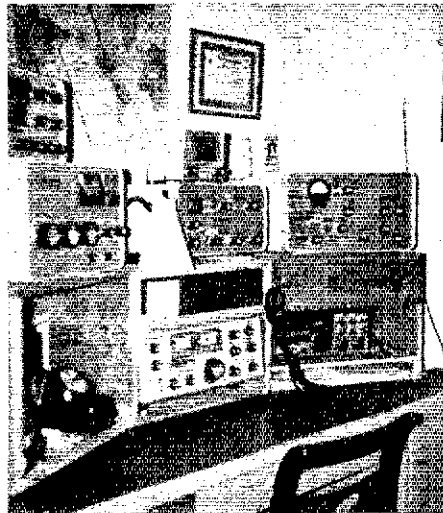
¹[Editor's Note: K4MSG favors circular polarization. His arguments will be presented next month.]

ON THE BANDS

6 Meters — How does one go about summarizing the events transpiring on 50 MHz during the peak of the 1977 Es season? It's like trying to briefly describe the contacts made on 20 meters over a good DX month. But we'll give it a try anyway. The extreme-distance propagation of early June, reported last month, continued throughout the rest of the month and well into July. The West Coast-to-Japan path opened up again June 11 with N6DX working JA1RDW and JA2RJU while W6PVB snagged 12 JAs that day and three more the next day. From his end JA1RDW reports these two stations plus WA6JRA. JA1VOK reports the same results but adds



The 220-MHz EME array at K7NII in Queen Creek, AZ.



The setup at W4EQR of Pensacola, FL. The cabinet at the upper right is a 144- to 50-MHz transverter which is fed by Harvey's TS-700A.

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730 or call 301-384-6736 and record your message.

that on the 12th JA7MIT and JA7QVI heard or worked WA6CMD, WB6BIM, WB6VIN (??) and heard WAØMRH! The band was dead in southern CA on July 11, reports WB6NMT, except for the JAs! On that occasion Louie worked 24 of them. Signals were quite weak but strong enough for cw QSOs. The opening lasted from 2342 until 2357 UTC and included the Japanese one, two and three districts. K6RNQ was also in on the fun and is understood to have worked at least two JAs. An earlier contact that Bob had with a station signing JW5SJH has been confirmed to be Japanese.

June 26 saw the first QSO since statehood between the 49th and 50th states when KH6HI (ex-KH6GRU) contacted KL7IFP. Bert put a bunch of W7s and VE7s in the log on the same occasion. Thanks to the fountain-head of much 6-meter information K5ZMS, SMIRK no. 1, for this item.

The really big day for KH6 openings to the U.S. was, according to initial reports, July 3. KH6HI, KH6IJ and KH6IAA were all reported worked in various parts of the country. During these early fireworks KH6HI filled two log pages with mainland contacts including many midwestern and some eastern stations. Known to have been favored with QSOs are WB8BGY MI and K3MWW PA and possibly WB4LJQ VA. In addition, WB2RLK/VE1 is reported to have made the grade. That's a path comparable in distance to that between southern CA and JA.

As an indication of the amount of activity in Japan, both HL9WI and KG6JH report pages filled with JAs. From Seoul, Korea, Bill says that he has worked all Japanese prefectures and 10 countries in addition to Japan. Unfortunately, however, he did not get in on the big openings to the U.S. He is also intent on working South America and would like to hear from stations which might like to give it a try. From Guam, KG6JH notes that in his first 10 days of operation he has worked enough JAs to qualify for the ARRL 600 Point Award. Jerry, whose stateside call was K6QHC (now N6AJ), runs 2-kW PEP to a 6-element Yagi at 60 feet. With the conditions we have been having, he should be workable from this country.

The QRP boys have been having a fine time this year. Many are running the Yaesu 620B and the Kenwood TS-600 10-watt rigs which are giving fine accounts of themselves. Also popular is the ICOM 502 which puts out about three watts. WB5CHW near Dallas is one station with an excellent signal from one of these units. Incidentally, he has just donated his 502 to SMIRK for use on DXpeditions. A visitor to North America who has been having a great time on 6 meters with a 502 is G3PPE/VE7 in Victoria, BC. Contacts include HI and many U.S. mainland stations. Mike hopes to qualify for the 600 Point Award before returning to England. WA3WUL has been putting DE on the map with his 502. Through mid-July, Bruce lists 19 6s and 7s worked.

To get a bird's eye view of the conditions during June, WA5IYX's summary lists 92 openings totaling 920 hours. Multihop was noted on 17 days. In addition there were 90 hours in which TV Es was observed when no signals were heard on 50 MHz.

Six-meter Es does span the Atlantic. VE1ASJ has definitely identified the French beacon FX3VHF. He has also heard video signals of unknown origin between 51 and 52 MHz. On June 10 between 2045 and 2200 UTC, WA1OUB in Hillsboro, NH, also heard video signals from 51.545 to about 52 MHz with carriers every 15 kHz. The beam heading would seem to indicate that the source was in southern Europe or North Africa. Bob is not sure that the signals were what they appeared to be, although VE1ASJ was hearing them too. He does not discount the possibility that they may have been caused by an image response in his receiver from a Channel 6 TV station coming in via Es off the back of his beam. Can anyone shed any light on the origin of these signals?

2 Meters — Reporting the 2-meter scene this summer is almost as difficult as it is for 6 meters; there have been so many E-skip openings. WA5HMK of Houston says that he never heard Es on 2 before this year. Now he has caught seven sessions. Like many others,

1-1/4 Meter Standing

Figures are states, call areas and best DX in miles.

| | | | | | |
|---------|------|------|---------------|-------|------|
| K1PXE | 16 6 | 781 | K5FF | 7 5 | 1096 |
| WA1MUG* | 15 5 | 450 | K5JL | 6 4 | 1178 |
| W1HDQ | 13 5 | 450 | W5HN | 4 2 | 1050 |
| K1JIX | 12 4 | 600 | WB6NMT | 10 6 | 2500 |
| WA1FFD | 11 6 | 420 | W6WSQ | 6 4 | 1178 |
| W1AZK | 10 3 | 375 | W7CNK | 6 3 | 923 |
| K1BFA | 10 3 | 225 | W7JRG | 5 3 | 959 |
| K2CBA | 19 7 | 2500 | K7ICW | 4 2 | 250 |
| K2DWA | 15 5 | 740 | W7HSJ | 3 2 | 400 |
| W2CRS | 14 5 | 600 | K8HWW | 11 6 | 550 |
| K2RTH | 13 5 | 960 | W8IDU | 10 5 | 635 |
| K2DNR | 13 5 | 600 | K9HMB | 23 10 | 1816 |
| W2SEU | 13 5 | 325 | W0PW | 14 6 | 1600 |
| W3JUG | 14 5 | 460 | WA0QLP | 4 2 | 923 |
| W3RUE | 11 6 | 480 | VE2YU | 8 3 | 300 |
| K3IUU | 11 4 | 340 | VE2HW | 5 2 | 325 |
| W4UCH | 9 5 | 543 | VE3ON* | 16 8 | 420 |
| K4LHB | 6 5 | 150 | VE3EMS | 10 7 | 465 |
| K4IXC | 5 3 | 1115 | VE3AIB | 7 4 | 450 |
| K4GL | 4 2 | 485 | | | |
| W5RCI | 10 5 | 910 | *Club station | | |

his states' total soared. The weekend of the VHF QSO Party (June 11-12) and Field Day weekend (June 25-26) were particularly productive as were July 7/8 and 12/13. In addition to many E-skip contacts, over what now must be classified as "normal" distances, W5FF and K5FF of Edgewood, NM (near Albuquerque) at 2020 UTC on June 25 worked WA4OWC in Ft. Lauderdale, FL, on 145.1 ssb. This is a distance of 1,660 miles — the greatest distance that I have ever seen reported for 2-meter Es and certainly beyond single-hop range. Both stations were running high power and good antennas. W5FF/K5FF's 7,300-foot elevation and low horizon to the east was certainly a help in making this very notable contact. Es was not the only DX logged by the FFs. Later in the same evening (0202 UTC, June 26) W4WDH in Atlanta, GA, was contacted on 144.110 ssb by both Fred and Lee and a few minutes later WA4COG in Auburn, AL, went into their logs. Finally WA5TUD, LA, was snagged by Fred but Paul's signal faded before Lee could get her shot at him. On June 18 and 19 Fred and Lee participated in their second tropo session. This time Fred worked 30 TX stations as well as W5JTL in Vickburg, MS, a distance of 900 miles. For three days in a row, K5PTG in Houston (750 miles) was contacted. Work commitments kept Fred from hogging the rig all of the time so Lee got in some operating too. She QSOed WB5OMF in Abilene, TX, on ssb and W5UND, Big D, on cw.

Another station having good luck with the E skip was WA5BUI. From his Dallas, TX, QTH, Gene hooked up with 11 CA stations during the contest on 145.1 ssb. WA6PEV in Ridgecrest, CA, is also an ardent 2-meter Es operator. Being a doctor with his kW 2-meter ssb rig installed at his office, Ron says he's available anytime the band is open. He can be reached at 714-375-4497. On June 10 he took advantage of his flexible work situation to exchange ssb reports with W5JTA in Fort Worth and WB5JWL/mobile near Dallas.

When not busy with 70-cm moonbounce WB5LUA in Dallas finds time to pile up contacts on two via both tropo and E skip. On June 11 during the contest, Al hooked up with 18 stations via Es for four CA sections plus AZ. W5UWB in Kingsville, TX (near Corpus Christi), made good use of the Field Day opening, Saturday, June 25. John nabbed WA4OWC and K4RWW both FL, W3BSZ/4 and K4KAE SC and to top it off, K4KQR VA for state number 22.

The band put on another one of its E-skip shows the night of July 7 with many VE1s being worked in the Middle Atlantic states. VE1ASJ managed 53 QSOs in 12 states, 10 of them new ones for Andy. The clouds were busy again the evening of July 12/13 with stations in TX, AR, OK, IA, SD, MN, WI, IL and IN being worked by East Coast 2-meter operators.

Another hotbed of 2-meter ssb activity, according to WA9KGQ, is the southeastern WI/northern IL area. Ken says that there are many more stations on now than were active not long ago. He runs an ICOM 202 driving a kW amplifier and likes m.s. as well as the other propagation modes. During the contest,

the Maritime Section was logged by virtue of an Es contact with VE1ASJ. A recent tropo session netted W0SD of SD for state number 26.

VE3FN, (ex-VE3FVN), Ottawa, reminds us East Coasters that not all VE3s are to the northwest. Ray has problems attracting attention as he is farther than the Toronto gang for most people and more to the north. The setup consists of 500 watts output to a big beam. He normally works down into the MD/VA area during contests, usually on skeds, so his station does work. Give VE3FN a shot. He is an avid 2-meter man.

1-1/4 Meters — Although he has interest in all of the bands from 2 meters through 13 cm, K7NII of Queen Creek, AZ, is currently putting most of his effort into 1-1/4 EME. Despite some power-supply problems, 40 amps is a lot of current, Tom has a kW solid-state amplifier using eight MRF 306s running. The antenna shown in the photo is to be replaced this winter by a large dish. One station which Tom has been trying very hard to work is K5FF Edgewood, NM. Lee and OM Fred have a 32-foot dish which can accommodate either a 1-1/4-meter or 70-cm feed so things should be ready on their end.

Fm activity on the band appears to be growing rapidly in many parts of the country. N5AF reports 18 Houston-area stations active on 223.5-MHz simplex. From Troy, OH, near Dayton, WB8ROL notes a good activity level in that area. Gary relates that propagation conditions can be interesting also. On June 20 he worked several stations through the Battle Creek, MI, repeater WR8AEL which is 150 miles from his QTH.

Another active fmer, WA2ANZ in Middletown, NY, would like 223.5 schedules with similarly inclined amateurs. Mike runs a Clegg FM 76 to a solid-state amplifier delivering 120 watts. Antenna is 14 elements at 45 feet. Address: 15 Cottage St., Middletown, NY 10940. "KEEP 220 ALIVE" is Mike's slogan.

Two FL stations reporting 220 activity are WA4QGV in Sarasota and W4GPL in Madeira Beach.

Let's have some more 1-1/4-meter news!

70 Cm — Local and extended local activity seems to be picking up all over the country. This may be due in part to the availability of good commercial equipment for ssb and cw. WB5LUA Dallas, TX, reports working N4JS (ex-K4MPC) Meriden, MS, June 27, with signals running 5 X 7 to 5 X 9. Al says that about 0700 local time it is not uncommon to work 400 to 600 miles. Another Texan active on 70 cm is WA5HMK near Houston. Joe notes that 432.1 is coming into common use as the calling frequency throughout TX and the South. This makes a great deal of sense as it leaves the range from 432 to about 432.075 free for EME. With terrestrial activity increasing steadily, ORM to the moonbouncers could soon become a problem. Plenty of space is available before reaching the OSCAR 7 uplink band which extends from 432.125 to 432.175. WA5HMK says that there are about 15 stations in the Houston area active on 70-cm ssb. Dallas stations can be contacted regularly which adds to the fun. During a recent tropo session, Joe hooked up with KSUGM/mobile, about 200 miles to the north. He wants to know whether this is a mobile record for the band. Power on both ends was 10 watts but WA5HMK's 21-element F9FT Yagi at 100 feet didn't hurt.

23 Cm and Down — On April 3, after two weeks of unsuccessful nightly 1296 MHz schedules during poor weather conditions, K6ZMW near Santa Barbara worked WB6NMT in San Diego over a 195-mile path. Reports were 569 both ways. K6ZMW's 60 watts out cw and ssb fed a quad-helix at 20 feet. WB6NMT's 10 watts cw fed a three-foot dish sitting on the ground at Louie's hilltop QTH. Toward the end of the QSO, Louie was "QRMed" by WA6GUY, Hawthorne (Los Angeles) calling K6ZMW! Chip's 20-watt cw signals were 529 over the mountainous 90-mile path to Santa Barbara. The band is alive and well in California!

As the Beam Turns...

So do the seasons. Dusk comes earlier. People return from vacations. The amateur bands become crowded again and soon, the operating season will be in full swing. The traffic nets should be loaded with QTC, but there's always room for some more. A few traffickers have complained that they've run dry of traffic opportunities, even though we have provided ideas again and again. Nevertheless, here is another one, suggested by K6TP.

Have you ever thought of contributing your ideas, via radio, to that long-running soap opera in Washington, DC? In other words, to send radiograms to the President, congressional representatives or cabinet officers, to confirm or deny some issue they're deliberating on. This is one way the ham and members of his community can get opinions

on the record. The present administration is supposedly an "open" one, desirous of hearing from the people.

K6TP points out that such radiograms would bring amateur radio to the attention of many Washington bureaucrats and perhaps to the addressed officials themselves. This publicity is rather important, as recent events have shown. The messages would also provide a lot of grist for the National Traffic System's mill.

On the con side, a real flood of this type of traffic might tend to link ham radio or ARRL with some of the causes being espoused or decried. It might cause a back-breaking load of messages for DC area hams to deliver, as well. And would the messages even get beyond the secretaries who answer

the telephones? Hard to say, especially at first. Furthermore, we shouldn't forget those *expletive-deleted* amateurs who become self-appointed guardians of the public airwaves and public morality, who will refuse to relay or deliver political messages they don't agree with.

There's an old adage that politics is one subject to be avoided in ham radio. But times change. Maybe NTS is a good vehicle to make one's views known in the nation's capital. The purpose of this column is to find out what you think of this idea. Let us hear from you.

One slightly disturbing thought comes to mind. If everyone sends radiograms instead of writing letters, congressmen might wonder, when thinking about ham radio operators, "... but can they type?"



WA2THV (left), former manager of the NLI Phone Net, recently bumped into Asst. Communications Mgr. K1XA on the campus of the University of Southern California. (WA6YBT photo)



Elsewhere in LA, Emergency Coordinator W6SPK confers with WB6ZVC, Southern California Net manager, at the annual SCN picnic. (WB60 YN photo)

PUBLIC SERVICE DIARY

□ Ocean Co., NJ - April 14. Nearly two-dozen users of the Jersey Shore ARS repeater, WR2ABR, responded to a call by WA2FIB for Red Cross communications during an outbreak of fires. They delivered food and supplies to firemen and evacuees alike during the seven-hour emergency net. (WB2YWJ)

□ Pikes Peak, CO - May 2. WB0KDN and a partner were called by the El Paso Co. Search and Rescue Team to locate a lost man. Throughout the night they maintained contact on the local repeaters with fellow hams who set up a communications van at the sheriff's office. The body was found after the search resumed in the morning. (WB0TAQ)

□ Tampa, FL - May 6. When some form of

food poisoning affected more than 300 university students in Peru, OA4F and OA4ON contacted WB4BNH, University of South Florida ARC, asking for antitoxin serum. They provided over four hours of phone patches between doctors in Peru and the Center for Disease Control in Atlanta, GA, to gather more information. (WA4VEW)

□ Birmingham, AL - May 8. Window-breaking winds and one-inch hailstones were produced by a weather front passing through just as the Birminghamfest was ending. BARC station W4CUE relayed National Weather Service information to many of the 5,000 attendees. (WB4CXD, EC Jefferson Co.)

□ Hill City, MN - May 9-11. Normal channels for the state Forestry Division became overloaded during a forest fire. The Itasea Co. ARES supplemented, then became the primary communications between Hq. and the fire center base. (WB0QOB, EC Itasea Co.)

□ Laurel, MD - May 13. CB, 20-meter ssb

and 2-meter fm were combined to get a cancer medicine from the National Institute of Health to a patient at the Military Hospital in Bogota, Colombia. It was sent with a military academy professor minutes before his return home. Delivery was confirmed with a final phone patch. (WA3TKP)

□ Ortega Hills, FL - May 19. Immediately after a truck and passenger-train collision, WB4CGD and WA4IKJ happened by the scene. While WB4CGD checked the driver and engineer, WA4IKJ, an emergency medical technician, did not find any injuries among the others. After fire and rescue units had been called, the Jacksonville autopatch was used to call Tampa to start track-clearing work. (K4BSN)

□ Oklahoma City, OK - May 20. Members of the Oklahoma Central VHF ARC forewent their regular meeting when a severe thunderstorm hit the area. Throughout the weekend they worked with Red Cross and fire units in the rescue and cleanup efforts. (K5JB)

□ Pacific Ocean - May 20. T18RWK/R2 broke in on W6ZEN requesting assistance for a diabetic passenger who had become very ill. Information was given to a doctor and the Coast Guard who had a helicopter rendezvous with the sloop as soon as it was in range of the San Diego base. (W6ZEN)

□ Milwaukee, WI - June 5. Upon notification from NWS, a prearranged Severe Weather Net was activated on two area repeaters by the Milwaukee Co. ARES. Trained spotters reported in to NWS, Milwaukee Co. sheriff, the city's Emergency Operations Center and Red Cross. Although \$2-million damage and some injuries were reported, no deaths resulted. (WB9NNJ, EC Milwaukee Co.)

□ Idyllwild, CA - June 7. A stranded climber hung on the face of a cliff until the Riverside Mountain Rescue Unit reached him. On their request, W6AQB and others of the Riverside Co. RACES/ARES set up a mobile station and links for them as well as the sheriff's office. The climber was recovered in good condition. (W6AQB, SEC Orange)

□ Wichita, KS - June 7. Sensing a heart attack coming on, WA0GZO tried to reach a fire station near his motel. He had to pull over when nearly unconscious but was able to get

*Asst. Communications Mgr., ARRL

out a Mayday on the repeater. It was answered by K0FPI and W0TYN, who were able to direct paramedics in time. (WB0SPL)

█ Aikland Is., Bahamas - June 10. Unable to raise Coast Guard Miami after running aground a reef, the captain of a German sailing vessel went on 20 meters and contacted FG0DDV/FS7 (W2DIE). In turn he contacted KH6GDR for notification to Coast Guard Honolulu and relay back to the Miami base. Eventually emergency repairs were made; then another yacht escorted it to a nearby harbor. W2LZX also established communication with the Coast Guard cutter that had been dispatched. (W2LZX)

█ Fort Wayne, IN - June 30. During an intense thunderstorm WB9VKO came upon a man directing traffic at an intersection with all signals out. After autopatching the information, the two continued for two hours in the heavy rain. WB9VKO discovered that his partner was already studying for his Novice license. (WB9LJC)

█ Repeater Log. According to reports received to date, repeaters were used to report 83 auto accidents and related occurrences, four disturbances, four acts of criminal mischief, three suspicious persons, three fires and one heart-attack victim. Repeaters involved were WR1s AAC AGG, WR4ALO, WR5s ABA ABE ABY ADP AJG, WR6AOX, WR9s ABY AHZ AJE.

█ SEC reports received in June total 31; at this time last year 33 were submitted. Reported ARES membership totaled 11,177, as compared to 11,981 in June, 1976. Sections reporting were Alta, Ariz, Ark, Conn, Del, EMass, Ga, Ind, Me, Mich, Mo, Mont, NC, NFla, NNJ, NTex, Ohio, Okla, Ont, Org, SV, SDgo, SBAR, Sask, SFla, SNJ, Utah, Va, WVa, WMass, WPa.

NATIONAL TRAFFIC SYSTEM

9RN manager WB9KTR is now W9FC and he reports that "in regard to the last CD Bulletin, I don't know what CD thinks the job of net manager should be or what he should do, but I'll tell you what he do do. he do everything that's what he do." W9GGW has replaced WB9TWT (K9AI) as 9RN assistant manager. WB9NOZ is now N9TN. W7VSE, completing his second month as manager of RN7, reports that percentage representation is up, despite summer vacations. The First Region has again submitted one report for all sessions.

June Reports

(evening sessions)
(daytime sessions)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------|------|------|------|------|-------|---|
| EAN 30 | 1122 | 37.4 | .959 | 98.3 | | |
| EAN 60 | 636 | 10.6 | .592 | 87.2 | | |
| CAN 30 | 772 | 25.7 | .649 | 98.9 | | |
| CAN 60 | 203 | 3.3 | .162 | 85.6 | | |
| PAN 27 | 834 | 30.9 | .838 | 90.0 | | |
| PAN 29 | 238 | 8.2 | .244 | 83.3 | | |
| 1RN 93 | 538 | 5.8 | .395 | | 92.9 | |
| 2RN 85 | 413 | 4.8 | .425 | 89.3 | 96.6 | |
| 2RN 56 | 237 | 4.2 | .429 | 58.6 | 93.3 | |
| JRN | | | | | 93.3 | |
| JRN | | | | | 100.0 | |
| 4RN 50 | 317 | 6.3 | .326 | 60.4 | 100.0 | |
| 4RN 58 | 384 | 6.6 | .324 | 64.3 | 100.0 | |
| RN5 | | | | | 100.0 | |
| RN5 30 | 180 | 6.0 | .224 | 85.0 | 95.0 | |
| RN6 59 | 486 | 8.2 | .448 | 98.3 | 90.0 | |
| RN6 30 | 80 | 2.7 | .179 | 80.0 | 90.0 | |
| RN7 60 | 404 | 6.7 | .506 | 87.8 | 90.0 | |
| RN7 60 | 121 | 2.0 | .184 | 41.4 | 90.0 | |
| 8RN 53 | 194 | 3.6 | .228 | 76.0 | 100.0 | |
| 8RN 29 | 85 | 2.9 | .524 | 77.0 | 93.3 | |
| 9RN 60 | 523 | 8.7 | .450 | 86.6 | 96.6 | |
| 9RN 28 | 89 | 3.1 | .327 | 75.0 | 66.6 | |
| TEN 51 | 224 | 4.4 | .257 | 61.8 | 100.0 | |
| TEN | | | | | 95.0 | |
| ECN | | | | | 100.0 | |
| TWN 60 | 517 | 8.6 | .341 | 98.0 | 90.0 | |
| TWN 19 | 33 | 1.7 | .107 | 45.3 | 56.6 | |
| YCC 94 | 482 | | | | | |
| Eastern | | | | | | |
| TCC 83 ¹ | 422 | | | | | |
| Central | | | | | | |
| TCC 104 ¹ | 600 | | | | | |
| Pacific | | | | | | |

| Sections ² | 3393 | 12314 | 3.6 |
|-----------------------|------|-------|------|
| Summary | 4510 | 22448 | 4.9 |
| Record | 5402 | 27574 | 15.9 |

¹ TCC functions not counted as net sessions.
² Section and local nets reporting (102): BCEN (BC), MTN (MB), ODN OPN ODN (ON), WGV/UHF (PQ), SATN (SK), AENB AEND AENM AENW (AL), ASN (AK), ATEN HARC (AZ), NCN NEN SCN (CA), CWN (CO, WY), CN CPN (CT), DEPN DTN (DE), EAST FMN NFPN SPARC TPTN (FL), CVEN GARES (GA), IMN (ID, MT), ILN (IL), I75MN TLGN (IA), QKS QK5-SS (KS), KNNTN KPN KRN KSN KTN KYN MKPN (KY), LAN LRN LSN LTN (LA), SGN (ME), MDCTN MDD (MD), NENN WMN WMPN (MA), HEN KCAN MACS QMN WSN (MI), MSN MSPN MSSN PAW (MN), MSBN MTN (MS), MON (MO), NHVTN (NH, VT), BARTEN NJN NJPN (NJ), NLI NLI PN NLS (NY), NCSBN SCSSBN (NC, SC), BN ONN OSSBN 06mN OSN (OH), OAN OFON OLZ OTWN STN (OK), PTN (Pac), EPA EPAEP & TN PFN WPA WPAP & TN (PA), TEX TTN (TX), BUN (UT), VFN VN VSN (VA), WVN (WV), BEN BWN WIN WNN WSN (WI).

| | |
|--------------|---------------|
| 1 - NET | 5 - RATE |
| 2 - SESSIONS | 6 - % REP. |
| 3 - TRAFFIC | 7 - % REP. TO |
| 4 - AVG. | AREA NET |

Transcontinental Corps

W6ZRJ received a TCC-P certificate.

| 1 | 2 | 3 | 4 | 5 |
|---------|-----|------|------|------|
| Eastern | 120 | 89.5 | 1221 | 482 |
| Central | 90 | 92.2 | 834 | 422 |
| Pacific | 120 | 86.7 | 1219 | 600 |
| Summary | 330 | 89.4 | 3274 | 1504 |

TCC Roster

The TCC Roster (June): Eastern Area (W2FR, Dir.) - W1s NJM QYY, K1s BA EIR GN XA, WA1FCM, W2s CS FR GKZ JU, K2H1VE2, WA2ICB, WB2ASD, K3PA, WA3s VBM YJG, W4UQ, K4KPN, W8s LTA PMJ, K8KMQ, WB8ITT, VE1AAO, VE3s GOL SB, Central Area (W5GHP, Dir.) - N4s DY MD, WB4SKI, W5s GHP MI RB, K5GM, N5VL, WA5s HNN IQU, W9s CXY DND FC LF NVD, N9TN, W0s AM HI QMY, N0IN, K0s CXD EVH, WA0TNN, Pacific Area (K5MAT, Dir.) - W5KH, K5MAT, N6GW, W6s EOT MLF OA VZT YBV ZRJ, K6HW, W7s DZX EP GHT, K7IWD, W8s ETT FG IW KLE LQ, K0TER, W8s QOT TAQ, VE7ZK.

| | |
|------------------|----------------|
| 1 - AREA | 4 - TRAFFIC |
| 2 - FUNCTIONS | 5 - OUT-OF-NET |
| 3 - % SUCCESSFUL | TRAFFIC |

Independent Nets (June)

| 1 | 2 | 3 | 4 |
|---------------------------------|----|-----|------|
| American Radio | | | |
| Telegraph Society | 30 | 498 | 414 |
| Clearing House | 30 | 246 | 559 |
| Hit & Bounce | 60 | 956 | 438 |
| Hit & Bounce Slow | 17 | 28 | 16 |
| IMRA | 26 | 352 | 899 |
| North American SSB | 26 | 363 | 236 |
| North American Traffic & Awards | 30 | 42 | 611 |
| Washington Region PON | 16 | 28 | 230 |
| 20 Meter ISSB | 26 | 303 | 426 |
| 75 Meter ISSB | 30 | 439 | 1004 |
| 7290 Traffic | 44 | 412 | 2106 |

| | |
|--------------|---------------|
| 1 - NET | 3 - TRAFFIC |
| 2 - SESSIONS | 4 - CHECK-INS |

Public Service Honor Roll June 1977

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.

| | | | |
|--------|--------|----------|--------|
| 86 | WB2ASD | WA8ZNC | W9NXG |
| K5MAT | WD5ABL | K0EVH | W0OTF |
| 68 | W6RNL | VE1ACU | VE1AAO |
| N5TC | 55 | 48 | VE1ZH |
| 66 | VE7DKY | N5ES | VE4IX |
| W5KLV | 54 | WB0LFY | 43 |
| 64 | WB4CAK | 47 | WB2HIQ |
| WA4JDH | 53 | WA1MJ | WB1Q |
| 63 | W2MLC | WA2ERT/1 | N0TE |
| W6RFF | WB5NKC | WA2HTP | 42 |
| WB0HOX | N5YL | WA2JJP | 42 |
| 62 | 52 | WA4PSL | WB2RMK |
| K3PA | K4BKX | WB5LBR | WA4FKE |
| WB5NKD | W4MEE | WB8TTP | WB4TEK |
| 61 | WB8VLR | W2MTA | WA5VBM |
| K1PNB | WB0QOT | WA3VBM | KH6JJE |
| WB2EMU | 51 | 45 | WB8DKQ |
| WB2IWX | 51 | WA2AYY | 41 |
| K4ZN | WB2DFO | WB5PVL | W1RWG |
| WA5YEA | WB6FTY | WB0TAQ | W2SQ |
| W7OCX | W0RFF | 44 | W3IKA |
| W7VSE | W1BVR | 44 | N4DY |
| WB8JGW | 50 | WA1POJ | WA7KQE |
| 59 | WA1UWF | WB3EDX | WB0PGZ |
| WA1VGP | WA1YWK | N3PG | 40 |
| WB2IDP | WA4EPJ | WA3WPY | K2SE |
| W2YJR | WB6PVH | WB4OXT | WA3NOQ |
| WB4ARJ | WB8WTS | WB4GHU | WA4TXM |
| WB4DBK | 49 | WB4QBB | W6AUC |
| WA5RKU | WA1ZAZ | N4SS | WA9GBW |
| 57 | W2CS | WA4UUX | W0MDT |
| K1PAD | K3ORW | WB8AVY | WB0VHN |
| WA6UAZ | WA3PRW | N8CW | |
| 56 | K3YHR | WB9PW | 27 |
| K1BA | WB4EKJ | WB8YVI | WB4DHC |
| WA1FCM | WB5MTQ | K8YL | 22 |
| | WA7MEL | W9GGW | WA4QGV |

Brass Pounders League June 1977

BPL Medallions (see December 1973 QST p. 59) have been awarded to the following amateurs since last month's listings: WA1UGJ WA4EYW W6NL WA9GBW VE3CDK.

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 | 552 | 1049 | 1386 | 71 | 3058 |
| W0WYX | 56 | 1007 | 396 | 611 | 2070 |
| K0YFK | | 431 | | 431 | 862 |
| W3VR | 291 | 180 | 327 | 9 | 807 |
| K9CPM | | 483 | 70 | 239 | 792 |
| W4MEE | 4 | 401 | 352 | 15 | 772 |
| WA4JDH | | 297 | 283 | 2 | 582 |
| WB4ARJ | 3 | 269 | 304 | 3 | 579 |
| WB2IDP | 4 | 219 | 272 | 34 | 529 |
| W5KLV | 4 | 261 | 239 | 24 | 528 |
| W9IOH | 214 | 87 | 224 | 30 | 515 |
| WB8DKQ | 3 | 267 | 227 | 8 | 505 |

Multi-operator stations

| | | | | | |
|-------|-----|------|------|-----|------|
| K3NSN | 406 | 1350 | 1000 | 350 | 3106 |
|-------|-----|------|------|-----|------|

BPL for 100 or more originations-plus deliveries

| | | | |
|--------|-----|--------|-----|
| WA3ATQ | 233 | W0FIR | 115 |
| W7TZK | 183 | WA4TXM | 114 |
| WA4EYW | 139 | W7SQT | 110 |
| WA4EPJ | 127 | WA9GBW | 105 |
| WA3THT | 123 | WB4DBK | 103 |
| WA9UGW | 116 | WA1VGP | 101 |
| WA0AUX | 116 | WA4CRI | 101 |

| | |
|-----------|-----------|
| 1 - CALL | 4 - SENT |
| 2 - ORIG. | 5 - DEL. |
| 3 - RECD. | 6 - TOTAL |

How's DX?



Conducted By Rod Newkirk,* W9BRD

Ozzie the Equalizer

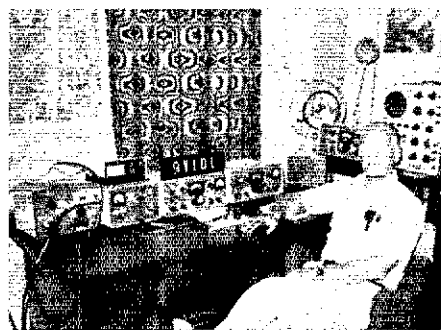
The projected unperturbability of prospective OSCAR propagation is a DX dimension far different from the present wireless world below 30 MHz. How will we cope with ham hands that neither skip nor fade? The very unpredictability of day-to-day hf DXing is one of its most fascinating features. Not for humdrum money-making commercial circuits, but we amateurs have always thrived on uncertainties, rushing to our rigs to catch transitory 10-meter openings or possible Asian breakthroughs on 160. Gee, OSCAR should be something like controlled weather in a superdome, steady sunshine and 70s day

after day. In such a stable environment can we still keep interested in the hunt? Will the DX challenge remain enchanting?

And how many of our current 20-meter Big Guns will be satisfied to become mere Average Guns like everybody else in an OSCAR spectrum? Without grandiose weapons will they truly enjoy hacking it strictly on alertness, good timing, diligence, persistence and the like? Say, that boils right down to basic operating skill, doesn't it? Right now the biggest lids in town just pound their way through 14-MHz dogfights if they have the biggest noises in town. Will they really dig this

new DX frontier if they have to learn how to really run a radio?

Questions, questions. One answer is already taking shape. The more we mull it over, the more we think we'll appreciate the new DX departure promised by AMSAT-OSCAR Phase III and phases to follow. Pileups may become awesome and we'll surely miss our traditional sun-inspired hf propagation surprises. But then we can always swing briefly down to ancient shortwaves for a nostalgic taste of extra-loud lids, QSB, static and other joyous attractions of the good old days. *Very* briefly.



9V10I radiates regularly near 14,240 kHz at 1400 UTC or so. W2AO snapped this shot while visiting Bud in Singapore recently.

very slow despite International Reply Coupons, self-addressed envelopes and other blandishments. (WA4QHV) . . . I vote for "How's" QSL/QTH info on a monthly basis. (WB0NOU) . . . Because all overseas mail from Canada now goes by air, a single IRC is sufficient for airmail reply from VE-land. (VE1BKB) . . . I'm receiving QSL requests for recent contacts with club station ZB2A but I can respond only for QSOs made by operator Gordon from June, 1970, to September of '72. (WA9YNE) . . . Reminder: I no longer manage QSLing for ex-5H3LV since his return to Canada. Garth can be reached at VE3EUP. (VE3BIZ) . . . Despite contrary indication WB2EDV states he has no connection with 4X4 QSLing. (W1CW) . . . K9CSM hasn't heard from 9V10I in years. Without logs he is unable to act as Bud's QSL manager. (WA2GEZ) . . . The addition of 13 ZPSS swells my QSL managerial clientele to 162. (W3HMK) . . . 7X4MD, preferring to QSL direct from his own address, has no Stateside QSL tender despite listings to the contrary. (K4FZU) . . . UK9AAN's card arrived via bureau within a year which, so far as Russian QSLs go, qualifies him as one of my QSLers of the Month. (WB4WHE) . . . I mentioned some long overdue U cards in a letter in Russian to CRC's Box 88 last summer. Maybe that helped produce confirmations via bureau for 10-year-old QSLs. (K8PYD) . . . N4MM, assisting at his local ARRL QSL Bureau branch, reports recent receipt of 25 pounds of U.S.S.R. QSLs for QSOs as far back as 1959. (WCDXB) . . . WB6DUF has no QSL arrangements with DX stations, Peruvian or otherwise. Try WB6DVE. (W9BRD) . . . I no longer manage ZL1BL's QSLing. Go direct or via NZART. (N4TJ) . . . In a very active DX year I'm very thankful to have my XYL serving as QSL manager - hi! (VK3AH) . . . I still QSL for ZE4JH but some logs have strayed in the mails, at least temporarily, including records of QSOs during January and February of this year. Patience, please. (N4TI) . . . After arrival of overdue stock from the printer, I'll answer all PA9AWG s.a.s.e. QSL requests direct, others via bureau. (WB9JEN) . . . I hold logs for Pitcairn Island operation by W6YO and continue as QSL manager for other stops by Jules aboard *Yankee Trader*. (W6BVM) . . . UR2QD advises that those U60 commemoratives are located thus: U60s A (UA1), MSK (UA3), ARH (UA1), BAK (UD6), BGD (UA3), WLA (UA3), KLN (UA3), MNK (UC2), NKW (UB5), RST (UA6), SEW (UB5), TLN (UR2), TKT (UI8) and LNK (UA4). QSL all via CRC. (N6HR) . . . I do HZ1AB QSLing only for operators Bill and Al, K8CSG and W5UJF, at least for the present. Return air postage from here to most foreign points requires three IRCs. (K8PYD) . . . Some former FH8s and FL8s are signing J28 calls from new Djibouti Republic, while FX and FZ prefixes may show up from France

ere long. VA and VB labels are used in Canada; VO's may try XO tags, suffixes usually unchanged. (DXNS) . . . SV0WZ, due to swap Crete for Maryland, reports QSL manager OE3NH temporarily stymied by the printer. TG9ML also ran out of cards but means to make good in due time. (WCDXB) . . . HW5ITU was co-operated commemorative in May by Es 6AQO and 9MD, HW6ITU by Es 6BJ and BIA. (DXNS) . . . Sinai Field Mission, Box 10, FPO, New York, NY 09527, seems to be a common QSL address for portable-SU types. (WCDXB) . . . June '77 KP6AL QSLs may be confirmed through K9ECE, others via KH6CHC. (VERON) . . . G3LQP holds VQ9R logs for June 11, 1971, to December 31, 1976; VQ9R/d for October 29 to November 2, 1972; and VQ9R/f for October 21-28, 1973. Roger also confirms all S79R contacts. (WCDXB) . . . Alpi Parenthesized pals plead for pushes toward the pasteboards of targets specified: (W2GRR) JT1AN, Howard of XV5DA '75; (W4WDI) VQ8AMR '65; (W7HP1) KW6GO '75, ZL1AA/c '74; (WB4FPH) FQ0MM, 4M4NQ, 9G1GK; (WB4WHE) KP4DSD; (WB7DRO) EA2IA, FP9VA, OX30A, VR3AH; (WB0NOU) FP8AA; (N4TJ) KG6SS '68, MP4BEU '68, XE2OK '67, VU2DIA '67; (N8ZZ) SVITSF; (VK3AH) HZ1TA, TA2SW '74, VR6TC and 8Z1AB '73. Any aid? . . . WA1UWF and K5JBC offer clerical assistance as Stateside QSL agents for hardpressed overseas DX ops, the rarer the better. . . Individual postal recommendations now follow but be aware that each suggestion is not necessarily accurate, complete or "official." . . . These rovers are said to respond via their home addresses: D14BZ/OY, K9AEG/6YS, KM6EB/KH6, OE2WSL/YK, OHS 2BDA/OH0 6NO/SU, Ws 1HUW/VP9 7FPX/SU and WA70TT/VP2.

GETTING 'EM ON THE WALL

Heartening batch of uncommonly reliable QSLers of the Month to commend, all applauded in "How's" mail from Ws 4LVP 7HP1, Ks 3UA 5IO 6ARE, WA4QHV, Wbs 4CSK 4FPH 4WHE, N8ZZ and VK3AH for their pasteboard punctuality: AP2AD, C6ABC, CR9AJ, Cts 2BZ 4AT, CW3BR, CX2XC, DUGEG, EA8BK, E15V, EL2s ETT, F3s 2YT 8TQ, EM7WV, FY7s AN YE, G3s FNI 1XB, CISUR, GM3LYY, GW3XJC, HB9s BCX DX, H18MOG, HKs 3CTJ 0BKX, HS5AKW, IK8RHZ, IS0s OMH YWA, IT9UAG, JAs 1PIG/PZ 3CMD, JHs 2XMN 3AIU, JWs 2CF 9WT, Ks 2MME/VP9 5QHS/D6A/EH8 9KDI/6YS 0WIO/DU2, KA6TA, KC6CG, KG6RT, KH6s GQW 1AN IIV JJ JFL, KL7HRP, KM6EB/KH6, KV4JV, LUs 1SH 6EF, LX1s BJ BW, LZ2SC, OAs 4AOB 4SS 8V, OC4A, ON5KD, P29s AJ CC JD, PA0s JR MSK, PI1PT, PJ8CO, PP2DV, PZ5AA, SM5HPB, SP9KR, SV1FT, TG9TG, 1U2GL, UK9AAN, UM8MAD, VEs 1ABR 2AOS/IG, VP2s KJ MAQ SZ, Vks 4DH 6TC, VU2s ACD GO, WIHUY/VP9, WASUKR/YV, XE2MX, YO6EX, YS1s CHE GMV JWD, YUs 1ANO 2CAY, ZD8W, ZEs AG IK, ZK1DR, ZL1HW, ZS6WV, 3D2s DM RM, 5B4CD, 6W8DY, 7J1RL, 7P8BC, 9G1JX, 9H1ED, 9K2DR, 9M2BH, 9V1s SG SY and 9Y4A, together with such dependable QSL aides as Ws 1JFL 2AYJ 3HNK 4JL 5ILU 6HS 7PHO 9NGA, K8LIG, WAs 4TLB 6AHF 6DVE 7ILC 9SMM, Wbs 2TSL 4YHN 8OBA, N8AG, VEs 2KQ 4SK 4VV, DLs 1YW 7S1 and VU2IJ. More! . . . Sometimes I think rarer DX stations QSL faster. Rather common South American and European types can be

A3SDG, D. Goddard, P. O. Box 147, Nuku-
alofa, Tonga
A4XGX, D. MacGregor, Pye TVT, BFPO 66,
London, England
C21EF, E. Flores, P. O. Box 267, Nauru
CF3AKX/TI2, J. Pastor, P. O. Box 114, Mora-
via, Costa Rica
CN8CW, P. O. Box 120, Rabat, Morocco
CP8CI, P. O. Box 95, Trinidad, Bolivia
CX8s BE ZBE, J. de Castro, Lieja 7184,
Montevideo, Uruguay
EA9EN, P. O. Box 191, Ceuta, Spanish
North Africa
EL1F, T. Skeffton, 143 Folger St., Clemson,
SC 29631
EP2JK, A. Whitehill (GW3IRK), c/o IBAC,
P. O. Box 14/1684, Tehran, Iran
FB8s XQ XR (via F5VU)
FB8s ZK ZL (via F8US)
FG0DDV/F57 (via W2QM)
FH0s OM YL (via DJ1TC)
FM7WA, Box 15, Lamentin, Martinique
FO0MB, P. O. Box 12, Papeete, Tahiti

FRØDGP, Dr. V. Thompson, K5KEZ/3, Box 670, Johns Hopkins Hospital, 601 North Broadway, Baltimore, MD 21208
 G-GM-GW5BTZ (to F6CWB)
 GW4DWN/VLE8 (via GW3AX)
 HC2FG, P. O. Box 1233, Guayaquil, Ecuador
 HK1RCB, Radio Club Barranquilla, P. O. Box 3367, Barranquilla, Colombia
 HK8CXQ, Apto. Aereo 897, Pasto, Colombia
 HM1KE, C. P. O. Box 3481, Seoul, Korea
 HM3LR, Song Young, June 89-6, Sunhwa 2, Talion 300, Korea
 HP1s MH SI, P. O. Box 3398, Panama 4, Panama
 HP1YV, R. Leandro, P. O. Box 661, Panama 1, Panama
 HP2LT, P. O. Box 1988, Colon, Panama
 IT9ERO, P. O. Box 266, Palermo, Sicily, Italy
 J28s AD AH (via I8JN)
 J28AN, P. O. Box 758, Djibouti, Djibouti
 K4SQT/SU, M. Broe, c/o Sinai Field Mission, U.S. Embassy, Cairo, Egypt
 KA6s RI YL (via WB6KGB)
 OY1s A AT M (via W6TCQ)
 PP1s ZAM ZBM (via WA2OKO)
 S21AB, Y. Moriyama, JAØZG/1, 3-18-9-306 Hon-amanuma, Sugunami, Tokyo 167, Japan
 TFs 3JB 5TP (via DL7MQ)
 IG9ML, Box 132, Guatemala, Guatemala
 TR8GB, P. O. Box 2134, Libreville, Gabon
 TR8MG, P. O. Box 177, Libreville, Gabon
 TY9ER, P. O. Box 1587, Cotonou, Benin (or via DJ8LC)
 UT5LK, S. Sichow, Box 41, 357-600 Essentuki, Ukrainian S.S.R., U.S.S.R.
 VE3HYU/SU (via VE1RU)
 VPIAPC, Airport Camp Amateur Radio Club, Box 826, Belize, Belize
 VP8s ML NY (via W4MWT)
 VP8OT, T. Stewart, British Antarctic Survey, Port Stanley, Falkland Islands

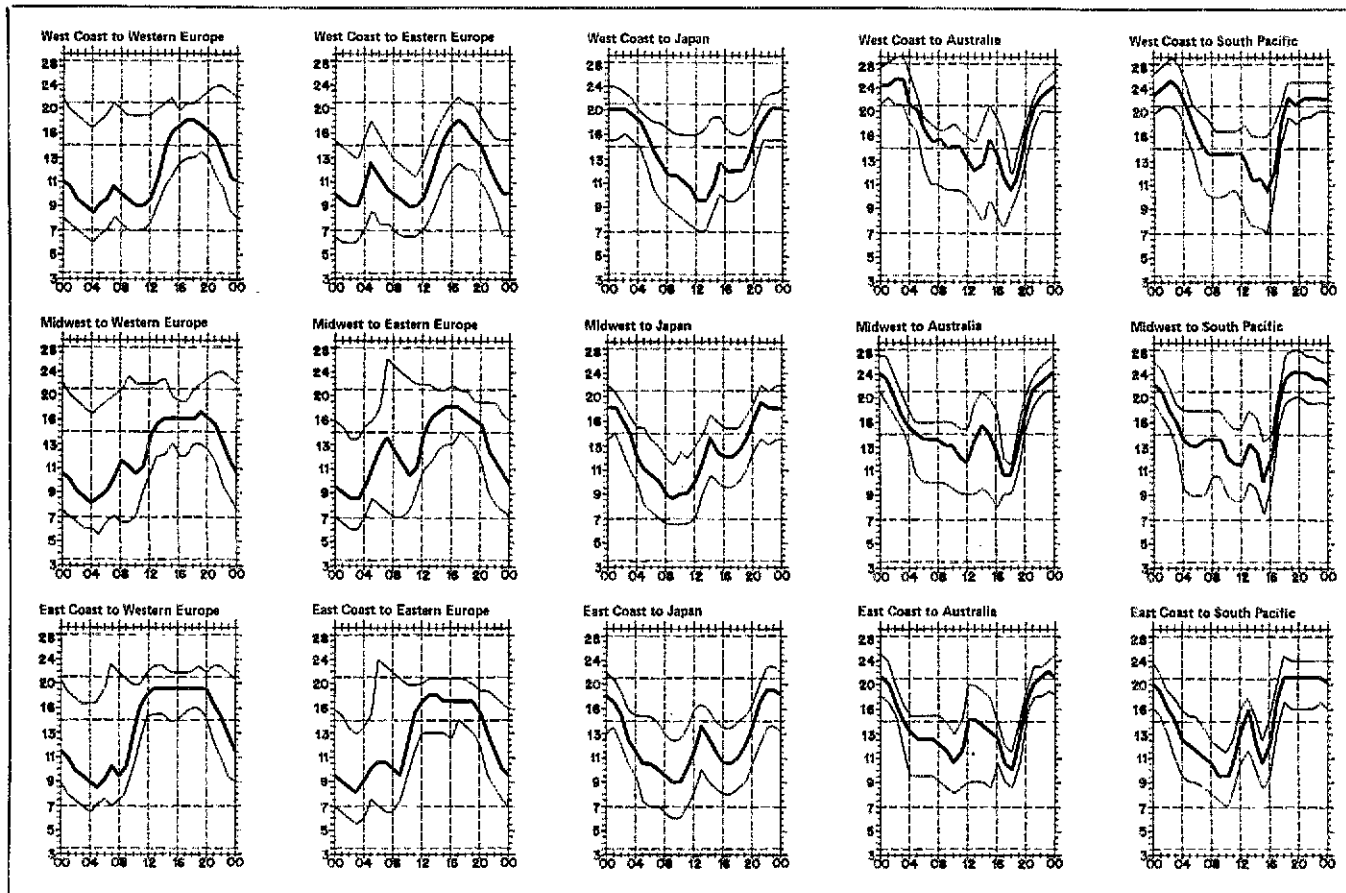


BV2B ably represents Taiwan near 14,218 kHz, usually on weekends between 0630 and 0930 UTC. Tim also signs BV2A on 14,025-kHz cw. (W2AO photo)

VP8PM, P. O. Box 179, Port Stanley, Falkland Islands
 W7IXF/SU, F. Pector, c/o Sinai Field Mission, Box 10, FPO, New York, NY 09527
 WA3FYL/5N2 (via K3UZY)
 WA6EGL/VQ9 (via W4FLA)
 WA6YLI/HR1, S. Storey, P. O. Box 964, San Pedro Sula, Cortes, Honduras
 WB2RLK/6Y5 (via WB4PXW)
 WB5TUV/VQ9 (via W4FLA)
 WB9BZL/T18 (via WA9UNR)
 WB9SYA/5N2 (via K9LSB)

Ex-YA8 2A 3A 4A 6A 7A 8A 9A 0A (via K4UTE)
 YB6ACV, H. Arasz (W2JVT), c/o Mobil Oil, Lho Seumawe, N. Sumatra, Indonesia
 YO2BTK, Box 100, Timisoara, Roumania
 YS1AJE, P. O. Box CC-2180, San Salvador, El Salvador
 YV4BOB, P. O. Box 32, Puerto Cabello, Carabobo, Venezuela
 ZD7PV, L. Dray (G3SHD), P. O. Box 8, Jamestown, St. Helena, So. Atlantic
 ZD8EW, E. Wilby, c/o BBC, Ascension Island, So. Atlantic
 ZF2AA, P. O. Box 688, Grand Cayman, Cayman Islands
 ZL3OG/c, D. Scott, c/o Radio Station, Chatham Islands, New Zealand
 ZP5s AL AN AO CBL EC EF KB LX PT PX RL WU YD (via W3HNC)
 4X4s UF VB (via WA4WTG)
 5A1ML/HZ, Box 71, CH-9500 Wil, Switzerland
 5N2PPP, P. O. Box 17, Ikeja, Nigeria
 5W1s BE BF (to KS6s DV FO)
 6Y5MR, Box 1061, Kingston 8, Jamaica
 7X3AH, Ahmed Berchi, Box 10, Hassi, Messaoud, Algeria
 9J2MA, M. Aoki (JR1VCS), P. O. Box 105, Chitpata, Zambia
 9J2s SJ TN WK (via W3HHV)
 9Q5GR, P. O. Box 1459, Kinshasa, Zaire
 9Q5QR, T. Jeuken (ON4QR), P. O. Box 10061, Airport, Kinshasa 24, Zaire

A351T (4Z4TT) CT6FSJ (CT1BT)
 A4XHE (D2FE) DU6BG (WA7RFH)
 AP2TN (O21VY) DU6RH (W7HP)
 C31MN (EA8CR) EL2FG (WA3NCP)
 C31NG (DJ3LK) EL2FY (JA1NSA)
 C31NQ (F6CWB) EL7E (DK5RL)
 C5AAB (K4UTE) EL7F (DK5BH)
 C5AS (DK3JA) EL8O (OE6WMG)
 CT2BZ (WA4DYA) EL9D (VE3BOZ)



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

EP2VW (W4YE)
 FgCI/mm (LX1DE)
 FQCVF/FC (DJ4PX)
 FQHN/W6 (W3HMK)
 FC2CH (DK4EB)
 FG0ST (F6CWB)
 FM7AQ (I2YAE)
 FO8DH (F6BXL)
 FO8DP (W7JST)
 FO8EX (F6AUS)
 FO0PJM (W6FWX)
 FO0RS (W6MAR)
 FP0CJ (K8CJQ)
 FP0DE (WB8NBT)
 FP0DW (VE2UN)
 FP0MS (W2HA)
 FR7BB (F6EKD)
 FR7BL (F6EVC)
 FR0DCK (F3OM)
 FY7AO (WA8CPU)
 FY7AE (WA4WTG)
 FY0AYO (W2JKN)
 FY0ST (F6CWB)
 GC4DA (G3ZOW)
 HB6LL (DJ9ZB)
 HC1WW/OA (K1ALP)
 HD0EE (K8LJG)
 HI7CMC (WA9WUT)
 HI8LC (W2KF)
 HR2RRD (WB5AVS)
 HR4BBA (I3CYG)
 HW2ITU (F6BFH)
 HW3ITU (F3II)
 HW6NFI (F9AE)
 HW8ITU (F8RU)
 HW9ITU (F9RM)
 IB0BXN (I4BXN)
 IF9DMK (I2DMK)
 IL7DMK (I2DMK)
 IY6ARI (ARI)
 J28AC (DJ1TC)
 J28AJ (W3HMK)
 JT0AOQ (UT5LK)

JY25 (WA3HUP)
 JY5HH (DJ9ZB)
 JY9CS (K5OEA)
 JY9DI (WA4APD)
 JY9EK (WA5LMG)
 JY9JR (K2TNI)
 KC6SK (W7PHO)
 KC6SX (JH1JGX)
 KG4AN (WA4MQJ)
 KG4OO (K0FMZ)
 KG6JH (K6TBQ)
 KJ6BZ (K0MSP)
 KP6AL (see text)
 KS6GJ (KH6II)
 Ex-KW6AA (W6FNS)
 KX6DC (W6VG)
 KX6MJ (WB8ON)
 LG5LG (LA2ZN)
 LX1BW (W3HMK)
 OC4A (RCP)
 OD5FU (F6DSC)
 OD5HU (SM4CIV)
 OX3VO (OZ9DP)
 OX5AP (WA5ZYF)
 OX5ND (W6ASA)
 OY3H (W3HMK)
 PJ9CDC (W1CDC)
 SJ9WL (SM0BMG)
 SM0FHY/4U (SSA)
 SM0FLK/4U (SSA)
 ST2JJ/0 (W4JBZ)
 SV11V (DJ9ZB)
 TA2QO (DJ0UQ)
 TG0AA (VE2KQ)
 TU2GL (F6CBC)
 TU2HA (W9ARV)
 TU4FOC (F3OA)
 VE8YE (VE2DQ1)
 VK0KH (VK5WV)
 Ex-VP1RS (VP1APC)
 VP2KAB (W3HMK)
 VP2LS (K4MZE)
 VP2MBC (W1CDC)



HS1WR joins spouse HS1YL, shown here last month, in the operation of this widely worked Bangkok installation. Kamchai and Mayuree frequently appear near 14,210 kHz at 1700-1800 UTC. (W2AO photo)

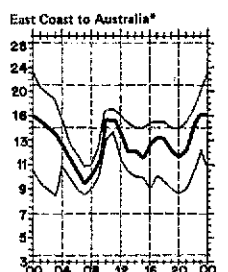
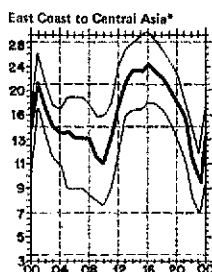
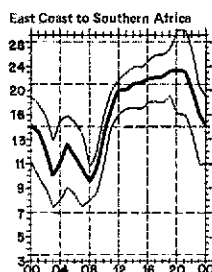
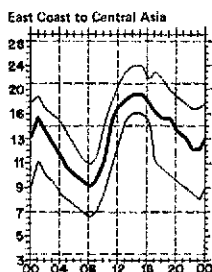
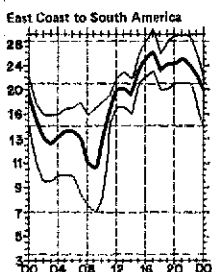
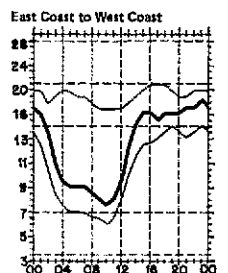
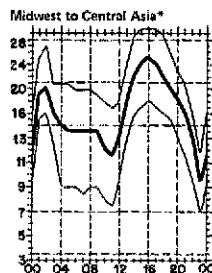
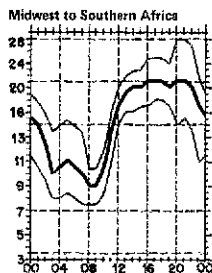
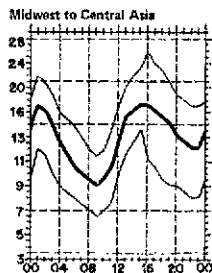
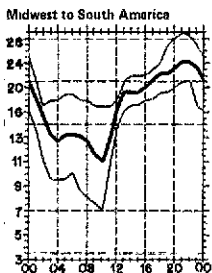
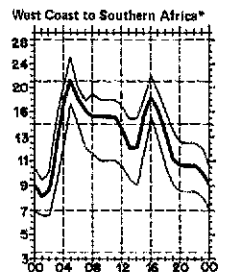
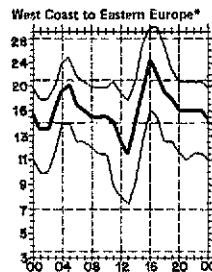
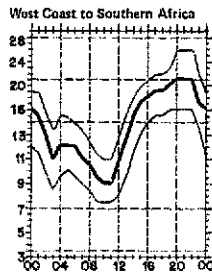
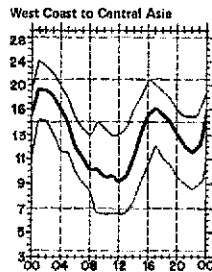
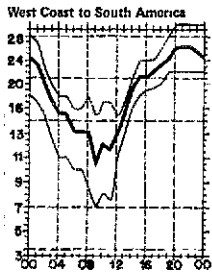
VP2MVP (WB4CSK)
 VP2SAE (W4UG)
 VP2SAZ (W2KF)
 VP2SQ (W2MIG)
 VP2VDM (W2GQN)
 VP2VDN (WB2EPG)
 VP8HZ (GM3ITN)
 Ex-VP8OB (G4BNQ)
 VP8OW (G4DSC)
 VR1X (G3IQM)
 VS5XU (DL1LD)

VS6GG (WB4FJO)
 VU2ACD (W7PHO)
 VU2GO (VU2IJ)
 Ex-YA2AG (SU7AG)
 YB7HB (JA8BMK)
 YB0ACT (SM0GMG)
 YN1QPX (W5QPX)
 YQ0ITU (YO3RF)
 YSIAG (WA3RID)
 YS1O (W2KF)
 ZB2A (see text)

ZB2TA (G3MZE)
 ZD8DB (K4VMA)
 ZF1CW (W0CW)
 ZF1DB (K0VVO)
 ZF1IK (W4JIK)
 ZF1SV (VE7BXG)
 ZF2AD (W4BAA)
 ZF2AN (W5UFF)
 ZF2AP (W4YKH)
 ZK1BA (WA7HRE)
 ZK1DR (WA0WCR)
 ZL1BIL (see text)
 ZS2ND (K4TXJ)
 ZS6DN (WA4HHG)
 ZV2ARU (PT2JB)
 ZV7ITU (PY7YS)
 ZV0ITU (PT2JB)
 ZY4ITU (PY4AKL)
 ZZ4ITU (PY4KL)
 3A0GP (F6BFJ)
 3B8DV (G8AXU)
 Ex-3D2AJ (9H1EY)
 3D2DA (W3HMK)
 3D2WR (G5RF)
 3D6BL (W0SUS)
 3D6BP (KIAGB)
 3V8Z (DL1HH)
 4B1AZ (XE1AZ)
 4C1HR (XE1HR)
 4M2YV (YV2YV)
 4T4AKL (OA4AKL)
 4Z4EV (WB4FSV)
 4Z4US (WA2KGY)

Ex-5A5TA (GMSAPC)
 5B4BK (OE2SUL)
 5H3KS (DK5EC)
 Ex-5H3LV (see text)
 5N2BYL (WB2MDB)
 5N2QIR (WA7QIR)
 5W1AX (WA7VGV)
 5X5NK (DJ6EA)
 5Z4OM (JA1BUY)
 5Z4PV (JA1BGS)
 5Z4PZ (F6EAO)
 5Z4QC (SM0HWN)
 7X2MM (F6DNN)
 7X4MD (see text)
 7X5AB (W2KF)
 8J1ITU (JARL)
 8P6ES (K4GLJ)
 8P6HO (VE4JM)
 8P6IJ (W3HMK)
 8R1VC (W9BNH)
 8R1Z (VE3DLC)
 9G1AK (W1YLR)
 9G1JX (DL7SI)
 9H1CE (W2KF)
 9H1FF (K9DID)
 9H3SMC (9H1YL)
 9H3WTD (MARL)
 9J2YL (W3HMK)
 9M2AX (JA6RIL)
 9U5CA (WA2QNW)
 9V1OI (see text)
 Ex-9V1PD (5B4DA)
 Ex-9V1PN (9H5F)

Contributors of the preceding directory include Ws 1CDC 1CW 3AZD 4LVP 6NLG 7HPI 7LLM 8IQ, Ks 1DLM 3UA 4PZ 4VMA 5CO 6EL 9AEG 9DID, WAs 4OHV 4WTG 6IDN, WBs 4CSK 4WHE 7DRO 9NOU, Ns 4TJ 6AJ 6HR 8ZZ, VE2UN, F6CWB, VK3AH and DX periodicals to be credited subsequently. Good show!



as the lowest curve (optimum traffic frequency, or *f_ot*). 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 September, 1977, assume a sunspot number of 38, which corresponds to a 2800-MHz solar flux of 92.

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 June 1 through June 30, 1977. 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

W6BYH/279
DJ6AU/208
K4YWZ/196
JR1VMX/147
W5YCB/140
CX1DZ/132
W9WR/130
EA8JB/129
WB2HYQ/125
LA8KD/123

F6BJH/121
WA4ICK/120
SM5FDD/119
W3FCJ/116
OZ7NJ/115
K4LJH/112
JH3CXL/110
W3GZQ/110
VE7IO/109
WA4LJW/109

YU3TEW/107
WA5DPO/106
WB5LMN/106
ZS6BOK/106
WB9SLV/105
JA1JLL/104
K2KNC/104
W5FL/104
WA5YTX/104
WB2IDU/104

F6DZL/103
VE3GXU/103
W2AJO/103
W9LOF/103
W9VJW/103
WA4DLY/103
WA9FFZ/103
WB4BNH/103
F6DUK/102
K4TIA/102

KP4EGO/102
N4FN/102
VE2ARA/102
WA4FMS/102
W9WJ/101
WB2GOK/101
F6BHG/100
JA1WXP/100
K1EQA/100
VK3BHN/100

Radiotelephone

CT1WB/213
G8NY/206
WA4CXZ/204
I1ZPT/158
F6DLM/154
WB9REB/151
JR1VMX/141

ZP5YD/131
I8YZP/123
15ISF/122
JA4WK/2/114
18IGS/111
P29JS/110
W3GZQ/110

WB5LMN/106
HK3DDD/105
WA1GBA/105
W2FDE/104
EA8DI/103
JA6GWX/103
W8KMN/103

WA6DTG/103
WB2IDU/103
I8KUT/102
KP4EGO/102
OE1SKC/101
WA2FCW/101
DK5UD/100

W8CBA/100
WB9NIO/100
WA7MCK/100
YS1BW/100
5N2NAS/100

CW

DL1PM/124
VE7CNE/115

W9HR/110
JA1JQY/105

K8SW/105
JH3CXL/102

F6ACD/101
KH6HC/101

WB9SLV/101

RTTY

W3KV

5BDXCC

CX9BT

UB5WE

K5KLA

Endorsements

Mixed

W5ABY/344
K6MA/332
W9PN/330
K4FJ/328
W9OH/327
D2AA/325
N6DX/325
OZ3PO/325
W5LZZ/325
W9HZ/324
W1AA/323
W5TO/323
OE2EGL/322
SM6AFH/321
W1ELR/321
JA1JRK/320
VE3DBT/320
W4GTS/320
W4JVV/320
W9GDN/320
W9SD/320
WA3HUP/320
DK3PO/318
K6XP/318
G3JAG/316

N5DX/316
WB8EUN/316
DJ6RX/313
W9KNI/311
CT2AK/310
W4WG/308
K6SVL/307
W9OQK/307
OE1ZGA/305
WB8BM/305
DL1MD/301
W9SS/300
N6JR/298
JA1RW/292
W1BGY/291
W7ETZ/290
DL1KS/283
N4RA/282
K4PI/281
N2DL/280
W8QFR/280
WA3CB/275
HK9BKX/274
JH1HWN/274

YV5CWO/274
W1GDD/270
W4HY/270
W8DI/270
W8BA/267
W4PZV/263
W4IQ/261
K5BZU/261
W3CDD/260
K9UWA/252
WB4EDD/252
K6ELX/250
DJ2MN/241
VE3II/241
DK5AD/240
W1VV/240
W2GRK/240
W2TA/238
W4LVM/231
W3RJ/230
WA3NGS/224
K3AO/222
W8II/221
K6CBL/220
VE3DMC/220

WA3SXH/220
WA7YRP/218
W1JDE/210
W3HER/206
K4YQ/201
K5BDS/201
K6DSK/201
WA1UAD/201
NAGE/200
SM4EMO/200
W4DZZ/200
WA6TLA/200
W4VE/198
K8AXU/196
N9XX/192
K5KEZ/186
H9HT/185
ZETUS/181
K1VSK/180
W3KH/180
K9QXY/174
WA1UAG/171
K1OEY/167
WA4JTC/164

JH7BRG/163
JR6BU/163
YU3DR/162
K9DWK/161
W9NC/161
K4PHE/160
W6TPR/160
W8BNF/160
WB4SV/160
K9HSC/153
W4OHC/150
OE2JG/149
VE4EW/145
W1VH/142
K4JNM/140
K7AOZ/140
KP4EBQ/140
VE6HT/140
WA7MCK/140
WA1KUL/138
K16DL/131
K5DEC/124
GW2CP/123
K2ZGC/120
WB9BIY/120

Radiotelephone

W5PQA/342
DL1KB/339
W4CWV/336
K8CFU/333
W9QG/332
DL7AA/328
K8DYZ/327
W6RGG/326
WB2HXD/328
OZ3Y/326
JA1MIN/325
SM6CWK/325
W5LZZ/325
W1AA/323
WA4MUB/323
DL8NU/322
JA2JW/322
W8ARH/322

W1FXD/322
K9MM/321
W9KRU/320
KV4FZ/319
W4JVV/319
JA1JRK/318
W9HZ/318
K4IKR/317
JA1BN/316
K4FJ/316
OA4OS/316
DL1JW/315
DK3PO/313
VE3AAZ/313
WB8EUN/309
DJ2AA/307
K6SVL/307
K6XP/307

JA7JH/306
W9OHH/306
W9BN/306
F5VU/302
JA1AG/300
W9BEK/300
W9SS/300
PY2BU/298
JA1DM/296
K6MA/294
WASREU/294
DL1MD/293
OE1ZGA/293
JA1RW/292
WA3HUP/292
W7VRO/290
W9LA/290
WA2EAN/289
W8LBM/285

YV5CWO/274
JH1HWN/272
N4CC/264
XE1CCP/263
EA3SA/261
N4RA/258
K3RPY/250
VE3FJE/250
VE4BJ/250
ZE1BP/248
W4PZV/247
W7ILR/242
VE3II/240
W1EED/239
W1GKN/222
VE3DU/221
EA3FP/220
WA7UVU/220

W9XM/220
HK3CLX/204
W2MOY/201
W3FZE/199
WA1UAD/193
W4EBO/183
K2YIY/180
VE3AO/178
W4LVM/178
F880/170
W8FYP/144
G55HJ/144
W3DQJ/140
WA7OIJ/140
K5DEC/124
W5KNC/123
K1PKT/119
WB2HJW/119

CW

W1DA/250
K9GN/215
W9ZM/215
W8AH/207
OZ7BW/205
JA1EMX/204
W9OHH/203
W8ZCQ/201

F3AT/200
DL6EN/216
SM5BHW/187
W6ID/182
W4BV/180
W4WSF/180

K5KEZ/3/180
K6AC/180
OE1ZGA/180
OZ3Y/180
DL1HH/172
W9BN/172

DL7AA/162
JH7BRG/161
WA6TLA/160
W4LVM/155
K6DSK/143
VE3DU/140

K8DYZ/139
K5TSQ/131
VE2EGC/120

Note: HB9AHA was incorrectly listed in the June Mixed New Members; this should have been shown at 103 in CW New Members.

DXCC NOTES

1) **RULE 9 IMPLEMENTATION.** Acceptance of retroactive credits to be added to DXCC records will soon be ready to be implemented in several stages. Thanks for your patience! Specific dates will be announced here and in future "DXCC Notes." (See January 1977 *QST* "DXCC Notes," page 76, for details on the new rule 9, which allows operation from anywhere within one's DXCC country to count for DXCC credits.)

Beginning November 1, 1977, only those persons now credited with 300 or more countries on any one of their DXCC records may submit applications based on the new rule 9. Beginning February 1, 1978, those persons now credited with 250 or more countries on any one of their DXCC records may submit applications. Special application forms (form CD-238) will be required, and can be obtained by sending a self-addressed, stamped (13 cents) envelope to ARRL headquarters. Watch *QST* for schedules for those below 250.

Brand new applications now made possible by rule 9 will be accepted beginning February 1, 1978. For example, if you have 55 countries confirmed from your old QTH in Arkansas, 23 different countries confirmed from your vacation last year to Maine, and 29 other countries confirmed from your new home in Utah - yes, you can now get one DXCC award by combining these credits to total 100 or more. These will be handled as regular new DXCC applications after February 1. Please submit them on a standard DXCC application form, not a special form CD-238 (which is to be used only by persons wishing to add to DXCC awards previously earned).

Five-band DXCC applications: The new rule 9 will be implemented for these beginning November 1, 1977. For applications received on or after November 1, 1969 from anywhere within one's DXCC country can count toward a 5BDXCC award. Use the regular 5BDXCC application form.

2) **SECONDARY CALL SIGNS NOW ALLOWED FOR DXCC.** Related to the new rule 9 is the implementation of this, as previously noted in "DXCC Notes," January 1977 *QST*. Effective November 1, 1977, an operator who simultaneously possesses more than one station location and more than one call sign in a DXCC country will be allowed to submit QSLs for contacts from any or all of these stations toward one DXCC from that country.

3) **SATLITE DXCC.** As announced in "DXCC Notes" in the April 1977 *QST*, a new DXCC award will be issued beginning October 3, 1977, to a station submitting 100 or more confirmations of contacts made exclusively by satellite. If more than one application arrives at ARRL headquarters during the first week, award numbers will be assigned on the basis of the earliest QSO date and time of the 100th country on each application. Pertinent DXCC rules will apply. This DXCC award will not be endorsable.

Strays

PHILATELISTS: A NEW STAMP FOR JAPAN'S 50 YEARS OF AMATEUR RADIO

Last year, the Japan Amateur Radio League (JARL) celebrated the 50th anniversary of its founding. This year, they are going to be celebrating that of amateur radio in Japan. Back in 1927, 12 amateur radio stations were legally authorized by the government of Japan. Today there are 320,304! In commemoration of this golden anniversary of Japanese amateur radio, a special 50-yen stamp will be issued in Tokyo on September 24, 1977. Full details are available from JARL, P. O. Box 377, Tokyo Central, Japan.

DXCC HONOR ROLL

The DXCC Honor Roll is comprised of those call signs which have been credited with at least 310 countries of the 319 current countries on the DXCC List.

Mixed

| | | | | | | | | | | | | |
|--|---|--|--|--|---|--|--|---|---|---|--|---|
| 319 W1BIH/360 W1HX/357 W2AGW/361 W2BXA/361 W2NUT/353 W2TP/346 W3KT/360 W4EX/361 W6AM/362 W6PT/352 W7MB/361 W7PHO/355 W8BF/358 W8GZ/360 W8LKH/356 W8PHZ/352 W9ZM/360 W0DU/359 4X4DK/355 | W2OKM/353 W2PV/337 W2SSC/351 W3LMA/357 W3LMO/348 W4EO/349 W4GD/355 W4OM/357 W5MMK/356 W5NO/345 W6BZE/354 W6KZL/351 W6ZO/355 W7GN/351 W7KH/350 W8DAW/359 W8OK/346 W8ZCQ/349 W9GIL/352 W0QGI/351 | W6CYV/352 W6EE/355 W6EL/337 W6ONZ/346 W7AQB/346 W8JB/353 W9BG/359 W9SFR/349 W9BW/355 W0ELA/357 W0SYK/352 | 315 DL3RK/350 DL7AA/355 I1ZL/344 JA1BK/341 JA1BN/338 JA1BRK/336 K4JC/337 K4MQG/337 K6GA/342 K6LGF/345 K6LU/339 K6RQ/343 K7GCM/341 K8DYZ/333 PY2CK/356 PY2PA/334 PY2PE/334 UR2AR/342 W1DK/352 W1HZ/351 W2AX/349 W2FXA/346 W2FZY/346 W2GLF/346 W2QHH/354 W2YY/341 W3DJZ/340 W3EUV/354 W3GRS/345 W3MP/355 W3WGH/348 W4AIT/356 W4BYU/351 W4QXB/354 W4SSU/341 | W4UG/336 W5GJ/340 W6ABA/335 W6BA/352 W6CHV/351 W6HX/356 W6ID/352 W6KTE/334 W6REH/338 W8ARH/336 W8EWS/357 W8GT/356 W9JUV/351 W9MQK/344 W9RCJ/345 W0LWG/343 W0PGI/349 ZL1HY/357 | 314 DJ7ZG/333 G5VT/352 HB9TL/348 IT9TAI/348 K2UVU/343 K4KQ/350 K4RPK/341 K4YYL/332 K5AAD/335 LU4DMG/348 OK1ADM/337 ON4NC/352 SM3BIZ/349 W1JNV/347 W2CP/338 W2GKZ/334 W2JUV/353 W2QK/336 W3CGS/351 W4EEE/348 W4IF/343 W4TM/354 W5EJT/338 W5FFW/348 W5LCI/343 W5QKZ/339 W6FF/346 W6GPB/353 | W6RGG/333 W6RKP/346 W6ZM/342 W7CMO/342 W7OF/348 W8DMD/353 W8CH/340 W9FKC/352 W9GFF/344 W9HB/346 W9WYB/345 W0BN/337 W0NVZ/344 WA2DIG/341 Y510/346 ZL3IS/345 4X4JU/347 | 313 DL7EN/347 G2BVN/349 GI3IVJ/346 I8KDB/344 K1RQE/330 K2YLM/331 K2YXY/339 K4ID/333 K4IKR/329 K5DX/348 K6EV/333 K6JG/332 K6KI/343 K8ONV/340 K8NCE/340 N6AV/332 ON4QJ/335 PY2CQ/332 PY2SO/332 VE5RU/343 W1DRJ/335 W2BHM/345 W5GK/332 W2PDB/342 W2PN/330 W3AFM/341 W3BWZ/326 W4ML/351 | W5GO/344 W5HJA/340 W6EPZ/352 W6EUF/330 W6KG/343 W6KNH/327 W6TZD/351 W7ADS/349 W9RKP/348 WA4WIP/330 XE1AE/340 YV5AB/349 YV5ANF/329 | 312 DL3OH/326 DL7HU/339 DL8NU/326 F9RM/339 I2KMG/330 IT9ZGY/343 JA1AG/343 JA1DM/341 K2BZT/347 K2PXX/334 K5QHS/326 K6WR/336 K8FF/335 K8OHG/335 LU5AQ/345 OH2BH/332 PY1HQ/346 PY1HX/343 PY7YS/340 SM5BHW/326 SM6CK/326 VE3MJ/329 VE3WT/330 VE5RU/341 W1AZY/343 W1CKA/340 W1FZ/348 W2AYJ/349 W2DX/336 W2GQN/331 W2GT/349 W2HO/346 WB2HXD/331 | W5GC/339 W5PWW/341 W5TIZ/343 W6CAE/349 W6HYG/342 W6ISQ/337 W6NJU/344 W8JQ/330 W8KPL/347 W9QLD/331 W0AUB/338 W0KF/346 YV5BBU/329 | 311 DJ5DA/330 DL2BOZ/346 G3HCT/339 G3JEC/326 G4ZA/330 K3BW/342 K8LZ/338 K4DV/337 K4VW/337 K6RN/337 K6ZM/335 K8LSG/338 K9KA/323 K9MM/323 K4V4F/323 N4WF/323 SM6AEK/327 SM6AJU/340 UA9VB/333 VE3AAZ/341 VK4QM/351 W1YRC/322 W2CY/350 W4BJ/340 W5FT/345 W5OB/338 W6OD/327 W6FW/329 W6PO/342 W6YK/346 W8LY/340 W9ILW/334 W9ZTD/335 W0AID/343 W0BK/337 W0ATP/324 WA4MUB/324 WA9NUQ/326 YV5AIP/337 | W5UX/344 W6KZS/331 W7QK/342 W8CUT/336 W8KBT/342 W9TKD/339 W0GKL/341 WA6EPQ/333 |
|--|---|--|--|--|---|--|--|---|---|---|--|---|

Radiotelephone

| | | | | | | | | | | | |
|--|-------------------------------------|--|-------------------------------------|--|--|---|--|---|---|---|---|
| 319 W2BXA/359 W2TP/343 W4EX/359 W8BF/358 W8GZ/360 4X4DK/355 | W4QCW/347 W9ZM/346 WA4WIP/330 | 316 F9RM/339 K2FL/341 W2PV/336 W5IO/352 W8MPW/343 W9NZM/338 | W9DWQ/336 W0BW/348 WA2RAU/334 | 313 DJ7ZG/332 DL7FT/332 G5VT/351 GI3IVJ/344 HB9TL/346 I8KDB/344 K4JC/331 K4MQG/331 K4YYL/329 K6LGF/340 LU9DAH/342 SM3BIZ/347 VE3QA/346 W2GK/331 W3DHH/344 W4UG/333 W6REH/333 W6ZM/336 | W8CJU/335 W9RNX/347 W0CM/348 W0GAA/334 XE1AE/340 YV5AB/349 YV5ANF/329 5Z4ER/352 | 312 I0ZV/337 JA4ZA/326 K8DR/329 K9CEC/338 ON4DH/345 UR2AR/331 VE3MJ/329 VE3MR/333 WIDGJ/334 | Y510/337 ZP5CF/345 W1HX/341 W4OM/346 W4SSU/335 W5GC/339 W6EUF/328 W6PT/335 W9SFR/336 WA8AJI/331 YV5BBU/329 | 311 DJ2YI/344 IT9JT/325 K1XG/336 K5DX/341 K5GOT/330 K7GCM/334 OK1ADM/329 VE3WT/329 | W2FGD/331 W2LV/342 W3AZD/333 W2GQN/326 W2HTI/344 W3JK/328 K4HEF/337 W6KNH/325 W6KTE/330 W9QLD/325 W9GKL/340 | 310 DL7HU/335 EA4JL/324 F2MO/331 G3JEC/326 I2KMG/328 I6FLD/335 I8AA/326 IT9GAI/324 | JA1BK/334 JA8ADQ/328 K6GC/324 K6JG/325 K6WR/334 LU4DMG/344 N4WF/323 ON4DM/347 T12HP/350 YV5AIP/337 YV5AJK/335 YV5AQ/330 W2XX/344 WA2EQ/328 W3GRS/332 WA3ATP/323 W4JWC/330 W5NO/325 W5WG/334 W8GKM/322 WA9NUQ/326 W0MLY/340 |
|--|-------------------------------------|--|-------------------------------------|--|--|---|--|---|---|---|---|

CW

| | | | | | | | |
|-------------------------|-------------------------|------------------------|------------------------|------------------------|-------------------------|------------------------|-------------------------------------|
| 268 W9KNI/270 | 263 K4YFQ/265 | 256 K6GA/258 | 252 K9MM/252 | 239 W6PT/240 | 232 OZ1VY/232 | 226 W3KT/226 | 223 K3FN/223 K4LRO/223 |
| 220 K2TQC/220 | 219 K4PI/220 | | | | | | |

Strays

DINNER TO HONOR PFEFFER

□ Nat Pfeffer, W2AIM/W6FZ, will be the guest of honor at a testimonial dinner at Luchow's Restaurant in Manhattan on September 14. Cosponsored by the QCWA

and the Radio Club of America, the dinner will be held in appreciation of his outstanding service to amateur radio and QCWA. Nat is director and activities manager of the Metro Chapter of QCWA and activities manager of the Radio Club of America. David W. Winter, W2AUF

FISHERIES EXHIBIT SITE OF SPECIAL STATION

□ The Halifax (NS) Amateur Radio Club will operate a special station from the site of the World Fisheries Exhibition in Halifax from August 31 to September 7. In keeping with the theme of the event, the special call sign CF1ISH (Sea Fish) will be used. We will QSL all stations sending us a card and s.a.s.e. or IRC. Please QSL via VE1FO, Halifax ARC, P. O. Box 663, Halifax, NS B3J 2T3, Canada.

1977 Novice Roundup Results

New states and countries provide some February fun.

By Jim White,* K1ZX

Novice Roundup . . . Novice roundup . . . it's hazy, but still I remember it well. It was the second weekend and I was out in the rain putting up a dipole so I could get on 40 and 80 to chalk up a few more QSOs. (I never dared venture onto noisy 40 or 80. Besides, at the top of the sunspot cycle there was always something to be worked on 15 — oh well, almost always.) Getting on the bands sure helped my score. My QSO total went up and I caught a few "close-in" multipliers as well. Those NR QSOs increased my code speed and my hope for a Worked-All-States Award as well.

The story was much the same for many of this year's Novice Roundup participants. Finally, the reason was there to fix the antennas, to tweak up the rig, to get that code speed up so that a General ticket wasn't too far away. Mac, WB0PTJ/N, seems to have said it all: "I had always avoided those crowded, noisy periods on the bands, but now I must confess it was a blast! I definitely learned a few things about an operator's skill." We won't say we told you so, but . . .

For a second year in a row the NR's top scorer came from four-land, this year from Tennessee. Paul, WA4SCL/N, walked away from the rig with a score of over 65,000 points. Not only did he catch a WAS, but a WAC too. His homebrew beam on 15 helped him garner 23 DX multipliers. In the overall standings, number-two slot goes to Technician WB2DFY making use of his Novice option to score over 57 kilopoints. Not far behind at 56k was

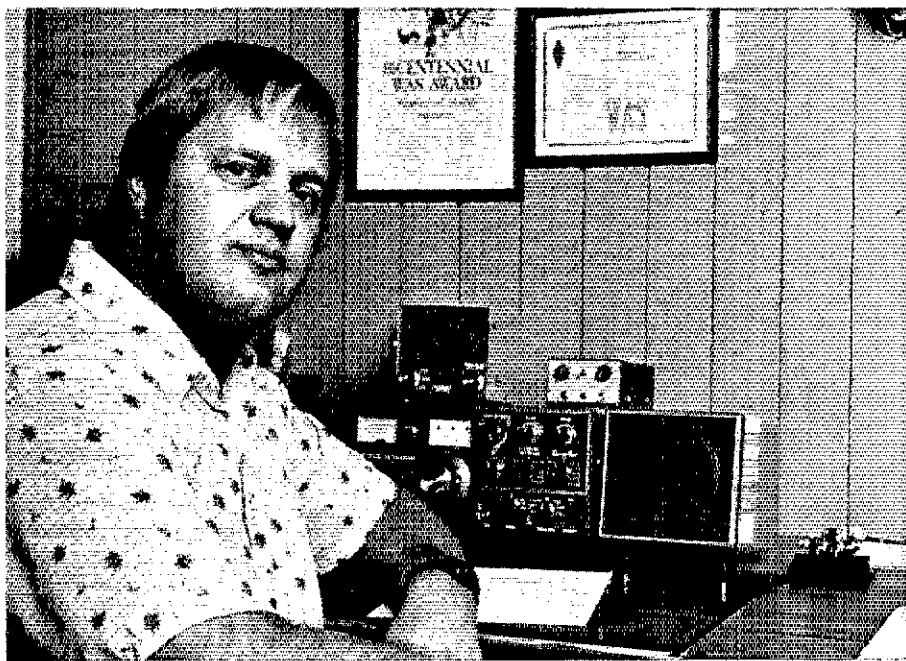
WB0NFY, also a Tech, operating /5 in Texas. Two excellent showings, Ed and Ken.

Total logs were up considerably from last year's 392. In fact, returns totaled 614 logs, up over 50 percent from 1976. Things are on the upswing. The number of hams coming into the hobby is up, and there was good participation from Technicians. Participation by Techs WB2DFY, WB0NFY and WB5POP (all overall top-tenners) shows us they are still finding the low bands fun.

As always thanks are due the non-

Novice participants. Their getting on makes it possible for Novices to run up big scores. Thanks also to those DX stations who took the time to look up the band and have that patience so necessary in the NR.

Some comments received remind us that all Novices are not necessarily new hams. The FCC now allows the holders of Novice tickets a chance to retake the exam. Perhaps it isn't fair for those Novices (who aren't neophytes) to be competing with other "brand new" Novices. Similar comments about participation by Technicians were heard. If



Kansas section and Midwest division leader WB0SPL (your editor notes the Bicentennial WAS award on Bob's wall).

*Communications Assistant, ARRL



Resisting the urge to ragchew, Bonnie, WB6SZH, managed 87 contacts and 33 sections, taking sixth in the LA section.

you feel that perhaps another category should be adopted or that there should be some other method of scoring for re-licensed Novices and Technicians, let us know! The format of our contests is decided on by you the participant. Got some ideas? Write to the Contest Advisory Committee, c/o ARRL headquarters.

Soapbox

I worked more stations in one week than I usually work in a year. (WB7ATZ/N) Couldn't think of a better smoke test for my new transceiver. (WB4KYT/T) High point of NR was my last QSO with JA3HZT, giving me Novice WAC. (WB4KZL/N) My long wire attacked two elderly women walking down the street and my algebra assignment only got longer. (WB0SYV/N) I hope you print this comment in your results. (KL7IFP) Whether I'm /N or not, see you next year in the NR. (WB8ZRL/N) DX this year was much better. (WB2DFY/T) Woke up Sunday morning to receive 559 report from DJ0NH/P, only to find my dipole had been badly mangled by

the previous night's storm and was lying on the ground. (WB4WXA) Was glad to see many fellow Techs out there. (WB2GTP/T) In spite of my rotten luck, it was fun. (WB7FFJ) My most frustrating moment was answering a VPI's CQ on 80 meters — only to hear an S9 WB8 station come back calling CQ NR. (WB8VEF) I feel like I could handle anything that came along after '77 NR. (WB0SPL) [See you in the November SS. — Ed.] The greatest thing for improving cw proficiency I have come



Southern New Jersey section leader WA2HXG pulled in 66 sections and 331 QSOs, giving Rob better than 21k.

Division Leaders

| Novice | Division | Technician |
|--------|--------------|------------|
| WA3ZLP | Atlantic | WB2DFY |
| WB9SAD | Central | WB9VIO |
| WB0VGN | Dakota | WB0UVD |
| WA4SCL | Delta | WB5POP |
| WB8JYF | Great Lakes | K8DHK |
| WB2JGQ | Hudson | WA2UKP |
| WB0SPL | Midwest | WB0QZY |
| WA1YDK | New England | WA1NHE |
| WB7EME | Northwestern | WB7ONV |
| WA6OEF | Pacific | WB6EQS |
| WA4VXG | Roanoke | WB4KIV |
| WB5SZL | Rocky Mt. | WB0UNU |
| WB4YHF | Southeastern | WB4NZA |
| WB7ERC | Southwestern | WB7FCE |
| WB5SDN | West Gulf | WB0NFY/5 |

Top Ten

| Novice | Technician |
|---------------|-----------------|
| WA4SCL 65,088 | WA2DFY 57,190 |
| WB8YJF 55,426 | WB0NFY/5 56,052 |
| WB5SDN 52,022 | WB5POP 46,096 |
| WB7EME 49,842 | WA2UKP 30,552 |
| WB2JGQ 48,015 | WA5IYX 25,690 |
| WB7CFL 45,885 | K8DHK 25,259 |
| WB5SZL 45,068 | WD8CMH 19,836 |
| WA6OEF 44,375 | WA1NHE 19,093 |
| WB5USV 43,736 | WB0QZY 18,840 |
| WB8VVE 40,807 | WB0UNU 17,670 |

in contact with. (WB1APT) Now I know why some hams go "contest crazy," gud fun! (WB3DQY) NR was a lot of fun but I couldn't get on when I wanted to due to school work schedule. (WB3FNZ) Enjoyed the privilege of being able to work the Novice Roundup as a Technician. (K8DHK/T) I know you have lots of soapbox to read, so tnx for FB contest. (WA4KTA) Ham radio is relaxing, really relaxing, when your father starts his electric razor during QSOs with weak DX stations. (WA4UYD/N) The characters NR on cw sometimes managed to come out as a slant bar — producing some very interesting combinations. (WB8WRL/N) Due to the fuel shortage I had to walk a quarter of a mile to use the john. (WD8CRT, op W8UMD/N) [That's devotion. — Ed.] NR's code practice enabled me to pass my Advanced test. (WB7OUO) Everything was going fine until the middle of the week when I got the mumps. (WB1ALW/N) After the first evening I thought "this is fun?" After the week was over and I had worked three new states including Wyoming my thoughts were "this is



Fourth place in the highly competitive Michigan section was nabbed by Durette, WD8CEN.



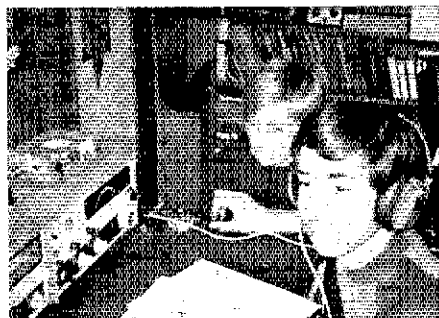
Many appreciated QSOs came from Earl, KL7ISX.



Paul's neat layout was instrumental in the WB3CMY total of 4,3k.



One of many Technicians joining in the NR this year was John, WA7ATU.



Brothers WA1WTB (Steve) and WB1AMQ (Mark) both from the Connecticut section.

fun!" (WB0TPQ) Couldn't stay up very late on school nights so I did the best I could in the afternoons. (WB9UER) Nine days of TV-dinners, TVI and a parakeet that imitates CQ NR CQ NR. (WB9SDA) [Wait 'til you get on phone. - Ed.] Can't wait for SS. (WB0VDY/N) After reading about the lack of KL7s in previous contests I decided to give NR a try. I was only able to log 100 QSOs. Now if you'd only point your beams my way. (KL7IKO) God bless KL7GN. (WA4OUT/N) TNX to KL7GN, who visited the Novice bands. (WA4VKD/N) Enjoyed the snappy exchanges. (KL7GN) I am firmly convinced that KL7 is a figment of someone's imagination. (KZ5BAN) Sorry I'll only be a

Novice once. (WA4OFW/N) Answered a weak, chirpy, drifting "CQ NR" on 15 and became WD9ARM's first contact. Since I'm an instructor I had some "First Contact Club" certificates and sent him one. (N6DE/WB6DJP) Worked Alaska and what I thought was the nonexistent state of Nevada. (WA4VXG/N) After finding out that I couldn't break a North Dakota station with my ground mounted vertical, I braved the 15-degree weather to go up on my roof four times to put up a 15-meter dipole. Brrr. I never did hear another North Dakota but my first contact on the new antenna was VE5LY, and the dipole brought in a lot of 6s and 7s to help my multiplier total.

(WB3FAF/N) [That was 15°F I take it! - Ed.] Sunday night my hand was dead. (WB4DHC/N) When's the next one? I'm ready any time. (WD8DVE/N) My score is far from being competitive, nonetheless I really enjoyed the '77 NR. (WD8BPH/N) I was very impressed with the operating ability and good manners shown by the Novices and Technicians in the NR. (W7KJA) Can't wait to pass the General and enter other ARRL contests. (WA1VVA/N) After looking for Wyoming for eight months I found it during the NR. (WA4AME/N) Very few stations heard on 10 meters - feel certain more contacts could have been made if there were more people on 10. (WA3UJE/T) The NR gave me a big boost on my code speed and with a little help I'll have my General. (WB9UKK/T) Heard a few /G.../A... and even a few /Es. (WA51YX/T) It was terrific! (KH6JBX/N) Numbness is the word. (WB0UFB/N) I used to laugh when I read the comments about rigs blowing up, etc. I don't laugh now - my finals went gassy and I had to operate the remainder of the NR running about 2 watt. (WA2HXG/N) After 30 hours in my converted coal bin shack working the NR, I am really beat... almost too much for us over-50 boys. (WB9UZQ/N) Can't complain about nine new states. (WB2JFO/N) [Ed.]

| U.S.A. | Vermont | Western Massachusetts | Eastern New York | N.Y.C.-L.I. | Northern New Jersey | Southern New Jersey | Western New York | Alabama | Georgia | Kentucky | North Carolina | South Carolina | West Indies | Arkansas | | | | | | | | | | |
|--------|----------------------|-------------------------------|---|--|---|--|------------------|--|---|------------------|--|--|-------------|--|---|----------|---|---|-------------|----------------------|-----------------------------------|----------|---------------------|------------------|
| I | WB1ABQ/N WA12VC/N | 3535-101-35-23 215-21-13-6 | WB2EJO/N WB3DK/T WA2ISG/N WB2JFO/T WA2JIC/N WA2EKF/N WA2KDL/N WA2GKX/V WA2ITH/N WA2FQK/N WB2ILY/N WB2SGS/T WA2ISW WB2FVY/N WA2FJO/N | 13,104-273-48-29 11,327-266-55-30 11,374-252-47-29 10,011-798-47-20 7,326-188-37-23 6,786-174-39-24 6,579-153-43-25 5,181-147-33-16 3,640-88-30-22 1,587-69-23-10 1,488-52-24-23 881-37-23-22 792-24-18-5 612-26-17-5 260-20-19-24 | WB3FRX/N WB3CPH/N WB3ODR/N WB3CIM/N WB3DXZ/N WB3BQU/T WB3KZ/N WB3DJM/N WB3DER/N | 7446-145-51-19 6218-130-43-15 3410-100-31-11 3286-88-37-22 3060-92-30-22 2528-75-32-19 2040-68-30-17 570-30-19-19 532-28-19-11 | Northern Florida | WB4QBB/N WB4FAJ/N WB4YUJ/N WB4AUC/N WB4YKQ/I WB4QGW/N | 20,416-332-58-15 3570-3-34-28 3,306-73-28-18 3232-101-32-8 3078-57-54-19 852-32-21-1 30-8-2 | Southern Florida | WA4V5B/N WA4AME/N WB4YEZ/N WB4YUJ/N WB4NAZ/T WB4ZOB/N WB4MWA/T WA4GQS/N WB4ICD/N WA4UQM/N WA4VZC/N | 22,177-331-67-23 21,528-302-50-27 20,760-335-60-36 18,300-229-68-30 18,400-152-46-16 5544-126-44-16 5390-110-49-14 3390-95-49-15 2700-80-30-21 2048-64-32-20 1034-4-22-21 432-24-18-8 | Tennessee | WA4SCL/N WA4DUT/N WA4QSH/4T WA4RXV/N WA4UJN/N WB2TK/N WB4CJN/N WB4UPJ/N WB4QBL/N WA4BXT/N WA4IQL/N WB4YSJ/N WB4UQM/N | 65,088-678-96-29 24,012-338-55-28 14,331-271-51-16 4,190-258-59-13 4,168-253-59-12 3472-81-57-16 4524-116-39-12 3531-107-33-26 2765-79-35-18 1885-50-29-5 816-39-21-4 576-21-16-2 180-14-12-3 | Virginia | WB4VCR/N WB4RMJ/N WA4ZLN/N WA4UYD/N WA4NTP/N WB4GQT/N WB4SRI/N WB4YVU/N WB4SHP/N WB4QW/N WB4SRI/N WB4YVU/N WB4YVU/N WB4PCH/N WB4SRI/N WB4WDM/N WB4ZLN/N | 20,961-411-51-30 20,097-318-53-29 14,456-219-56-23 13,664-229-56-27 11,571-158-57-27 11,000-235-44-24 9245-214-43-29 5616-129-39-18 4400-100-40-20 2670-89-30-9 2235-73-30-27 1925-62-25-11 1581-51-31-25 1296-48-27-7 561-21-5-18 408-24-10-10 100-20-15-4 | West Indies | KP4ECE/N KP4ENS/N | 17,640-290-58-19 4074-97-42-12 | Arkansas | WB5YV/N(WB5MN,opr.) | 18,239-299-61-21 |

| | | | | | | | | | |
|--------------------|------------------|---------------------------|------------------|----------|------------------|----------------------------------|------------------|---------------------|------------------|
| WB5UJE/N | 8694-161-54-17 | WB6PRU/N | 1265- 55-23- 4 | WB88HE/N | 22,080-368-60-20 | WB9YJF/N | 1024- 32-32-17 | Nebraska | |
| WB5VMZ/N | 1652- 59-28-17 | WA6RLA/N(+WA6RIR) | 40,034-541-74-30 | WB88EM/N | 15,370-265-58-29 | WB9VWC/N | 850- 34-25-16 | WB9QPA/N | 19,200-305-60-30 |
| WB5WZU/N | 925- 37-26- 7 | | | WB88EN/N | 15,240-252-60-26 | WB9UXW/N | 527- 31-17- 6 | WB9SMR/N | 15,252-246-62-30 |
| Louisiana | | San Diego | | WB88EA/N | 14,152-232-61-23 | WB9ARM/N | 384- 24-16- 6 | WAGMRH/T | 7700-154-50-26 |
| WB5UWI/N | 21,514-386-53-21 | WA6T XO | 27,135-405-67-24 | WB88EB/N | 14,124-232-61-23 | WB9AWT/N | 263- 24-16- 6 | WB95Y/N | 1,450- 43-23-13 |
| WB5WZA/N | 12,240-204-60-16 | WB6CWT/T | 3040- 85-32-11 | WB88EC/N | 10,944-218-48-29 | WB9BWE/N | 28- 7- 4,12 | WB9RHJ/N | 2340- 70-32-19 |
| WB5TEQ/N | 9840-164-60-26 | WA6CWN/N | 1830- 51-30-13 | WB88ED/N | 10,707-238-43-30 | K9HWI/N(WB95 WLQ, YSR, ZDD, KPR) | 1012- 46-22- 0 | | |
| WB5VGV/N | 6624-128-48-19 | | | WB88EE/N | 992-229-45-19 | | | | |
| | | San Francisco | | WB88EF/N | 9300- 71-50- 0 | Indiana | | South Dakota | |
| Mississippi | | WA6VMG/N | 3627- 93-39-28 | WB88EG/N | 8554-182-47-30 | WB9UXQ/N | 13,367-532-61-30 | WB9VGN/N | 27,216-363-72-17 |
| WB5POP/T | 46,094-436-86-26 | | | WB88EH/N | 7800-140-52-21 | WB9VQO/N | 15,620-400-61-23 | WB9TGO/N | 15,252-246-62-30 |
| WB5ZKR/N | 25,047-363-69-29 | | | WB88EI/N | 552-118-44-14 | WB9TJR/N | 23,694-344-66-30 | WB9TGU/N | 587- 41-53-50 |
| WB5TJM/N | 5520-115-40-13 | | | WB88EJ/N | 5845-38-19 | WB9TJL/N | 18,370-312-59-30 | WB9TYU/N | 984- 41-24-15 |
| WB5TUJ/N | 2912-104-28-15 | | | WB88EK/N | 5535-123-45-30 | WB9TJN/N | 13,338-234-45-24 | | |
| WB55YP/N | 42- 7- 6- 2 | | | WB88EL/N | 5248-128-41-10 | WB9TJQ/N | 11,160-220-56-17 | | |
| | | San Joaquin Valley | | WB88EM/N | 3663- 99-37-25 | WB9TJR/N | 6536-194-44-17 | | |
| | | WA6OEF/N | 44,375-605-71-30 | WB88EN/N | 3068-99-37-28 | WB9TJL/N | 6688-142-44-19 | | |
| | | WA6PAK/N | 925- 37-25- 5 | WB88EO/N | 2070- 69-30-15 | WB9TJM/N | 4929- 83-53-28 | | |
| | | | | WB88EP/N | 1156- 34-34-15 | WB9TJN/N | 4602- 78-59-22 | | |
| | | Sacramento Valley | | WB88EQ/N | 1128- 47-21-17 | WB9TJQ/N | 4400-100-44-13 | | |
| | | WB6STU/N | 5120-118-40-22 | WB88ER/N | 1045- 45-19-14 | WB9TJR/N | 3666- 34-38-20 | | |
| | | WB6PJZ/N | 1375- 55-25-21 | WB88ES/N | 1595-10-60-19 | WB9TJL/N | 1840-116-30- 3 | | |
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| | | Pacific | | WB88EU/N | 780- 39-20- 5 | WB9TJQ/N | 3090-103-30-10 | | |
| | | KH6JRX/N | 4410- 98-45-30 | WB88EV/N | 780- 39-20- 5 | WB9TJR/N | 2829- 69-41-19 | | |
| | | KH6IRI/N | 3196- 94-34-30 | WB88EW/N | 548-29-18- 6 | WB9TJL/N | 1495- 65-23-14 | | |
| | | | | WB88EX/N | 13,395-235-57-30 | WB9TJM/N | 208-16- 8- 5 | | |
| | | | | WB88EY/N | 10,464-208-48-18 | WB9TJN/N | 150-15-10- 6 | | |
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Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1BTV, Nicholas Abbenante, Cranston, RI
 WA1CQI, Irving W. Bush, Gloucester, MA
 W1EHT, Harry A. Gardner, Hancock, NH
 W1EUL, Carlton F. Stewart, Brookline, ME
 W1JFR, Harold C. Maxfield, Danvers, MA
 W1NWF, Selwyn C. Reed, Stamford, CT
 K1VMF, N. Michael Luksha, West Boylston, MA
 W1YZC, John T. Blanchard, Winchester, MA
 WA2CCI, Robert E. Dinet, Rochester, NY
 W2CNM, Harold R. Johnson, Floral Park, NY
 WB2GCF, Elliott Doan, Bayport, NY
 W2HDO, William E. Maphis, Binghamton, NY
 W2HE, Dr. Henry Jasik, Westbury, NY
 W2IKT, Harold R. Cooper, Park Ridge, NJ
 WB2KPP, Charles Sottile, Emerson, NJ
 Ex-WA2NBB, Santo P. Sava, Syracuse, NY
 WA2QHI, Jean J. Anania, Fairlawn, NJ
 W2QIE, Fred J. Krell, Dover, NJ
 WA2UPZ, Raymond F. Vondran, Sr., Roselle, NJ
 W2ZFN, Edwin M. Meers, Pawling, NY
 W3QS, Philemon W. Ricketts, Glenside, PA
 WA3WWI, Seaton Schroeder, Villanova, PA
 W4AMK, John D. Askew, Atlanta, GA
 K4ESD, Forrest E. Rice, Glasgow, KY
 W4GK, Aug A. Nickel, Matthews, NC
 W4ID, Alfred R. Marcy, Eau Gallie, FL
 K4KDM, Donald W. Vary, Holmes Beach, FL
 WB4KIL, Julian G. Marty, Humboldt, TN
 W4MKM, Charles H. McKnight, Kilmarnock, VA
 WA4SIY, Harry G. Lindsay, Melbourne, FL
 WA4TFA, William B. Hankinson, Jr., Atlanta, GA

WA4VKL, Rexford M. Morris, Aiken, SC
 WA4WEV, Mark S. Skeffington, Winter Haven, FL
 WA4YLT, Fred F. Pepper, Walnut Cove, NC
 WB4YWJ, Vivian F. Fisher, Stanley, NC
 K5AFG, Edwin E. Sewall, Dallas, TX
 W5FSC, Ervin J. Beck, Caldwell, TX
 W5GHB, Ralph N. Weekes, Port Arthur, TX
 W51VU, Henry N. Dittrich, Alief, TX
 W5KU, Edwin D. Nuttall, Shreveport, LA
 WB5LYA, Alphonso Tovar, El Paso, TX
 W5MJ, Frank R. Clegg, Beaumont, TX
 K5ODU, William C. Thurman, Lewisville, TX
 K5QLF, Louis H. Staples, Alexandria, LA
 K6APH, William G. Crist, Colton, CA
 K6AQA, Robert B. McIntosh, Goleta, CA
 WB6BGT, Otis K. Lo Velte, Stockton, CA
 WN6BNF, V. LeRoy White, Redlands, CA
 W6CRX, Samuel J. Lawrence, Los Angeles, CA
 WA6DDH, Mario R. Benjamin, Oakland, CA
 K6DOD, James S. Gwathmey, El Cajon, CA
 WA6DXX, James G. Fenston, Fresno, CA
 W6DZJ, Harold M. Boring, Los Angeles, CA
 K6EF, George D. Sackman, Pomona, CA
 Ex-W6FOH, Claude R. Oliver, Napa, CA
 W6IV, Tom E. Atherstone, Boca Raton, FL
 W6KQQ, George W. Thunen, Oakland, CA
 W6TPM, Harold S. Powell, Anaheim, CA
 K6TJM, Edward Colmans, Gardena, CA
 W7ANB, Harry S. McElfresh, Yuma, AZ
 K7AXG, Clyde A. Briggs, Umpqua, OR
 K7JKT, Charles P. Adcock, Roberts, MT
 WA7MSG, Edward F. Stevens, Jr., Seattle, WA

W7TUX, Reid J. Brooke, Molino, OR
 W8DGT, Ivan D. Stewart, Cincinnati, OH
 W8DYQ, Leslie C. Conant, Port Huron, MI
 W8EB, Ellison E. Aker, Strettsboro, OH
 W8EDL, Harry M. Riddle, Toledo, OH
 W8GNL, Ralph W. Harris, Hartsville, OH
 K8HCO, Carl L. Smith, Copley, OH
 K8HID, Talmadge D. Foster, Jr., Tornado, WV
 K8IRU, Frank Parker, River Rouge, MI
 WD8JKS, Kenneth E. Jinkens, Oregon, OH
 W8OPM, Michael G. Innat, Cleveland, OH
 WB8TBP, Jack M. Brown, Eastlake, OH
 W9AD, Herbert S. Brier, Chesterton, IN
 W9CCH, Alan H. Story, Lincolnwood, IL
 WB9CHL, Fred E. Retzlaff, Wauwatosa, WI
 W9CWB, Martin A. Yuriga, Gary, IN
 K9DWV, Bruce Lehman, Lansing, IL
 K9EEE, Dorothy E. Blystone, LaPorte, IN
 K9HUI, William A. Kofras, Kokomo, IN
 W9IWI, Ralph W. Duke, Kokomo, IN
 WB9JJM, Michael A. Biedron, Cicero, IL
 WB9JZX, Charles M. Kraemer, Crystal Lake, IL
 W9PWQ, Lloyd K. Ellis, Wanatah, IN
 WA9UMK, Julian M. Brown, Oden, IN
 W9BQI, Edward F. Goodberlet, St. Louis, MO
 W9BVV, Frederick A. Wade, Independence, MO
 K9GYE, R. C. Omer, Warsaw, MO
 WN9IOE, Randy A. Ellason, Harcourt, IA
 K9KKP, Jerry D. Novotny, Omaha, NE
 VE7ABR, C. M. Sculthorpe, Parksville, BC
 9Q5GE, Dr. Glen J. R. Eschtruth, Zaire, Africa

50 Years Ago

September, 1927

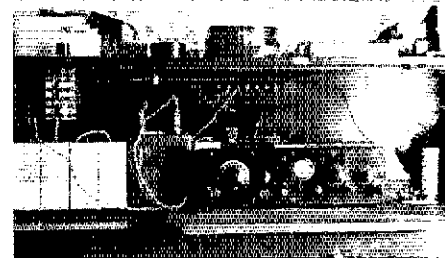
- The Berne (Switzerland) Bureau has now published the numerous proposals from participating countries as to what should be included in new international radio regulations to be formulated during the Washington conference later this year. The United States view is generally in strong support of amateur radio, but other nations are less enthusiastic or even negative; one proposal would prohibit private communication entirely.
- David Grimes argues that we can obtain considerable improvement in selectivity if we tune the plate circuit of our t.r.f. stages to the second harmonic of the input frequency.
- Technical Editor Kruse takes us through the process of editing and producing the final version of an article for *QST*, explaining the many steps involved and why it takes so long.
- Op3AA (for Oceania-Philippines) took along a complete ham station in a Ford coupe for his sojourn in Europe, and by describing the suspicious-looking gear as a new "pretzel-bender" was able to get through customs and operate in a number of countries.
- 9BHR describes a compact UX210 Ultra-udion circuit rig he built, and his hints on construction and adjustment provide good tips to apply in our own stations.
- Near the Hq. building is a factory turning out "web" resistances by weaving on a loom, and Kruse takes us on a tour through the plant.
- General Counsel Paul Segal, 9EEA, writes on "Municipal Ordinances on Radio Transmission," destined to become a classic, affirming that radio communication *per se* is interstate commerce which can be regulated only by the Federal government, and thus towns and cities cannot tax or license amateur stations.
- Shipboard op Oliver Wright has designed a neat circular slide rule for the world's time zones.

25 Years Ago

September, 1952

- The Editor expresses alarm at a new FCC proposal which would establish segments of our bands for calling and answering purposes only (e.g., 3500-3510 on 80 c.w.), with a maximum of four CQs. If you get an answer, you both move elsewhere in the band for QSO; if not, you wait five minutes before another CQ.
- Perhaps foreshadowing the "tuna tin" approach, W1FTX has used an aluminum measuring cup to house an absorption wavemeter for the Novice, who still has trouble with harmonics on his pi-network rig.
- Canadian and U.S. amateurs can now get permission to work mobile in the others' country under simple application and registration procedures.
- The thermocouple ammeter is rather expensive, but to get an equally reliable indication of r.f. output, W1DF shows us a circuit rectifying a sample of the energy and reading the result on an ordinary d.c. meter.
- We may get a shock from W6HPV's summary of the Underwriters' Rules when we compare them with procedures in use at our own stations, undoubtedly considerably more liberal.
- W5DF's backyard looks like a small forest, with a number of quarter-wave verticals at 7 Mc. reaching for the sky; a switching system allows any three to be selected for a parasitic array in one of several directions.
- Groundplane antennas have such a low driving-point impedance that matching is difficult, but W2AFG shows us some ways to solve the problem.
- W5FKQ continues the search for super-selectivity, and describes his version of the "ultimate" in receivers.
- W1HDDQ's 50-28-21-Mc. exciter design will be particularly useful to the 6-meter enthusiast who wants to use 10 for comparing notes while waiting for an opening on the higher band. — *W1RW*

Strays



Although he has been a Silent Key for more than two years, the memory of Powell May, W4FX, lives on through this photograph of his homebrew superregen receiver/transmitter. Built in 1932, he christened it "Little David." The photo, which Powell May used on his QSL card for many years, is all that remains. — *W4SGJ*

DONATIONS NEEDED

□ Three years ago in Hayes, KS, a man lost his life because his wife, in a panic during his heart attack, tried to call for help on their CB with the squelch set on maximum. She also forgot to give their location, thwarting the efforts of the Ellis County Emergency Service, which is trying to prevent similar mishaps. Donations of old parts and of operation manuals, along with advice, is requested to help them modify an ARN-6 radiolocator device for "Project Lifesaver." They need 12SK7, 12SQ7, 12SX7, 12SY7, 2050 and 26A7 tubes, and need the manual or schematics for the ARN/6 series including R-101, AS-131 and ID-91. Contact Lou Hinshaw, WB9NRU, Box 522, Hays, KS 67601.

Contest Troubles

Not so long ago, in this column, we told you about our DXCC troubles. Now we want to tell you about our contest troubles. Yes, contesting has for many years been popular among amateurs, and is becoming more so. Unfortunately, the more popular it becomes the more QRM it causes, thus making it more unpopular with other amateurs. And so the proponents line up against the opponents and the battle lines form, with the average amateur in the middle. 'Tis ever thus.

Just how popular are contests? Well, in 1976 in ARRL-sponsored contests alone, we estimate participation at approximately 25,000. How do we arrive at such a figure? It's really just an educated guess. The actual count of contest logs received was 10,449 (not including FD), plus 16,120 FD participants. Of course, a quite high percentage of those submitting logs did so for more than one contest, but on the other hand quite a few people participate without sending in logs. If we assume these two factors more or less balance out, 25,000 should be a pretty educated guess.

Is this a lot? Maybe not compared to the total number of amateurs, but compared to the total of those engaged in any other form of operating activity, it's very high, maybe the highest. Competition is the name of the American game, and participants will flock to it. It is also characteristic that those not interested in it will react to it in a highly negative manner.

But just as in any competition, there must be rules, and that's where a lot of the trouble lies. Smart alecks like to say that rules are made to be broken, but they are just the kind of people who make rules more and more complicated. In the beginning, a set of contest rules may be simple. Then someone uses a "gimmick," a way to get around the intent of a rule — an intent which the gimmicker realizes full well. So the rule has to be rewritten to eliminate this particular gimmick. Then someone finds another loophole and tries to crawl through it. The rule is rewritten again, to close this one. This process is repeated again and again, until eventually the rule becomes so complicated that not even the rule-writer can understand or interpret it.

We could regale you with quite a few horror tales of rules evolution through the years — especially Field Day, an activity with so many facets that rules must be complicated *anyway*, and become ever so much more so when "sharpies" try to find ways around what they know full well to be the intent. To some, finding ways to circumvent the rules is part of the fun of any contest, so that they will have an unfair advantage over the poor slob who is slugging away honestly. This is the kind of intellectual precocity which, it seems to us, we could somehow manage to struggle along without. But we suppose we shall always have it.

So, what's to do? The rules have to be written in the English language — a limited

medium for expressing an intent (but probably less limited than any other language). Every word has a definition (or several!), no two of which are *exactly* the same. Oh yes, there are what we call synonyms, words that can be used interchangeably, but for a language to retain its basic integrity each word must express a different *shade* of meaning, even synonyms. The problem is that the only way to define words is in terms of other words, each of which themselves have one or more definitions in terms of *still* other words, and by the time you get through chasing them all down as often as not utter confusion reigns. Modern dictionaries try to get around this by demonstrating usage of synonyms, and this is commendable and progressive but not a cure-all. You have to learn to *feel* what a word means; you cannot accurately express it in terms of other words. And wouldn't you know it, verbalists are prone to disagree even on this.

All this being the case, how, then, does one go about expressing a precise, specific meaning? One doesn't. It isn't possible. No matter how precise the words, they can be twisted to convey wishful intent. This isn't new. It has been going on for centuries, probably ever since written languages were invented. That's why rules have to be interpreted to comply with the basic, inexpressible intent. And when this basic intent is not clearly understood, then we are in *real* trouble!

Have we lost anybody in all this phraseology? Probably so. Let's take an example. In several of our contest rules, the word "transmitter" is used. We have single transmitters and multi-transmitters, single operators and multi-operators. The intent? Well gosh, isn't this obvious? "Single" is defined as one, unity; therefore, a single something is one only. "Transmitter" is defined as "a . . . transmitting set." In very early Field Day rules, a group that went out on FD with only one transmitter and swam or sank with that transmitter was in the "single transmitter" class. If they had two transmitters, they were on the two-transmitter class, etc. It was that simple and straightforward — in the beginning.

Then someone got the notion that there ought to be a spare transmitter along, in case the one to be used by the group conked out in the middle of FD — a not-uncommon experience in those early homebrew days. This seemed reasonable, so the rules were "clarified" to define "single transmitter" to mean that only one transmitter could be used at a time, although more than one could be brought on FD, "just in case."

That was the point at which the wording of the rule lost its integrity; but, believe it or not, it held the fort for quite a few years. Then some genius deduced that if both rigs were operated, but not at *exactly* the same time, this would comply with the rules. That genius's group won its class in FD several years in a row, weathered complaints of

others who claimed their tactics were in violation of the intent of the rules. But the rule was interpreted as permitting back-and-forth operation of two or more transmitters in a "single transmitter" class.

Then came the "octopus" — an ingenious device by means of which a whole row of transmitters could be operated nearly simultaneously as a "single transmitter" simply because the device made it impossible for more than one of them to emit a signal at a time. "Single transmitter" outlays became extensive. Plans were even underway by one group to devise a pulsing method by means of which all transmissions would be pulsed at such a rapid rate that only a slight modulation of the signal would be evident, yet at any millisecond of time only one emission would be occurring. The obvious violation of intent became so ludicrous that something had to be done.

But, what? Go back to the old definition of a single transmitter as a single transmitter? Outlaw mechanical or electronic "octopi"? In view of the long precedent of the definition of "single transmitter," it was decided that the latter would have to be attempted. Many different phraseologies were tried, finally settling on the current one, that transmitter classifications are determined by the number of transmitted signals on the air at any one time, but that devices violating the intent are illegal, and a minimum time on each band is required. Thus, a "single transmitter class" entry can consist of a whole row of rigs, provided only one of them is used at a time.

Okay, fine. That takes care of the FD dilemma for the time being (until someone finds another loophole). Meanwhile, group competition in other contests started becoming popular, and before we knew it we were enveloped in the same sort of controversy all over again. An individual operating his own (or even someone else's) rig was no problem; this became a "single operator" classification. But how about a group operation that wanted to use more than one operator at a time? Okay, a "multi-operator" class. Then two or more individuals got together to operate one of the individuals' stations. Okay, a multi-operator single-transmitter class ("multi-single") separate from an operation in which several transmitters and many operators were used ("multi-multi").

Then the fun began. Amidst a controversy resulting from reclassification of certain entries who were deemed to have changed bands too often to be considered in the "single transmitter" classification there arose a number of anomalies. Only in the Field Day rules is a "single transmitter" defined as a class of entry in which not more than one signal can be put on the air at a time. In other contests, the term is not defined specifically, and in most not even used. Does it make sense to define "single transmitter" as two or more transmitters only one of which is on the air at a time unless we also define "single operator" as two or more operators only one of whom

*Communications Manager, ARRL

operates at a time? Couldn't a rules sharp make a case for using more than one operator in the "single operator" class on that basis?

At the very least, our rules ought to make sense. In some cases, they don't. Each contest and other competitive activity has its individual rules and definitions. While this is as it

must be, there should be fidelity of terminology and definition from one set of rules to another, so that interpretations can be uniform. We want to maintain differences between contests, for the sake of variety and versatility, but differences in definitions and interpretations can only cause confusion. A

start in this direction has already been made in the establishment of disqualification criteria.

Meanwhile, let's knock off the loopholes-seeking. It can only result in making the wording of the rules more complicated, more oblique, more frustrating for everybody.

W1AW Operating Schedule (April 24-October 30, 1977)

| PDST | CDST | EDST | UTC | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|-----------|------------|-----------|------|-------------------|-------------------|------------------------------|-------------------|-------------------|-------------------|-------------------|
| 6 A.M. | 8 A.M. | 9 A.M. | 1300 | Slow ¹ | Fast ² | Slow ¹ | Fast ² | Slow ¹ | | |
| 7 A.M. | 9 A.M. | 10 A.M. | 1400 | | | Cw Bulletins ³ | | | | |
| 8 A.M. | 10 A.M. | 11 A.M. | 1500 | | | RTTY Bulletins ⁴ | | | | |
| 1 P.M. | 3 P.M. | 4 P.M. | 2000 | Fast ² | Slow ¹ | Fast ² | Slow ¹ | Fast ² | Slow ¹ | Slow ¹ |
| 2 P.M. | 4 P.M. | 5 P.M. | 2100 | | | Cw Bulletins ³ | | | | |
| 3 P.M. | 5 P.M. | 6 P.M. | 2200 | | | RTTY Bulletins ⁴ | | | | |
| 4 P.M. | 6 P.M. | 7 P.M. | 2300 | Slow ¹ | Fast ² | Slow ¹ | Fast ² | Slow ² | Fast ² | Fast ² |
| 5 P.M. | 7 P.M. | 8 P.M. | 0000 | | | Cw Bulletins ³ | | | | |
| 6 P.M. | 8 P.M. | 9 P.M. | 0100 | | | RTTY Bulletins ⁴ | | | | |
| 6:30 P.M. | 8:30 P.M. | 9:30 P.M. | 0130 | | | Phone Bulletins ⁵ | | | | |
| 7 P.M. | 9 P.M. | 10 P.M. | 0200 | Fast ² | Slow ¹ | Fast ² | Slow ¹ | Fast ² | Slow ¹ | Slow ¹ |
| 8 P.M. | 10 P.M. | 11 P.M. | 0300 | | | Cw Bulletins ³ | | | | |
| 9 P.M. | 11 P.M. | 12 P.M. | 0400 | | | RTTY Bulletins ⁴ | | | | |
| 9:30 P.M. | 11:30 P.M. | 12:30 | 0430 | | | Phone Bulletins ⁵ | | | | |

¹ Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 5, 7-1/2, 7-1/2, 10, 13, 15 wpm.
² Fast code practice on cw bulletin frequencies, 8 minutes each session; 35, 30, 25, 20, 15, 13, 10 wpm.
³ Cw bulletins, 18 wpm, on: 1.835 3.58 7.08 14.08 21.08 28.08 50.08 147.555 MHz.
⁴ RTTY bulletins 60 wpm/170-Hz shift on 3.625 7.095 14.095 21.095 28.095 MHz.
⁵ Phone bulletins on 1.835 3.99 7.29 14.29 21.39 28.59 50.19 147.555 MHz.

Operating-visiting hours are Monday through Friday 7:30 A.M. to 1 A.M. and Saturday and Sunday 3:30 P.M. to 1 A.M. (all local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). 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 Sept. 5. 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 (times in UTC): phone on the hour, RTTY at 15 minutes past the hour, cw on the half hour.

To improve your list 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 0200 practice from the issue of QST two calendar months past: Sept. 2, It Seems to Us; Sept. 8, Correspondence; Sept. 14, League Lines; Sept. 22, Public Service; Sept. 26, World Above; Sept. 30, Operating News.

Operating Events

SEPTEMBER

- 1-10: K2BR Operation (Miss America Pageant)**
- 2-4: W7GV Grand Canyon DXpedition*
- 2-5: WMØSTR Operation**
- 3-5: Four-Land QSO Party*
- 4: LZ DX Contest*
- 7: West Coast Qualifying Run (+40 wpm)**
- 10-11: VHF QSO Party,* WAE phone (July), PA QSO Party,* WA State QSO Party*
- 11: The North American CW Sprint,* CLARA Contest**
- 13: W1AW Qualifying Run,** WSIACR Operation**
- 17-18: SAC cw,** MDC QSO Party,** VE/W Contest**
- 18: FMT**
- 20: W1AW Morning Qualifying Run**
- 24-25: Delta QSO Party,** SAC phone**

OCTOBER

- 1-2: California QSO Party**
- 6: West Coast Qualifying Run
- 8-9: CD Party cw, RSGB 21/28 MHz Contest,** QRP QSO Party**
- 12-13: YL/AP cw***

*Detailed last month
 **Details this issue
 ***Details next issue

- 15-16: CD Party phone, RSGB 7 MHz cw,** WADM,** Manitoba QSO Party,** JOTA**
- 19: W1AW Qualifying Run
- 22-23: CARIG RTTY SS,** CQ-WE,** Indiana QSO Party**
- 29-30: CQWW phone***

NOVEMBER

- 2: West Coast Qualifying Run
- 5: Frequency Measuring Test
- 5-6: Sweepstakes cw
- 17: W1AW Qualifying Run
- 26-27: CQWW cw

SEPTEMBER

- 1-10: Miss America Pageant Operation, K2BR, sponsored by the Southern Counties Amateur Radio Assn. Cw, 3560 7060 14060 21060; phone, 3960 7260 14290 21390; Novice, 3720 7120 21120. QSL to N2NJ (K2JOX).
- 2-5: Western Minnesota Steam Threshers Reunion, WMØSTR, 80-10, cw and ssb (possibly 6 meters added). The station will be manned by the Forks area RC, and the Fargo-Moorhead area RC. QSL with s.a.s.e. to WBØLRK, Box 596, Fertile, MN 56540.
- 7: West Coast Qualifying Run, (W6OWP prime, W6ZRJ alternate) 10-40 wpm at

0400Z (Universal Coordinated Time, abbreviated UTC, with Z shown as a time designator). The run will take place at 2100 PDST (9 P.M. PDST the night of Sept. 6) on approximately 3590/7090 kHz. Dates are always shown several months in advance and times are always the same local Pacific time of 9 P.M. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A large stamped addressed envelope will help to expedite your award/endorsements.

10-11: CLARA Contest, sponsored by the VE YL Club, 1800Z-1800Z, open to all. Exchange report, QTH, name and call. Non-members score 1 point for each CLARA member worked, 3 points for each bonus station, multiplied by the number of VE call areas. A station may be worked twice, 1 cw and 1 phone or on 2 different bands, cw or phone. Awards. Before Nov. 1 send your entry to Ann Nutter, VE3HAL, 135 Weston Place, Waterloo, Ontario, N2J 3W2, Canada.

13: W1AW Qualifying Run, 10-35 wpm at 0200 UTC, 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 Sept. 12. Follow additional directions per the Sept. 7 listing. WSIACR Operation, commemorating the America's Cup Race, through the end of the race. Operating on 8-2, the station will be manned by members of the Newport County RC, W1SYE. QSL, with s.a.s.e., to Newport

County RC, Seamen's Church Institute Bldg., 18 Market Sq., Newport, RI 02840.

17-18: Scandinavian Activity Contest (SAC), cw, 18th annual, from 1500Z Saturday to 1800Z Sunday (phone Sept. 24-25). Non-Scandinavians will call CQ SAC on cw and CQ Scandinavia on phone. Bands 80-10 meters. Work as many Scandinavian stations as possible. The same station may be worked once on each band during the contest. Only cw-cw and phone-phone permitted. Prefixes valid: LA/LB/LG/LJ Norway, JW Svalbard, JX Jan Mayen, OF/OH/OI/OJ Finland, OH Åland Island, OJ Market Reef, OX Greenland, OY Faroe Islands, OZ Denmark, SJ/SK/SL/SM Sweden. For contest purposes they are all considered to be Scandinavia. Operating classes: single operator, multiplier/single transmitter, multiplier/multi-transmitter. Only all-band entry. Club stations, even if operated by one operator, are considered multiplier. Multi-multis use a separate serial number system for each band. Serials consist of RS(T) and consecutive QSO number starting with 001. Non-EU stations count 1 point for QSOs on 20-15-10 and 3 points for 7/3.5-MHz contacts. Each call area in the Scandinavian prefixes shown counts as a multiplier on every band. A portable station in Norway or Denmark counts as the 10th area there; W4XXX/OZ counts for OZ and G4XYZ/LA counts for LA's. S19 is the 9th call area in Sweden. OH0 is the 10th call area in Finland and OJ0 is a separate call area. Some countries have no geographic call areas but count in this contest as if they had. Final score is the sum of all QSO points from all bands multiplied by the sum of multipliers from all bands. Awards. Logs must contact date/time(Z), stations, messages exchanged, multiplier and points. Separate logs for each band and also for each mode weekend. On summary show call, name, address, final result, operating class and usual signed statement. Logs must be mailed no later than Oct. 15 and go this year to the Norwegian Radio Relay League, NRRL, Post Box 21, Refstad Oslo 5, Norway. Maryland-District of Columbia QSO Party, starts 2300Z Sept. 17 and ends 0100Z Sept. 19th, 11th annual, sponsored by the Maydale ARS. The same station may be worked on each band and mode for QSO points as well as band multiplier. Exchange QSO no., RS(T) and QTH (county for MD stations except Baltimore City and Washington, DC; ARRL section or country for all others). Score 2 points for each complete QSO. The same station may be worked on each band/mode for additional QSO points. Multiplier: MDC uses ARRL sections/countries. All others use MD counties and Independent Cities. Final score multiply total QSO points by the sum of multipliers on each band. On hf bands operate 75 kHz from the low end of the cw band on even hours, 25 kHz from the top of the band on phone on odd hours. On the half hour try 10 and 15 meters. 6, 2 and 220 may be worked through repeaters. Awards. Log separately for each band/mode, as well as submitting a check sheet for each band/mode with over 100 contacts. Use a summary showing totals for

all bands/modes, name, address, call (in block letters) and usual signed declaration. Mailing deadline is Nov. 1. Send to Maydale ARS, c/o C. E. Andersen, W3XE/W5TWT, 14601 Claude Lane, Silver Spring, MD 20904. VE/W Contest, sponsored by the Montreal Amateur Radio Club, open to all. Two classes, cw and phone, each to be logged, tabulated and submitted separately. Single and multiplier categories. All cw contacts must be made during the 24-hour UTC period of September 17, phone likewise September 18. Only 18 hours total operating time per mode. (Times on/off must be shown in the log. Minimum time-off period allowed is 15 minutes. Listening counts as operating time.) No repeaters. W/Ks will work VE/VOs and vice versa. W/K to W/K and VE/VO to VE/VO do not count. Exchange RS(T) and consecutive serial number beginning with 001, plus ARRL section for W/K and the following geographical areas for VE/VOs: VO1 VO2 VE1 (PE1) VE1(NS) VE1(NB) VE2 VE3 VE4 VE5 VE6 VE7 VE8 (Yukon) VE8(NWT). Each complete contact is worth 2 points. For final score add QSOs on all bands, multiply by 2, multiply by the sum of sections/VE areas all bands, then W/K stations multiply by a 10X multiplier, which is designed to encourage more competition by equating U.S. and Canadian scores. No 10X multiplier for VE/VOs. Use a summary for each entry, showing number of contacts, multipliers and total scores. Any 200-plus contact entry should also have a check list. Official sheets are not necessary and reasonable facsimiles are acceptable. Plaques (minimum 25 QSOs) and certificates. Entrants operating under reciprocal licensing agreements are not eligible for plaques. Usual disqualification criteria. Ruling of the VE/W contest committee will be final. All entries should be sent to the Montreal Amateur Radio Club Inc., Box 2206, Dorval, Quebec, Canada H9S 3K9, and must be postmarked no later than Oct. 31, 1977. All entries become the property of the contest committee.

18: Frequency Measuring Test, open to all, begins with a callup at 0200 and 0500 UTC Sept. 18. Remember, this is the evening before, Sept. 17, by local time. The periods for measurement start at 0207 (20 meters), 0215 (40 meters) and 0223 (80 meters); for the late run, 0507, 0515 and 0523, respectively. Each measuring period lasts five minutes. Submit your averages for each five-minute period which will be compared with the umpire's averages during the same period. (The umpire is a professional measuring laboratory.) Tell how many readings you took to form your averages. Approximate frequencies for the early run are 14,005, 7062 and 3526 kHz; late-run frequencies are 14,120, 7047 and 3539 kHz. Your report must be received by Sept. 29 to qualify for the December QST report of the competition. W1AW will start transmitting the official results in a special bulletin Sept. 30.

20: WIAW Morning Qualifying Run, 10-35 wpm at 1300Z (9 A.M. local EDST). See the Sept. 13 listing for other details.

24-25: Delta QSO Party, 8th annual spon-

sored by the Delta division of the ARRL; from 1800Z Sept. 24 to 2400Z Sept. 25. No time or power restrictions. "Outside" stations will try to contact as many amateurs inside the Delta division as possible (AR, LA, MS, TN). Delta Amateurs may work stations both inside and outside the division. Exchange QSO no., RS(T) and QTH (ARRL section for non-Delta participants, county/state for Delta division). Logs must include date/time, stations, exchanges, bands, emissions, and multiplier. Stations may be worked on each band/mode. Portables and mobiles may be re-worked on the same band/mode if they change counties. Suggested frequencies: cw, 3550 7050 14050 21050 28050; phone, 3990 7290 14290 21390 28590; Novice, 3725 7125 21125 28125. Outside amateurs compute scoring by number of QSOs times number of Delta counties worked, maximum of 316. Delta amateurs multiply QSOs by the number of ARRL sections worked (section multiplier of 75 includes VE8). DX stations may be worked but do not count as multipliers. Awards/plaques. Logs must be post-marked no later than Oct. 21 to be eligible for award considerations. Logs will be returned if requested. Send entries to Malcolm P. Keown, W5RUB, 213 Moonmist, Vicksburg, MS 39180. SAC phone, see Sept. 17-18 listing.

OCTOBER

1-2: California QSO Party, sponsored by the Northern California Contest Club, from 1800Z Sat., Oct. 1, through 2400Z Sunday, Oct. 2, open to all. Of the 30-hour period, the maximum operating time shall not exceed 24 hours, off times not less than 15 minutes and all times clearly indicated in the log. All bands. Stations may be worked on phone and cw on each band. A CA station changing counties is considered to be a new station and may be contacted again on each band and mode. CA stations will transmit consecutive QSO numbers and county. Non-CA stations will send QSO number and state, VE province, or country. CA stations may work each other, non-CA stations may not count other non-CA stations. Complete QSOs count 2 points, no partials. The multiplier for CA stations shall be the number of states plus VE districts (maximum of eight). CA stations may count the state of CA as one multiplier. DX may be worked for QSO points, but does not count for multipliers. Non-CA stations use the number of different CA counties (max. 58). Final score equals total QSO points times multiplier. Suggested frequencies: cw, 1805 2560 7060 14060 21060 28060; ssb, 1815 3895 7230 14280 21355 28560; Novice, 3725 7125 21125 28125. Try 10 on the hour, and 15 on the half hour between 1800 and 2200 UTC. Usual log info., number each new multiplier. Complete signed summary, note whether entry is single or multiplier (summary sheets available from the NCCC). Awards. Entries must be sent to the NCCC, c/o Lew Jenkins, N6VV, 1750 Eucalyptus Ct., Concord, CA 94521, post-marked not later than Oct. 31. A large s.a.s.e. should be included, likewise comments and suggestions.

QST

Strays



HAMS HELP WITH LAST POWDER PUFF DERBY

After 30 years, the Powder Puff Derby is no more. In contrast to past years, this all-woman air race was a sentimental journey along the route of the first Derby — Palm Springs, CA, to Tampa, FL.

Amateurs tracked the pilots at every leg of the four-day race, with the Desert Radio Amateur Transmitting Society handling communications at the start and the Tampa ARC and Tampa Bay Repeater Association working at the finish line. The Desert RATS helped

keep track of the aircraft and relayed weather information, using a mobile antenna on the back of a car. In Florida, TARC participants provided long-distance communication on 20 and 40 meters with checkpoints along the way, while TBRA handled local communications between stations at the finish line, in the official van and at the motel. One-hundred twenty-seven planes finished the race.

Just two weeks after the early July air race, TBRA helped out with another race — the Brandon Great Bicycle Race — showing that two modes of transportation popular just after the turn of the century are still very much alive! — *WB6FKP and N4BZ*

TIKAL STATION IN OPERATION

A DXpedition station, T75AA, will operate on September 16, 17 and 18 on six bands from Tikal, the ancient capital of the Mayan

Empire. Frequencies (MHz) will be 146.52 (and OSCAR) on 2 meters, 28.59 on 10, 21.3 on 15, 14.195 and 14.205 on 20, 7.095 and 7.250 on 40, and 3.775 and 3.805 on 80. An attractive certificate and special QSL are available from the Club de Radio Aficionados de Guatemala (CRAG), P. O. Box 115, Guatemala City, Guatemala. There is a \$2 fee (U.S.) for the certificate.

"Talk to the World," a new informative booklet about Canadian amateur radio, has been created and produced by the Radio Society of Ontario, Inc. It is directed at the general public and the media to satisfy a continuing need for easily understood information about amateur radio in Canada. Clubs or groups wishing to make use of this booklet may send an s.a.s.e. to RSO, Box 334, Station U., Toronto, ON M8Z 5P7, for a sample copy and details of how to place a club order at a nominal handling cost.

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 FCC X PAM X WAS

CANADIAN DIVISION

ALBERTA: SCM, Sydney T. Jones, VE6MJ - SEC: VE5XC. PAM: VE6AFO. The Lakeland Radio Club is to be congratulated on the excellent Hamfest June 11 & 12 at Heinsburg. It was my pleasure to be on hand and present their charter as the newest ARRL affiliate club in Alberta. VE5ZA is a new call in Lloydminster. Congrats Bernard, VE6BAF has new call and is now VE6QM. The Red Deer Hamfest (Picnic) was a success. It seems to get bigger and better every year. VE7ED and XYL were Edmonton visitors. The Northern Alberta Radio Club members were active on the Field Day weekend and came up with a good score. VE6FS 130, VE6AA 20, VE6VW 10, VE6HO 6, VE6MJ 4, VE6VS 4, VE6BBU 1, VE6COJ 1.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB - Many thanks for allowing me to remain as your SCM for another two years. All I ask is for the continued support you all have given us in the past years. Field Day is past and the WX was kind to most of us even though the band conditions were not all that good for some of us, or was it that new antenna? Some of the exotic places as to the SCM's messages hiked to 4 kilo Widgeon Lake at 3:00 P.M. Seven Green abandoned golf course and so on. VE7DRF is proud Father, Daughter.

MANITOBA: SCM, Steve Fink, VE4FQ - Asst. SCM: Peter Guenther, VE4PG. RM: VE4UL. PAM: VE4JP. This year's Field Day was the most active in several years. Reports were received from VE4AA/4 VE4BB/4 VE4GF/4 VE4KE/4 VE4QD/4 and VE4TY/4. The Peace Garden Hamfest was also a great success, with nearly 200 hams and almost as many non-hams from Man. and ND in attendance, the largest crowd in its 13-year history. VE4QC was elected Man. Amateur of the Year, while VE4ND won the QLF contest. We welcome VE4YE as EC for The Pas area. MTN: 19 sessions, 117 QNI, 70 QTC, MEPP: 30 sess., 865 QNI, 59 QTC. Traffic: VE4UL, 153, VE4K 46, VE4FG 45, VE4JP 4, VE4VE 1, VE4CR 19, VE4AN 10, VE4NM 10, VE4QJ 10, VE4ID 9, VE4XD 8, VE4AD 7, VE4FQ 6, VE4RO 6, VE4HA 4, VE4LN 4, VE4OE 4, VE4OP 4, VE4AAU 2, VE4AM 2.

MARITIME & NLFD: SCM, Aaron D. Solomon, VE1OC - Asst. SCM: Maurice Gladden, VO1FG. SEC: VE1DI. PAM: VO1JN. RM and APN Mgr.: VE1ACU. NFN Mgr.: VO1JG. Sympathy to families of Silent Keys: VE15 AIA, VE15 AD, VE15 AD from Cornerbrook, Florida; Greenwood and Halifax. Lots of FD activity. At National in Toronto: VE15 AIA, AJP AKO AKT AJT BBW BCZ BFV CJ FQ HT JM OC SH ST YX; VO1NP. CRRL "Amateur of Year" award went to VE1QP, congrats. Major prizes won by VE15 BCZ CJ and HT. Lions Club Cert. of Apprec. awarded posthumously to VE15 AIA. VE15 AIA and VE15 AD to Moncton. VE1AUT & MAARC updated Map of Maritime repeaters. VE1BVF completed duty on Sable Island, has new job. HARC operating from Int. Fisheries EX. Call CF11SH. VE1CX gave talk MAARC on Antique Radio, also TV shows. HARC supplying operators for Marblehead Yacht races. New VE15: VE1QL, pres.; K1HHC, 1st. vice-pres.; VE1WB, 2nd. vice-pres.; VE1DL, secy.; VE1AN, treas. NS VHF Assn. held annual picnic in Truro. IRG held picnic & Supper in July. Visitors VE1 incl. K2SQM W5VBX W6B9J VE2EWT. VO1NP appointed CARF Atlantic Dir. APN sessions 28, QNI 88/15, QTC 78/69. Traffic: VE15 (69) VE1CU 69, VE1ZH 66, VE1H 62, VE1G 36, VE1JH 36, VE1AMR 22, VE1AB 12, VE1AMB 12, VE1AS 11, VE1KL 6, VE1AJ 3, (May) VE1AAO 137, VE1ASW 15, VE1EJ 8, VE1MBH 3.

ONTARIO: SCM, Larry Thivierge, VE3GT - Asst. SCM: Noreen Nilmons, VE3GOL. At a recent meeting, the Board of Directors of the ARRL voted to appropriate \$5000.00 for the support of the Personal Communications Foundation to assist this group in a major research project concerning the legal aspects of restrictive zoning laws prohibiting or limiting amateur radio towers and cases related to TVI-RFI. The foundation is soliciting individual memberships, applications and details are available from your SCM. London ARC held a successful annual banquet where VE3CMQ was awarded the club's "Amateur of the Year Award" for the 17th Annual "Rural 100 Years Decade Sweepstakes" which he held on Oct. 22 thru 24. Log sheets and charts from CARTG for sales or IRCS. VE3GOL received her 40 wpm sticker. VE3AAG has joined the PL club. OVMRC will have a new repeater on the air from Ottawa with the call VE3TWO and using 147.90 in and 147.30 out. Thornhill RAC is off the drawing board with VE3JL as prez and VE3S FDI, DQJ VPH and AYT completing the executive. VE3GKJ and the Burlington ARC came through on their wheel chair project. New TOT members are VE3S HZD IMS IOT IPG and Nina Choate. VE3BRE will be the new TOT-Topics editor. Our sympathies to the families of the following Silent Keys, VE3S DR FFE, QNT and IOP. TFM Society has installed a new slate of officers headed by VE3EJW and assisted by VE3S DHL HCO PQ HE BDW OS and AYT. Field Day 1977 provided hardships with wind and rain in certain parts of the Section, and many clubs still not taking advantage of the 40 point bonus by sending the SCM a 40 message. New Antennas are 15A, JCR, RM and IWH. XYL of ICQ. Congrats to VE3HHG on passing his Advanced. Special congratulations to VE3KAY, who, being not only slightless, but deaf also, on joining our ranks, thanks to the patience and understanding of VE3S YU, HQ NS the CNIB and the DQC Hamilton District Office examiners. Traffic: (June) VE3SB 359, VE3GOL 160, VE3HGJ 134, VE3CDK 114, VE3OPO 102, VE3DV 102, VE3GFN 4, VE3GGJ 68, VE3BDM 60, VE3EBC 46, VE3ISW 41, VE3GT 39, VE3EWD 37, VE3DVE 30, VE3ATR 21, VE3HTT 20, VE3AWD 18, VE3DVG 9, VE3DH 4, (May) VE3BDM 56, VE3DVE 31, VE3AWE 27, VE3FVG 16, VE3GEG 12.

SASKATCHEWAN: Asst. SCM, Ron Nagel, VE5RN - SATN is running well this summer averaging about ten QRM per hour. Swift Current treated us to a real fine Hamfest. Congrats to the Swift Current Club and the Comprehensive School Club for a fine job. Hamfest '78 will be in Regina date to be announced later. Congrats to Bill District 10 SARL Dir. Many new hams have come on the air this year. Be sure and give them a QSO, the practice will do us all good. It's a pleasure to note the fine signal we are now getting from W1AW. Code practice should be easier for all. Hope all clubs will run CW classes again this year. Traffic: VE5HP 31, VE5AAE 20, VE5KS 12, VE5YK 11, VE5WM 10, VE5LO 8, VE5HE 4, VE5LC 4, VE5UP 4.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX - SEC: PAM: W3AD. RM: W3EEL. PSH: K3YHR 49, W3PQ 44, W3A3WPV 44, K3KAJ is now W3FQ and ex-WB4HBC is WB3HSP. WB3HWV is a new Novice. WB3ANC has joined the U.S. Navy and reports for active duty Aug. 25th. The Du Pont Experimental Station will offer a Ham Radio Beginner's Course in Sept. Theory instructors are WA3ZV, W3PFA and WB3AFQ while W3EFLQ will teach the code. W3WD is now on 2 meters and K3HBP has his TCS 520 nicely broken in. DTN QNI 320, QTC 46; DEPQ QNI 48, QTC 5. Traffic: W3PQ 105, W3A3WPV 66, W3EEL 58, W3A3WY 35, W3DKX 23, K3YHR 18, K3HBP 1.

EASTERN PENNSYLVANIA: SCM, Geo. S. Van Dyke, Jr., W3HK - SEC: W3BFB. RMs: WA3SXU WA3YJG. PAMS: WA3PZO WA3AVJ. Net reports: PFN QNI 365, QTC 459; EPA&P&N QNI 215, QTC 75. Net reports are again lacking. Lets get with it! WA3CKA is unable to pick up RM for EPA so unless I hear from the gang I will make the present RM it! OVS reports: K3RTM W3CL K3JXK W3GOA WA3NDQ WA3BJG. OO reports: W3KEK K3NSN. OBS reports: W3CL WA3LWR WA3AVJ. BPL: W3CUL W3YF K3M5N WA3AOT WA3HTT W3HBT W3P. K3KZ WA3PZO WA3NDQ. FD mssg rec'd fm Delmont ARC 30 nps/20 AREC; Villanova ARC 4/2; Tasbar 15/6; Abington ARC 17/7; Allentown 15/15; York ARC 24/2; U of P 2/1; Floga Co. ARC 28/7; Murgas ARC. W3PNL/3 2/0; N3AW/3 1/0; K3ONW/3 2/0; WA3ZL/3 4/0. More reports than many a year! Late net report: K3M5N 38/0, W3HTT 24/7, W3HBT 2/0. Due to efforts of WB2BT/3, K3RC will be busy at BSA Jamboree this year. WA3TMP reports XYL now Novice, now it will be shared rig not shared time. W3WRE now up to 240 keys! W3ADE now has outlet in Chicago, his son WD9EAM! K3RVK now N3AI moving to MD. All these new 2-letter calls coming up, getting a good call book! WA3VQ and WA3QV did a Ham Radio demonstration for the Dillsburg JCs. W3EU spent much time fixing ant at tower end, then the other end fell! After you fix that watch out for the center insulator! Vacation taking its toll on reports, but I guess we all need a change. We'll give it you know what in the fall. Correction: Anthrax Re-ye-ye, graduates 517. We'll get six Novices! New officers: Mt. Airy VHF Radio Club (Pack Rats): W3HMU, pres.; W3HQT, vice-pres.; W3IIT, corr. secy.; WA3NFV, rec. secy.; K3GAS, treas.; K3M5M K3MMV WB2SZ K3IGX K3JZJ, dir. Looks like the treasurer's job is for life! A lot of nice looking club papers coming my way. Keep up the good work! Traffic: (June) K3NSN 3100, W3CUL 3058, W3VR 807, WA3ZRY 354, K3PA 322, WA3THT 316, WA3ATQ 319, N3KZ 272, WA3WQP 248, K3KW 223, K3NGN 132, WB3FKR 112, W3RJ 93, W3ATJ 90, W3IPX 67, WA3PZO 56, WA3NDQ 43, WA3LWR 22, W3AVJ 21, W3CUL 18, WA3WAC 17, W3CL 16, W3BDE 15, W3HBT 15, W3HTT 14, WA3OFD 10, W3VLE 10, WB3BKV 11, WA3QLG 10, WA3YHR 10, WA3TMP 9, WA3CKA 8, W3WRE 6, W3HK 4, K3HKS 4, WA3BJQ 3, N3AI 3, WA3UZI 2, W3KEK 1, K3JXK 1, WA3VQD 1, W3EU 1, W3GOA 1. (May) W3ADE 4, W3KEK 1, WA3VQD 1.

MARYLAND - DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA - Our sympathy to W3FZV who lost both his parents this June. His dad's call was W4IA. OO reports from WA3NSA WA3JSZ WA3KCY and WA3UJH. Business forces WA3NSA to resign. WA3UJH sports a new call W3MR. WA3KCJ says things didn't go so good during the YU and I for-tion or on FD. W3BHE publicity man for the Mt. ARC reports WB3CFD, pres.; WB3BZZ veep; WB3BZY, secy.; WA3YMV, treas.; K3HYE, trustee; WA3IIL, repeater trustee. W3EOV is learning the difference between originations and sends! W3JPT needs 8 to make W3J in Six. Congrats to W3EJG new Extra and WB3EDX new General. W3QDQ is off to YU and I for eyeballs. W3FCI K3KU WA3AZS and W3IKA with a large cast helped PVR. W5TWT was in charge of eats. FD messages received from N3AG W3DOS K3NS5CU W3VPR K3CEZ and K3AK. Good show by alt. K3HBP who has a 55R type homebrew all band dipole. W3BWB has been finding the VHF openings delightful. W8BZY/3 was all cranked up to move, but his orders were changed to keep him with us. W3TK keeps MDD alive on 3RN Wed. WA3YKK fully recovered from the AA prefix. WA3UYF gave theory to 5 Novices and code to one Tech. WB3EDX and W3IKA are giving the Anne Arundel RC the W3AZV. MDD has W3FA bulletin editor, W3PQ record keeper and W3EEL net mgr. With the nets: - Mgr., Sessions/ Tfc/ QNI Average. MDD-PON, W3OYU, 5/12/18.6. MDCTN, K3ORW, 15/63/14. WR PON, W3DFW, 16/28/14.3. MEPP, WA3PRW, 23/46/20.8. 100 percent WA3QW and WB3AKK. Others W3HWZ W3DQ W3COMN, WA3PRW and K3RKL. MDD, W3EEL, 5/9/14/6.1. Top Brass W3PQ W3IKA and W3EEL. MDD-MEPP-MDCTN Picnic Sat. Aug. 27 Patapsco State Park McKeldin area No. 501. Awards a little past noon. The MDC QSO Party 26 hours of rare counties Sept. 17, 18, 19. WB3EJB edits the Ham Arundel news from that the Anne Arundel RC has W3AZV, pres.; N3DE, veep; WA3YSW, secy. K3CN, treas.; WA3WLO, activities; W3CQM W3NAE and W3GMI, dir. Meanwhile the BARC is having a big 50-50 along with the election. Traffic: (June) WB3EDX 116, W3FA 101, W3IKA 88, W3FZV 41, W3EOV 40, WA3UYU 35, K3ORW 30, WA3PRW 20, K3KU 17, WA3YKK 17, W3TK 15, W3HPG 14, W3WBV 12,

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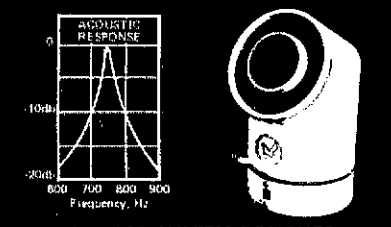
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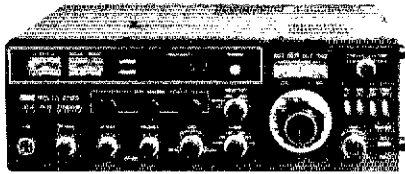
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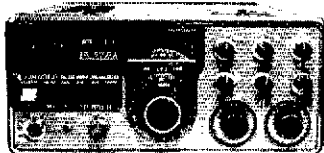
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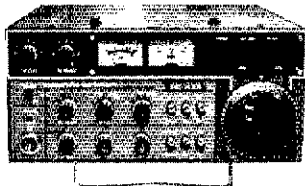
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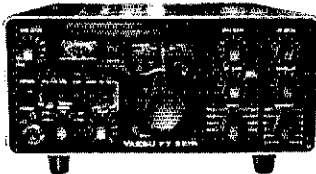
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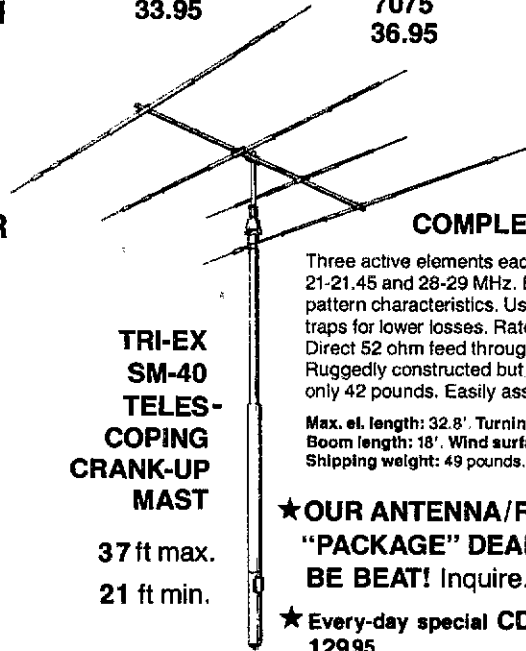
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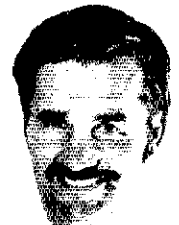
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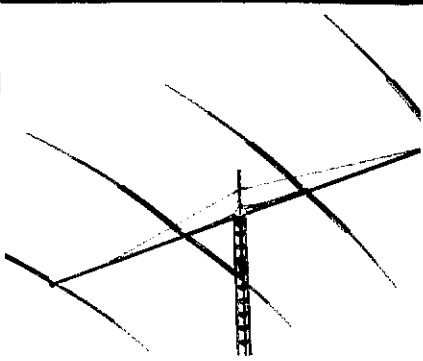


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SOUTHERN NEW JERSEY: SCM, Raymond F. Clancy, WB2GTE — W2BAY Ham-Tracked from Phila. to Oakland, CA by transcontinental trains with his 2M rig and QSO'd over 27 hours from the train. WB2LYA passed Extra WA2AWR in Tech. W2JI deplores msg errors. W2LPI wkd 24 hrs FD. WB2TUL moved to Trenton. W2FAM moved to FL. K2RN, McGuire Radio Assn. had 14 ops on FD. WB2AYA reports new 3M repeater WR2AJY at Robbinsville, NJ 147.675 MHz. WB2FLO is N1CG at Brown University. WA2FGS, SEC W2RE needs ant. repairs. W2FBP is N2CQ, SEC W2HOR attends club meetings stirring up interest in AREC. SPARC starts a General class at WB2EYF. WB2MJP new call, WB2KKA new General. WA2AIQ now Advanced. W2OB red DXCC No. 223. K2LA has op'd 41 years. SCARA's W2BYW shows many methods of hamming. Pine Barrens ARC's officers WA2VNT, pres.; WB2DQD, vice-pres.; K2AXQ, treas.; WA3DPS, am. SPARKS welcomes WA2LRN, WA3LZE sez WB2HVD. W2ZQ handled emergency msg to Guatemala when commercial and RC failed. Delaware Valley RAC ordered a new repeater. WA2HSS started with DB now a General teacher code to a by scout club. WB2IM started with CB is now a General. WB2GFG is Advanced. WB2KFK nw N2AK, W2NEA nw N2IA. Just got call WA2PIX. WA2KIP finally got his TX working OK. W2CB moves to Avalon, NJ. W2BAY new ORS. Traffic: W2ZQ 106, N100/2 35, W2JI 19, WB2TUL 10, W2BAY 2, WA2KIP 2.

WESTERN NEW YORK: SCM, Joseph M. Hood, K2YA — Asst. SCM; William W. Thompson, W2MTA, SEC; N2JC. Thanks to those who sent FD messages. Spent most of my FD time at K2MP on 80 and 40 cw. 80 cw was a little trying however — had to use a straight key from a rickety card table. It took three ops, one to log, one to key and one to hold the table. But FD is not the only June contest. WA2LWH, the Skyline ARC operated the VHF Contest working 33 sections on 6M and 15 sections in 7 states on 2M. Regret to report that K2YK is a silent key. WA2ELB reports that WA4NMX plans to operate from KL7-Land on 6M in July and Aug. W2FR is regrettably resigning as Dir. TCC (E) effective Aug. first. He will continue as NCS of EAN on Fri. (GMT) however. As the result of emergency work during the Blizzard of '77 Raven now have a new club station and meeting place at the salvation army. You see, Public Service pays! RAGS have initiated a new emergency reporting system via WR2AOC called Starline which will link amateurs to the Onandoga County Sheriffs Department Control Center. New RARA officers and Directors for the '77-78 season are: K2MP, pres.; WA2ZNC, vice-pres.; K2RJ, treas.; WB2RJB, secy; N2JC, W2KRF, WA2UEB, WA2ZFM, WA2BQA and WA2KND, dir. K2YV is a new OPS and K2GJC a new OJ Class 4. WB2VPK is not W2XR as previously reported, he is W2XG. Apologies to Bob and W2XR. Traffic: W2OE 135, W2MTA 130, W2FR 114, WA2ELD 113, WA2ZJP 92, W2TZ 37, W2PZL 32, WB2QIX 28, W2RQF 21, W2UYE 21, K2VR 11, WA2UAR 4.

WESTERN PENNSYLVANIA: SCM, Donald J. Myslewski, K3CHD — SEC: WA3VUP, Asst. SECs: K3SMB, WA3LW, PAM: K3SMB. RMs: K3AT, W3NEM, W3LOS, W3KUN.

| Net | kHz | Time/Days |
|------------------------|--------|-------------|
| WPA CW Traffic | 3985.0 | 7:00 PM Dy |
| WPA Phone Traffic | 3983.0 | 6:30 PM Dy |
| Pa. Traffic & Training | 3610.0 | 6:30 PM M-F |
| WPA RACES | 3990.0 | 9:00 AM Su |

New appointment of WB3AGV as OPS. K3CWL, EC for Indiana County reports ARES net on 6, 2, and 1-1/2 meters using phone, cw and RTTY. WB3BRD and WA3AOQ erected new towers and triband beams. Foothills ARC presented in Amateur Radio display at the Greengate Mall. Any YLs interested in forming a YLRL Chapter in the WPA Section, contact WB3ATC for details. W3EGJ is on the air with a new HW-2036. New Novices: WB3HVK, WB3IIR, WB3IEN, WB3HQK. I believe W3KQD holds the record in the Section for giving a total of 117 Novice exams. Can anyone top that? The following have upgraded: to Tech., WB3BZH, WB3HKL, WB3HKU; to General, WB3GUL, WB3DWH, WB3FNW; to Advanced, WB3BTX. Special thanks to Horseshoe ARC of Altoona for sending their newsletter to the SCM. WR3ADK repeater has changed frequency from 146.13/73 MHz to 146.40 MHz in and 147.00 MHz out. REMEMBER! The annual WPA picnic will be held on Sept. 11 at Cook's Forest. All WPA net members and appointment holders are welcome. Contact K3AT for myself for details. The WPA CW Traffic Net report for June will appear next month. The WPA Phone and Traffic Net had 30 sessions in June, handled 63 messages with 284 check-ins. PSHR credits WA3VBM 46. Traffic: WA3VBM 208, K3AT 190, N3FM 71, K3CHD 44, K3HCT 34, WB3AGB 32, K3SMB 24, W3KQD 16, W3KUN 11, WA3YXJ 10, W3SN 7, W3EJ 6, W3LOS 6, W3YD 4.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES, PAM: WA9KFK. RM: W9NJP. Cook County EC: W9HPG.

| Net | Freq. | Time(D)Days | TFC | Sec. |
|-----------|-------|---------------|-----|------|
| ILN | 3690 | 2300/3300 Dy | 302 | dy |
| Ill Phone | 3915 | 2245 Dy | 240 | 28 |
| NCPN | 3915 | 1200/1700 M-S | | No |
| IEN | 3940 | 1400 Su | | No |
| Ill Slo | | | | No |
| Speed | 3712 | 0100 Dy | | Rpt. |

The newly elected officers of RAMS (Chicago) are: WA9KID, W9ZCL, WA9LEY and WA9ZPL. WD9DZH, WD9EEW, WD9EDO, WD9EDN, WD9EMV, WD9ENU, WD9UOB, WD9EMH, WD9EDU, WD9EDT, WD9EDS and WD9ELK are new licensees from the Sangamon Valley Radio Club's club and theory classes. W9FLF and WA9CJG have received their Extra Class license. From the preliminary reports received from the Field Day chairmen, this should be a high scoring year especially with the band openings on the FD weekend. WB9SNA is now K9SW. New call in Belleville is WD9FFQ. New Chicago Novice is WD9EMZ. The Ill. Slow Speed Net has been discontinued for the present.

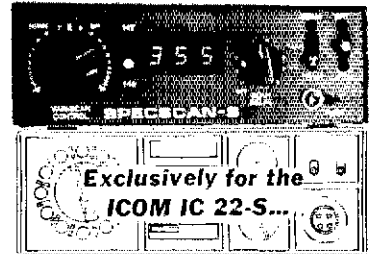
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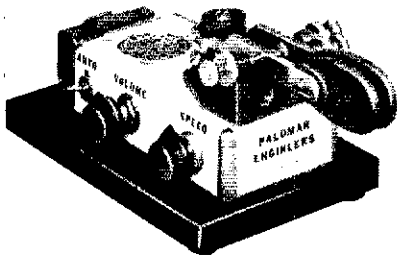
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and may be reactivated in the future. The Jacksonville Amateur Radio Club's Hamfest was well attended and a fine success. The League's Executive Committee has approved the application for club affiliation of Elmwood Park Amateur Radio Club, Inc., Lake and Kenosha County Amateur Radio Society, Ltd., and Sillis Amateur Radio Explorer Post 9120 and they have been declared duly affiliated societies. In the July issue of QST Dave Miller, WB9GQ, was listed as a Silent Key. This was in error in information received by this column. His new call is N9SS. W9TT has built a new 40-meter vertical antenna after the Apr. QST article. Reports from the field claim that the Sun spot count for the month was the highest since Aug. of '75. Karl Kopetzky of the Chicago Area Radio Club Council will have the West Coast as his new QTH. A few of the Ill. gang were visible at the ARRL National Convention at Toronto and eyeball QSOs were held. K9WA is new call for former K9DDA. WA9GBW and W9NXG are BPL recipients for the month. Traffic: WA9GBW 271, W9NXG 155, WA9VGV 147, W9OK 144, W9KJ 124, W9KR 112, W9TN 99, W9GHT 91, WB9JSR 82, WA9EBT 76, W99ZA 75, W99Z 66, K9EW 50, W9JJ 44, K9EEA 33, K9HXH 27, W9FL 20, WA9GBX 19, W9PRN 18, W9OYL 18, W9BR5W 15, WB9RFC 8, WA9LTH 6, W9BV/W9AVLK 4, W9HPG 3.

INDIANA: SCM, M. P. Hunter, W9LF — SEC: W9JMH. It is with regret that I report the passing of W9AD. Herb was one of the truly great people in Ham Radio. The IRCC will be sponsoring an IN QSO party on Oct. 22-23. K9DCK has retired as PAM and net mgr. of ITN/INTN/IPCOP. Many thanks to Herb for his fine service to the nets. His replacement as net mgr. will be W9HUF. W9SU is in the process of relocation to Johnson Co. and is sure to return with a bigger than ever signal. The new officers of the Indy DXers are N9NS, pres., W9CL, vice-pres.; W9OBF, secy-treas. The Kingston DX expedition by N9MM, WB9KTA et al came off on schedule with about 11k QSOs as KP6BD. Congrats to the crew of W9CL's multi-multi effort in the ARRL DX test for a tenth spot in the cw standings, nothing in the midwest came close to their score. Congrats also to WB9LHI and W9LT for No. 2 and No. 6 in the single op high band class. Who says the Hoosiers are W9LLOU! Many thanks to Gert who is down in activity; fear not, the sun will set earlier soon. K9EQT is a newlywed and his wife will soon be a novice — there goes the marital bliss. WB9VKO is a new General. K9JQY is reported to be moving to FL. Net Tlc: QIN 250, ITN 342, INTN 42, IPON 3, ICN 28. Traffic: W9JCH 115, W9GQ 201, W9HUF 191, W9GGW 193, W9LTU 152, W99PI 101, K9CQ 90, W9EI 86, W9GQZ 86, W9FOT 84, W9GLW 70, WA9TJS 52, K9FZX 47, K9YBM 35, WA9GCF 34, W99FGK 33, K9KTB 31, W9UEM 30, K9JQY 23, W99YN 23, K9TKE 15, WA9OHK 14, W99DIX 12, K9RPZ 12, K9WWJ 10, W9DLF 8, WB9VKO 8, K9CGS 6, W9ENU 4, W9RTH 3, W9BDP 1.

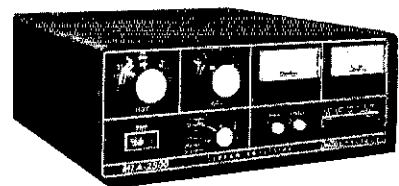
WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: K9ZZ. PAMs: W9AYK, K9UTQ, W9IEM. RMs: WB9JCH, K9KSA, W9SFL, K9LGO, K9EN. Nets, Freq., Time, QNL, QTC. Mgr.: BWN, 3985, 11452 M5, 371, 526, W9AYK; BEN, 3985, 1700Z Dy, 660, 131, W9IEM; WSBN, 3985, 2230Z Dy, 913, 135, K9UTQ; WNN, 3725, 2215Z Dy, 55, 4, WB9JCH; WIN-E, 3662, 0000Z Dy, 170, 44, W9SFL; WIN-L, 3662, 0300 Dy, 163, 70, K9LGO; W55N, 3662, 2345Z, K9KSA; RTTY, 3662, 0000Z, K9EN; WI-E, P.C., 3925, 1701Z M-F, 592, 40, W9SFL. WB9JCH has 1 on Tech. PM2-GRP rig. WB9HLS is now N9CP. WB9YXY on 2 meters with TR-7400A. WSBN certificate to WD9AUD. WB9PYG is now N9BE. New Novices in Baraboo: WD9ESA, WD9ESJ, WD9ESK. WB9ESK is now W9SK. WB9RLU has Tech. WB9PZ is now K9AQ. WIN-L certificate to WD9AUD. WA9QVT is now W9UW. WB9SVL has Tech. W9PIT is now W9OP. Does your county have an EC? Do you belong to ARES? EC endorsed WB9JGA. K9UTN is now K9GN. WB9LAH is now K9JB. WB9GNH is now W9SR. W9HCR has Tech. WB9CRB has General. WB9ZCU has Advanced. WD9ESJ is Tech. W9PFS is now W9XM. (from FLARAC). Support your radio club. WA9PDM is now K9ST. WB9EWR is now W9TP. QRS to K9MZO. K9CPM made BPL. Traffic: (June) K9CPM 792, W9IEM 86, WD9AUD 76, W9DND 75, K9MZO 66, K9FHI 57, W9SFL 41, W9AYK 46, K9JCH 44, W9GHW 41, W9VGV 40, W9UW 38, K9JPS 35, WB9JCH 34, WB9BRE 32, K9LUT 29, WB9RRV 27, K9ANV 13, N9CP 12, W9MFG 12, WB9RRU 6, K9ASC 4, W9KHH 2, WB9LKC 2. (May) WB9OEC 31.

DAKOTA DIVISION

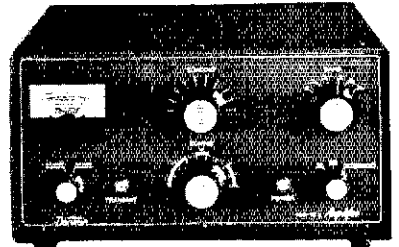
MINNESOTA: SCM, Gordon Olson, K9EC — Hope everyone had a good time Field Day. I received 10 excellent activity reports during the weekend and all reported multi ops. WA9DCC 30, W9SW 25, W9NE 22, W9NG 18, K9EN 13, K9II 7, K9AGF 7, W9QIT 7, WB9TTZ 4, WB9CGW. Thanks for the rpts FD chmn.: good job to all of you. This month is open CD Party time again and I will be looking for all of you both weekends. Any contests among you club members? Any challenges? Who will score highest in CW and Phone? The Minn. WX Net is closed for the summer months. Hope to see all you WX Net-ers again this fall. K9EJ is going sailing — he joined the Navy. Hope we don't have to hear so hear from you again. Good luck. WB9KTH is moving to Good luck in 4-Land. New calls: WA9IAW K9TK, WB9DDH K9EN. W9CBXD and W9WCO now Tech. Congrats all. W9OSJ retiring as Minn. noun PAM. Sorry to see you go. Congrats to WB9JYT new PAM and also new captain afternoon PAW. WA9YVA is morning captain. WB9OCJ is sending the summer in MN. WA9CFZ has resigned as SEC, new promotion and more work. He has accepted the EC apt for Waseca County when WB9BAM resigned also becuz of work. We will see you in the CD Party this month. Joel New appointments will be listed next column for SEC and OBS. The MSN meeting and picnic was held at the QTH of W9RQJ. Members in attendance: K9CVD, K9EJ, K9EJ, K9II, N9JP, WB9KTH, WB9LDW, K9PIZ. To all CD appointees — reports are due by the 5th of each month. You represent the Minn. Section. Let's make the MN Section the top Sec. in the League. Traffic: (June) WB9HOX 268, K9CUD 129, WA9YVT 124, WB9LDW 109, WB9QEU 87, W9OSJ 52, K9II 50, WB9NZB 43, WB9TEC 42, WB9ZU 39, W9RQJ 34, WB9PGZ 23, W9RQJ 29, WB9PKG 27, K9EJ 25, WB9PGZ 23, WB9JYT 14, N9JP 10, K9FLT 4, WB9OFQ 4, K9RMX 3. (May) K9CVD 239, K9II 40, W9RQJ 23, K9PIZ 13, WA9WV 12.

NORTH DAKOTA: SCM, Mark J. Worcester, WA9WLP — Field Day reports received were: Fargo Novice had 8 operators at Prosper, Minn., reported by

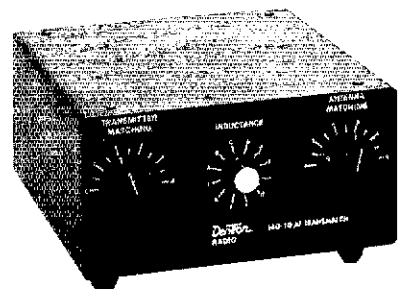
Dentron



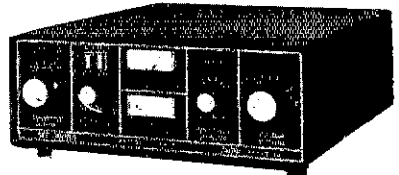
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160-10M 1.5kw tuner w/wattmeter . 299.50

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| RX50C Kit | 31-60 MHz rx w/ 2 pole 10.7 MHz crystal filter | 59.95 |
| RX50C W/T | same as above-wired & tested | 104.95 |
| RX144C Kit | 140-170 MHz rx w/ 2 pole 10.7 MHz crystal filter | 69.95 |
| RX144C W/T | same as above-wired & tested | 114.95 |
| RX220C Kit | 210-240 MHz rx w/ 2 pole 10.7 MHz crystal filter | 69.95 |
| RX220C W/T | same as above-wired & tested | 114.95 |
| RX432C Kit | 432 MHz rx w/ 2 pole 10.7 MHz crystal filter | 79.95 |
| RX432C W/T | same as above-wired & tested | 124.95 |

RECEIVERS



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| RXCF | accessory filter for above receiver kits gives 70 dB adjacent channel rejection | 8.50 |
| RF28 Kit | 10 mtr RF front end 10.7 MHz out | 12.50 |
| RF50 Kit | 6 mtr RF front end 10.7 MHz out | 12.50 |
| RF144B Kit | 2 mtr RF front end 10.7 MHz out | 17.50 |
| RF220D Kit | 220 MHz RF front end 10.7 MHz out | 17.50 |
| RF432 Kit | 432 MHz RF front end 10.7 MHz out | 27.50 |
| IF 10.7F Kit | 10.7 MHz IF module includes 2 pole crystal filter | 27.50 |
| FM455 Kit | 455 KHz IF stage plus FM detector | 17.50 |
| AS2 Kit | audio and squelch board | 15.00 |

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|------------|-------------------------------------|-------|
| TX50 | transmitter exciter, 1 watt, 6 mtr. | 39.95 |
| TX50 W/T | same as above-wired & tested | 59.95 |
| TX144B Kit | transmitter exciter-1 watt-2 mtrs | 29.95 |
| TX144B W/T | same as above-wired & tested | 49.95 |
| TX220B Kit | transmitter exciter-1 watt-220 MHz | 29.95 |

TRANSMITTERS



| | | |
|------------|----------------------------------|-------|
| TX220B W/T | same as above-wired & tested | 49.95 |
| TX432B Kit | transmitter exciter 432 MHz | 39.95 |
| TX432B W/T | same as above-wired & tested | 59.95 |
| TX150 Kit | 300 milliwatt, 2 mtr transmitter | 19.95 |
| TX150 W/T | same as above-wired & tested | 29.95 |

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|--------------|--|--------|
| PA2501H Kit | 2 mtr power amp-kit 1w in-25w out with solid state switching, case, connectors | 59.95 |
| PA2501H W/T | same as above-wired & tested | 74.95 |
| PA4010H Kit | 2 mtr power amp-10w in-40w out-relay switching | 59.95 |
| PA4010H W/T | same as above-wired & tested | 74.95 |
| PA50/25 Kit | 6 mtr power amp, 1w in, 25w out, less case, connectors & switching | 49.95 |
| PA50/25 W/T | same as above, wired & tested | 69.95 |
| PA144/15 Kit | 2 mtr power amp-1w in-15w out-less case, connectors and switching | 39.95 |
| PA144/25 Kit | same as PA144/15 kit but 25w | 49.95 |
| PA220/15 Kit | similar to PA144/15 for 220 MHz | 39.95 |
| PA432/10 Kit | power amp-similar to PA144/15 except 10w and 432 MHz | 49.95 |
| PA140/10 W/T | 10w in-140w out-2 mtr amp | 179.95 |
| PA140/30 W/T | 30w in-140w out-2 mtr amp | 159.95 |

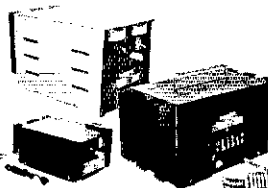
POWER AMPLIFIERS



| Model | BAND | Power Input | Power Output | Price |
|------------|---------|-------------|--------------|--------|
| BLC 10/70 | 144 MHz | 10W | 70W | 139.95 |
| BLC 2/70 | 144 MHz | 2W | 70W | 159.95 |
| BLC 10/150 | 144 MHz | 10W | 150W | 259.95 |
| BLC 30/150 | 144 MHz | 30W | 150W | 239.95 |
| BLD 2/60 | 220 MHz | 2W | 60W | 159.95 |
| BLD 10/60 | 220 MHz | 10W | 60W | 139.95 |
| BLD 10/120 | 220 MHz | 10W | 120W | 259.95 |
| BLE 10/40 | 420 MHz | 10W | 40W | 139.95 |
| BLE 2/40 | 420 MHz | 2W | 40W | 159.95 |
| BLE 30/80 | 420 MHz | 30W | 80W | 259.95 |
| BLE 10/80 | 420 MHz | 10W | 80W | 289.95 |

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|-----------|---|--------|
| PS15C Kit | 15 amp-12 volt regulated power supply w/case, w/fold-back current limiting and overvoltage protection | 79.95 |
| PS15C W/T | same as above-wired & tested | 94.95 |
| PS25C Kit | 25 amp-12 volt regulated power supply w/case, w/fold-back current limiting and ovp | 129.95 |
| PS25C W/T | same as above-wired & tested | 149.95 |
| PS25M Kit | same as PS25C with meters | 149.95 |
| PS25M W/T | same as above-wired & tested | 169.95 |

POWER SUPPLIES



| | | |
|------------|--|--------|
| O.V.P. | adds over voltage protection to your power supplies, 15 VDC max. | 9.95 |
| PS3A Kit | 12 volt-power supply regulator card with fold-back current limiting | 8.95 |
| PS3012 W/T | new commercial duty 30 amp 12 VDC regulated power supply w/case, w/fold-back current limiting and overvoltage protection | 239.95 |

| | | |
|------------|---|--------|
| RPT50 Kit | repeater-6 meter | 465.95 |
| RPT50 | repeater-6 meter, wired & tested | 695.95 |
| RPT144 Kit | repeater-2 mtr-15w-complete (less crystals) | 465.95 |
| RPT220 Kit | repeater-220 MHz-15w-complete (less crystals) | 465.95 |
| RPT432 Kit | repeater-10 watt-432 MHz (less crystals) | 515.95 |
| RPT144 W/T | repeater-15 watt-2 mtr. | 695.95 |
| RPT220 W/T | repeater-15 watt-220 MHz. | 695.95 |
| RPT432 W/T | repeater-10 watt-432 MHz. | 749.95 |
| DPLA50 | 6 mtr close spaced duplexer | 575.00 |

REPEATERS



| | | |
|---------|--|--------|
| DPLA144 | 2 mtr, 600 KHz spaced duplexer, wired and tuned to frequency | 379.95 |
| DPLA220 | 220 MHz duplexer, wired and tuned to frequency | 379.95 |
| DPLA432 | rack mount duplexer | 319.95 |
| DSC-U | double shielded duplexer cables with PL259 connectors (pr.) | 25.00 |
| DSC-N | same as above with type N connectors (pr.) | 25.00 |

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|------------|--|--------|
| TRX50 Kit | Complete 6 mtr FM transceiver kit, 20w out, 10 channel scan with case (less mike and crystals) | 229.95 |
| TRX144 Kit | same as above, but 2 mtr & 15w out | 219.95 |
| TRX220 Kit | same as above except for 220 MHz | 219.95 |
| TRX432 Kit | same as above except 10 watt and 432 MHz | 254.95 |
| TRC-1 | transceiver case only | 19.95 |
| TRC-2 | transceiver case and accessories | 39.95 |

TRANSCIVERS

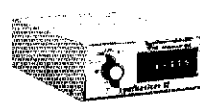


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| CD2 Kit | 10 channel xmit deck w/switch and trimmers | 14.95 |
| CD3 Kit | UHF version of CD1 deck, needed for 432 multi-channel operation | 12.95 |
| COR2 Kit | carrier operated relays | 19.95 |
| SC3 Kit | 10 channel auto-scan adapter for RX with priority | 19.95 |
| Crystals | we stock most repeater and simplex pairs from 146.0-147.0 (each) | 5.00 |
| CWID Kit | 159 bit, field programmable, code identifier with built-in squelch tail and ID timers | 39.95 |
| CWID | wired and tested, not programmed | 54.95 |
| CWID | wired and tested, programmed | 59.95 |
| MIC 1 | 2,000 ohm dynamic mike with P.T.I. and coil cord | 12.95 |
| IS1 W/T | tone squelch decoder | 59.95 |
| IS1 W/T | installed in repeater, including interface accessories | 89.95 |
| TD3 Kit | 2 tone decoder | 29.95 |
| TD3 W/T | same as above-wired & tested | 39.95 |
| HL144 W/T | 4 pole helical resonator, wired & tested, swept tuned to 144 MHz band | 24.95 |
| HL220 W/T | same as above tuned to 220 MHz band | 24.95 |
| HL432 W/T | same as above tuned to 432 MHz band | 24.95 |

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|------------|---|--------|
| SYN II Kit | 2 mtr synthesizer, transmit offsets programmable from 100 KHz-10 MHz, (Mars offsets with optional adapters) | 169.95 |
| SYN II W/T | same as above-wired & tested | 239.95 |
| MO-1 Kit | Mars/cap offset optional | 2.50 |
| TO-1 Kit | 18 MHz optional tripler | 2.50 |

SYNTHESIZERS



| | | |
|-------------|--|--------|
| HT 144B Kit | 2 mtr, 2w, 4 channel, hand held transceiver with crystals for 146.52 simplex | 129.95 |
| NICAD | battery pack, 12 VDC, 1/2 amp. | 29.95 |
| BC12 | battery charger for above | 5.95 |
| Rubber Duck | 2 mtr, with male BNC connector | 12.95 |

WALKIE-TALKIES



Vhf engineering

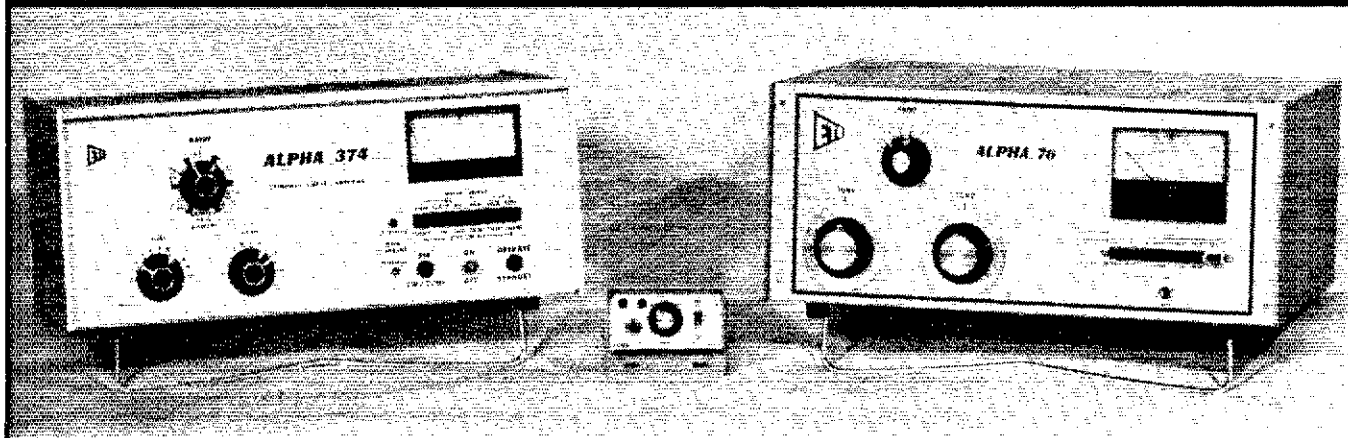
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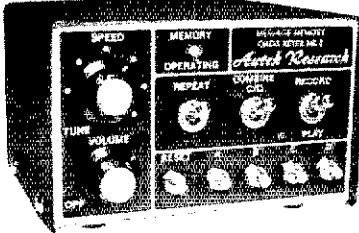
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W0CZ former WA9OUT. Three Rivers RC set up at Fort Abercrombie, reported by WA0VJ. Minot had 10 operators and 4 rigs operating, reported by WB0KWY. FARC operated from G. F. Fair Grounds under the call N0ND. BARC operated north of Bismarck with 22 operators, reported by W0TEE. W0RIB did well on six meters. BARC had coverage by 2 TV and one radio station. K0GRM working on Heath HW2036. Would each club pick one operator to relay the club activities to me at the end of each month via the Data Net.
Net - kHz CDT/Days Sess. QNI QTC
Manager 1800 S-5 30 201 31
DATA - 3996.5
WA0SUF Traffic: WA0SUF 30, WA0JPT 11, W0DM 5, K0ATK 2.

SOUTH DAKOTA: SCM, Ed Gray, W0SD - WA0TMM, Rte. 2, Box 69, Colome, SD 57528 is the SEC for SD. All Emergency Coordinators needing supplies or materials should contact Jim. Also all ECS should report their activities to Jim if you are interested in being an EC if you are an ARRL member should contact Jim. Jim is also RM for SD and keeps things going on the CW SDN net. Current EC appointments are WA0BZD WA0CUL W0DVB K0FTN W0BGTY K0JIM WA0MRY WA0NRE K0OL WB0QMF W0PRZ WA0RQ K0TY W0VY W0VWE and WA0ZXY. OPS appointments are K0GF WA0HQ WA0TMM K0ZZ; ORSS: W0CLS WB0EVQ W0BUIJ WA0LYO WA0NZA K0RA W0SMV WA0TMM W0VE K0ZZ. OVSs: W0IT K0S, VXM; OBSS: K0CXX and W0VE; current OO is WA0RQ. PAM is W0VE. Any station holding an appointment is supposed to report to the SCM once a month on their station activities. Anyone who would like an appointment should contact W0SD SCM. WB0OMF of Platte has a new TS-820S. WA0VPY Rapid City has a KWM-2 and VHF Collins converter for 6 and 2. Bruce assisted by K0AG WA0NRE W0RUF and W0B0JD made nearly 30,000 points in the June VHF Contest.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5UAU - SEC: W5AVN, PAMs: W5POH W5B5WZ K5MEA. RM: W5MVT, Net, kHz, Times/Days, QNI, QTC, Mgr.: OZK, 3760, 2000/DY, 15, 15M, 2, 15, 15, 15, 15, 1100/M-S, 7, 7, 38, W5POH; M-Bird, 3528, 2130/M-F, 464, 13, W5B5WZ; ARN, 3995, 2330/DY, 550, 51, K5MEA. New officers: OZARC: W5SHY, pres.; W5OYH, vice-pres.; W5ZYH, secy.; W5B5WVA, treas. W5GVE now NSNA. Welcome to new hams in AR: RD, CEI, GEM, CEN, CEP, CEQ, CEZ, CFA, CFL, CEU, CFM, CFN, CGC, CGI, CIG, CII, CJE, CJM, CJN, CJT, CJU, CKA, CKC, CKD, CKE, CKF, CKN, CKP, CHP, CLS, CLR, CNB, CNC, CND, COB, COI, COS, COT, COZ. Ur SCM made three Field Day site visits this year. CAREN at Little Rock, Saline Co. at Benton and the F5AARC at Ft. Smith. Stopped at Russellville but the boys didn't make it this year. If you want me to visit your site, please make plans and let me know now. W5GQH now NSNR. W5TDP now NSDL. Traffic: K5MEA 56, W5B5MFI 31, W5POH 17, W5UAU 16, W5EIJ 13, K5DW 9, W5G5WU 9, W5S5XC 3, W5G5QH 1, N5NA 1.

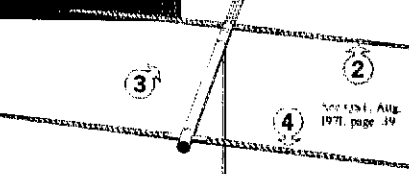
LOUISIANA: SCM, R. P. Schmidt, W5GHP - Asst. SCM: John Meyer, W5JFB. SEC: W5B5CQP. RM: N5YL. PAM: W5B5NEZ. VHF PAM: W5VBX. First reports Field Day show the Delta DX Club of New Orleans with approx. 2000 contacts. The Lafayette Club (LARL) had 1590 contacts. W5B5NEZ, PAM reports LTN Net certificates to W5B5EVE, W5B5CXX, W5B5ZOO, W5B5PTH, W5B5QNH, K5KIO, W5MVA, W5B5IKT, W5B5NVB, W5B5RFL, N5ES, W5A7GA, W5B5JNL, W5B5KFA, W5B5AWJ, W5B5LV, W5B5GVE, W5B5JJK, W5B5RZC and W5B5ANV. In July W5B5NVB moved out of the Section. We will sure miss her work around out of the Section. Good Luck Ronda, K5CAY, W5AOKF and W5B5FB had a good time at the Natchez Hamfest. W5B5UTY active on RTTY. How about checking into LRN? License classes are being planned for Lafayette and New Iberia to start in Sept. If you know of some interested parties, please contact W5EXI or K5DPG. Baton Rouge Club reports 23 students passed their code test in their summer course. Thanks to W5B5RYD of Baton Rouge for his timely re-birth of a newspaper article in the BR Newspaper. ARCOS station W5LEP was a relay station for the Powder Puff Derby.

Net - Freq. Time/Days QTC QNI Manager
LAN - 3615 7 & 10 PM Dy 254 506 N5YL
LTN - 3910 6:30 PM Dy 111 330 W5B5NEZ
LSN - 3703 8:30 PM M-F 24 62 W5B5ANV
LRN - 3587.5 6:30 PM Su&W 5 14 W5B5FHU
Traffic (June) N5YL 315, W5GHP 198, W5A1QU 181, K5M 15, W5M 50, W5B5NEZ 32, W5B5NVB 75, W5B5PTH 75, N5ES 54, W5B5CXX 42, W5B5FHU 41, W5B5CDX 38, W5B5LBR 38, W5B5OOM 33, W5B5JIM 30, W5YN 20. (May) W5MI 74.

MISSISSIPPI: SCM, E. Ed Robinson, W5YTN - SEC: W5B5XA. 1977 FD is now history; first reports on turn-outs are good all over the state. Check-ins on all nets need boosting. Please check in. 2-meter activity increasing as is 6 meters. N5XA on the air with new 820 K5RFG also getting new rig. Heard on MTN W5WZ W5B5AKV/B. W5LCK W5EDT, N5YX, W5AMZ. Welcome to new MS amateurs: W5DSS, CPE COM CTI, CPM CMS CPS CPG CPB CMV CMU CMI CPT CNU CRE CMQ CMO CQA CQC CCB CSX CRU CSU CRX CZD DAX DAT DIJ DCC DCG DCM DCI DFJ DCD DCK DCF DCJ DFR DCE DCL DCH DCM DJR DLM DKO DPO DRK DPF DPA DPT DSN DRL CKA CKJ CKL DRN5 W5KLV, sess. 30, QTC 28, MS Rep 83% by W5QDC W5EDT W5B5LXX W5VKR W5B5KXX W5B5EX, CGCHN, K5OWK, QNI 2018, QTC 136; MSBN, W5B5SNB, QNI 1181, QTC 70; MTN, W5B5FHA, QNI 185, QTC 63; MSN, W5B5MTQ, QNI 42, QTC 18; MS Lou Weather Net, K5UXV, QNI 118, QTC 4; Traffic: W5EDT 78, W5B5MTQ 60, W5LGG 38, W5YTN 31, W5A5IWD 28, W5TC 28, W5RUB 16, W5B5SNB 14, N5XA 14, W5B 13, K5VXV 13, W5AOKI 12, N5CW 7, W5LL 6, W5B5XK 6, K5RRG 5, W5B5VFS 5.

TENNESSEE: SCM, O. D. Keaton, WA4GLS - SEC: WB4DJU, PAM: WB4PRF, RM: WB4DJU, Net Mgrs.: WA4EWW, W4PFP, WB4VPO, K4FCV, WA4CNY, WA4WZ, WB4DZG, WA4EY, WA4VY & W4ZY.
Net - Freq. Time(Z)Days Sess. QNI QTC
TPN - 3.980 1140 M-F 87 3872 267
1245 M-F
0130 M-Su
1400 SSuH

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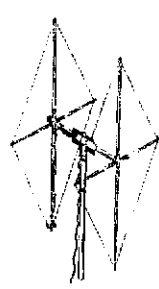


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1 Element 15M - 11 lbs. \$192.99
1 Element 10M - 9 lbs. \$149.99



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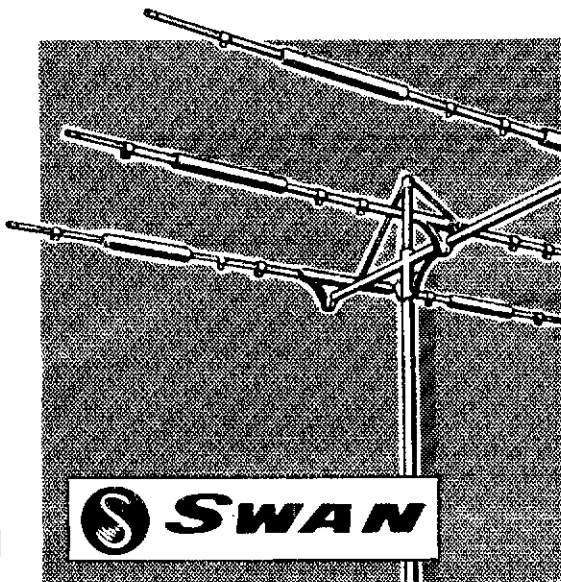
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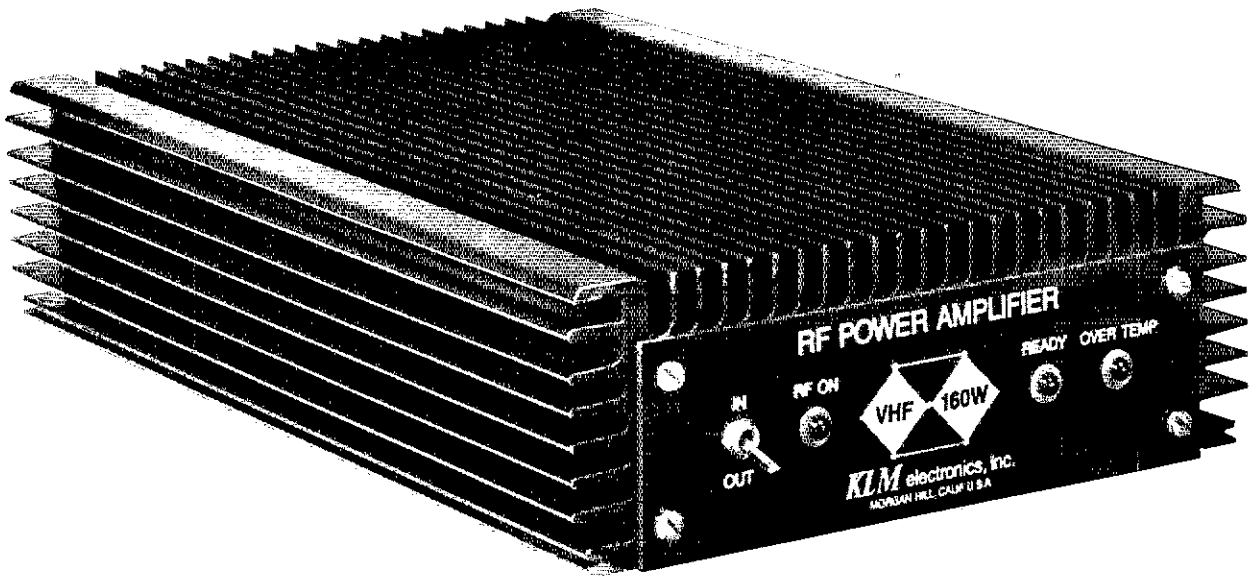
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|-----------|--------------|------------------|-------------------------|-------------------|------------|------|-----------|--------------|------------------|-------------------------|-------------------|------------|------|
| 50-54 | PA4-70AL ◊ | 2-8 | 80 | 10 | 13.5 | C | " | PA10-140BL ◊ | 5-15 | 140 | 18 | " | D |
| 50-54 | PA10-160AL ◊ | 5-15 | 160 | 10 | 28 | C | " | PA10-160BL ◊ | 5-15 | 160 | 22 | " | D |
| 144-148 | PA2-25B | 1-4 | 25 | 3 | 13.5 | A | " | PA30-140B | 15-45 | 140 | 15 | " | D |
| " | PA2-70B | 1-4 | 70 | 10 | " | C | " | FA30-140BL ◊ | 15-45 | 140 | 15 | " | D |
| " | PA2-70BL ◊ | 1-4 | 70 | 10 | " | C | 219-226 | PA2-70BC | 1-4 | 70 | 10 | " | C |
| " | PA2-140B | 1-4 | 140 | 20 | " | D | " | PA10-60BC | 5-15 | 60 | 8 | " | C |
| " | PA10-40B | 5-15 | 40 | 5 | " | B | " | FA30-120BC | 15-45 | 120 | 15 | 13.5 | D |
| " | PA10-40BL ◊ | 5-15 | 40 | 5 | " | B | 400-470 | PA2-40C | 1-4 | 40 | 7 | " | C |
| 144-148 | PA10-70B | 5-15 | 70 | 8 | " | C | " | PA10-35C | 5-15 | 35 | 6 | " | B |
| " | PA10-70BL ◊ | 5-15 | 70 | 8 | " | C | " | PA10-35CL ◊ | 5-15 | 35 | 6 | " | B |
| " | PA10-80BL ◊ | 5-15 | 80 | 10 | " | C | " | PA10-100C | 5-15 | 100 | 15 | " | D |
| " | PA10-140B | 5-15 | 140 | 18 | 13.5 | D | " | PA10-110CL ◊ | 5-15 | 110 | 20 | " | D |

SIZES: Inches: "A", 6.5×2×2 "B", 6.5×5×2 "C", 6.5×7×2, "D", 8.5×10×2
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- This is my second TRITON IV. They are excellent. I think you have scooped the field.*
- Luv it. Dynamite:*
- Most versatile SSB/CW radio I have used.
 - I like CW and full break-in. Beautiful.
 - Beautiful radio to use. Magnificent CW filter.
 - Rig is just great ... a super transceiver.
 - New features very welcome.
 - Very nice. Good audio quality.
 - Excellent rig. Good filters.
 - Power-signal reports good.
 - I like the compactness and appearance.
 - Excellent rig with superior receive quality.
 - This TRITON is a beautiful new experience.
 - Easy to set up — works great.
 - Meets and exceeds advertised claims.
 - Very sophisticated. Easiest tuning rig ever.
 - Puts out 100 watts as good as 300 watt rigs.
 - The most outstanding rig I have ever used.
 - Pleased with the clarity of the receiver.
 - Compact, light weight, good engineering.
 - A real nice rig ... have owned about every make.
 - Makes running SSB nets a real breeze.
 - Far out-distances any competitive product.
 - A ham for 45 years ... solid-state perfection.
 - A FB piece of equipment made in the USA.
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W2CET
WB2UEH
VE3IBK
WA4LOG
KL7IHW
W2EMX
WN5SOH
W4LZP
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- How pleased I am with the noise blanker.
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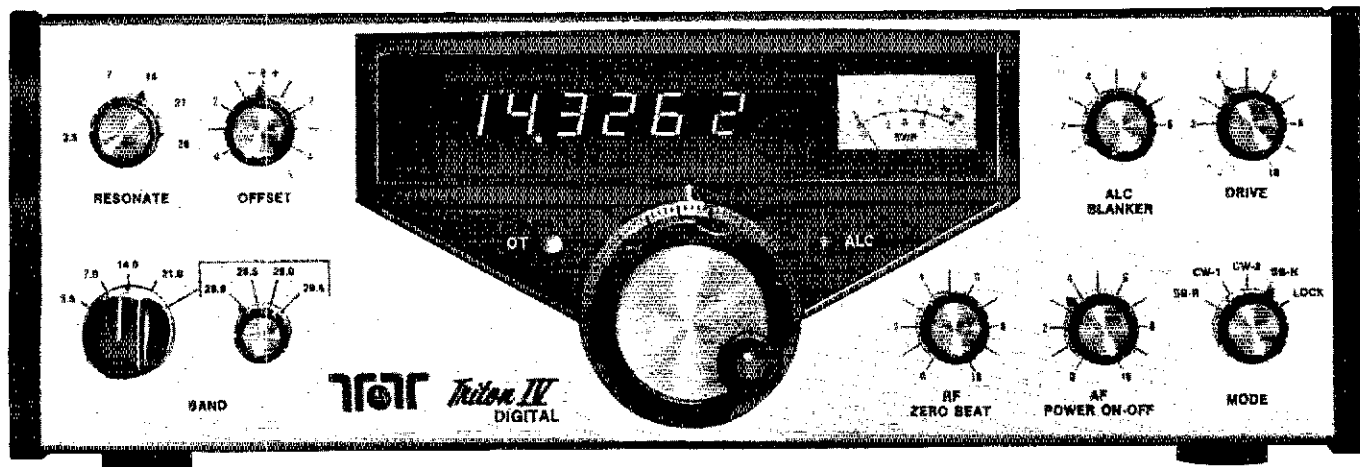
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K4KXB
W1FYM
WN8TTO

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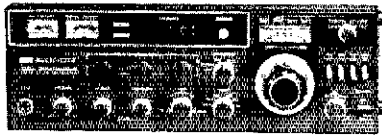
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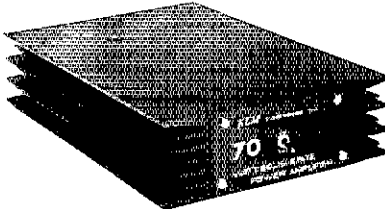
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| PA10-70B | 2m FM | 5-15w | 70w | 139.95 |
| PA10-140B | 2m FM | 5-15w | 140w | 199.95 |
| PA30-140B | 2m FM | 15-45w | 140w | 179.95 |
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| PA10-140BL | 2m FM/SSB | 5-15w | 140w | 215.95 |
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| PA30-140BL | 2m FM/SSB | 15-45w | 140w | 189.95 |
| PA2-70CB | 220 FM | 1-4w | 70w | 169.95 |
| PA10-60CB | 220 FM | 5-15w | 60w | 149.95 |
| PA30-120CB | 220 FM | 15-45w | 120w | 189.95 |
| PA2-40C | 450 FM | 1-4w | 40w | 149.95 |
| PA10-35C | 450 FM | 5-15w | 35w | 119.95 |
| PA10-70C | 450 FM | 5-15w | 70w | 229.95 |
| PA10-35CL | 450 FM/SSB | 5-15w | 35w | 139.95 |
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 - 144-148-50N As above, with type N connectors 15.95
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|-----------------|-----------|----|------|-----|
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| INN - 3.710 | 2300 M&Th | 9 | 59 | 36 |
| ETVHFN - 50.4 | 0200 MWF | 13 | 101 | 2 |
| ETVHFN - 145.2 | 0200 TTh | 9 | 43 | 0 |
| MTTMIN - 28.8 | 0200 T&Th | 9 | 102 | 0 |
| WTVHFN - 146.37 | 2330 Dy | 32 | 1980 | 500 |
| 146.97 | | | | |
| TCDARCN | 0200 W | 5 | 230 | 0 |
| 146.13 | | | | |
| 146.78 | | | | |

Late reports for May traffic are: WA4BDL 4, WA4WXT 4, K4XU 1. This is to remind you to get your reports to me as soon after the first of the month as possible. I was very happy to have attended the Hernando, MS Hamfest, very good in all respects. Good to meet the MS Section officials and Delta Div. Vice Dir. All of you are invited to attend the Tenn. Section's activities. The NARC Novice class has been successfully completed. Congratulations go to WB4JGL for the fine training of these students. Make plans to attend the next Novice class to begin Sept. 12, 1977, publicize this class and get those beginners. Good to meet the ARRL on June 17, 1977. Guest speaker was W4IYU. A commendation from the Civil Defense was awarded to WA4GOM for his work with this group. The club's first secy. WA4GOL was eulogized. This report is being prepared early due to vacation therefore the June traffic is not included, the next report will contain both June and July traffic.

GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID - SEC: WB4ZML.

| Net - Freq. | Time/Days | QNI | QTC |
|---------------|-----------|-----|-----|
| KRN - 3960 | 0630 Dy | 353 | 39 |
| MKPN - 3960 | 0830 Dy | 972 | 111 |
| KTN - 3960 | 1845 Dy | 840 | 103 |
| KYN - 3600 | 2200 Dy | 137 | 98 |
| KSN - 3600 | 2200 Dy | 61 | 8 |
| KNTN - 3727 | 2100 Dy | 330 | 107 |
| SEKEN - 07/67 | 2100 Su | 32 | 1 |
| 6DAREC - | | 81 | 7 |

WB4BZ reports KNTN going great guns. By looks of QNI-QTC this is true. Our nets need participation. QNI and bring traffic. Lots of good Field Day activity around the State but Memphis seems to have had the most fun. WA4SAC has a new rig. WB4KTR placed first in KY section in phone CD. Last minute reminder for early QST recipients. Sept. 1 is license plate deadline. Contact UR county clerk. Traffic: W4BAZ 129, W4IG5 57, W4AAV 55, W4CID 44, W4W5M 37, W4GD 36, W4AUN 35, W4HRE 32, W4EOR 27, W4AJTE 27, W4JUN 19, W4AJAV 15, W4FAF 15, W4ASAC 15, W4AGH 12, W4ANR 9, W4KTR 8, K4AVX 4.

MICHIGAN: SCM, A. L. Baker, W8TZZ - Asst. SCM: Stan Briggs, W8MPD. SEC: W8BEPK. RMs: W8JYA, W8BNC, PAMs: K8LNE, W8SOP. VHF PAM: W8WVV.

| Net - Freq. | Time/Days | QNI | QTC | Sess. |
|--------------|--------------|-----|-----|-------|
| MACS - 3953 | 1515 Dy | 888 | 457 | 34 |
| GMN - 3663 | 2230/0200 Dy | 565 | 153 | 60 |
| WSBN - 3935 | 2301 Dy | 724 | 121 | 30 |
| GLETN - 3930 | 0130 Dy | 764 | 106 | 31 |
| UPEN - 3922 | 2130 Dy | 633 | 56 | 34 |
| VHF PAM Rpt. | | 237 | 22 | 16 |
| MIGM - 50.7 | 2301 Dy | 92 | 19 | 16 |

Two letter calls in the resulting change over in station appointments have been the bulk of my work this month. If you have a new call, let me know and we will set the wheels in motion. Who is Who Dept: W8BNC is now K8CN, W8BPPY is N8SR and W8GLC now K8DD. New pres. of the Michigan DX Assn. is W8TVA. W8VU entered the CD party after 25 years absence, the official scorers credited his work to W8VUL, such a waste. New equipment is reported at W8RC - TS520, W8VET - TR2200A, W8BVB, W8BREI and W8HAN sport new TS820s. Another TS520 is reported at W8ABR. New licenses are reported at W8JDC, W8ABR and W8BAPM and W8BPNZ. General: W8CA, W8DNL and K8BZL, Advanced, W8CJU, W8BMUS and W8DQJ. Extra. Congratulations. Regretfully I report W8AYZ Silent Key. Traffic: (June) W8DKQ 505, K8LNE 162, W8SOP 137, W8VPM 126, K8ZJU 120, W8BYDZ 119, W8WZF 14, W8JYA 101, W8YU 99, W8BPO 94, W8BIT 88, W8DHB 83, W7KQU 83, K8DYI 51, W8RTN 51, W8WV 49, W8MO 46, W8NOH 45, W8TZZ 41, K8DTG 36, W8BES 34, K8DD 33, W8PDP 24, W8UFS 24, W8BET 20, W8SCW 19, W8OIE 18, W8VIZ 17, W8BFBG 16, W8BRKI 14, W8IUC 12, W8JUP 12, W8BAVI 11, W8BWC 11, K8JHA 10, W8QBE 10, W8SDB 10, W8BIF 9, W8WFK 9, W8FXR 8, W8HKL 6, K8ODY 6, W8WVV 6, W8BKBZ 5, W8LD 5, W8WVL 5, W8JAX 4, W8ZL 3, W8LOU 3, W8VW, W8BNC 12, W8TBL 11, W8BVB 10, W8TBP 10, W8CJU 5, W8BVB 4, W8VPM 2, W8DC 1.

OHIO: SCM, Hank Greeb, W8CHT/W8XX - Asst. SCM: William K. Schaeffer, W8MCR. SEC: W8BKNP. PAMs: W8DIL, W8VU, W8S5I, RMs: W8BJWG, W8BKJ, W8LTA, W8VLR. Net reports (June)

| Net - Freq. | Time(2) | Sess. | QNI | QTC |
|----------------|------------|-------|-----|-----|
| BN - 3.577 | 2245/0200 | | 43 | 150 |
| OSN - 3.577 | 2210 | | 27 | 161 |
| OGMN - 50.16 | 0100 | | 30 | 225 |
| OSSBN - 3.9725 | 1430/2000/ | | | |
| | 2245 | | | |
| ONN - 3.708 | 2230 | | | |
| BNR - 3.605 | 2200 | | | |

Remember Hamfests in Cincinnati, Cleveland and Findlay in Sept. 1. K8TUT reports excellent 50 MHz spots for 2 or 3 days in June to all parts of the U.S. and Canada. Central Ohio AHA and Central Ohio Reading Service in a Walkathon. WBIM made 40 wpm Code Proficiency. W8IQ is manager of BRIN (Cleveland) which meets daily on 146.46 MHz at 0100Z. Hamilton County ARPC members aided in relief efforts at the fire at Beverly Hills in Southgate, KY. Apricot Net communicated for two parades in Cleveland. Participants in Field Day included W8IYB, W8GV8, K8BAR, W8EQ8, W8FY8, W8DCOS, W8KNU, W8KSC, W8WE8, W8WTS, W8WVL, W8WNP, W8LWA, W8WON, W8BZNC is now active on 80 & 40 from St. Clairsville. W5KLV congratulates W8MCR and W8TH on help with CANID. W8DYF is working GRP with Alkatraz. K8OCL has circularly polarized 2-meter antenna for all modes. W8PMJ 349, W8MCR 315, W8WTS 212, W8BTTT 175, W8LTA 148, W8BKJ 115, N8CW 104, W8BAV 44, W8BOMQ 93, K8BYR 86, W8BJGW 83, W8TH 77, W8CXM 69, W8QZK 58, W8S5I 58, W8VLR 53, W8BML 52, K8LXA 51, W8BYV 45,

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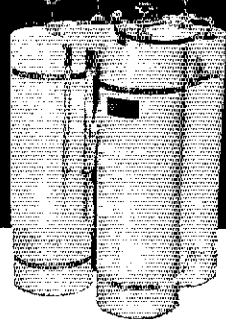
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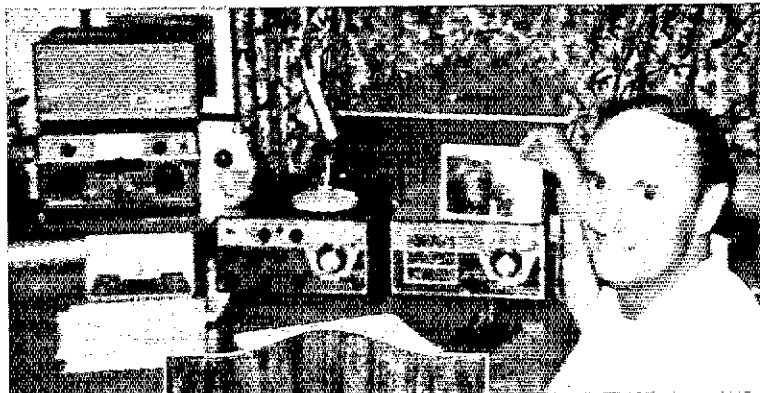
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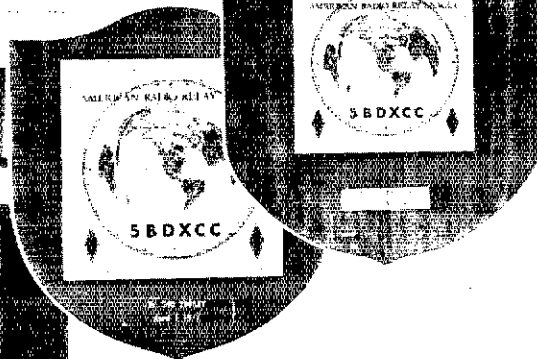
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First radio amateur to receive two

5-Band DXCC awards



Dr. Richard J. Brown, W4VN, shown above with his station setup in Pensacola, Florida, and at left with the same transceiver in Jakarta, Indonesia.



His equipment? The ever-reliable
TR-4 R. L. DRAKE
TRANSCIVER

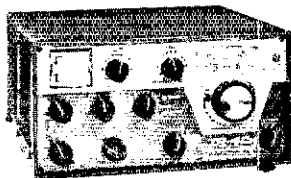
(purchased in 1971)

The R.L. Drake Company wishes to congratulate Dr. Richard J. Brown, W4VN, for being the first to work 5-Band DXCC from two separate countries as well as two continents — WØEXD/4, Pensacola, Florida, 5BDXCC Number 245; and YBØABV Jakarta, Indonesia, 5BDXCC Number 540.

Dr. Brown operated in Pensacola from February 1971 to June 1973 and in Jakarta, Indonesia from November 1974 until July 1976. In addition, his veterinarian research duty as a Lt. Col. with the US Air Force has taken him and his Drake TR-4 equipment to the jungles of Java and the Pribilof Islands, Alaska. On these assignments the TR-4 served primarily for communications with a laboratory back in Oakland. During this time the equipment was taken along as checked baggage twice, and shipped by mail from Florida, Taiwan, and Indonesia.

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- Two 5-Band DXCC awards
- First from two countries and two continents
- Over 14,000 miles to Indonesia (several trips)
- 18,000 cumulative QSO's
- 13,000 QSO's from Indonesia
- All under greatly diversified climactic conditions and still performing



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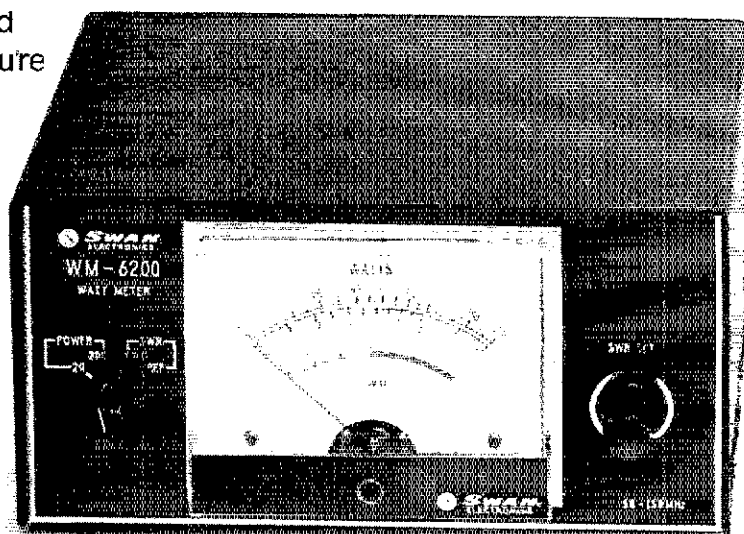
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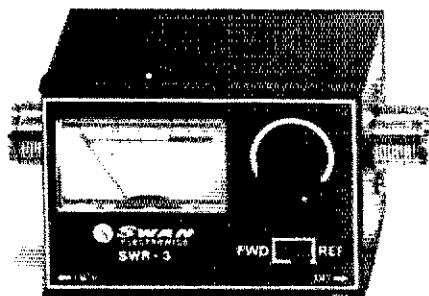


At last. A precision wattmeter for the 2-meter man. The upper-band man needs accurate output measurements, too. Now our WM6200 gives them to him with $\pm 7\%$ accuracy output power at 50 to 150 MHz. Two scales to 200 watts. Reads SWR on expanded range scale.

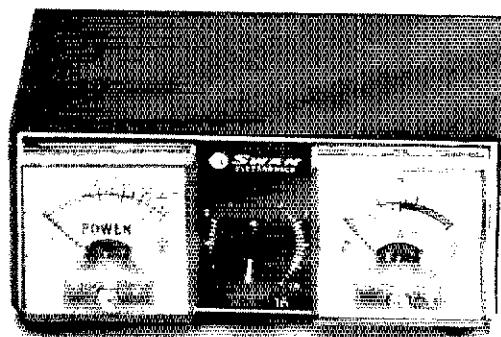
WM6200 In-Line Wattmeter \$59.95



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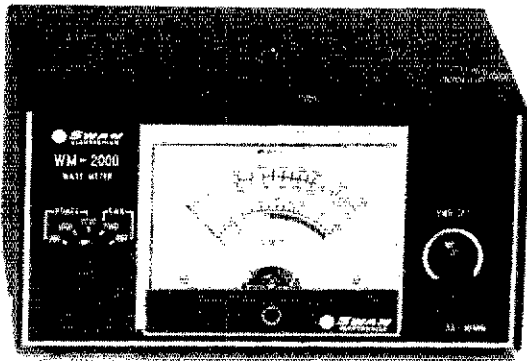


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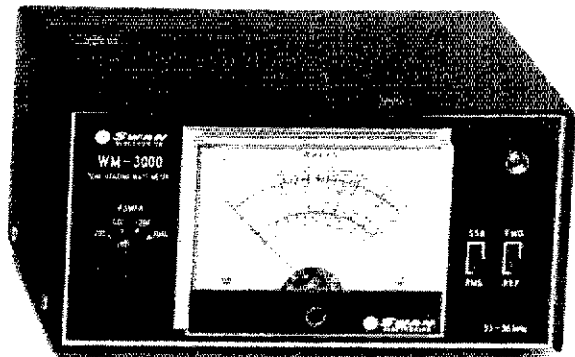


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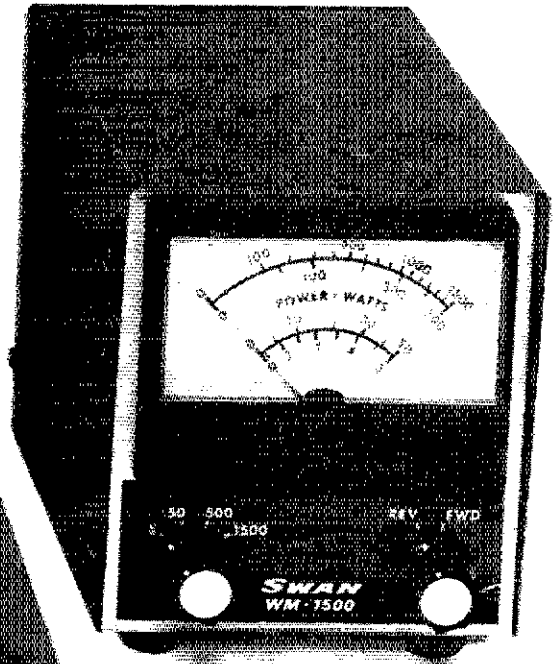
All-the-law-allows in-line wattmeter. With three scales to 2000 watts, new flat-frequency-response directional coupler for maximum accuracy and a price anybody can afford, this meter has become an amateur radio standard. 3.5 to 30 MHz with expanded range SWR scale.
WM2000 In-Line Wattmeter . . \$59.95



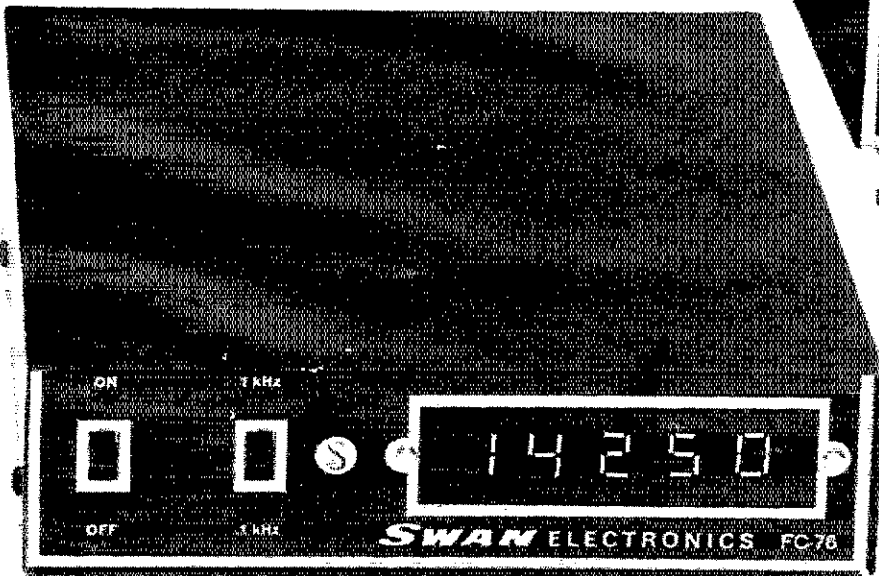
This wattmeter tells the truth about SSB. True peak envelope power of your voice modulated signal is what you want to know most about your SSB transmission, and that's where our WM3000 shines. Flat response forward or reflected power from 3.5 to 30 MHz on scales to 2000 watts in RMS or PEAK at the flip of a switch. **WM3000 Peak/RMS Wattmeter \$79.95**



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Double-duty in-line wattmeter. Use this meter for output power measurement and troubleshooting, too. Better than 10% full scale accuracy from 2 to 30 MHz, and you can go to 50 MHz with only slightly reduced accuracy. Four scales to 1500 watts and selector for forward or reflected power.
WM1500 in-Line Wattmeter . . \$74.95

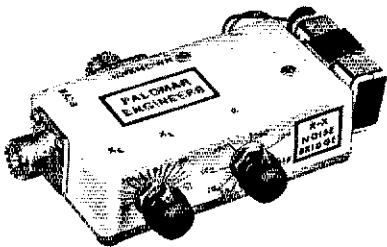


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HUDSON DIVISION:

EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV - SEC: WB2VUK, Asst. SEC: K2AYQ, PAMS: WB2EMU WB2QEL, RMS: W2CS K2QYG WB2IXW. First just a word of thanks from all of us to Gary, W2CS, for his fine job as past SCM. Luckily we still have him as NYS mgr. Wish you well, Gary, and see you on NYS. Congrats to hard-earned 1st graders to Extra: WA2RKT, WB2EMU. Advanced: WA2PGI WA2JKN WB2JRT. General: WB2CQK WA2EBV WA2AFS WA2YUP WB2YAZ. Technician: WB2KNO WA2LUU WA2BSS. WA2YYM reports excessive wetness but fine time on Field Day. FD msgs read in good form from WB2SON/2 W2FWG/2 W211/2 K2AE/2 K2KN/2 N2SE/2 K1RW/2 WB2ST 2 active in Interder Watch to report commercial stns in ham bands. Congrats to new club officers - Poughkeepsie ARC: WA2YSM WB2GOJ WA2KCL K2GBH. Mt. Beacon ARC: W2AZD WA2YSM W2CXC WA2UGO K2UZS. Poughkeepsie ARC will hold Novice/General/Advanced classes at F.D. Roosevelt H.S. Hyde Park, N.Y. Mon. evs starting mid-September. Instructors W2CS W2GID WB2GOJ. Dutchess AREC held practice drill - jet crash - on June 29 with Red Cross participating. Stns participating: K2JXU/2, W2s AWX G1J/2 HBT/2 1EU/2 JS/2 RTE/2 SUL; WA2s LJM/2 KDJ/2; WB2s COY GOJ/2 NKN/2 YGU/2 ZSO/2. Fine job! (Curiosity: whose plane did you use?) Thanks to WB2GOJ for the reporting on 20K arser activity. Some appointees running out of stn report cards. These come in the CD Bulletin. Let me know if you aren't getting yours. June PSHR: WB2EMU W2YJR W2CS. Traffic: WB2EMU 265, W2YJR 217, W2CS 96, WA2YYM 70, WB2TGL 69, N2EF 39, W2JLJ 36, W2ACQ 35, K2AV 32, WA2CJY 16, WB2GOJ 9, WA2PAU 4.

NEW YORK CITY - LONG ISLAND: SCM, John H. Smale, WB2CHY - Asst. SCM: Art Malatzky, WB2WFJ. SEC: K2HTX. RM: WB2LZN. PAM: WA2ECO. The following are major AREC/RACES lists, join one, please.

| | | | |
|------------|------------|-------------|----------------|
| Brox | 28.64 MHz | 50.39 MHz | 146.88 fm |
| Kings | 28.64 MHz | 50.35 MHz | 146.88 fm |
| Richmond | 29.5 MHz | | 146.88 fm |
| New York | 29.5 MHz | | 146.88 fm |
| Queens | 29.5 MHz | 50.52 MHz | 146.62 am/fm |
| Nassau | 28.75 MHz | | 145.68 am |
| W. Suffolk | 28.73 MHz | | 145.59 am |
| | (Hunt.) | | |
| | 28.65 MHz | | 147.21 fm |
| | (Smith) | | |
| | 28.61 MHz | | 146.085/685 fm |
| | (Babylon) | | |
| | 28.65 MHz | | (Islip) |
| E. Suffolk | Brookhaven | 146.82 fm | |
| | Riverhead | 16/76 fm | |
| | | 3730 kHz cw | |

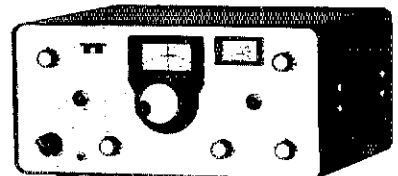
Note: Net times between 2000 and 2100 local on Mon. WB2IDP WB2LZN and WB2JUD have a local Rag Chew Net going on Wed. CW Congratulatory. WB2IWX, after eight months of licensing he passed the test for Extra, all this after starting out as a Novice. WA2HTP passed his Advanced. WA2JKG is now in Elmhurst. W2HXT had a great trip to Europe and England. WA2YEI acquired a TX 62 for Oscar ops, bought the HQ1 Mini Quad to add to his growing ant. farm and he built the 2nd and 2nd mt. Monument from the VHF Manual. K2JFE now has a Clegg FM 28. W2EC reports the new Net Mgr. for the Clearing House Net is WB2AEK. After successfully graduating 15 Novices, K2MFY plans again to teach a course in Amateur Radio in the Adult Ed. program at Bethpage H.S. Registration will be held 9/26 and 9/28 at the school, with the start date of 10/5/77, the course will run for ten weeks, further details can be obtained by calling 516-931-2900 X326. WR2AKV now is with "J" pole ant. behind Babylon Town Hall. WA2BJJ is now K2GJ. Amateurs participating in the "Salute to Israel Parade" included K2s EZD RVM VMR; N2s: WA2s ARD BRF LUB GDU HES LZY G. Monmouth RRN QDS YYL; WB2s CUW CVJ EQE GZW HGK JSJ KHO PQR RVG UDD. It was nice to hear so many Long Island Stations active for Field Day. The Great South Bay ARC held their Annual Picnic at Belmont State Park. WA2EUB has been appointed EC for Kings County. The Cat South Bay ARC Field Day had two visitors, the Suffolk County O.A. and the Babylon Town Supv. who were given a complete display of amateur radio in emergency action. Congrats to WB2IDP and WB2IWX on making BPL. Traffic: (June) WB2IDP 529, WB2IWX 136, WB2LZN 85, WA2HTP 76, W2MLC 45, WA2JKG 43, WB2HIG 19, WB2HXT 19, WA2YEI 12, K2CFC 5, K2JFE 2 (May) WB2IWX 382, W2EC 132, WA2ECO 131, WB2JAY 37, W2DBQ 51, WA2YEI 12.

NORTHERN NEW JERSEY: SCM, Robert E. Naukamm, WA2MVQ

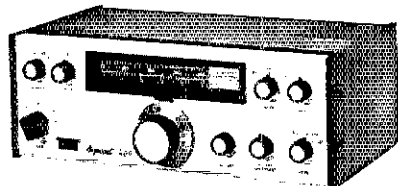
| Net - Freq. | Time(PM)/Days | Sess. | QNT | QSP |
|--|---------------|-------|-----|-----|
| NJN - 3695 | 7:00 Dy | 30 | 338 | 99 |
| WB2CS I | | | | |
| NJN - 3695 | 10:00 Dy | 30 | 158 | 45 |
| WB2CST | | | | |
| NJN - 3750 | 8:15 Dy | | | |
| WA2WIW | | | | |
| NJPN - 3950 | 6:00 Dy | 30 | 502 | 106 |
| W2QC | | | | |
| NJPN - 3950 | 9:00 A Su | 4 | 50 | 8 |
| W2GC | | | | |
| PVTN - 145.7 | 8:00 Dy | | | |
| WA2OPY | | | | |
| SEC: WB2VUF. PAMS: W2QC & WA2OPY (VHF). RMS: WB2CST & WA2WIW. Congratulations to WB2ASD WB2DFO WA2AYY WB2RMK W2SQ and K2SE all making PSHR this month. WA2WXC passed Extra Class. WA2JUG and WA2JUU the Advanced. WB2LCT WA2LNL and WA2MAE the General. WB2CHF the Tech. The following are new Novices: WA2PIJ WB2PIJ WA2PIR and WB2PIR. W2RRQ was in the hospital. WA2WJC underwent open heart surgery and is now on the mend. WA2AYY is QRT from NJJ and is attending the Univ. of Miami (FL) and will be active at K4HYE. WA2RMZ did not get Extra as reported. WA2KFE attended advanced ROTC Ft. | | | | |

TEN-TEC

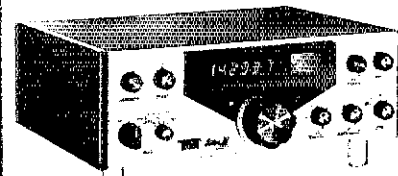
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- 273 28.5-29.0 MHz Xtal..... 5.00



- 509 Argonaut 80-10m 5w Xcvr..... 359.00
- 206 Crystal calibrator..... 29.00
- 208 External CW filter..... 29.00
- 210 AC power supply..... 30.00
- 210/E 110/220vac ps..... 92.00
- 215P Microphone w/plug..... 29.50
- 405 80-10m 50w linear..... 159.00
- 251 AC ps for 405 & 509..... 85.00
- 251/E 110/220vac ps..... 92.00



- 540 Triton IV 80-10m Xcvr..... 699.00
- 544 Triton IV Digital..... 869.00
- 252G 18A 110vac power supply..... 109.00
- 262G As above, w/VOX & speaker..... 139.00
- 252G/E 18A 110/230v supply..... 116.00
- 262G/E As above, w/VOX, spkr..... 146.00
- 240 160m converter..... 97.00
- 241 Xtal oscillator..... 29.00
- 242 External VFO..... 169.00
- 244 Digital display..... 197.00
- 245 150 Hz CW filter..... 25.00
- 249 Noise blanker..... 29.00
- 207 Ammeter..... 14.00
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NEW! FM144-10SXRII

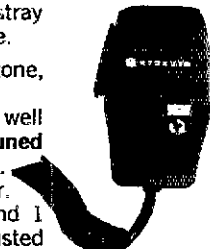


All Solid State-PLL digital synthesized — No Crystals to buy! 5KHz steps — 144-149 MHz-LED digital readout PLUS MARS-CAP.*

- 5MHz Band Coverage — 1000 Channels (instead of the usual 2MHz to 4MHz — 400 to 800 Channels)
- Priority Channel
- Audio Output 4 Watts • 15 Watts Output
- Unequaled Receiver Sensitivity and Selectivity — 15 POLE FILTER, MONOLITHIC CRYSTAL FILTER AND AUTOMATIC TUNED RECEIVER FRONT END — COMPARE!!
- Superb Engineering and Superior Commercial Avionics Grade Quality and Construction Second to None at ANY PRICE.

- **FREQUENCY RANGE:** Receive: 144.00 to 148.995 MHz, 5 KHz steps (1000 channels). Transmit 144.00 to 148.995 MHz, 5 KHz steps (1000 channels) + MARSCAP.*
- **FULL DIGITAL READOUT:** Six easy to read LED digits provide direct frequency readout assuring accurate and simple selection of operating frequency.
- **AIRCRAFT TYPE FREQUENCY SELECTOR:** Large and small coaxially mounted knobs select 100KHz and 10KHz steps respectively. Switches click-stopped with a home position facilitate frequency changing without need to view LED'S while driving and provides the sightless amateur with full Braille dial as standard equipment.
- **FULL AUTOMATIC TUNING OF RECEIVER FRONT END:** DC output of PLL fed to varactor diodes in all front end R-F tuned circuits provides full sensitivity and optimum intermodulation rejection over the entire band. **No other amateur unit at any price** has this feature which is found in only the most sophisticated and expensive aircraft and commercial transceivers.
- **TRUE FM:** Not phase modulation — for superb emphasized hi-fi audio quality second to none.
- **FULLY REGULATED INTEGRAL POWER SUPPLIES:** Operating voltage for all circuits, i.e., 12v 9v and 5v have independently regulated supplies. 12v regulator effective in keeping engine alternator noises out and protects final transistor from overload.

- **MONITOR LAMPS:** 2 LED'S on front panel indicate (1) incoming signal-channel busy, and (2) un-lock condition of phase locked loop.
- **DUPLEX FREQUENCY OFFSET:** 600KHz plus or minus, 5KHz steps. Plus simplex, any frequency.
- **MODULAR COMMERCIAL GRADE CONSTRUCTION:** 6 unitized modules eliminate stray coupling and facilitate ease of maintenance.
- **ACCESSORY SOCKET:** Fully wired for touch-tone, phone patch, and other accessories.
- **RECEIVE:** .25 uv sensitivity. 15 pole filter as well as monolithic crystal filter and automatic tuned LC circuits provide superior skirt selectivity.
- **AUDIO OUTPUT: 4 WATTS.** Built in speaker.
- **HIGH/LOW POWER OUTPUT:** 15 watts and 1 watt, switch selected. Low power may be adjusted anywhere between 1 watt and 15 watts, fully protected—short or open SWR.
- **PRIORITY CHANNEL:** Instant selection by front panel switch. Diode matrix may be owner re-programmed to any frequency (146.52 provided).
- **DUAL METER:** Provides "S" reading on receive and power out on transmit.
- **OTHER FEATURES:** Dynamic microphone, mobile mount, external speaker jack, and much, much more. Size: 2¼ x 6½ x 7½. All cords, plugs, fuses, mobile mount, microphone hanger, etc., included. Weight 5 lbs.



NEW! 6 METER FM50-10SXRII

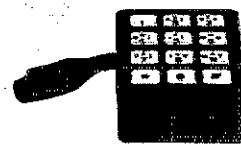
Same specifications as above except transmit/receive: 51.00-53.995 MHz. 600 channels
Introductory Price \$389.00



SUMMER SPECIAL
FM144-10SXRII
\$389.00
VALUE \$599.00
Regulated AC/PS
Model FMPS-4R ... \$49.00



NEW!
STONE ENCODER/DECODER
SC-12A ... 12 CHANNELS ... DUAL TONE
Introductory Price \$119.00



Touch-Tone Pad
MODEL FMTP-1
... \$59.00

Manufactured by one of the world's most distinguished Avionics manufacturers, Kyokuto Denshi Kaisha, Ltd.

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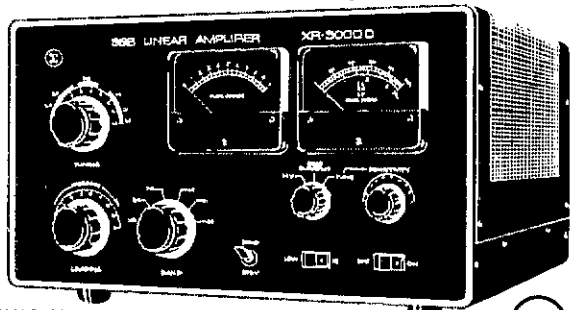
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NEW SIGMA XR-3000D LINEAR AMPLIFIER

INTRODUCTORY PRICE **\$789**



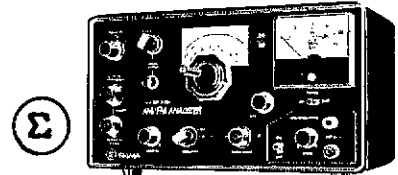
- 2 DAY AIR SHIPMENT ANYWHERE IN U.S. \$35 ALASKA AND HAWAII SLIGHTLY HIGHER.
- FULL BAND COVERAGE 160-10 METERS INCLUDING MARS.
 - 2000+ WATTS P.E.P. SSB INPUT. 1000 WATTS INPUT CONTINUOUS DUTY, CW, RTTY & SSTV.
 - TWO EIMAC 3-500Z CONSERVATIVELY RATED FINALS
 - ALL MAJOR HV AND OTHER CIRCUIT COMPONENTS MOUNTED ON SINGLE G-10 GLASS PLUG IN BOARD. HAVE A SERVICE PROBLEM? (VERY UNLIKELY) JUST UNPLUG BOARD AND SEND TO US.
 - HEAVY DUTY COMMERCIAL GRADE QUALITY AND CONSTRUCTION SECOND TO NO OTHER UNIT AT ANY PRICE!
 - WEIGHT: 90 lbs. SIZE: 9 1/2" (h) x 16" (w) x 15 3/4" (d).

FEATURES

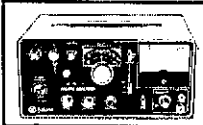
CUSTOM COMPUTER GRADE COMMERCIAL COMPONENTS, CAPACITORS, AND TUBE SOCKETS MANUFACTURED ESPECIALLY FOR HIGH POWER USE—HEAVY DUTY 10KW SILVER PLATED CERAMIC BAND SWITCHES • SILVER PLATED COPPER TUBING TANK COIL • HUGH 4" EASY TO READ METERS—MEASURE PLATE CURRENT, HIGH VOLTAGE, GRID CURRENT, AND RELATIVE RF OUTPUT • CONTINUOUS DUTY POWER SUPPLY BUILT IN • STATE OF THE ART ZENER DIODE STANDBY AND OPERATING BIAS PROVIDES REDUCED IDLING CURRENT AND GREATER OUTPUT EFFICIENCY • BUILT IN HUM FREE DC HEAVY DUTY ANTENNA CHANGE-OVER RELAYS • AC INPUT 110V OR 220V AC, 50-60Hz • TUNED INPUT CIRCUITS • ALC-REAR PANEL CONNECTIONS FOR ALC OUTPUT TO EXCITER AND FOR RELAY CONTROL • DOUBLE INTERNAL SHIELDING OF ALL RF ENCLOSURES • HEAVY DUTY CHASSIS AND CABINET CONSTRUCTION AND MUCH, MUCH MORE.



SIGMA RF-2000 SWR & POWER METER
Introductory Price **\$29** Cal PWR Scales 200W-2000W
Freq Range 3.5 - 150 MHz Please do not confuse the RF2000 with similar appearing lower priced units - RF2000 is an individually calibrated professional quality instrument - Unequaled at many times the price Size 7" (w) x 2 1/2" (h) x 2 1/3" (d).



NEW AM/FM ANALYZER SIGMA AF-250L
INTRODUCTORY PRICE **\$199**
Deviation/Modulation Meter - FM: 0-20 KHz, AM: 0-100%. Size: 5 1/2" (h) x 10 1/2" (w) x 7 1/4" (d)
Weight 7 lbs. Frequency: 1.8MHz-520MHz



ALSO MODEL AF-251LW WITH BUILT IN 125 WATT CALIBRATED WATT METER & DUMMY LOAD. PRICE **\$239**. PLEASE WRITE FOR COMPLETE INFORMATION.

NEW—CDR HAM ROTATORS—Reg. **\$159.95** \$125.

STANDARD NEW 2 METER FM TRANSCEIVERS Model SRC 146A SPECIAL SALE

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| SRC 146A | \$314 |
| 4 Xtlals: 34/94 and 94/94 | NC |
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| PT3644 Leather Case | \$10 |
| A1 19 Rubber Ant and Whip | \$6 |
| Nl-Cads | \$30 |
| | Reg. \$400 |

Our Price \$279

NEW!!! Touch Tone pad completely wired and ready to plug in—\$69.00



NEW! FMSC-2 SCANNER FOR KDK FM-144

14 CHANNEL PROGRAMMABLE INTRODUCTORY PRICE **\$109**

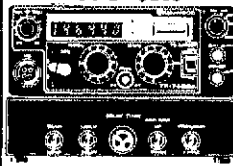


NEW! 7400 SCANNER

FOR KENWOOD TR-7400A
14 CHANNEL PROGRAMMABLE
INTRODUCTORY PRICE **\$109**



FMSC-1 - \$169



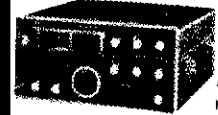
7400 Scanner II—\$189

TWO NEW SCANNERS!

FMSC-1 Scanner for KDK FM 144 and 7400 Scanner II for Trio-Kenwood TR-7400A.
• Full scan 146 and 147 MHz consecutively or 1 MHz, or any MHz range • Scan rate: 1 MHz/2 seconds adjustable • Controls: Scan/Hold, Latch/Delay, 600 KHz Offset (off, up, down), program 1 MHz • Simple installation.



| ACCESSORIES FOR KDK FM 144 | | |
|----------------------------|--|--------|
| FMPS 4R | Regulated AC/PS | \$49 |
| FMTP 1 | Touch Tone Pad | \$59 |
| FMTP-2 | Touch Tone Pad with 10 Number Programmable Memory | \$99 |
| FMMC-1 | Microphone with Built in Touch Tone Pad | \$59 |
| FMTO-1 | Private Call Decoder for use with and Programmed by Any Touch Tone Pad | \$129 |
| SC 17A | Audible Tone Encoder/Decoder | \$119 |
| FMSC 1 | Scanner - Random, Any Range | \$189 |
| FMSC 2 | Scanner - Programmable, 14 Channels | \$109 |
| MARS CAP | Option Kit - Any Frequency, Any Split | \$12 |
| FMDF-1 | Distel Option Kit - 2 Extra Positions, Crystals Required | \$19 |
| FMOF 2 | ±1 MHz Distel Option Kit (No Crystals to Buy) | \$19 |
| FMIF 1 | Sub Audible Tone (100 Hz - Adjustable 67 203 Hz) | \$29 |
| FMAT 1 | 1/2 Wave Portable Antenna for Hotel Motel or Apartment | \$7.95 |
| | Extra DC Cord & Plug | \$3.50 |
| | ACC Socket 5 Pin Din Plug | \$1.50 |
| | Owners Manual (Extra) | \$5.00 |
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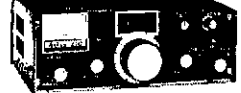
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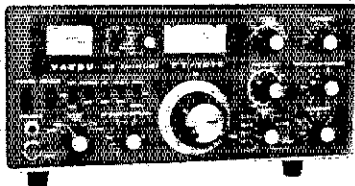
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| FT-101EE As above, but no processor | 649.00 |
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| MMB-1 Mobile mount | 19.00 |
| RFP-104 RF speech processor | 79.00 |
| XF-30B AM filter | 40.00 |
| Labor - AES install AM filter. | 12.00 |
| XF-30C CW filter, 600 Hz. | 40.00 |
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| Crystals For FT-101 series | each 5.00 |
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| FP-301 AC supply | 125.00 |
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| XF-30C CW filter, 600 Hz. | 40.00 |
| FM-1 FM detector | 40.00 |
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| YC-601 Digital readout (101/401) | 169.00 |
| YO-100 Monitor scope | 199.00 |
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| YC-221 Digital freq display | 119.00 |
| YD-844L Lo-Z base microphone | 29.00 |
| YM-846 Lo-Z hand microphone | 16.00 |
| MMB-4 Mobile mt for FT-620B/221 | 19.00 |
| XF-90B AM filter | 40.00 |

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Bragg, NC from middle of June to early Aug. WB2GMV WA2IFL and WA2MVQ were operators from NNJ at K2BSA/3 at the National Boy Scout jamboree at Lemoine State Park, PA. WA2JUDY spent an enjoyable weekend at the ARRL National convention in Toronto also operated in the June VHF QSO party and added a 40 foot Triax crankup to his QTH. WB2ELF is attending RPI in New York State. Field Day messages to the SCM were received from the following: Irvington Radio Amateur club and Tri-County Radio Assn, Inc. Newsworthy articles of Field Day activities were received from: WB2DFO and WB2KRC who operated GRPP in the Catskills; the Bell Laboratories Radio Club, and the Jersey Shore Amateur Radio Society. W2TM's call was used for Bergen Amateur Radio Association's Field Day site at the old Nike Base in Franklin Lakes. A new Field Day group known as Radio Amateurs Defying Inertia (RAD) - R.A.D.I.O. was W2RS/2 in Upper Saddle River. WB2YGT is the Repeater Council Coordinator and for the NYC Marathon to be held Oct. 23rd, Pete is looking for volunteers with 2-meter handie talkies to assist in this event. WB2MGB has a new HW2026. WA2WDT has an 80-meter dipole on the ZBT flat house at Route 42. WB2B is going for 100000 ratings for flying. WA2GEZ has worked 200 countries with 192 confirmed for DXCC. N2NS EC for Union County advises a new 2-meter net for traffic and emergencies meets at 145.52 simplex Sat. and Sun. at 4 PM and 7:30 PM. WA2UOO is now W2GD. WB2MV1 is K2MV. WA2JUI is W2KB. W2ZJVN is N2SW. CW report received from W2PL Traffic: (June) WB2ASD 226, WA2AY 193, WB2RMK 50, W2GC 55, WB2DFO 51, K2SE 40, WB2VTT 38, N2NS 36, WA2NPP 34, W2SWE 32, WB2RC 28, WA2MVQ 26, WA2VTT 24, WB2CST 15, W2CU 13, WA2KFE 12, W2CC 9, WA2DLZ 8, N2SW 8, WB2ANI 6, W2SQ 5, WA2GJU 5, W2C03 5, WB2CNF 2, WA2RSU 1, W2KB 1. (May) N2NS 12.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF - SEC: W01YW. PAM/VHF: K0LKH. PAM/HF: W0AVW. RM: K0EVH. Iowa has a new CW net. Starting Sept. 2nd The Iowa Code Net (ICN) will meet 2354Z M-W-F on 3713 kHz with W0NRN as mgr. K0LKH is custodian of Military Rec. Station W0QAYD. W0IKT was among those helping the Pony Club in Westfield. W0E is super for FD. heard from W0UJE W0LJ W0CVJ W0JV K0RN K0KJ W0AJA W0YL W0SS W0OM W0MG and K0OLF. New calls: W0FHE is W0SR, W0MUH is K0AT and W0BUA is K0RN. W0JAJ's mobile was totaled, no injuries. W0BX now retired and has CR3, VJL and FK logged. W0BQC has new RTTY. W0D Computer and worded W4KVL. Congrats to W0BJU W0BPPQ and W0BPR for new tech. tickets. New in Humboldt: W0DDB W0DCC W0DDC W0DCE W0DDF W0DDG W0DDC. Siouxland ARC election: W0QFR, pres; W0ICT, 1st vice-pres; W0VNX, 2nd vice-pres; W0JFO, secy; W0TCS, treas. Iowa Repeater Council new address: 1010 Oakpark Blvd. Denison, IA 51442. Congrats to K0EVH on becoming Mgr. of Tenth Region Net and to W0YLS on becoming Mgr. of IA Tall Corn Net. Happy Labor Day. IA 75M 3970 kHz 1730Z K0JVO mgr. QNI 1573, QTC 118, sess. 26. IA 75M 3970 kHz 2300Z K0RN mgr. QNI 1972, QTC 68, sess. 26. IA Tall Corn 3860 kHz 2330/0300 W0YLS mgr. QNI 403, QTC 97, sess. 60 Traffic: (June) W0AJX 489, K0FVH 240, W0YLS 112, W0SS 71, W0IKT 22, W0LFF 19, W0NSS 18, K0GP 14, W0PYD 12, W0SR 8, W0JAJ 2. (May) W0KHF 64.

KANSAS: SCM, Robert M. Summers, K0BXF - SEC: W0KLL. PAMS: W0SEV W0RCL. RM: K0MRI. Field Day 1977 is over and quite a few reports were received on club group participation. I hope you all got the news releases made also for extra credit and met of all full credit due Amateur Radio thru your efforts. Just received notice from W0SEV on his giving up the PAM spot for KS. I shall appoint a new PAM probably by the time you read this. KS net reports for June: K5WN QNI 618, QTC 247; Q1SS QNI 107, QTC 42; K5PN QNI 136, QTC 113; Q1SN QNI 142, QTC 145 QTC. Late reports for May: K5BN QNI 959, QTC 136, K5PN QNI 178, QTC 27 and CSTN QNI 712, QTC 57. QKS the regular CW Traffic net is holding its own despite the wx conditions with 334 QNI and 131 QTC. You are invited to join the QKS gang daily on 3610 kHz at 7 and 10 PM. W0VEZ doing fine job keeping the QKS net operating. You also can help daily 6:30 PM on 3735 kHz. CW still a good mode to keep up with. Modulator tubes do occasionally go out, also transistors. Congratulations to the gang at Great Bend on fine publicity they recently received in the Great Bend Tribune. The Lawrence ARC also received fine releases on the amateur activity from that area. Note to Novices and Tec's, when you submit a PSHR total please indicate your class of license so that I won't pass you up when the total is under 40. Are you planning on the convention in Wichita? Midwest Division convention you know! Traffic: (June) N0IE 172, W0FIR 130, W0RFF 96, W0CJL 81, K0BFX 75, W0YFH 72, W0VEZ 51, W0VEZ 41, W0TFT 42, W0BSEV 43, W0HJ 37, W0BHG 18, W0PB 18, W0QPC 14, W0LKA 12, W0HJ 12, W0FDJ 11, W0BBI 8, W0IX 8, W0ATRO 4, W0RBO 2, W0OCA 1. (May) W0SEV 33.

MISSOURI: SCM, L. G. Wilson, K0RWL - Ast. SCM, Joe Flowers, W0TFF. SEC: W0FKY. MOSSBN officers for the coming year are as follows: Net Mgr.: W0LFF; Asst. Net Mgr.: W0LRX; treas. K0AFY; and editor: W0BRI. These officers were elected at the MOSSBN picnic in Jefferson City on June 12 and attended by approximately 100 people. Field Day messages were received from the following stations: N0SS/Q W0BRN/Q W0HSL/Q W0CLR/Q W0IE W0BVHN and W0S,CBL/Q Sincere sympathy to the family and friends of W0QZY who joined the ranks of the Silent Eys. (Information HARC) W0NXX is now sporting a new call W0GW.

| | | | | | |
|-----|-----|-----|-------|-----|-----|
| Net | QNI | QTC | Net | QNI | QTC |
| MSN | 82 | 27 | SCEN | 57 | 5 |
| MON | 151 | 97 | MON-2 | 109 | 46 |
| PHD | 41 | 11 | PHD | 31 | 7 |

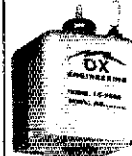
(May)
 MOSSBN 1026 121 HBN 244 22
 Congratulations to the following new licensees:
 W0JDS W0PSS W0TNT W0AUG W0AUK
 W0AUO W0AUP W0AUT W0AUW W0AUV
 W0AVE W0AVS W0AVV W0AVW W0AVX
 W0AXW W0AZB W0AZG W0AZI W0AZM
 W0BAZ W0BAZT W0BAZV W0BAZV W0BAM
 W0BAN W0BBA W0BBQ W0BBB W0BBB
 W0BBP W0BBR W0BCD W0BCB W0BCM
 W0BCO W0BCR W0BCX W0BDE W0BDI

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RF Speech Processor

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- NO CABLES OR BENCH SPACE REQUIRED
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- UNIQUE PLUG-IN UNIT — NO MODIFICATIONS REQUIRED



This is RF Envelope Clipping — the feature being used in new transmitter designs for amateur and military use.

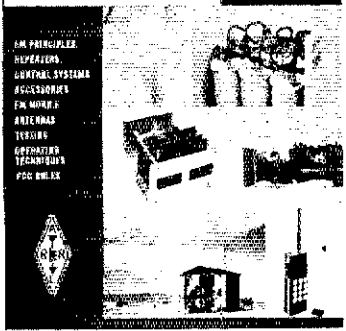
Models Now Available
 Collins 32S, KWM-2 \$ 98.50 ea.
 Drake TR-3, TR-4, TR-6, TR-4C,
 T-4, T-4X, T-4XB, T-4XC \$128.50 ea.
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Watch for other models later!

DX Engineering

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FM and REPEATERS for the Radio Amateur



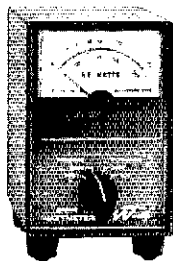
This book is a must for the fm buff as well as the operator just breaking into fm and repeaters. Fourteen chapters include: mobile installation, transmitters, receivers and antennas for mobile and base, and fm test equipment. Special sections treat alignment and troubleshooting gear as well as repeater technical problems and cures. Club organization, repeater location planning, and operating are covered. At your dealer's or postpaid from ARRL. \$4.00 in U.S.A., \$4.50 elsewhere.

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W-4 1.8-54 MHz



WV-4 20-200 MHz

Drake directional, through line wattmeters, using printed circuits, toroids, and state of the art techniques, permit versatile performance and unsurpassed accuracy, yet at a lower cost.

In contrast to VSWR measuring devices of the past, Drake wattmeters are frequency insensitive throughout their specified range, requiring no adjustments for power or VSWR measurements.

Negligible insertion loss allows continuous monitoring of either forward or reflected power for fast accurate tune up and checking of transmitter-antenna performance.

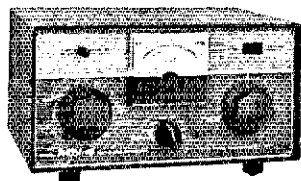
Indirectly measure radiated power (forward power minus reflected power) and VSWR by means of a plastic nomogram included.

Each wattmeter makes possible quick, accurate adjustments of antenna resonance and impedance match, when placed between transmitter and matching network.

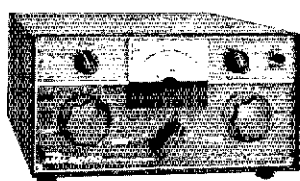
High accuracy; ideal as laboratory instruments. Removable coupler allows remote metering.

| Specifications | W-4 | WV-4 |
|---------------------------------|---------------------------------------|-------------------------------------|
| Frequency Coverage | 1.8-54 MHz | 20-200 MHz |
| Line Impedance | 50 ohm resistive | 50 ohm resistive |
| Power Capability | 2000 W continuous | 1000 W continuous |
| Jacks, Removable Coupler | Two SO239 input and output connectors | Type N input and output connectors. |
| Semiconductors | Two 1N295 power meter rectifiers | Two 1N695 power meter rectifiers |
| Accuracy | + (5% of reading + 1% of full scale) | |

Drake MN-4 & MN-2000 Matching Networks



MN-4 (300 Watts)



MN-2000 (2000 Watts)

To receive a FREE Drake Full Line Catalog, please send name and date of this publication to:

R. L. DRAKE COMPANY

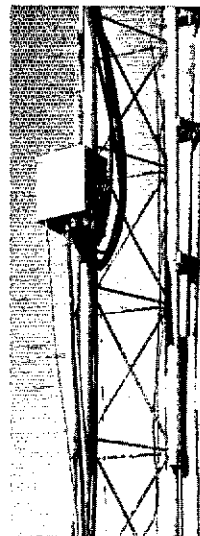


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Drake RCS-4 Remote Coax Switch

- Remotely Selects One of Five Antennas
- Grounds All Unused Antennas
- Grounds All Antennas in Gnd Position for Lightning Protection
- Front Panel Indicator Monitors Antenna Selection Interval
- Protected Against Adverse Weather Conditions
- SO-239 Connectors Provided for Main Coax Feed-Line and Individual Antenna Feed-Lines
- Handles 2000 Watts PEP
- Available in 120 V-ac or 240 V-ac 50/60Hz Versions



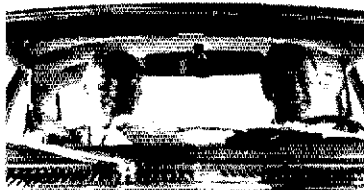
- Control unit works on 110/220 V-ac, 50/60 Hz, and supplies necessary voltage to motor.
- Excellent for single coax feed to multiband quads or arrays of monobanders. The five positions allow a single coax feed to three beams and two dipoles, or other similar combinations.
- Control cable (not supplied) same as for HAM-M rotator.
- Selects antennas remotely, grounds all unused antennas. Gnd position grounds all antennas when leaving station. "Rain-Hat" construction shields motor and switches.
- Up to 30 MHz, insertion of switch changes VSWR no more than 1.05:1.
- From 30 MHz to 150 MHz, insertion changes VSWR no more than 1.5:1.
- Motor: 24 V-ac, 2 amp. Lubrication good to -40°F.
- Switch Rf Capability: Maximum legal limit.

- 80-10 Meters
- Antenna Selector and By-Pass Switches included

A Drake matching network is a worthwhile addition to any amateur station where peak performance is desired. Basically identical, except for power handling capabilities, the MN-4 and MN-2000 enable feedline SWR's of 5:1 to be matched to the transmitter. If input impedance is purely resistive, even higher SWR's can be handled. Besides presenting a 50 ohm load to the transmitter, the Matching Network's built in rf wattmeter allows accurate and continuous power measurement and VSWR indication. The advanced wattmeter circuitry yields frequency-insensitive readings from 2 to 30 MHz, and accuracy until now obtainable only in expensive wattmeters.

All prices (suggested amateur net) and specifications subject to change without notice.

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WD9BEY WD9BFZ WD9BGF WD9BGG WD9BGU
WD9BHA WD9BHB WD9BHQ WD9BHU WD9BIF
WD9BIO WD9BIE WD9BIF WD9BJK WD9BJV
WD9BLR WD9BLM WD9BLN WD9BND WD9BNE
WD9BNH WD9BNM WD9BNR WD9BNZ WD9BOO
WD9BOP WD9BPD WD9BPH WD9BPX WD9BPZ
WD9BQA WD9BQC WD9BQS WD9BQT WD9BQV
WD9BQX WD9BQZ WD9BRE WD9BRM WD9BRR
WD9BRY and WD9BSO through WD9BSV. Congratulations to W9GCI on new Advance license. Traffic: (June) K9QK 829, W9MEO 208, W9OTC 17, W9NUB 124, N052, W9OVD 48, W9OQD 47, W9OLFY 40, W9OFND 37, W9BVL 31, W9OLMW 31, K0SSN 27, W9QFKD 25, W9QVHN 25, K9BM 22, W9QFKY 19, W9QMOF 19, W9QAU 13, K9RWL 13, W9ELE 9, K9AHL 6. (May) W9EMX 6.

NEBRASKA: SCM, Claire Richard Dyas, W9JCP — WA9QEI is a Silent Key. New Novices in the Holdrege area are: WD9CWK, WD9CWL and WD9CWM. W9BSYV of Cicero is now NCS of a CTC at 0000Z on 3740 kHz. All check-ins are welcome. All radio clubs report a good turn out for Field Day and many contacts were made. WA9UPV is a Silent Key. Net reports: QCWA, QNI 55; Cornhusker Net, QNI 1286, QTC 42; Nebr. Storm Net, QNI 860, QTC 45; Nebr. Morning Phone Net, QNI 1185, QTC 28; Sandhills Wx Net, QNI 211, QTC 24; Platte Valley 2-mtr net, QNI 30, 6 tornado alerts; Western Nebr. Net, QNI 426, QTC 15, AREC net, QNI 140. Traffic: W9FQB 60, W9VEA 55, W9BJWQ 36, K0TUH 35, WA9CBJ 34, W9HOP 28, W9JCP 25, WA9QX 18, WA9PC 18, K9BRS 16, W9BSYV 16, W9NIK 11, WA9EX 10, W9SA 10, W9JUI 8, K9COT 4, W9GMQ 4, K9HNT 4, W9VYX 3, W9YFR 2, W9GAK 1, WA9LOY 1.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, John McNassar, W1GVT — SEC: W1XX. RM: K1EIR. PAM: K1EIC. VHF PAM: WA1ELA.
Net — Freq. Time/Days Sess. QNI QTC
CN - 3640 1900/2200 Dy 60 340 276
CPN - 3965 1000 Su 30 453 135
1800 M-S
VHF-2 — 28/88 2130 Dy 30

High QNI: CN - W1KV K1GF and WA1RUR. CPN — W1QC and K1DFR. SEC comments: ECs use the new Workbook, comments and suggestions are in order. N. E. Emergency Phone Net active on 3945 at 8:30 Sun. Director W1HHR suggests clubs keep abreast of info on FCC Memos and Orders, please voice your opinions. Novice Traffic Net now operating, WA1UAX invites check-ins on 3740 at 6:30 PM to the Conn. Training Net. Clubs, spread the word! Conn Section amateurs (and many others) extend sincere sympathy to W1EWF on the death of his XYL. Danbury CARA said their 14th annual Conn. QSO Party produced a record number of logs, their thanks to all! Stamford ARA thanks K1GF for interesting talk on Traffic Nets. Meriden ARC Members enjoyed 2-Meter Tx. Hunt Congratulations to: WA1VGP for May & June Br.; WA1ZAP WA1AK and WA1UJ on Advanced Class; WA2TTC on Tech. Class; Hockanum Valley ARS on ARRL Affiliation; W1BDN awarded Life Membership for Meritorious Service in Shoreline ARC; and to W1LKV (W1NRF op.) Grand State Winner in Conn. QSO Party! Most all clubs took an active part in Field Day (as they do each year) and was "first" for many Novice operators. Suggest that clubs now help Novice ops. with traffic handling and encourage them to become active traffic operators. Please check in to the Conn. Training Net! Traffic: WA1VGP 296, K1GF 205, K1XA 123, WA1RUR 86, WA1UR 54, W1AW 42, W1BDN 35, W1GVT 23, WA1JX 23, K1DFS 21, W1QCG 21, K1QCG 21, W1TR 16, WA1ZQP 9, WA1UWR 5, W1CUH 4, W1VS 2.

EASTERN MASSACHUSETTS: SCM, Frank Baker, W1ALP — Asst. SCM: Raymond N. Witt, WA1OWQ. SEC: W1AOG. W1IAMG new EC for Sharon. WA1TYX new NM for EASN. Endorsements: ECs: K1UJQ WA1TEH K1PAD. Many FD reports received. NEERN had 64 QNIs, 7 QTC. NENN had 177 QNs, 86 QTC. reports: WA1ZAP WA1AK and WA1UJ on Advanced Class; WA2TTC on Tech. Class; Hockanum Valley ARS on ARRL Affiliation; W1BDN awarded Life Membership for Meritorious Service in Shoreline ARC; and to W1LKV (W1NRF op.) Grand State Winner in Conn. QSO Party! Most all clubs took an active part in Field Day (as they do each year) and was "first" for many Novice operators. Suggest that clubs now help Novice ops. with traffic handling and encourage them to become active traffic operators. Please check in to the Conn. Training Net! Traffic: WA1VGP 296, K1GF 205, K1XA 123, WA1RUR 86, WA1UR 54, W1AW 42, W1BDN 35, W1GVT 23, WA1JX 23, K1DFS 21, W1QCG 21, K1QCG 21, W1TR 16, WA1ZQP 9, WA1UWR 5, W1CUH 4, W1VS 2.

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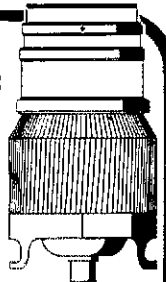
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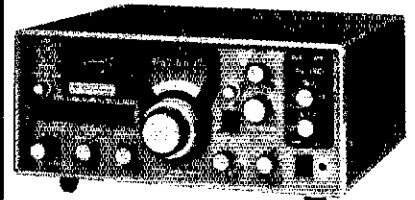
| CAT. NO. | CAT NO. | WPM |
|-----------------------|--------------------|----------|
| <i>Plain language</i> | <i>Code groups</i> | |
| P-3 | C-3 | 3 |
| P-4 | C-4 | 4 |
| P-5 | C-5 | 5 |
| P-6B | C-6B | 6,7,8 |
| P-91 | C-91 | 9,10,11 |
| P-10 | C-10 | 10 |
| 4P-12 | 4C-12 | 12,13,14 |
| P-14 | C-14 | 14 |
| OP-16 | OC-16 | 16,18,20 |
| P-22 | C-22 | 22 |

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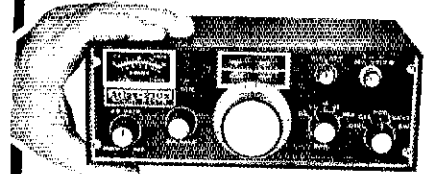


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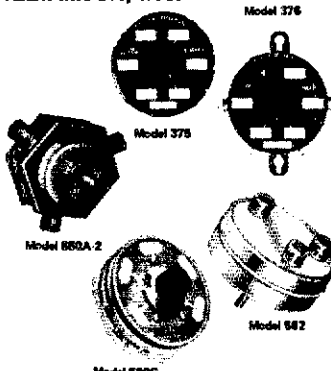
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| Model | PRICE | Outputs | Connector Placement | Remarks |
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| 378 | 18.95 | 5 | Radial | PROTAX switch. Grounds all except selected output circuit. Sixth switch position grounds all outputs. |
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| 550A-2 | 12.50 | 2 | Radial | |
| 551A | 17.50 | 2 | Radial | Special 2 pole, 2 position switch used to switch any RF device in or out of series connection in a coaxial line. See figure (lower). |
| 556 | .95 | - | - | Bracket only for wall mounting of radial connector switches. |
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| 595 | 18.50 | 6 | In-line | Grounds all except selected output circuit. |



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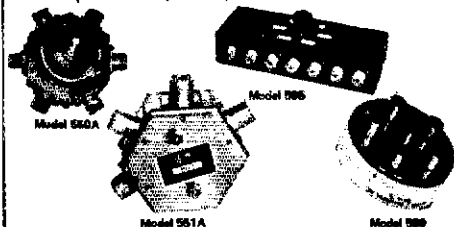
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| Ripple/Noise | 2 mV RMS | 5 mV RMS |
| Transient Response | 20 μ Sec | |
| Current Continuous | 4 Amp | |
| Current Limit | 6 Amp | |
| Current Foldback | 2 Amp | |

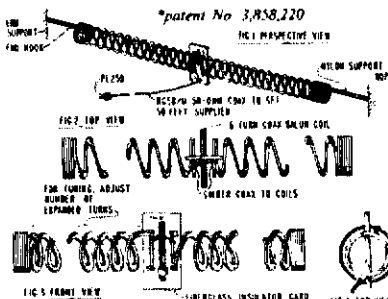
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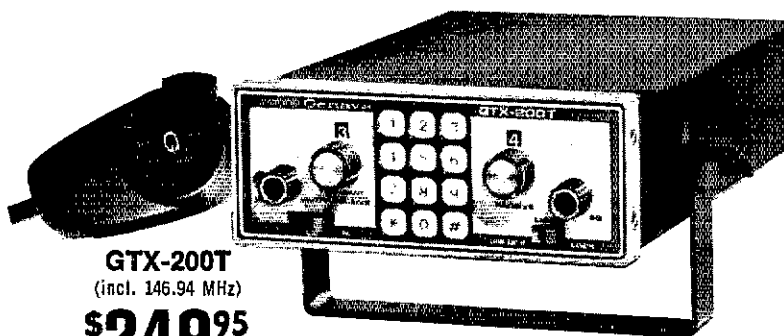
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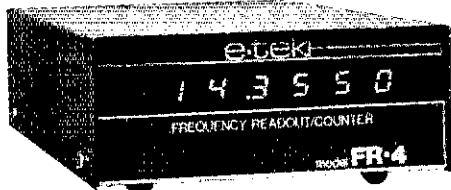
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WAITUN spoke on integrated circuits at the Middlesex ARC. EMRPN, QTC 128, QTC 438, WLAQG received reports from: WA1S RTR TIG ZLO W1S BAB BHD JKW, K1S NFW CCW, EM2MN had 115 QNI, QTC 50, on 90/30 Mon, Wed, Fri., on AM Tue, Thurs. New officers of Mass. Chapter NAHC: K1YBX, pres.; WA1FE vice-pres.; W1DKD, secy-treas.; Awards Custodian, WA1EZA trustee, WA1YMD, W1DRR. Traffic: (June) K1BA 193, WA1ZAZ 167, WA1EY 115, K1PAD 115, W1DMS 106, WA1UWF 100, W1PEX 85, WA1YWK 83, K1GN 74, WA1RVZ 66, WA1VQR 60, WA1OWQ 45, W1DMH 44, K1PNB 44, W1EMG 42, WA1IFE 12, K1LCC 6, W1CZB 4, W1HL 2, W1LE 2, W1NF 1. (May) WA1DHW 38, K1PNB 27, WA1VMG 12, WA1PQY 6. (Apr.) WA1RVZ 153.

MAINE: SCM, Bill Mann, WA1BFC — New ECs: WA1YUW — Androscoggin, WB1BS5 — Aroostook. Excellent program on amateur radio on Lew Colby's Tangents show seen statewide on WCSH-TV and WLBZ-TV, July 10. The 90-min. program was produced by W1PHT with several members of Portland AWA and others participating. FD saw much club and group activity. Maine Slow Net begins early Sept., managed by WA1MUX, on 3596 kHz at 1830 local, a half hour before PTN. Speed 13 wpm or slower. Try cw net operation — it's fun! New Mars Hill rpt. 146.40/147.00. At NE Barnyard Net luncheon, W1NLE elected Mgr, W1NGG Asst. Mgr, W1LRE Chief Op. PTN sess. 30 QTC 158, QNI 23, 50 QTC 26, QTC 80, QNI 1057, BYN sess. 26, QTC 34, QNI 936. Traffic: WA1FCM 258, WA2ERT/1 89, W1RWG 63, WA1QFX 58, W1ERW 49, K1EF 42, W1KYO 42, WA1JHT 34, K1TZH 28, W1CTR 16, WA1MUX 16, WA1RDX 9, WAZMEQ/1 6, W1CEV 4, WAINKE 3, W1NPP 3.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1NH/W1SWX — SEC: K1RSC, RM: N1NH. Welcome to new hams: WB1S BXH BXG BXB BZI BZC BNE & CNL. The Great Bay RA is now WB1CAG. Appointments: W1TN as OPS, OBS & ORS; K1RR & K1RX QOs. Endorsements: K1SHR as OBS & ORS; WA1QGA EC & OPS; W1MHX ORS. W1KZG has a new CW contest machine. W1JGR is on 2-meter FM. The GSPN had 329 check-ins, 116 traffic. W1HWH has a new F101E & YEL 15-meter beam. The NHV Net had 17 check-ins. W1NINH & W1SWX attended the LO meeting in Marlboro, MA. The WR1AAL & WR1ABU repeaters gave constant communications throughout the state during the Boy Scout Camporee. W1EJ needs Hawaii on 6 meters for WAS. His wife Alice received the call WB1DFD. The famous Concord Brasspounders (W1OC) operated FD from Turtorborrow, the home of K1GAC. The facsimile rig is all ready and K1SHR is looking for contacts. K1VBL, owner of 220 repeater WR1AIL is now Extra Class. WA1JTM is now N6QU and sends best to NH gang. K1ACL needs KH6 & KL7 on 10 meters for 5BWAS. N1NH needs more check-ins from VT on the NHV Net. Traffic: (June) N1NH 124, W1TN 97, K1NH 27, K1PQY 24, K1ACL 24, K1ACL 19, WA1PE 6, W1NH 5, W1BYS 4. (May) N1NH 73, K1PQY 59.

RHODE ISLAND: SCM, John Titterton, W1E0F — RM: WA1POJ. PAM: WA1RFT. Congratulations to new hams in area WA1YDH; WB1S DAJ DER DES DET DEU DEV DEW DEX DEY and DEZ. WA1YUH is now General. WA1POJ WA1SZC and WA1WXB all made Advanced. WA1QOG and WA1TRA made Extra. Don Rosen, 2nd radioman, is K1DS. W1GME now W1GL. NHCT had election, officers are WB1EZO, pres.; WA1TVZ, vice-pres.; WA1OQL, treas.; W1JFF, secy. Retiring pres., WA1RHH, is moving to NJ and was made Life Member of NCR. WA1POJ makes DXCC, congrats! EBAWA plans an Advanced course during summer and new Novice class in Sept. An exhibit was held at Warren Summer Festival, July 30-31. NH FM Repeater Assn. etc. are job on communications for 4th of July parade in Bristol. PRA, NCR, EBAWA and ARASNE all reported participation in Field Day and good results all around. Thanks for your confidence but I need both cooperation and news from each one of you. Traffic: WA1POJ 80, W1E0F 15.

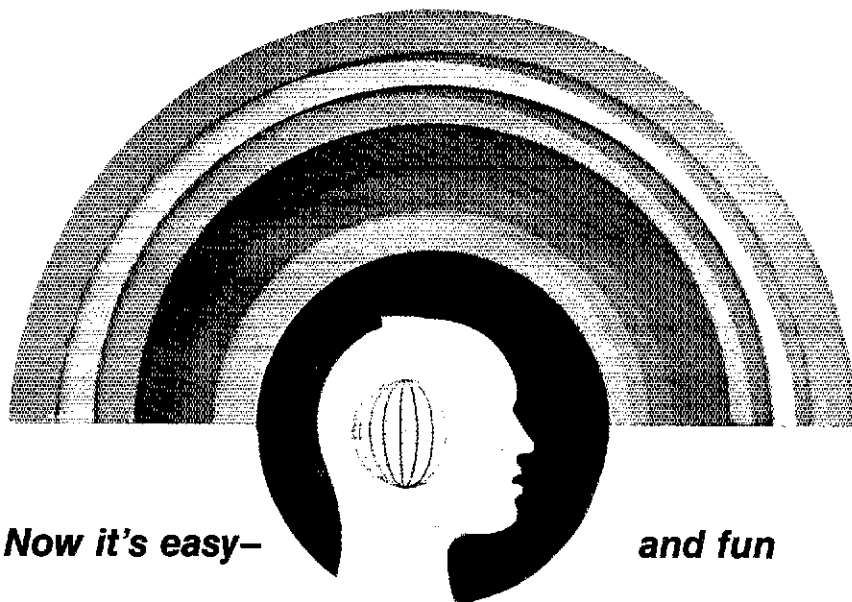
VERMONT: SCM, R. L. Scott, W1RNA — SEC: W1VSA. Recent appointments: EC for WR1ACA area, K1LEG, WB1BZR, ORS II and OVS. WA1UQY and WA1UNT are getting material ready to start amateur instructional classes. Rutland area, about Sept. The NH VT cw net, effective July 1, is on 3702, Dy, 2330 UTC. Whatever your speed, you are invited to join. Pass word along to those who may not read this. The Central Valley RC, on Field Day, operated in a rest area on south-bound I-91 giving amateur radio a little more exposure to some of the traveling public. GMN 26/471/45; Carrier 26/456/74; VTSS5 29/406/68; VT Fone 4/70/12; VTRFD 4/63/7. Traffic: K1BQB 71, W1RNA 14, W1BKZ 1, WB1BZR 1.

WESTERN MASSACHUSETTS: SCM, Percy C. Noble, W1BVR — Hello! W1TM was hospitalized two weeks for an operation. He delayed his entry until the day after Field Day. WA1HHN is doing well on 145 and has developed a new multi-polarized antenna. 18 operators of W1TM's FD group, Mt. Tom Repeater Group used 7 transmitters and 18 operators. WMPN had fine picnic at Eunie & Bob's, about 30 in attendance. ARRL meeting at the NOBARC Hamfest — total hamfest attendance during the two days approximately 600. WA1MJE for WMPN (Mon. thru Fri. 4:30 PM 3935); 22 sess., total QNI 257, QTC 48. 10 different stations for W1DVM for W1MN. W1VLY 7:00 PM 3562; 30 sess., total QNI 209, QTC 106, 21 different stations. WA1DNB for WMEN (Sun. 8:30 AM 3935); 4 sess., total QNI 199, 73 SSB & 126 from liaison to our five county AREC repeaters. Traffic: WA1MJE 212, W1KIK 86, W1BVR 75, W1DVM 66, W1VLY 62, WA1VUZ 34, W1ZBP 15, W1DOY 11, K1RQG 9, WA1PLS 3, WA1OPN 4.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davis, KL7COK — The big event this month was Field Day. Many stations participated. The Anchorage Club had a large outing at Wasilla Lake with other groups running up good scores. The Fairbanks Club had their annual coverage of the Yukon River boat races. KL7FD worked several hundred meters which is rare for Alaska. 7HMH is erecting new antennas to celebrate getting her General Class. KL7SB is the new Section Emergency Coordinator. All ECs please note. Andy will be writing

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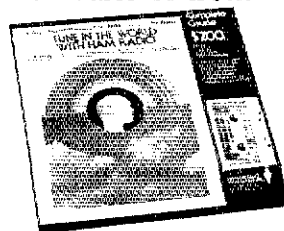
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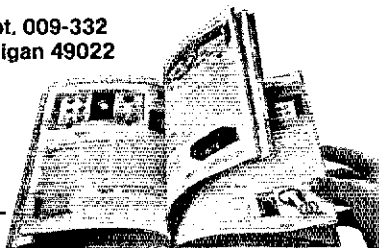
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each one of you relative to his plans. KL7HOV PAM for ASN reports very good totals for this month in spite of summer activities. The new 1977-78 Repeater Directory is out, if you want a copy please let me know as Newton is sending several to me. KL7FSE has a new antenna tower which will carry several new beams. KL7HDS is still working lots of stations via Oscar. I am still looking for news from any and all stations. Traffic: KL7CUK 9, KL7HMH 4.

IDAHO: SCM, Dale A. Brock, WA7EYW - SEC: W7JMH, PAM: WA7HOS, RM: N7DH. Net. Freq. Time QNI QTC Manager
F4M - 3:35 0200 Dy 303 3M W7CJC
RACES - 3:39 1415 M-F 187 10 WA7WXI
IMN - 3:35 0300 M-F 204 127 W7GHT
WB7BZ has received his General ticket. The Lewis-Clark Amateur Radio Club spent Field Day weekend on Cottonwood Butte; high scores and low temperatures were the order of the day. Traffic: W7GHT 216, W7GBO 157, W7LIM 33, N7DH 14, WB7OUJ 6.

MONTANA: SCM, Robert Leo, W7LR - W7DB transmits bulletins 649-654 on MTN. W7LR attended Wally Byam Caravan lunch in Bozeman, presented ARRL to the attendees. W7LR is now W7BTRIS. W7TYN active on Oscar. MTN in May had QNI 883, QTC 74, 21 sess. W7LR gave talk to Bozeman Kiwanis for Amateur Radio Week. WB6KBZ W7HAH WA7PDC in Kalispell Field Day, also WB75FF Missoula, plus Butte and Anaconda, WA7QBH continues QO reports. Traffic: (June) 15, W7NE 13, W7DB 5, W7HAH 3, (May) W7DEO 42, W7TYN 6.

OREGON: SCM, Dwight J. Albright, W7HLF - Asst. SCM: Leland McIntosh, A7UJU, SEC: W7LBH. PAM: WA7SSO, Asst. PAM: WA7GFE, RM (CW): K7OUF, BSN, 3908, QNI 503, QTC 82, 30 sess, WA7SSO mgr., OSN, 3585, QNI 62, QTC 126, 30 sess, K7WID mgr., ARES, 2993, QNI 435, QTC 109, 30 sess, WA7NEQ mgr., ARES, 1706, QNI 109, QTC 5, 9 sess, WA7UJU mgr., WCN, 3702, QNI 312, QTC 91, 30 sess, K7UJU mgr. Field Day brought many surprises, old friends and many new ones. 12 of 14 known Radio Clubs sent messages to SCM. Some did a yeoman job of getting up those antennas. Murphy of course was present. Take a look at page 62. I would like OTS. Hey fellows watch those band edges some are slipping outside just a little. Also quote an OQ "the ham that uses phonetics is seldom a violator." Read up on 3rd party traffic (business). Abide by the RULES and promote ham radio in the eyes of the FCC anyway. Sharpen up on your code, two good cw nets now 3585 & 3702. Try some traffic, send a report to me, I'll answer. Congrats to K7ZCB, WAS on 6 meters. The CBers are really watching our operations. Let's lend an EAR, maybe a key, WTF? Traffic: W7VSE 224, K7NTS 161, K7OUF 135, K7IFG 82, W7HLF 65, WA7XV 55, WA7GFE 47, K7QFG 27, WB7AAK 22, WA4HRG/7 19, WA7ZAP 18, W7LT 12, WB7CBA 3.

WASHINGTON: SCM, Mary E. Lewis, W7QGP - SEC: K7VAS, HF-PAM: K7GWE, W7M, K7YF and RM: K7OZA conduct any necessary testing for ORS and OPS candidates respectfully and make recommendation regarding such to the SCM. Listed are the traffic nets in Washington State: The Noon Time Net, freq. 3970, meets daily 11:30, mgr. W7PFD; Washington Amateur Radio Traffic Systems, freq. 3970 daily 1:30pm mgr. W7QGP; The Northwest Emergency Net, freq. 3945 daily, mgr. WA7RCR; Washington Section Net, freq. 3590 daily, 10:30Z, mgr. K7OZA; The Evergreen State Net, freq. 2920 phone and 3720 CW daily 0100Z, mgr. WA7MIF; The Amateur Radio Emergency Services, freq. 3930 Sun, 0900 SEC. K7VAS - Novices interested in forming a traffic net need only to contact K7OZA for information and assistance. Hamfest for Washington State: Tacoma Ham Fair Aug. 20 and 21 at a different location than in the past two years and Wallawalla Sept. 24 and 25 at Melton Freewater Community Center and W7BMK has received from the QCWA the Golden Anniversary Certificate for 50 years continuously licensed. W7DZ has received QCWA Worked 100 Certificates and also has a new rig and is on six meter SSB from Spokane. Individual total and net report will be included with July reports.

PACIFIC DIVISION

EAST BAY: SCM, Charles R. Breeding, K6UWR - Asst. SCMs: W6ZF VE2AQV/W6, SEC: W6IHH. A special Section meeting was held with the Calif. Dept. of Motor Vehicles. This was an open meeting with all Calif. SCMs of the Pacific Division present. We were pleased to have Mr. Leonard Brady and Marcia Flores of DMV present to explain their position. The original proposed fee of \$25 new plates, \$10 annual renewal and \$12 transfer has now been put aside. DMV is now looking into true cost figures and will have them sometime after mid-Sept. At this time DMV is looking favorably at a one time cost with no renewal of transfer to save the annual already had plates would not be effected. Just as soon as firm information is available all Section Clubs will receive details. I am pleased to announce that the Silverado AR Society is now an affiliated club. CCRC lists the following new calls in the Section. WB6RZK WB6RYH WA6RXP WA6RZF WA6SAE WA6SAK WB6RZZ WA6RWV WA6RVA WA6RKO WA6RWW WA6SCY WA6SGT WA6SDV WA6SCW WA6SAN WA6SHN WB6SBL WA6SGN WB6SEK WA6SAJ WB6SDY WB6SBM WB6SGU and WA6SEO. Be sure to plan to attend the Pacific Division Convention Oct. 15 and 16 in San Mateo. Traffic: K6OE 236, W6OA 158, WB6UZX 43, N6IH 35, K6PMG 10.

NEVADA: SCM, Leonard M. Norman, W7PEV - SEC: K7ZAU, K7ZOK reports best openings on 2 and 6 in NV in many years. W7VW "NARA" Field Day station reports biggest and best ever, by W7XZ chmn. WB7BTG W7CJY WB7CZU WB7EJ WB7EJU WB7EUV W7IKT W7UJ W7KSE WB6MFS W7MWF K6HIT W7PBV W7PAK W7PRM W7PZD WB6RIV WA7UDV WA7UDW WA7YCS visited a Coast Guard's Loran station near Searchlight, NV then on to Christmas Tree Pass for a picnic. WB7BDX rescued W7UJ's vehicle from a pile of rocks then W7MIF arrived for a tow truck. A 2M club of 60 members W7KJU, pres.; WA6SIM, vice-pres.; WA6VYN, secy.; WB6MZX, treas. W7KJU, editor of TARA News; WA6SUV, membership chmn. Traffic: W7ILX 299, W7SK 4.

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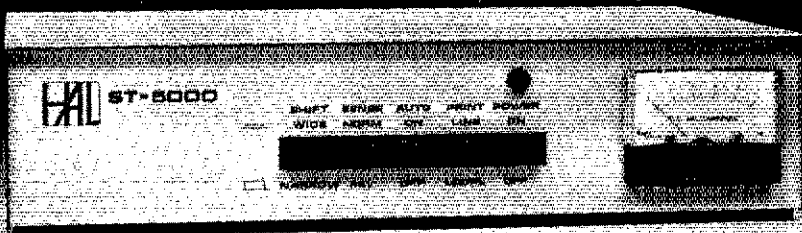
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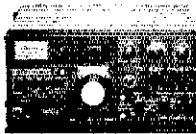
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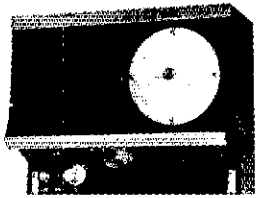
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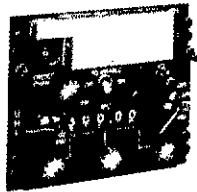
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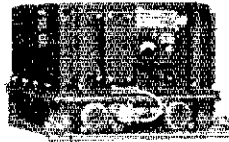
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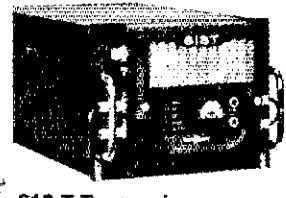
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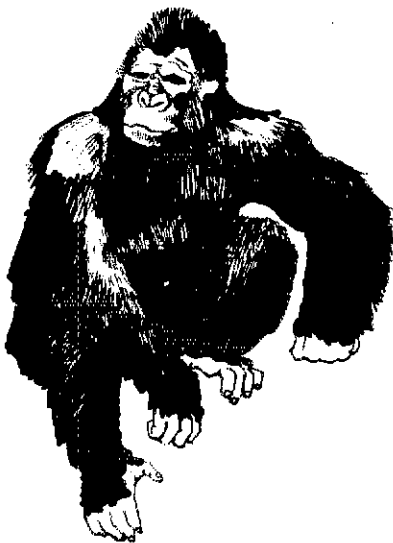
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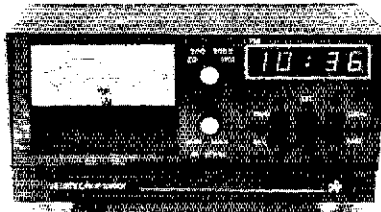
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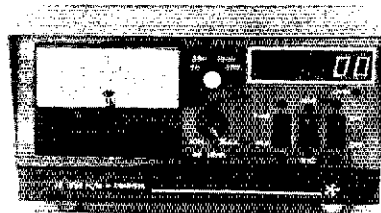
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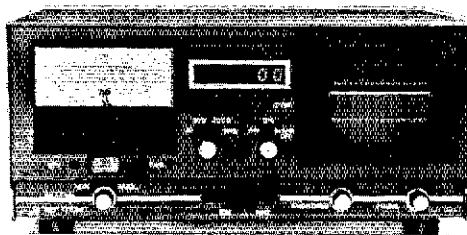
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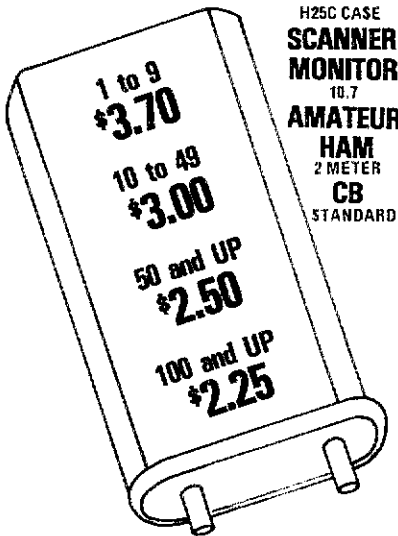
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PACIFIC: SCM, Pat Corrigan, KH6GOW — SEC KH6CKJ, RM: KH6JAC, EC-Maui: KH6HHG, EC Kauai: KH6FMT, EC-Hawaii: KH6HOU. Crystals are in and RTTY repeater should now be up on 10/70. KH6BZF reports that WA6MHZ, a VHFer was in Hawaii. Also, Lee is building another big array for 2m. Both 6 and 8 have been busy. W6EYX, this summer allowing DX for VHFers. KH6HI (formerly KH6GRU) worked E. Coast and many states on 6. Gov. Arlyosh proclaimed Hawaii Am. Rad. Week in the state June 20. Likewise, Mayors Fasi & Cravalho from Hono. Maui. The week was culminated in Hawaii's greatest Field Day ever with much publicity including a visit to the HARR site. Mayor East, W6EYX, in town in July and operated KH6AHZ during IARU contest. Kingman Reef DX group quietly passed thru in an out. Several KH6s worked VR3 KP6 & KP6/KR on 160 during the trip (VR3 was KH6CHC on vacation. Traffic: KH6JE 58, KH6GGW 57, KH6BZF 20.

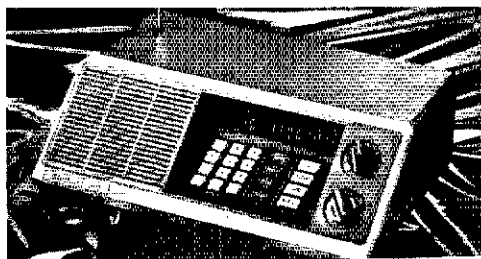
SACRAMENTO VALLEY: SCM, Norman Wilson N6JV — SEC: W6SMU, WA6LXT played host to the North Hills Radio Club's Field Day operation at a ranch near Somerset. The Tahoe Amateur Radio Ass'n's Hope Valley FD site was very well manned and their operation received very fine press coverage in local papers. Did you get publicity out for your club activities? New calls in the section include WB6s TO NIV YAE YLL and YQC; WD6s ABF ALE and ANX N6DM alias W6ZGM of Yuba City has four elements on 20 meters, two on 40, and one element each on 80 and 160. In the Berry area, W6EYX is now one of their most active members, WA6EHC. After 2 years as a crop duster pilot, Al was killed in his car. W6NJU and N6JV attended an E. Bay meeting with reps. from many Pac. Div. Radio Clubs and State Transportation people in order to gain information regarding proposed Ham License plate fees. Traffic: W6RSP 98, W6DEF 47, K6RPN 9.

SAN FRANCISCO: SCM, Rusty Epps, W6OAT/N6SF Congrats to Mark Nelson, W6NHF, our new SCM. Mark will assume his post on Oct. W1ARR/6 has been appointed OO. The ARRL has approved the application of the Far West Repeater Ass'n. for affiliated club status. W6BITN passed the Extra exam and now awaits the 1X2 call. WD6AUD and WD6AU are newly licensed in San Rafael. The Pacific Div. Convention slated for Oct. 15 & 16 at the Royal Coach Inn, San Mateo. N6DR spending a couple of months in Paris. WA6MDS the new pres. of Terr Linda HS ARC. W6BITN heads to UC Berkeley to study EE this fall. W6EJ snagged a Field Day QSO with an OR sin 160 miles away — not bad for 2m in mobile! MARRC sea level site in Corte Madera might explain its 180% upswing in FD QSOs this year (th generator was grounded to a salt water pond). Traffic: W6RNL 230, K6TP 179, W6NL 126, W6IPL 122, W6BITN 9, W6SG/6 5.

SAN JOAQUIN VALLEY: SCM, Charles McConnel W6DPD — Officers of the Fresno ARC are WA6UOF pres.; WA6CTR, vice-pres.; WA6YAK, secy.; K6KDM treas. WA6JDB made NCN Honor Roll for June. TH Murray School ARC, WA6YBN, in Ridgecrest now affiliated with ARRL. Chas. of the Indian Valley Valley resulted in 21 new Novices. WA6SLB now N6LD. WA6EYK now N6VF. W6BKO on 220 MH FM. K6JCY won the FT221 at the Satellite AR picnic. WA6GJV has a TR2200A and RTTY equipment. WA6ABH worked 4 JAs on 6 meters. There are 30 new Novices in the Stockton Area. W6MR operated mobile in VCB. W6EHC has a new vertical. W6BVIN and WA6YLB now General. W6EFLX an WB6WYA now Techs. Lets try to have a station operating in each county in the Section during the C QSO Party, Oct. 1-2, 1977. Plan now for Pacific Division Convention in San Mateo on Oct. 15-16. W6B6V has a TR2200A. Future County ARC operated Field Day with the Calpacer Service. W6B6V operated Field Day from Radio Flat. Your SCM received one FD message. Traffic: (June) WA6JZ 1, WA6GJV 10, W6DPD 3, WA6CPP 1. (May) N6AM 6, W6BVJW 1.

SANTA CLARA VALLEY: SCM, Jim Maxwell, W6C — W6RFF WA6UC made P5HR. 8 SCVers made the NCN Honor Roll this month: N6AJU W6BHT W6KZ W6RFF W6SMA/6 W6YVB K6YKB on CW, an W6RIGS on RTTY. W6RIGS has announced that he will not run again for Pacific Division Dir. this year, after ten years of service. We all owe Doc a debt of thanks for his ten years of dedication toward amateur radio. Congrats to W6SUJ on his new Extra ticket, and to WA6JAB and WA6ZEM, who are now known as N6YF and N6KC, respectively. The FCC San Francisco office now uses ham exams on Wed. rather than Fri. Times remain the same. The 21st National Wheelchair Games were held on June 16 at San Jose State. FB communications were provided by group from West Valley ARA (W6PIY), SCV Repeater Soc (W6BADE), the Telephone Pioneers RC (W6RAB), and the ARRL. The two week-end service should be circled on your calendar in Oct. The Calif. QSO party on Oct. 1-2 and the ARRL Pac. Div. Convention in San Mateo on Oct. 15-16. The Santa Cruz AREC net still going strong, with check-ins each Mon. at 1900 local time on 146.52 FM. W6QIE is still running code practice daily except Mon. at 8 PM local time on 359 kHz CW and 146.58 FM. 5 CTC's starts at 5 wpm and increase to 30 wpm in 5 wpm increments. K6WRV expecting to close down as PA9WRB later this year after 3 years in Amsterdam. He's broken the 20 country barrier finally from the European end. Brothers W6HBL and WA6NDN are both trekking through the Sierras this summer, HBL backpacking and NDN on a bicycle. The California County Service is Bishop way. The WD6s are here! W6AOG is now GRV in Redwood City, reports W6MMG. Traffic: (June) W6YBV 162, W6RFF 90, WA6UC 5, W6BHT 18, W6ZRJ 14, W6UOC 6, W6CF 2. (May) W6ZRJ 18.

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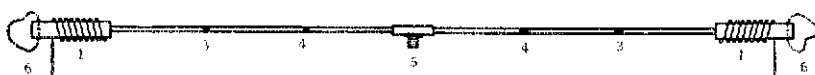
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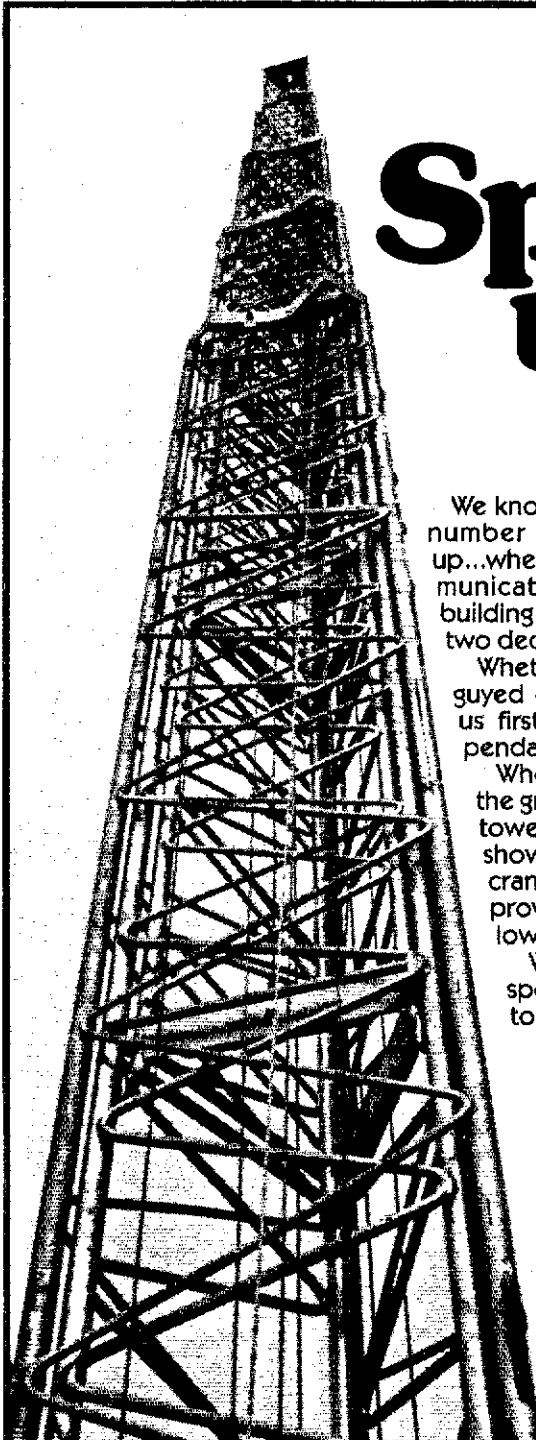
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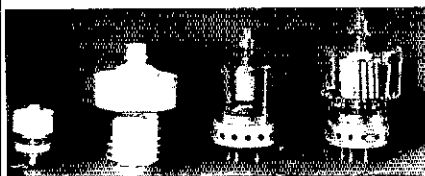
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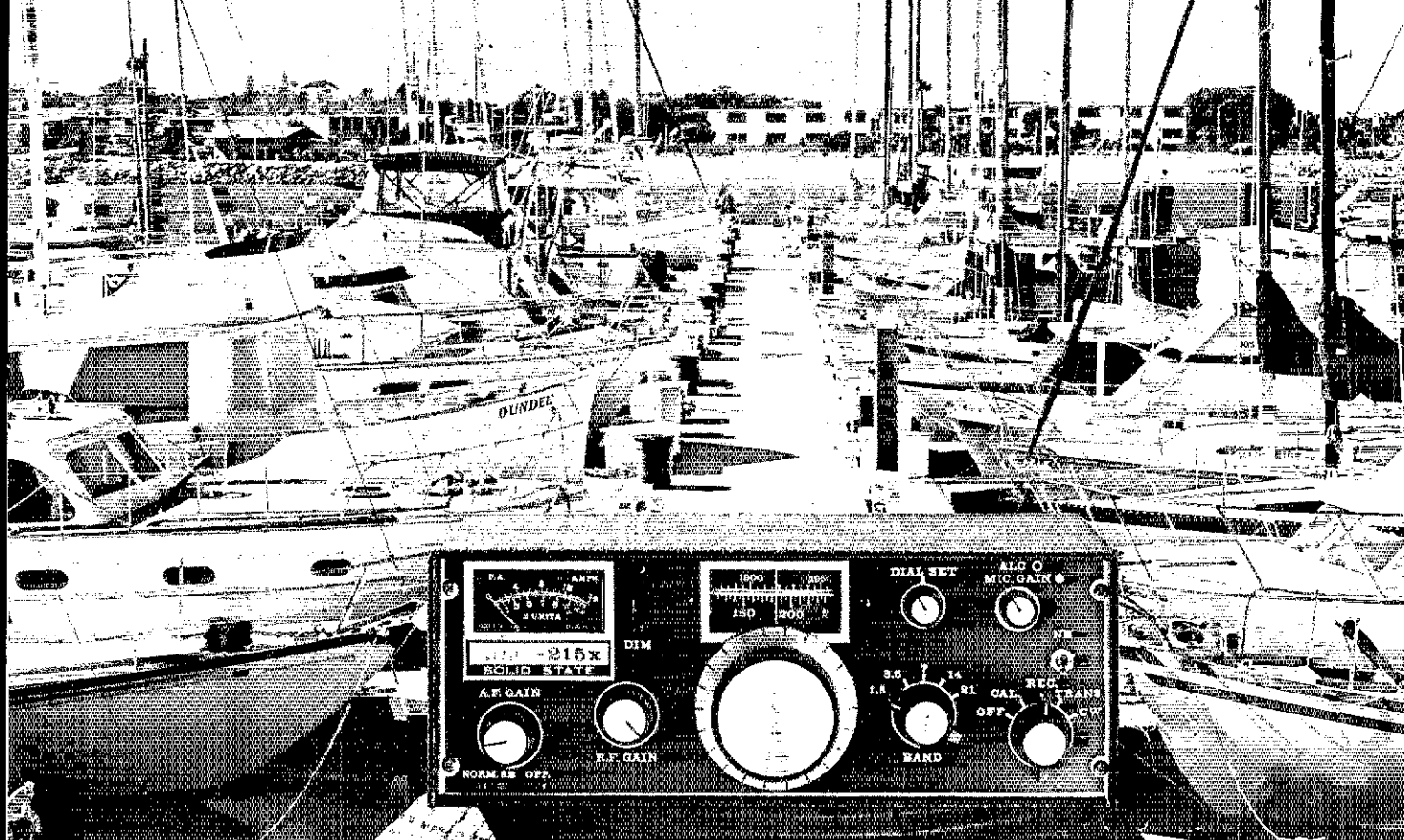
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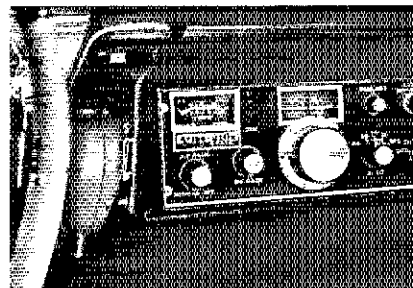
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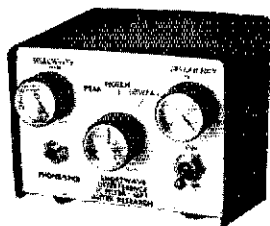
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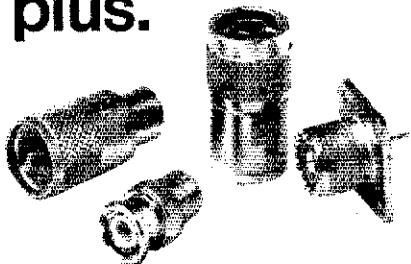
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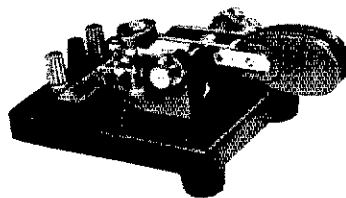
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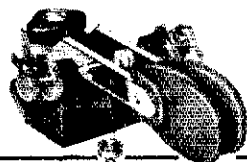
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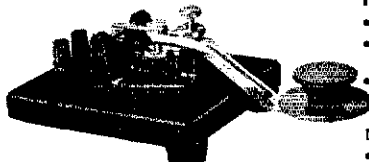
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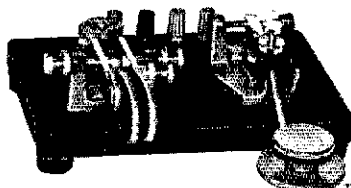
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Mecklenburg ARS WBFB reports high score for July VHF Contest from atop Roan Mountain - look for the BFB Gang again on Sept. 3 & 4. Fall VHF QSO Party, CNCTN 146.73 MHz reports QNI 146. QTC 35 from Net Mgr. WB4VIM. Congrats to K4MO the new Editor of the CVRA "Journal," and to the Rockingham Co. ARC (Reidsville) now affiliated with ARRL. ECs remember the NC E.C. Net on 3919 kHz 2nd Sat. at 410. See the 1978 exchange schedule in Winston-Salem will be increased to 6 times per year - specific dates to be announced later. See you at Shelby Hamfest Sept. 3 & 4. Remember CVRA General Meeting and Dutch Supper at 1830 on Sat. Sept. 3 in Shelby. Thanks to WA4OQS serving as Acting Net Manager for Carolina Novice Net (CN 371 kHz during absence of WB4FVY. Traffic: June K4FTB 156, WA4OQS 112, WA4IC 102, N4ZH 73, K4FBG 66, K4MC 65, W4FNM 60, W4WXZ 34, W4EHF 30, WB4TOP 30, WA4OQS 24, WB4OXT 15, WB4VVL 13, K4GHR 6. (Apr.) W4VOX 90.

SOUTH CAROLINA: SCM, Tom Lutkin, WA4DAX, Asst. SCM, Garry Barnett, WA4MDP, SEC: WB4TNS PAM: W4MTK, RM: WB4CAK, W4FVV reports Anderson Club very active in contests and with novice classes. They will have picnic Aug. 20-21 at Lake Hartwell contact Jerry for more info. Atlanta Hamfest was biggest yet with two computer prize winners from SC, W4JUN won big computer prize and WB4SF won second prize. N4EL has been appointed AMSA area coordinator for SC if you have questions in the area contact Dick at 225-0970. WB4UDK writes of his concern about the closing 2mths. If this activity is heard notify the FCC 202-832-9775. It is with deep regret that I learned of the resignation of Chuc Bridges W4WXZ as SCM of NC. Chuck was a big help to me in the last year. He will be replaced by Bill Parris K4GHR who I know will do a good job. Enthusiastic turnout in S.C. for Field Day. We had fun in the field. See the Hamfest Reporters SCSSB QNI 1121, QTC 242, Blue Ridge 2Mtr QN 971, QTC 19, Anderson 2Mtr QNI 414, QTC 21, P. QNI 232, QTC 64. Traffic: (June) WB4ARJ 575, K4ZN 418, WA4KXZ 105, W4NTO 72, W4MTK 61, WB4CAK 51, WA4DAX 41, WB4UDK 41, K4FRX 34, WA4ZG 30, W4FMZ 22, W4JUN 19, WB4JNE 14, W4FVY 12, WA4LLT 10, W4DRF 8, WB4EZA 7, WB4LED 4. (May) WB4CAK 44.

VIRGINIA: SCM, Robert L. Fullmar, N4RF - SEC: WB4ZNB, PAM: WB4BK, RM: W4K8KX, R51, WA4EPJ 4RN W4SHF, Field Day a big success. R51 fm: COMSAT (clubs), Albemarle, Franklin, Fauquier, NOVARC, Central Virginia, Old Manassas, Bristol, W4UVA plus N4FM & N4EA. FB job man, New ARRL in VA: Arlington, Fauquier and Culpeper Amateur Radio Assn. A new VA Net is the Shenandoah Valley State Net. CW's K4MS 35 and 35 plus openings at 50 MHz, working Maine: VE1; Minn; Ill; Iowa; K; Nebr; SD; Fla; LA; Ala; Texas; Oregon; Wash. Nice on Pauli Recd. photo fm W4WWQ who claims a possible first, a repeater mounted in his car and the first rpt license plate in VA. CO rpt recd fm W4HU leadin with 36 violations and 425 calls. WB4AJB on the tailgate. Nice wrk mem! Club papers recd: RF, NOVARC; AMRAD; The Tidewater; LARC an W4CA log. Getting out these club papers entails burning lots of midnight oil. Tnx fellows. PAN WB4DBK says Bro. Tom got his ticket, WD4FMC K4 health fine one catch to station. 5k-5CN K4GR's Tdy en Nr. 1 daughter's marriage took out time. Grand old man K4KNP activity curtailed by equipment troubles. Tuff PN, it happens to all of us. W4TMM had FB time at VFN Hamfest & wa re-elected secy for the coming yr. The Roanoke Div. Conv. had a vy successful go in Norfolk. Many new face contacts. One of many going to the 8th yr. abse committees. W4LXB has new 45-ft. pipe up and ready to string new dipole any year now. W4AJF new 80M bazooka seems to help his net sig. WA4AJF callibrator burned up the 5 volt reg, failed in his QRP xmt. W4OOL is making some headway in another antenna. Think ya w/ ever get a 579 Int. Norfolk. Pete W4NWM one of many going into activity during the past month (vacations). W4VY working for W4 plus WA4/WB/WN4 bureaus. QSL mem for Doug (K4EZ) EP2VW. First VP W4KFC attended National in Toronto & meeting of IARU International working group in London. Took part in Inaugural for patch between Jamaica and the U.S. Jamaican Society pres. 6V6LA talked with ARRL pres. W4HD on Jun. 12th the effective date of the new agreement. E.C. K4EJ working on Extra class, gud luck QM! B1 Farone changed fm W4NHI to N4NK. WB4DRC go his HW-101 wrking. W4API (Arlington) recd. an award at the Dayton Hamfest from AS Magazine for "outstanding contribution to Amateur TV." WB4EK bought IC-225 & built external programmer for it. Wrks FB: 80-mtr TVI raised its ugly head agn, h. Congrats to WA4EPJ & WB4DBK for making BPN again! Traffic: WA4EPJ 393, WB4DBK 344, WB4PN 340, K4BRX 284, WA4UJX 158, W4UQ 122, WB3ETD 104, K4GR 97, F4JM 96, K4MLC 87, WB4EFT 76, K4NRF 67, W4NFM 57, W4TMM 57, W4LXB 55, N4RF 44, WB4DQZ 54, WA4VY 42, W4SHJ 36, WA4QQI 34, N4FM 32, WB4KIT 29, W4SUS 28, WA4PBG 26, WA4AFJ 18, W4OOL 18, WB4UUY 15, W4NWM 16, W4KX 14, WA4NYZ 13, W4YE 11, WA4RDI 10, W4KFC 9, WA4WQG 6, W4ZDU 6, W4MK 5, W4A9NB 5, N4DW 5, K4EJ 5, N4FP 4, W44JUO 2, K4SPS 2, K4LEF 2.

WEST VIRGINIA: SCM, Donald B. Morris, W8JM - K5EF was presented the Award for Outstanding Amateur of 1977 at the State ARRL convention at Jackson's Mill and Logan County ARC received the Field Day Award. W8JYM was elected Novice Net Mgr. WB8IIJ re-elected CW Mgr. and WB8TSE, Phone Net Mgr. W8DVC upgrades to General at age 76. WB8VAZ new OPS and WB8YUH has Extra. State Radio Council meeting, Oct. 1, at Jackson's Mill, with election of officers for the 20th annual ARRL Convention next July.

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WB8CPU now W8PV and WB8IJW is N8II. Traffic: WB8TDA 87, K8YJ 70, W8JM 36, K8QEW 21, WB8IIJ 20, W8DLU 16, WB8VAZ 15, W8JWX 13, WB8JYN 13, WB8TJN 12, W8CXJ 11, W8BRUJ 10, K8ZDY 10, WB8TEE 9, W8DJYM 8, K8KT 8, W8FC 7, WB8SAW 6, K8M2M 6, W8BVM 5, K8MHR 5, W8LYV 4, WB8CNN 4, N8RR 3, W8BVM 3, N8II 2, K8ZPN 2, W8ACRW 2, W8BLFZ 2, W8ZBM 2, WB8IHA 2, W8EGW 2, W8BILK 2, W8GH 1, K8DF 1, W8DYB 1, W8GSN 1, W8SKD 1, K8LSN 1, K8YK 1, W8GUY 1, W8TOM 1, W8VTP 1, W8ZNP 1, W8NSL 1, W8NKA 1, W8BOVO 1, W8TJP 1.

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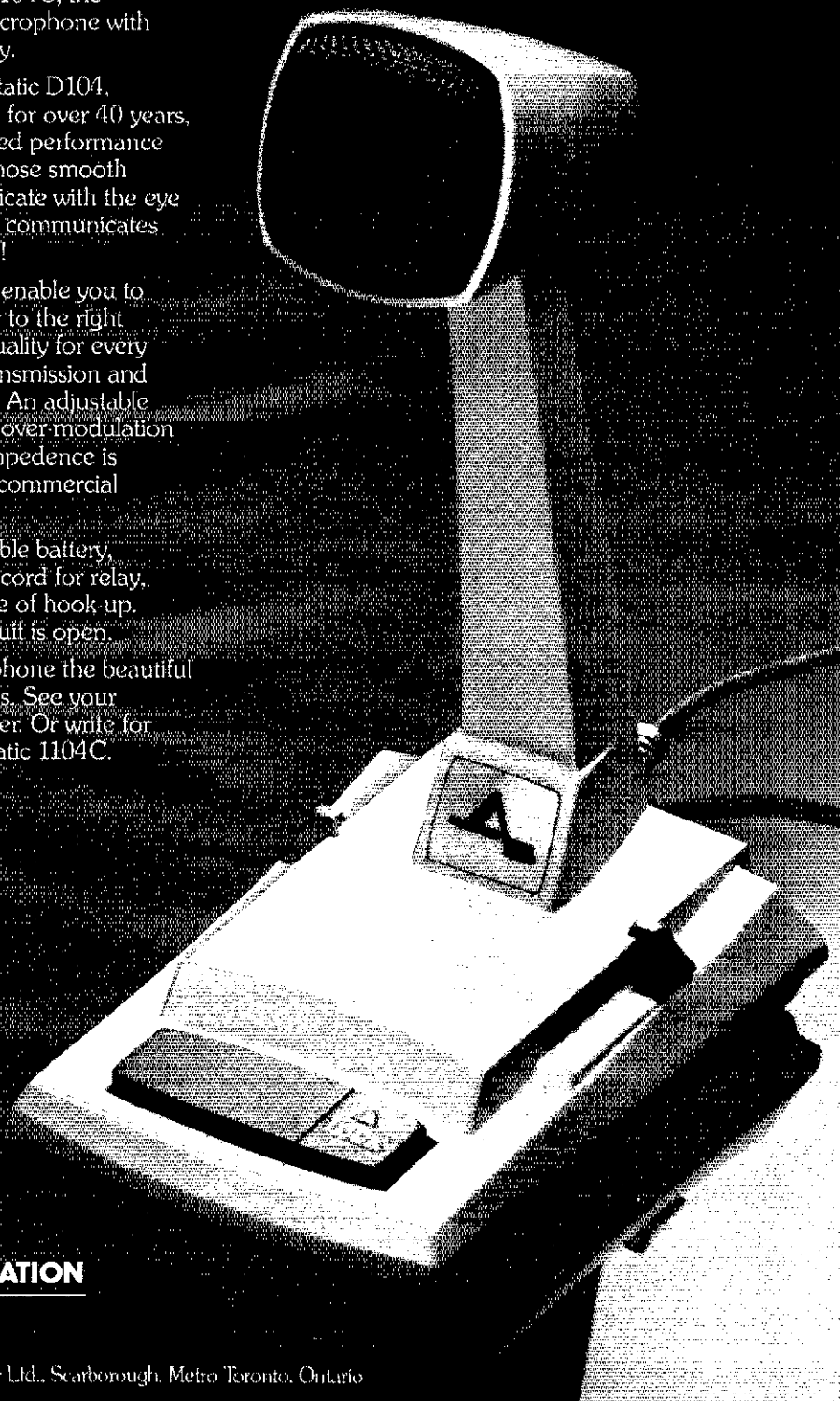
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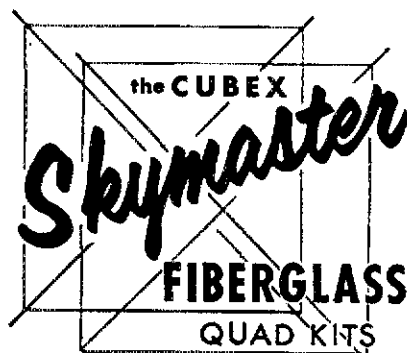


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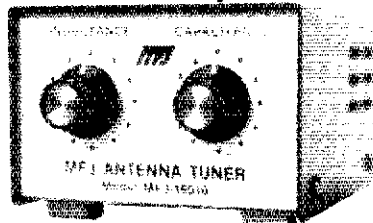
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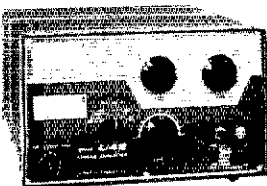
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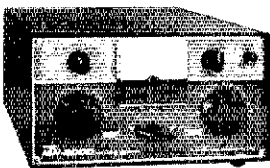
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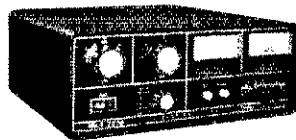
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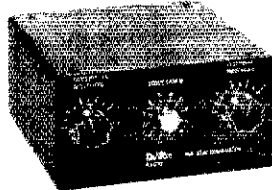
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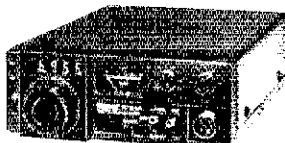
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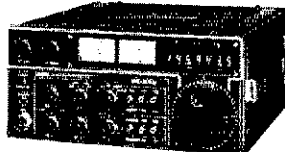
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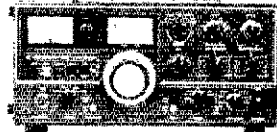
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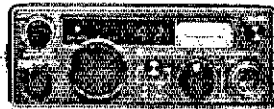
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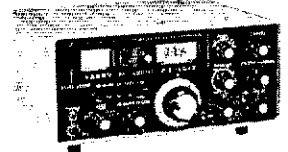
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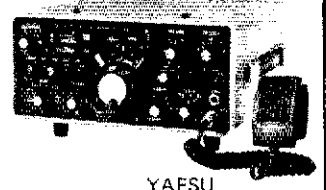
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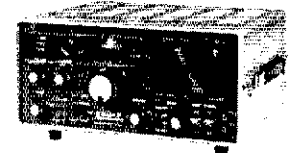
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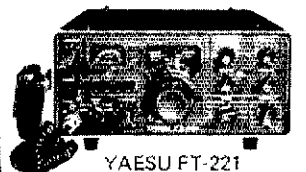
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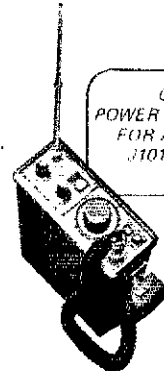


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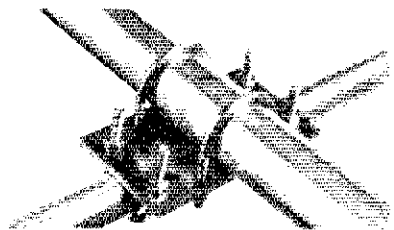
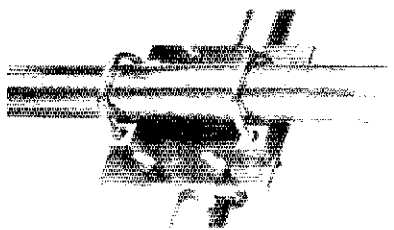
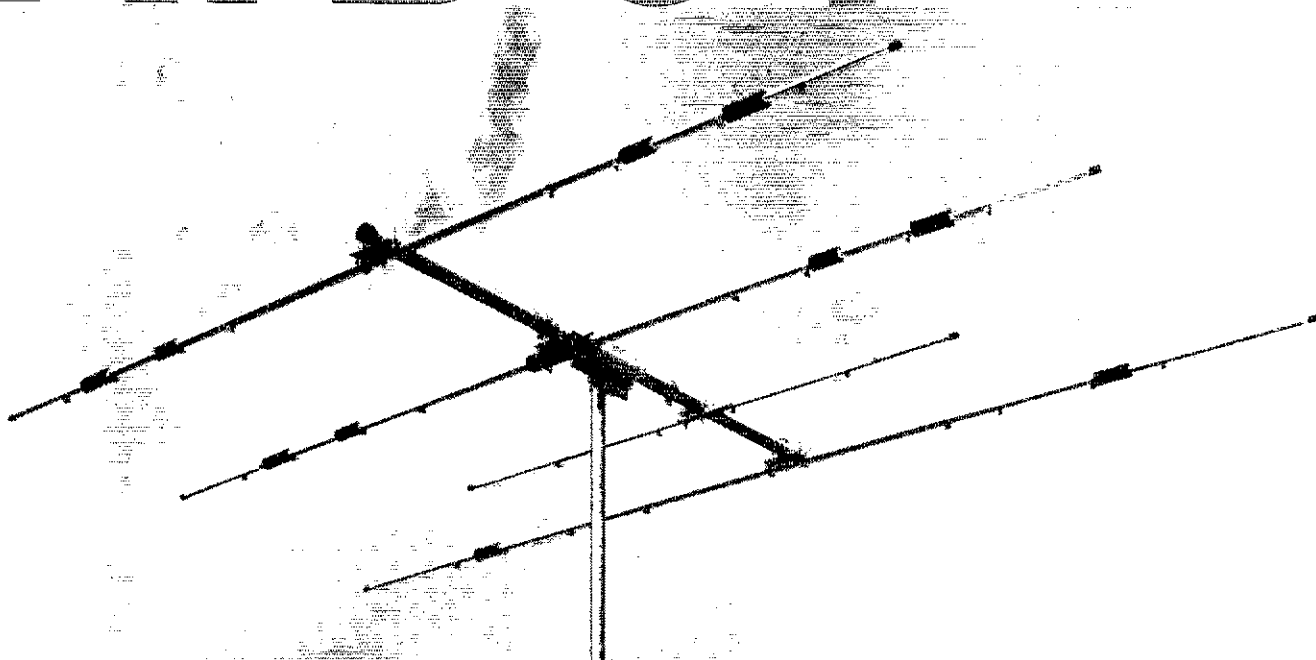
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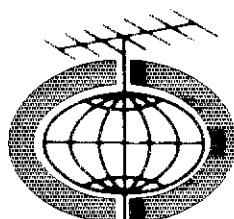
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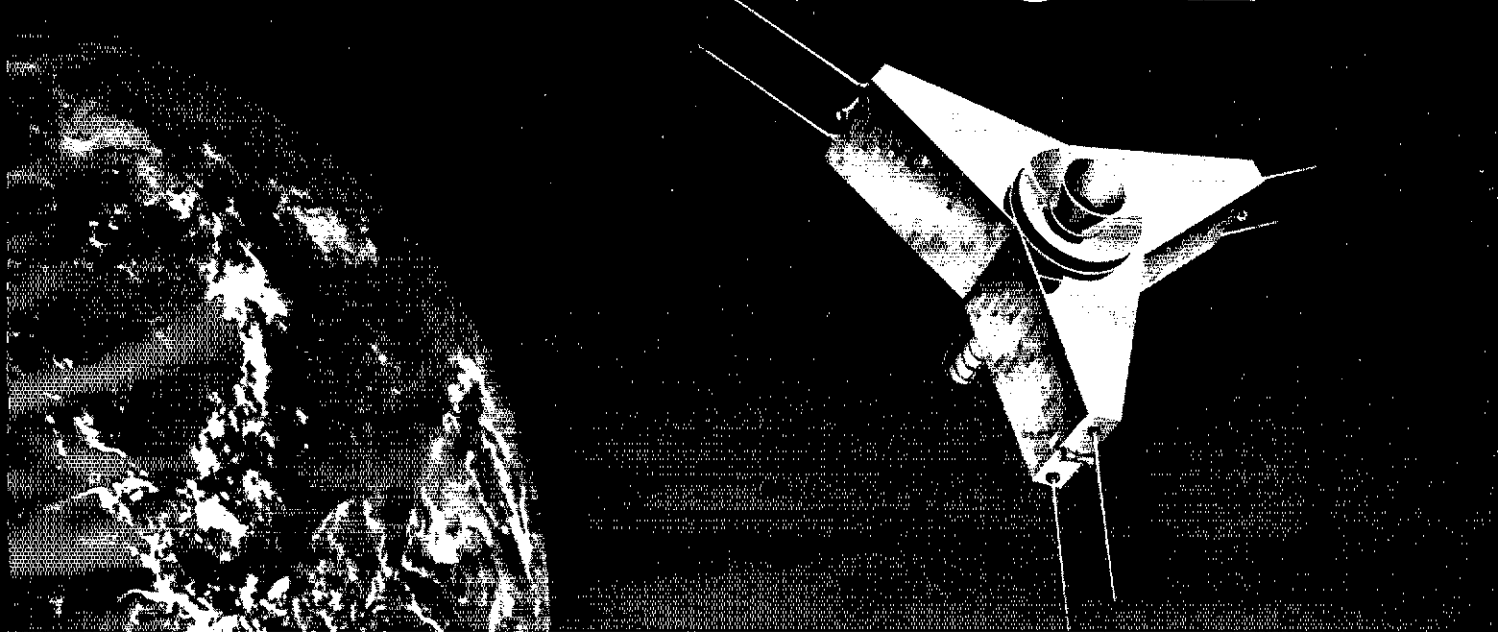


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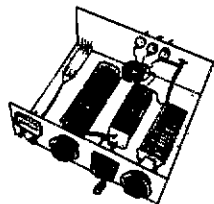
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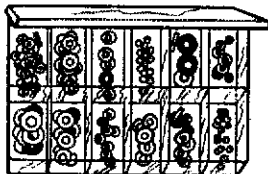
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ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Clyde O. Penney, WA9HLQ - SEC. R. G. R. M. K. K. K. P. A. M. S. K. G. N. V. WA9VGG. It is with deep regret that we add the call WA9SUM to the list of Silent Keys in the Colorado Section. W5HRS/WB9PVT now has a 65 foot mast hill-over at 25 feet, with 2-meter ground plane antenna on top. Many amateurs report having lots of fun, and many excellent contacts on Field Day, including 41 contacts reported by K9JPE on 10 meters. Net 10 for June: Columbine Net, QNF 135, QTC 135, informals 349, QNF 1568; NI-Noon QNI 1203, QNI 71, informals 143, QNF 1296, 29 sessions; CWN QNI 19. Traffic: (June) W9WYX 2070, K9YFK 862, WB9TAQ 275, WB9QOT 274, WB9BAL 145, WA9LSB 21, WB9RE 19, W9KLE 103, WB9MCL 96, W9MDT 74, WB9PT 73, W9YNP 73, W9LQ 66, K9OTU 60, W9EJD 43, WA9REX 41, W9LQ 38, WB9QPQ 35, WB9OZO 28, K9SPR 12, WB9LQ 11, WA9HLQ 9. (May) W9KLE 178, WA9YNP 112, WB9LQ 71, K9SPR 6.

NEW MEXICO: SCM, Joe T. Knight, W5P5D - SEC. W5ALR. PR: W5QNR. PAMS: W5PNY K5IKL RM K5KPS. South West Net (SWN) meets daily on 3581 kHz at 19:15 local time, handled 216 msgs. with 210 check-ins. New Mexico Roadrunner Net (NMRN) meets daily on 3940 kHz at 18:00 local time, handled 85 msgs. with 865 check-ins. Breakfast Club/NM Emg Ph. Net meets daily at 07:00/07:30 local time, handled 75 msgs. with 338 check-ins. WA5FQQ had surgery and is now making a good recovery at home. Los Alamos, Santa Fe, Albuquerque and others were outstanding during the very serious Los Alamos (La Mesa) Forest Fire. Much good work by many dedicated amateur operators for approximately one week. Lots of good Field Day rpt. Traffic: W5UH 461, W5ENI 224, W5JOV 214, W5LZF 185, W5DAE 180, K5KPS 163, K5MAT 158, K5KH 112, WB5RO 40, W5YQ 28, WA5GHI 24, K5XL 20, W5TWZ 16, WA5MIV 11, W5BWV 6.

UTAH: SCM, Carl R. Ruthstrom, W7GPN - SEC. WA7ZBO. Ogden Amateur Radio Club annual steering schedule for alert for date to be announced on the 22/82 repeater. WA7ADK continues to work OSCAR with good success. W7GPN still working on Ogden's new solid state 2-mtr repeater and control system. The timetable for completion keeps slipping to the point it borders on a lifetime project. Hi. Testing has highlighted problems with audio interface between the receiver and the transmitter. It is hoped that the project will be completed by early fall '77. W7OCX reports BUN had 30 sessions, 39 messages handled, and 904 check-ins during the month. WA7MEL lists 30 sessions, 83 messages, and 161 check-ins for UCN for the same period. W7KHY has completed and has in operation 50 Watts of RTTY and is going with 100W. He encourages operator RTTY and will start as a great way to keep in touch, and as a good potential during emergencies. Weber Co. will have an emergency exercise in mid Sept. The County's ARES/RACES group is expected to serve in this disaster drill. Regret reporting W7LE a Silent Key. Traffic: WA7IR 85, K7ALR 79, WA7OCX 33, WB7DMI 37, W7KHY 26, W7RO 10, W7UTM 6.

WYOMING: SCM, Chester C. Stanwalley, W7SDA - Asst. SCM: Tom Graham, W7KHH. PAMS: WA7NH4P. RM: K7KSA. Several clubs had crews out for Field Day. W7PT W7JBA W7KHH and K7IKO manned the Cody Field Day station on Carter Mtn. WA7WFC and WB7AEM from Casper operated a 2-mtr. all mode station on Laramie peak. The Casper Club had about 26 amateurs taking part in their Field Day. Other clubs participating in FD activities were Cheyenne, Sheridan and Rock Springs. No report of any other activities or how many operators took part. New Novices reported in June were WB7RWX WB7RYV and WB7BYI. Cowboy net report from K7SLM, 22 sessions, 591 QNI, 13 QTC. Traffic: W7TZK 410, W7SQT 310.

SOUTHEASTERN DIVISION

ALABAMA: SCM, Jim Brashear, WB4EKJ - Cong. congratulations to the Sand Mtn Repeater Assn. They recently presented WA4WOS with a new rig; the members held a yard sale to raise money for the new rig. Field Day (June 27) came off well again and from most reports, the rain and bad weather didn't stop them. WA4HMV, pres. Twin Base ARC says they will be better organized next year. WA4QIN, pres. Birmingham ARC acquired a new nickname after he called for some overcoats on .52 (did it get that cold during FD?). The Decatur ARC put together a bind PR package, thanks to WA4MGI (and possibly others) who did the National Bank of Decatur announced through their lighted sign. "Amateur Radio Week June 20-26". WA4SIG, pres. Huntsville ARC, WA4GQD, pres. Huntsville Area Young Ladies ARC and WB4EKJ, PR HARC appeared on an interview/talk program on WRSA on June 26. K4HJM reports they had a good time and much participation for their FD this year; he also reports he signed up 23 new AREC members at a recent club meeting. WA4ZDW had a problem with an ICOM 225 - dealer no help, but ICOM East in Dallas came through in fine shape. WA4MHO says AENW a wx-watch on June 26; minor damage reported. WD4AWX new Tech - she is XYL of WA4NDE. Appointed WA4ZOC as EC. Traffic: (June) WA4JH 582, N4MDE 279, WB4EKJ 180, K4LYV 111, K4A0Z 96, WB4KSL 52, KAUMD 17, WA4RND 14, WB4ZHS 13, WD4AXA 9, WB4RCF 9, WA4ZDW 8, WA4RMP 6, WA4MHO 6, WA4VHK 1. (May) WA4TMG 100, WB4AYO 5, WB4ZSD 2.

GEORGIA: SCM, A. H. Stakely, K4WC - SEC. K4YRL. PAM: K4JNL. RM: W4SHL. Congrats to WB4DHC making PSHR May and June and WB4TEK doing same for June. Congrats to W4SHL getting 20 WPM Code Proficiency award. Congrats to W4NWB for getting FLIC (Florida) certificate. Congrats to WB4ACV qualifying as Class 1 QO. Congrats to WB4GTS getting Extra, WA4OPV getting General, WD4HJZ and WD4IVE making Novice. Welcome to new hams in Albany: WD4s IB0 IBP IBQ IBR IB5 IBT IBU IBV IBW IBX IBZ ICA ICB ICC ICD ICE ICH IIK IIL as a result of Albany ARC training class.

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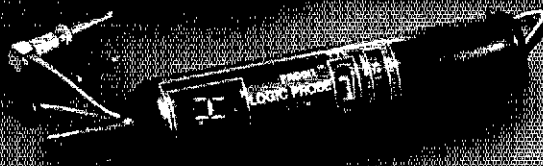
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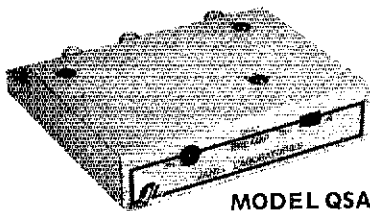
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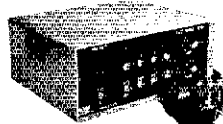
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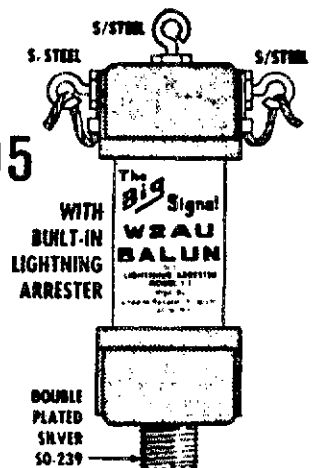
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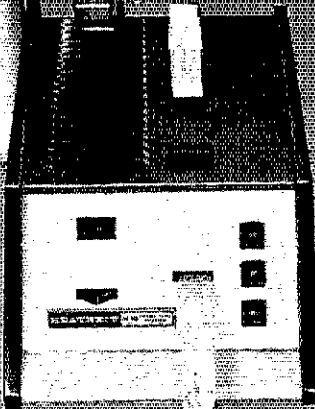
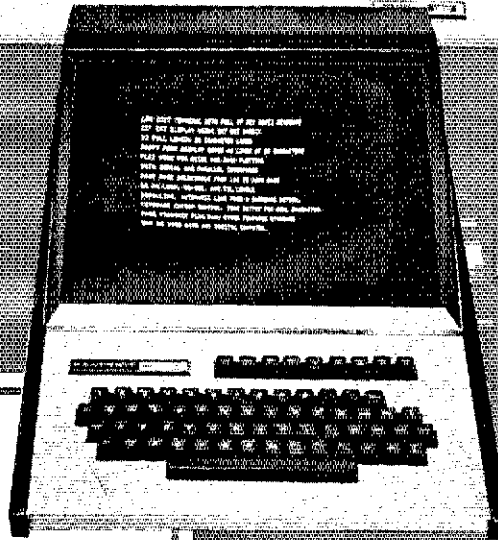
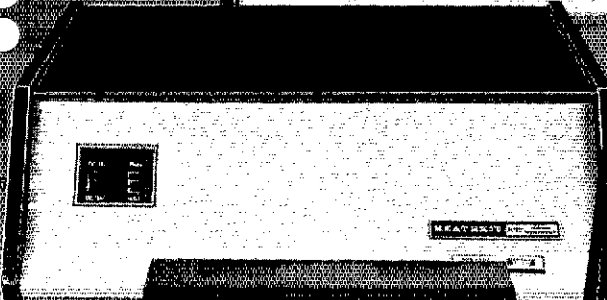
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| 2C Ham Rcvr 189 | HQ-170C Ham Rcvr 149 | 400 Xcvt/410 VFO 229 |
| 2CS Speaker 15 | HQ-170A/VHF Rcvr 269 | MB-80A 80m Xcvt 229 |
| R-4 Ham Rcvr 269 | HQ-180 SW Rcvr 259 | 270 Cygnat Xcvt 329 |
| R-4B Ham Rcvr 339 | HQ-180AC SW Rcvr 369 | 300B/SS16B Xcvt 419 |
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| SPR-4 Rcvr/cal/nb 379 | SBA-300-4 2m conv 29 | 117C AC supply 69 |
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WB4DHC still doing great job with GTN. Try it on 3.715 MHz at 2200Z. WB4TEK has new ant tuner. WA4JN says and fed 160 amp loads but will have to wait for QRN to subside to find out how well it does. Albany 10/70 rpt back in service with autopatch. WA7LWS back to Albany from Las Vegas. K4GBL now K4XA. K4SMX in great DXpedition on Palmyra and Kingman Reef; CVEN No. 2. QNI 56. QTC 3; CVEN No. 2 QNI 72. QNI 56; GARES QNI 57, QTC 3. AREC now has 627 full and 114 limited members. Great job, Doug. Huge hamfest by Atlanta Radio Club had 6972 registrants! Field Day brought out 16 ops at Thomaston Area ARC, 20 ops at Macon ARC, 15 ops at Americus ARA, and 25 at Columbus ARC. Cntrl GA VHF net QNI 95, QTC zero. GTN QNI 60, QTC 16. Excellent article in Savannah News-Press on Savannah ARC. FD. Traffic: (June) W4OJE 283, K4VHC 78, WA4OZT 71, WASHL 67, W4NWB 33, K4YRL 24, WB4DHC 23, WB4TEK 16, W4HON 6, W4JM 4. (May) WB4DHC 63, W4CZCN 51, K4HON 31, W4NWB 26, W4BTZ 4.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr., W4RH - SEC; WA4WBM, RM; WB4GHU. PAMS: WA4TNC/75; WA4TXM/40; WB4BSZ/VHF. New ops: WB4GVR as RM; WB4VDL as OBS; K4YX as OBS; WA4EVR as GM; WB4GVR as GM. QNI, while WA4OEM is new NM of TPTN. Net certificates earned on FPTN by WB4EXA, WA4EYV, WB4QBB, WB4QPW, WB4UPJ and WA4VCK. WA4YV proposes a phone net Bulletin with net news similar to QFN Bulletin. Would you support such a bulletin by being a reporter for your net? Let me know. Jacksonville RANGE and Nassau County ARC have related with ARRL. Eleven clubs sent FD messages to the SCM - did you? New calls: WA4CGB now N4FY; W4SJA now N4GQ; K4KPA now N4JL. WA4WKL received 40 wpm CP certificate. WB4QBB back on phone nets with a TS-520. WA4TXM's station had lightning damage. WA4YX now on 2m FM his XYL is now WB4GWB. WB4GWB has 400 ft. tower and 8 SD QSOs on 6-meters. K4SVX & K4GBV donated RTTY gear to W4UC club station. K4MZX upgraded to Extra. WD4CKU to General, WD4CZQ to Tech. WB4VDL now as NCS on FMTN. WB4RIS active on SOWP Net. NOFAHS had over 100 at May meeting. WA4ZXS publishes the Nassau Co. ARS NARS News. Their local net meets on 146.2 Tue. at 7:30 PM, Clay Co. ARS also has a new net on 146.2 PM at 7:30 PM on the 07/67 repeater. WB4NMU received PSA for work in KY & WVA emergencies. W4MGO's weekly ham column picked up by GA paper. WA4CRI received A1 Op. certificate. Daytona 75/15 repeater zapped by lightning. Orlando has a 220 repeater going and plans a 430 ATV repeater. At 7:30 PM, W4CJL club in Brooksville area received call WD4110. WB4FHT now operator at WPD. Tampa Marine Radio. Traffic: (June) WA4EYV 321, WA4TXM 304, WA4CRI 201, W41LE 128, WB4GHU 106, W4JL 97, WA4FKE 91, W4LDM 89, WB4QBB 79, WB4HRG 76, WB4NMU 75, WB4GWB 74, WB4TZR 69, N4S 63, N4DY 57, WB4MM 57, WB4FY 44, WA4X 49, WA4T 47, W4RH 47, W4MGO 44, K4YX 41, WB4DTS 37, WB4FHT 33, WB4RIS 33, K4OER 26, WB4NJU 21, WB4VDL 21, WB4EXA 20, WB4YV 16, WA4NDO 14, K4RRNS 11, WB4UKX 9, WB4VAP 9, WA4EYU 8, WB4VMP 5, K4EX 2. (May) K4YX 80, WA4STZ 48, K4EX 12.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SC - SEC; WB4ALH, Asst. SEC; W4WYR. RM: W4MEE. PAMS: WB4LD. W4BND. W4BND appointment: WB4KYE EC Lee County. W4BK is traveling by motor home to Seattle for QCWA convention in July. W4MML reports his HT-37 needs a new power transformer. W4WY tried to quit operating after 50 years continuous, but weakened and bought a new Swan 700CX1. Good luck! Louisi W4DL completed 57 OR skeds in June. We received Field Day messages from Indian River ARC, Platinum Coast ARS, Manatee ARC and Tampa ARC. In addition, we know Clearwater ARS was on Field Day - we worked them. With band conditions excellent, 15 through 2 meters, we expect some fantastic FD scores. W4BNE attended meeting of Hillsborough County officials and RACES members making hurricane season preparations. With the hurricane season here, all active amateurs should be registered with their local Emergency Coordinator. Don't know him? Ask me or your SEC. Prepare yourself, family and equipment to survive a big blow and/or flood, in case it comes your way. Be aware of, and active in, your local emergency frequencies, as well as Southern Florida Emergency frequencies 35.0 and 72.7. Learn net discipline and improve your ability to handle formal written messages so that you may be a help rather than a hindrance should disaster strike. Traffic: (June) W4MEE 772, K4TH 340, K4SCL 292, K4SJM 239, WB4WY 219, WB4AID 174, WA4JPV 109, WB4NBE 124, W411, W4WYR 92, WB4NBE 92, WB4ALH 72, W4GVR 67, WB4TEK 64, W4NTE 62, K4NAN 56, WA4QGV 46, K4BLM 43, W4GDK 40, W4UQG 37, WA4EIC 26, W4QM 36, WB4PIB 34, K4EUK 32, W4IRA 36, WA4HDH 24, W4Z 22, WB4NJU 21, W4BK 20, K4ISS 16, WA4ZHU 14, W4BNE 9, W4SMK 5, W4MML 4, W4TJM 4. (May) WA4GNI 12.

WEST INDIES: SCM, David Novoa, KP4BDL - Field Day participation was not as good as expected. This is an important activity and should have more cooperation. KP4CV returned from his annual trip to Europe. KP4QC is now KP4X. KP4ENI passed his General exam. KP4EIQ also got his General and is active with a Dentron MLA-2500. Ex-KP4ABG is active again now as KP4ERG. KP4EIJ is working on an autopatch for a repeater which should now be on the air. KP4BRI has a Kenwood TS-520. KP4DMZ and his XYL doing a very FB job with the QSL Bureau. Many YLs and XYLs are studying radio to join their OMs. Traffic: KP4EHF 46, KP4RK 1.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DQS - RM; W7EP. PAMS: WA7KQE & W7UQQ. Members of state HF nets and stations active on several repeaters monitored during simultaneous forest fires in the north and south parts of the state in late June. This represents the ideal way for concerned amateurs to be available for emergency of public service traffic in an emergency; monitor the area repeater or appropriate traffic net (both if possible) for information. DO NOT transmit unnecessarily; keep alert for instructions from responsible persons in the area. WB7CZL reports two one-hour programs on Tucson broadcasts that were arranged to inform the public on the nature and value of amateur radio. The AZ ARC plans a program on zoning problems and other legal matters facing

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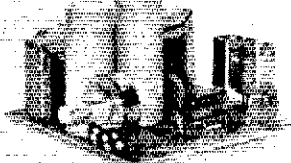
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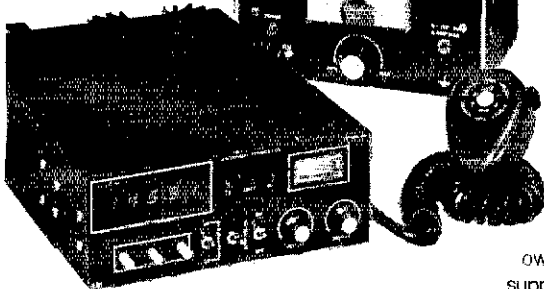
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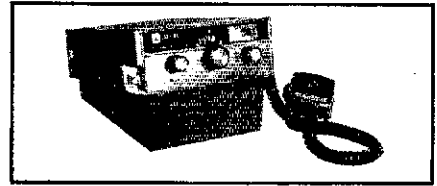
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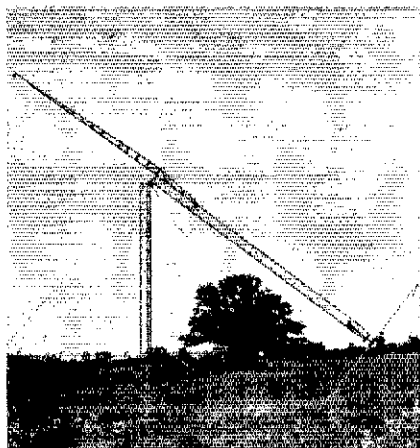
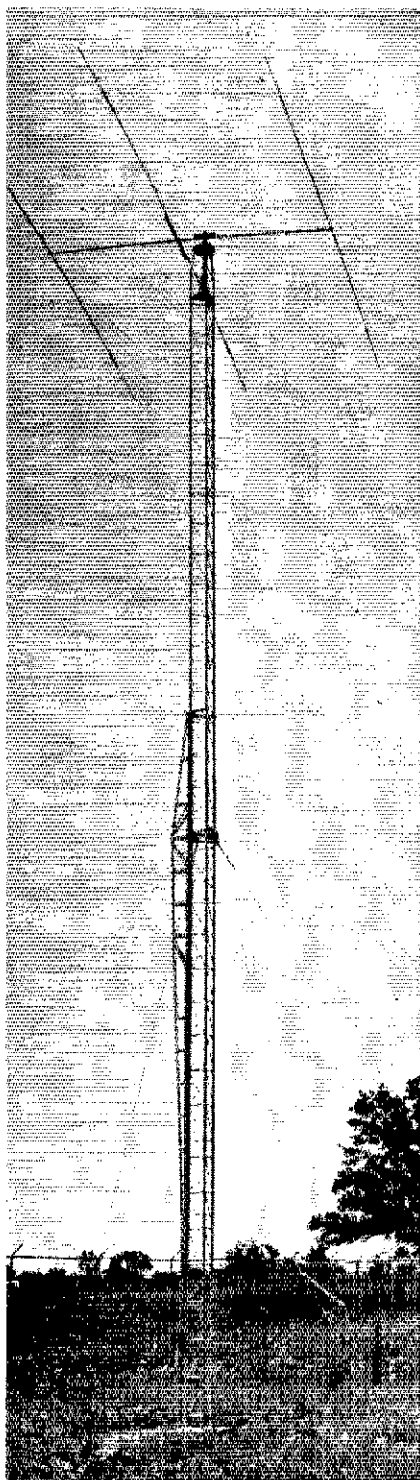
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forward to making some trips around the state, also to the West Gulf Convention in Austin and to Texoma, both in Oct. Make your plans and join the fun. Traffic: W8SNKC 798, W5RB 155, W5REC 151, W8RNKD 126, W5DABL 304, K5OWK 82, W5VOR 52, W5RFK 45, W5SLG 40, W5BELG 37, W5AFSN 30, W5MLT 21, W5FKL 20, W5BVL 18, W5BOLV 8, W5SUCM 6, W5FLV 4, W5OYU 2.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR — SEC: W5TOP, PAM: N5TC (W8SNUM), RM: K5RG, OOs reporting this month: W5CIT K5HGB K5DAE. OVS reporting this month: W5CIT W5QCP, OPS K5RVF and wife attended ARRL convention in Toronto; reports that K5INE and W5APX also were there. OPS W5VBM, Sister Mary, reports Lufkin has new lady Novice, W5SET. OD K5HGB is new Civil Defense Radio Officer for City of Houston. OO/OVS W5CIT reports San Antonio 10-10 net meets on 28.625 kHz Sun, at 0200Z (that's Mon. in Zulu time). From HAMYIDES: K5CA reports new Novice classes at Galveston College. From Coastal Bend AR Digest: W5JZE reports Kingsville ARC members install emergency gear at County Center House only when court not in session — at judge's request. K55BU conducted a personal survival, mountain climbing and first aid training course in the rugged Davis Mountains; W5ZCJ upgraded to General; W5ZUN and Mrs. celebrated 50th wedding anniversary. Traffic: (June) W5KLV 528, W5AYE 313, K5HZE 242, N5TC 159, W5VBM 150, W5ARKJ 109, K5ZSI 93, K5RG 40, W5KR 33, W5BHO 14, K5RVF 7. (May) K5HZR 422, K5GM 191, K5ZSI 60.

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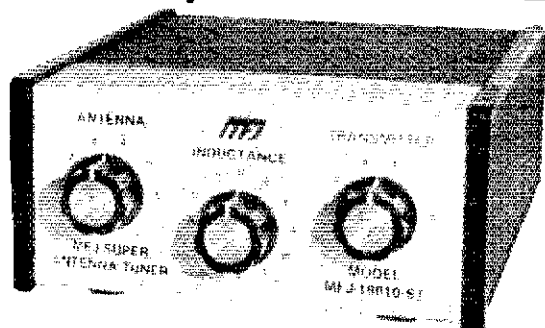
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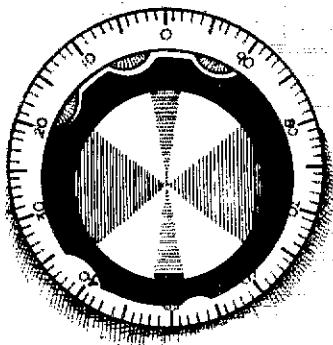
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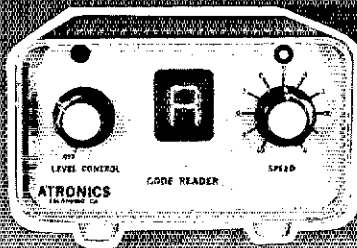
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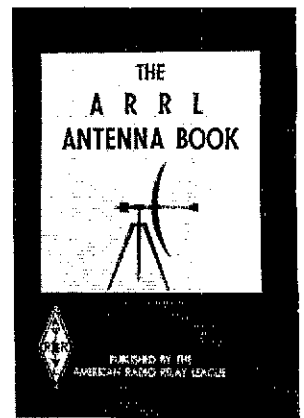
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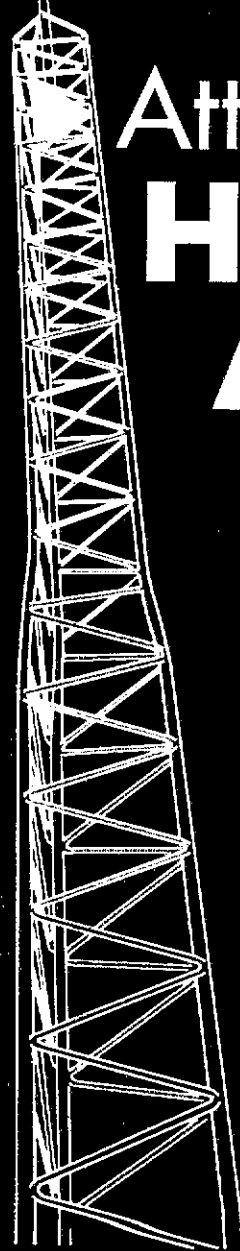
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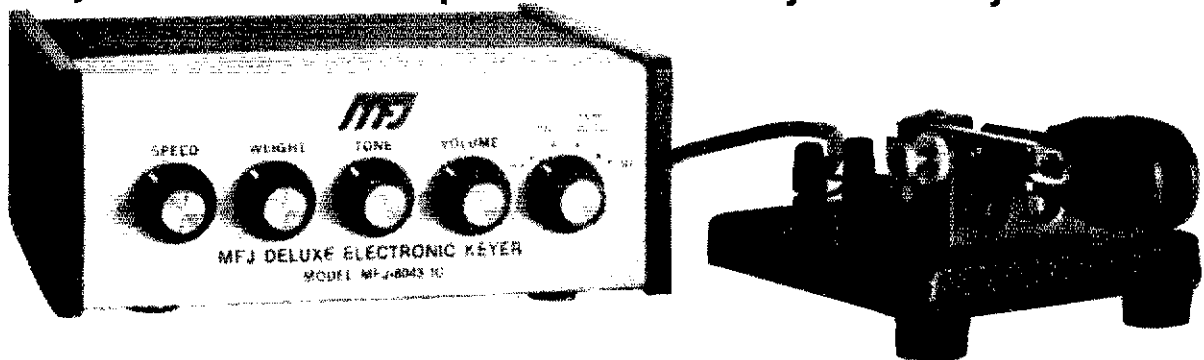
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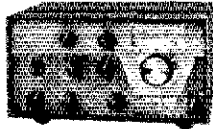
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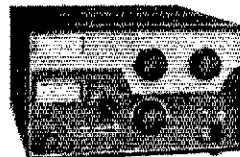
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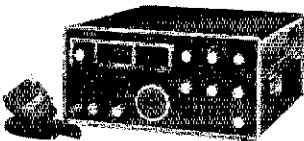
R-4C



T-4XC



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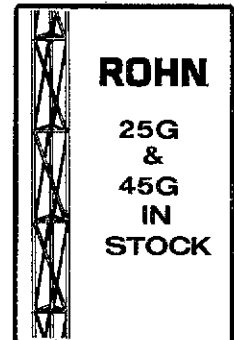
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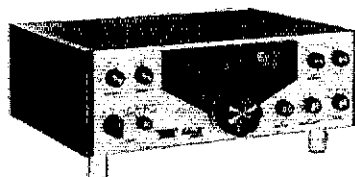
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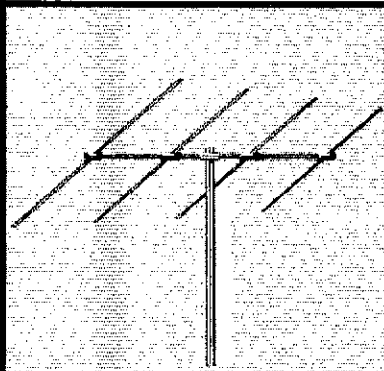
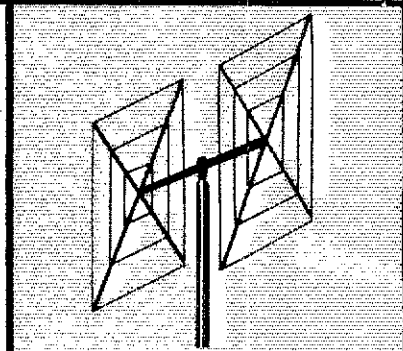
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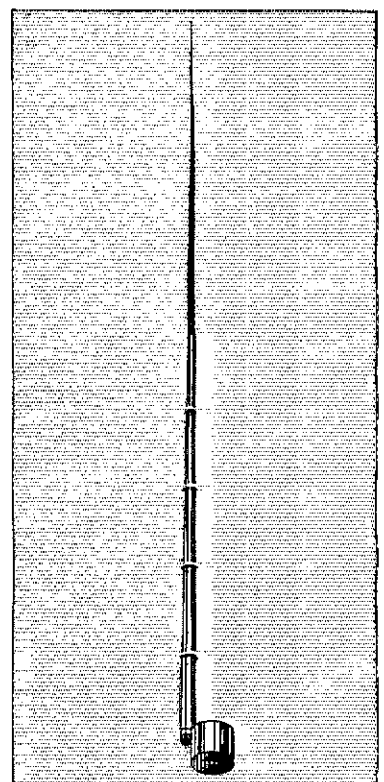
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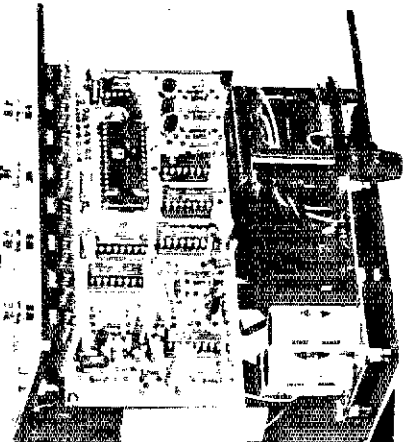
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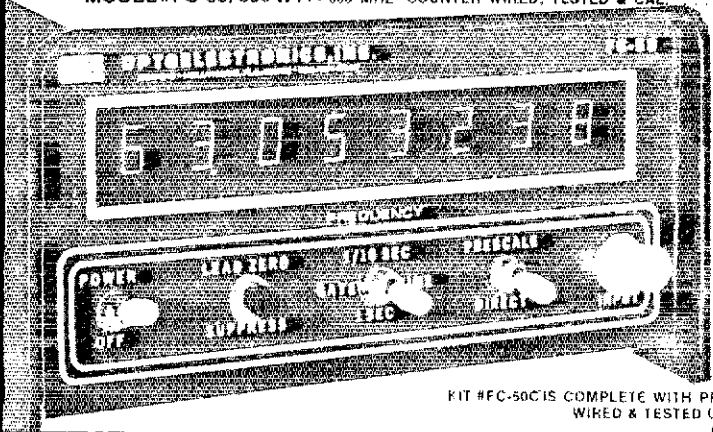
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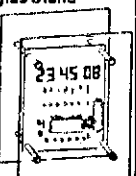
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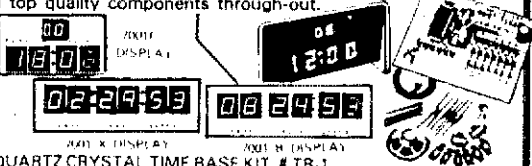
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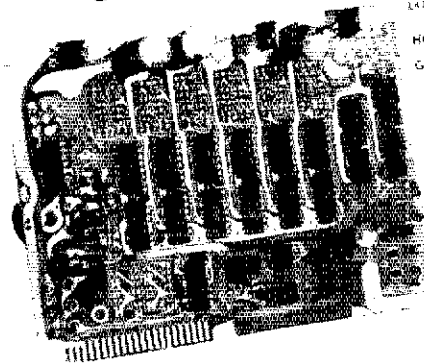
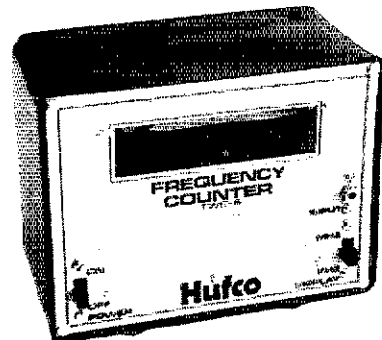
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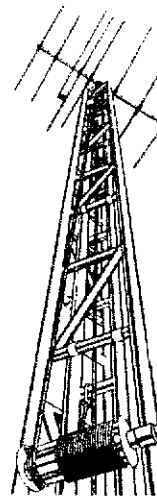


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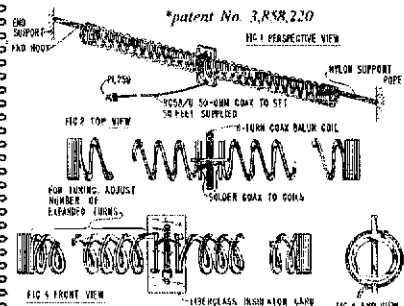
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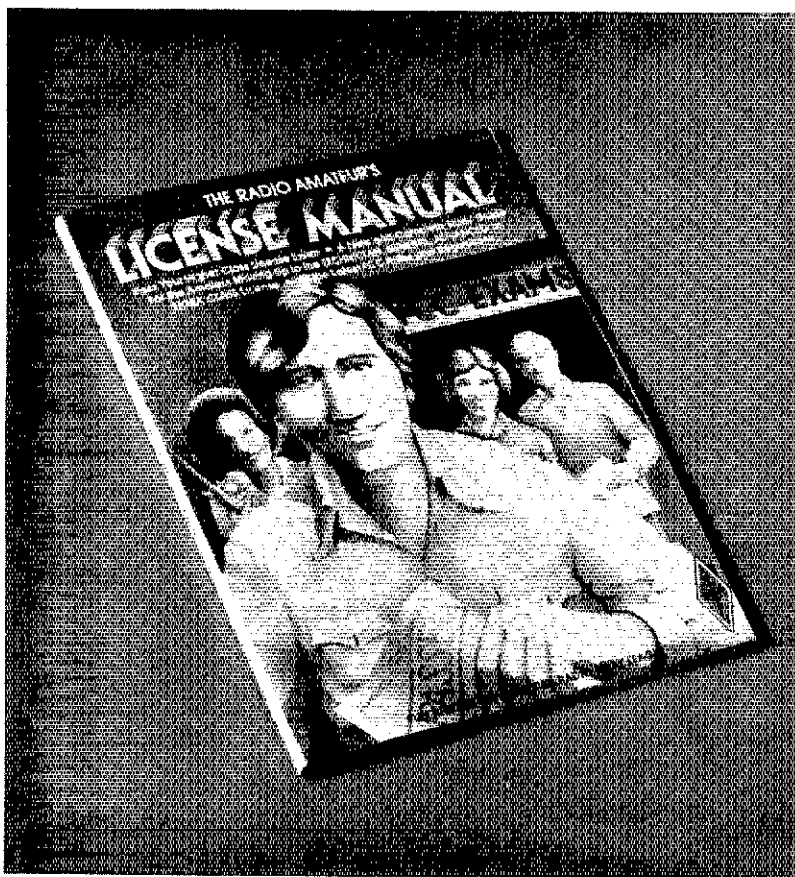
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MEMPHIS is beautiful in October! The Memphis ARRL-sponsored Hamfest, bigger and better than the 4,500 who attended last year, will be held at State Technical Institute, Interstate 40 at Macon Road, on Saturday and Sunday October 1 and 2. Demonstrations, displays, MARS meetings, flea market, ladies flea market, boat hospitality room, informal dinners, XYL entertainment, Dealers and Distributors welcome. Contact Harry Simpson W4SCF PO Box 27015, Memphis, TN 38127 for further information.

PEORIA Hamfest - September 18, Peoria, IL, same place as last year. For further details see September Hamfest Calendar or write Bruce Hunsen K9PWC, 304 Indian Circle, East Peoria, IL 61611. Advance tickets \$1.50, door tickets \$2.

ELMIRA, New York, annual hamfest Sat., Sept. 24 Chemung Co. Airgrounds. Flea market, dealer displays, tech talks. Talk-in 3/7/70 and 146.52. Advance tickets \$2 at gate \$2.50. Write WA2SMM, 320 West Ave., Elmira, NY 14904.

The 35th Annual Findlay hamfest will be held Sept. 17 at the Riverside Park, Findlay, Ohio. Advance tickets are \$1.50 and \$2 at the gate. For tickets and additional information send a S.A.S.E. to Clark Foltz, W8VBN, 122 W. Hobart, Findlay, OH 45840.

MELBOURNE, Florida, September 10-11. The 12th annual Melbourne Hamfest Saturday and Sunday, from 9 A.M. to 5 P.M. in the airconditioned Melbourne Civic Auditorium on Hibiscus Boulevard. Donation \$2.50 per person. Full program includes forums, meetings, auction, swap tables, commercial exhibits, awards etc. Contact K4HPT, 2749 Herford Road, Melbourne, FL 32935 for swap table reservations. FCC exams Saturday. Form 610 must be filed with FCC Room 919, 51 S.W. First Avenue, Miami, FL 33130, not later than August 31, 1977. Talk-in on 25/85 and 32/52. Sponsored by Platinum Coast Amateur Radio Society. For more info write P.O. Box 1004, Melbourne, FL 32901.

CHICAGO'S Radio Expo '77, September 17 and 18. Manufacturers' exhibits, seminars on amateur radio and microprocessors, QCWA banquet Friday night at Mundelain Holiday Inn. Indoor/outdoor flea market open for set up Friday evening. Tickets \$2 advance, \$3 at gate. Radio Expo, P. O. Box 1014, Arlington Heights, IL 60006.

CINCINNATI Hamfest: 41st Annual - Sunday September 18, 1977 at the Improved Stricker's Grove on State Route 128, one mile west of Ross (Venice) Ohio. Flea Market, Contest, Model Aircraft Flying, Food and beverages all day. Advance ticket sales \$7.50 - tickets at the gate \$8. - covers everything. For further information Lillian Abbott K8CKI 1424 Main Street Cincinnati OH 45210.

22ND Annual York County Hamfest Sept. 4th. Rain or shine 9:00 A.M. to 4:30 P.M. Registration \$3, XYLs and children free. No charge for tailgaters. New location U.S.29 Drag-O-Way at York Airport, Thomasville, 10 miles west of York on U.S. 30. Talk-ins 146.37-97, 52-52, 147.93-33. Fly into site. Saturday night campers welcome. Full service cafeteria, clean rest rooms, electric on grounds. Display tables under roof \$2 charge. By advance reservation only, Contact LeRoy Frey K3POR 170 S. Albemarle St., York, PA 17403. 717-854-1203.

HAMFEST Lima, Ohio October 9. The Northwest Ohio ARC 3rd annual hamfest at the Allen County Fairgrounds. Two large buildings, tables and table space available. Dealers welcome. For information and reservations write N.O.A.R.C. P. O. Box 211 Lima, Ohio 45802. Phone 640-1433 or 991-2716.

BLOSSOMLAND annual fall Swap-Shop, October 2nd, Berrien County Youth Fair Grounds, Berrien Springs, Michigan. Large, convenient facilities. Refreshments, fun. Open all night for set-up. Table space restricted to radio and electronic items. Advance ticket donation \$1.50. Tables \$2. Write John Sullivan, P. O. Box 345, St. Joseph, MI 49085. Make checks payable to Blossomland Hamfest.

AUGUSTA, Georgia Hamfest September 18, 1977 at Julian Smith Casino Park, Flea Market, free parking, hospitality room at Ramada Inn West on Saturday September 17, Bar B-Q., talk in 34-94.

FOUNDATION for amateur radio annual Hamfest Sunday 23 October 1977 at Gaithersburg Maryland Fairgrounds.

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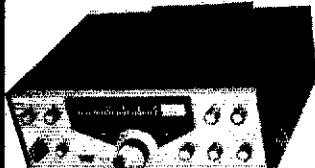
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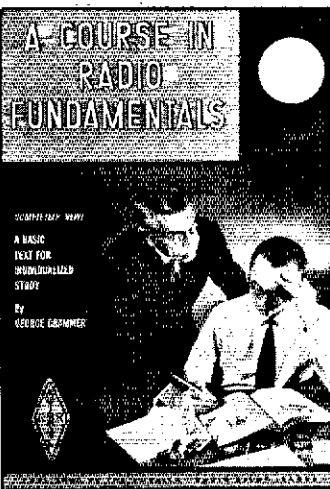
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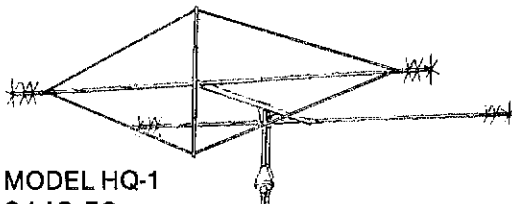
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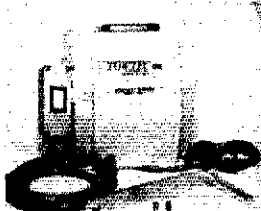
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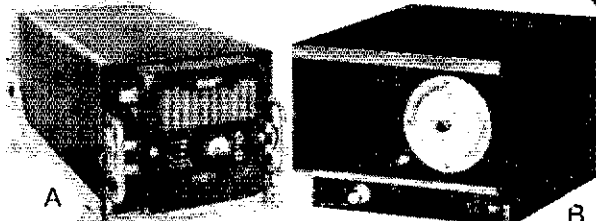
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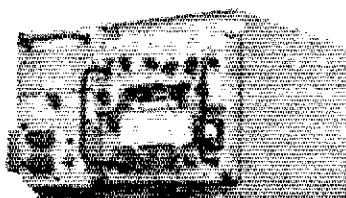
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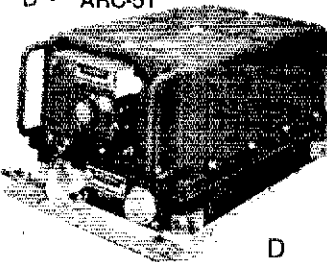
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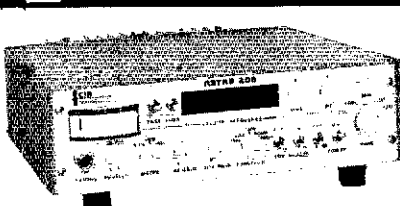
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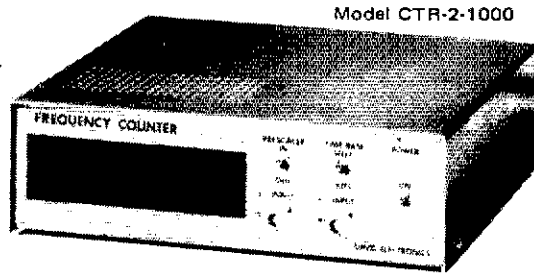
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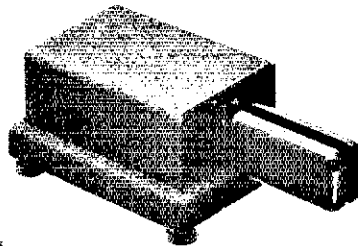


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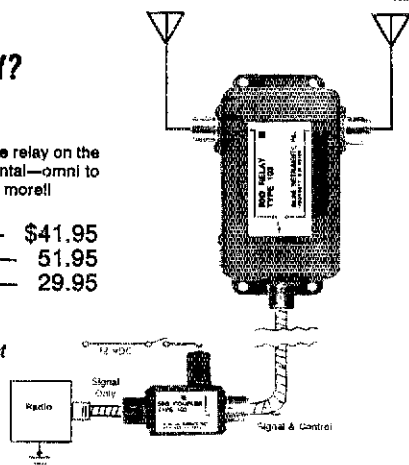
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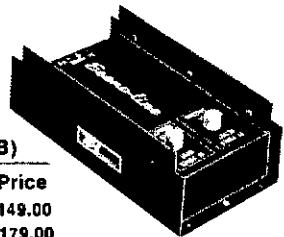
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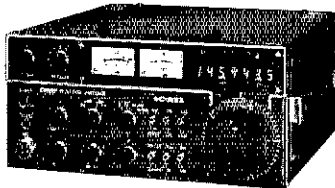
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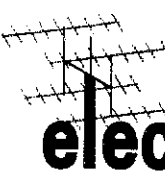
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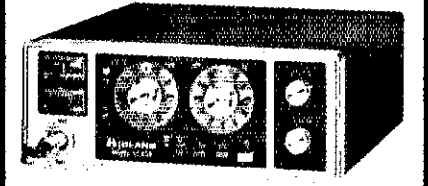
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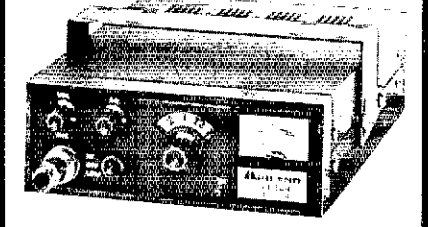
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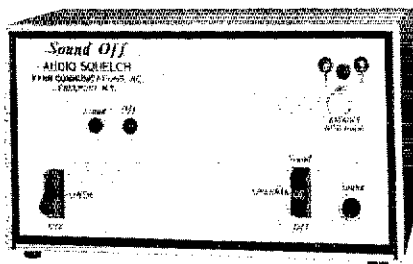
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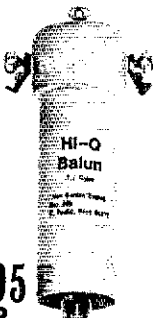
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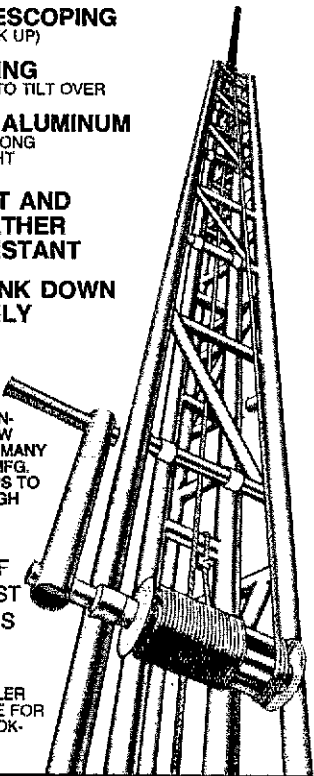
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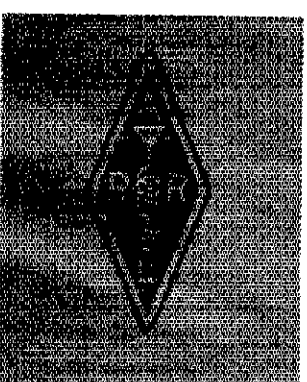
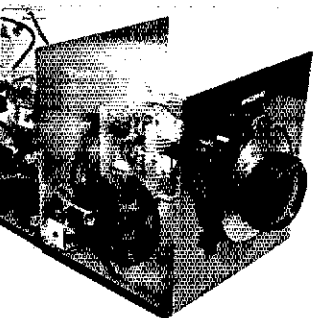
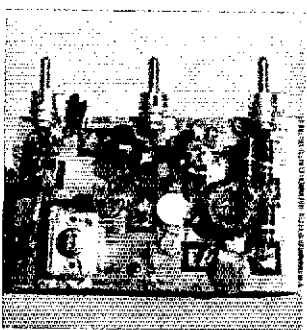
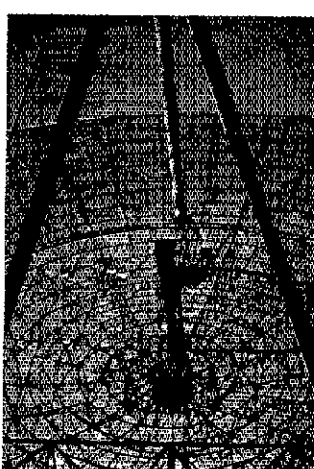
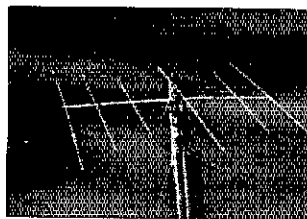
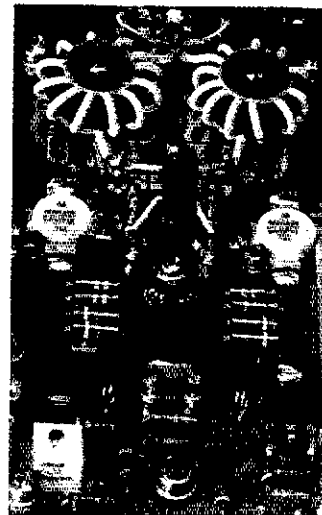
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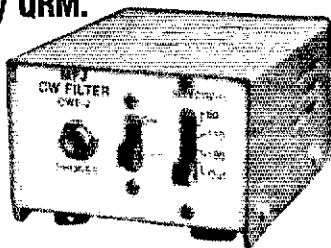


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NEEDED: 4CX1000A, Cushcraft model A26-ZP Yaesu or Finco 2-2-2 Yagi, W6AWK Howard 717 Denton, Decatur, GA 30033 404-636-9305.

WANTED — Old microphones, pre 1940. Also microphone literature. Write Bob Paquette 443 N. 31 St. Milw. WI 53208.

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FOR SALE: Drake RV4C remote vfo and DC4 power supply. Best offers. Chuck, WA2LZB, SNJ 609-783-8490.

HEATHKIT HX-10 xmtr. 59p, cw, TTY, am. 180 PEP \$75. Shipping wt 92 lbs. T. A. Carr, 452 Highland Ave., San Mateo, CA 94401.

CAPACITORS 40uf 5KV oil-filled unused \$33. Ni-Cad batteries 12V-4AH \$8 as is. I pay shipping. Cleaning out ham shack, send for list. Chris Wartes, K7JWTK/71, 706 Harvest Rd., Bothell, WA 98011. 206-485-5344.

SELL: 755-3B, Round, \$695; Yaesu FT-221, \$495; Hy-Gain rotor \$185; Johnson 220 MHz FM, \$125. K1VTM 203-621-6392.

HW-101, HP-23 \$300; KLM Echo II 2 mtr. USB/LSB — \$235; Heath Twoer — dc supply — \$30; FOB N6KM 272 Fourth St., East, Sonoma, CA 95476.

SALE: SB-303, SB-401, SB-600, \$548.; SB-650, \$135.; Dentron 160XV \$95. or best offer; Robot modification kit, \$65. W2WHK, 210 Utica St., Tonawanda, NY 14150 716-692-5451.

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FOR SALE: Yaesu FT-101 with SP101P mint condition all manuals \$425 Gary 913-782-0567.

COLLINS 755-3B for sale Ser. 16,700 mint. 800 Hz filter and 312 B-3 speaker included. \$795 certified check and will ship. K4NYO, Route 1, Box 80B Danville, KY 40422.

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FOR SALE Collins 30L1 Round Emblem \$495. you ship. Large stock pre 1946 tubes. Large prup pitch QST. 1957 to 1975. ten cent copy you ship, W8OAR 3915 Grosvenor Cleveland OH 44118.

WANTED: Heathkit SB-401 transmitter. State price and condition. Greg LaRoque, WA1JHW, 860 Centra Ave., Pawtucket, RI 02861.

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WANTED: HT 32B mint condition only K/BDY Box 744 Snowlow AZ 85901.

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POWER Supplies 110/13.8V. Regulated, Filtered, Protected. 10A \$50, 20A \$70, 30A \$100. plus UPS. Winner Box 73, Lenni, PA 19052.

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MOTOROLA Hi-band pager no. HOBNC 110/HO W/charger \$120, no. HO4BNC1103AQ w/charger \$120, Mucrom 30 VHF D33CMT 310DDM \$125, HT200 VHF \$150. J. Stephens K6UZP 714-298-7832.

NEW Cathode Ray tubes for Tektronix 317 and 536 scopes at very reasonable prices, 536 tubes have P2 Phosphor call 301-926-7064 W3CZ.

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DIGIT-AMP Big diodes at little cost; quality optical enlarger for LFD & LCD readouts; snap-fit for 15820, counters, clocks, rigs. Clear Hat lens can give 100% height increase, no loss color, light, 2 1/2-inch length, \$3. 3 inch, \$3.50, M.J. Becker, W2NFB, 215 E. 68th St., NYC NY 10021.

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FOR SALE - Colin B. Kennedy type 311 Portable receiver. Also 40 years of QST Feb. 1931 thru Dec. 1970. Springsteel Island, Warroad, MN 56763. WQDPT.

WANTED: Antenna tuner MN-2000, MN-4, Millen Jr., MFJ; QF-1; Century-21 and accessories. Carsner, 933 Geary, San Francisco, CA 94109.

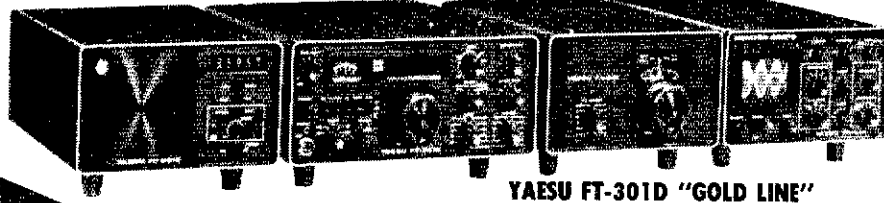
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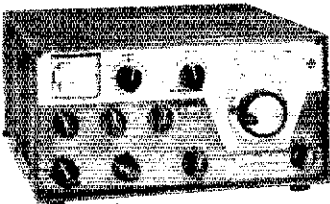
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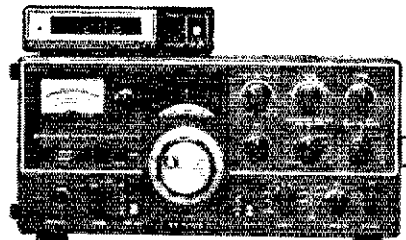
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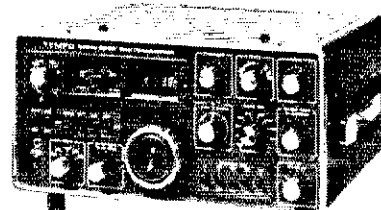
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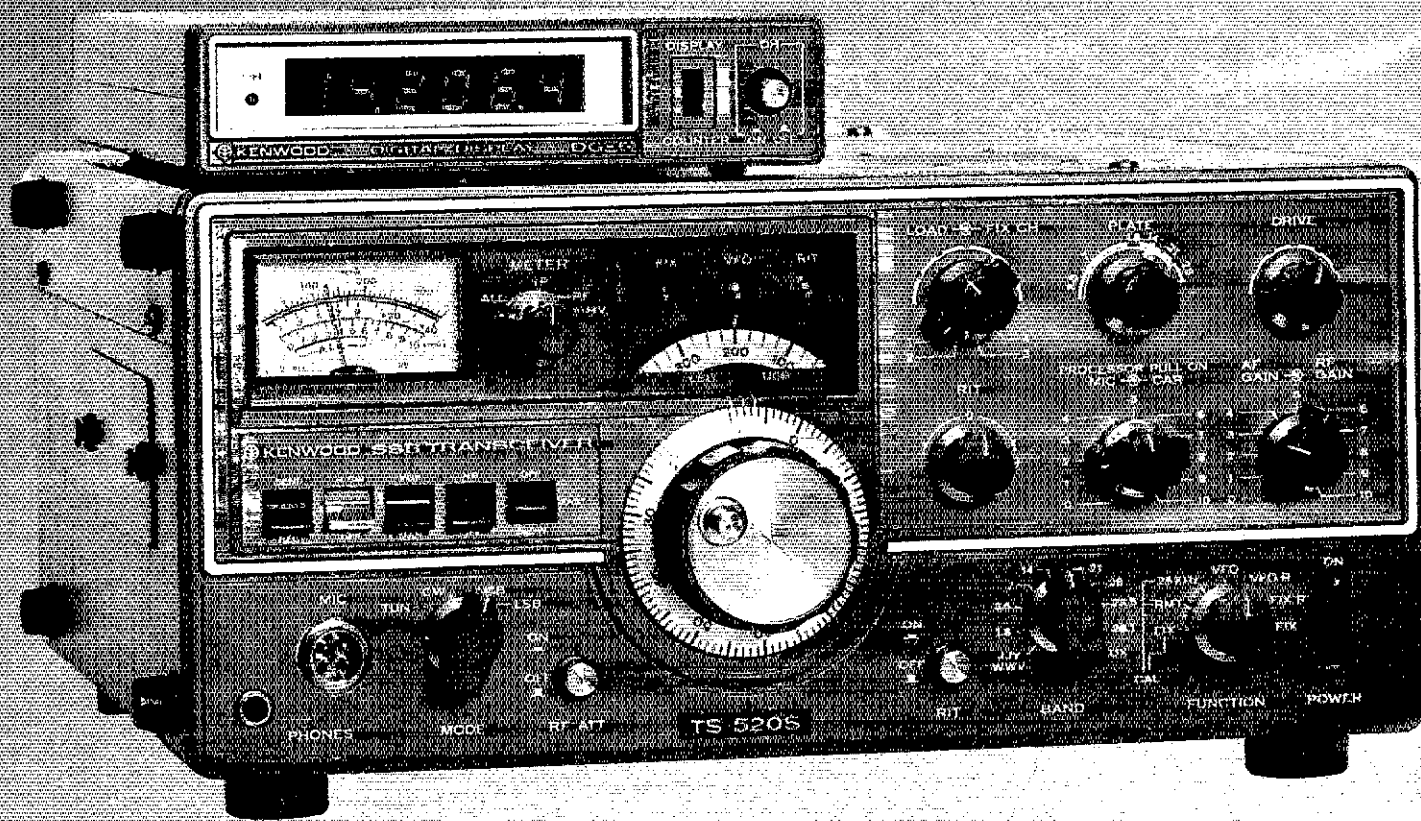
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In short, we S-E-R-V-I-C-E WHAT WE SELL as well as those we sell to, and we firmly believe that there is NO SUBSTITUTE for the kind of "GOOD" S-E-R-V-I-C-E that we are READY, WILLING and ABLE to provide you with. Sure, it may cost you a little more "NOW" — but, when you deal with us, it will SAVE YOU a lot of time, a lot of trouble and a lot of hassles in the long run. WE'RE FOR REAL — THERE'S NO DOUBT ABOUT IT!

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TS-520S

AND DG-5 DIGITAL FREQUENCY DISPLAY



FULL COVERAGE TRANSCEIVER

The TS-520S provides full coverage on 160 meters from 1.8 to 29.7 MHz. Kenwood gives you 160 meter capability, WWV on 15,000 MHz., and an auxiliary band position for maximum flexibility. And with the addition of the TV-506 transverter, your TS-520S can cover 160 meters to 6 meters on SSB and CW.

DIGITAL DISPLAY DG-5 (option)

The Kenwood DG-5 provides easy, accurate readout of your operating frequency while transmitting *and* receiving.

OUTSTANDING RECEIVER SENSITIVITY AND MINIMUM CROSS MODULATION

The TS-520S incorporates a 3SK35 dual gate MOSFET for outstanding cross modulation and spurious response characteristics. The 3SK35 has a low noise figure (3.5 dB typ.) and high gain (18 dB typ.) for excellent sensitivity.

NEW IMPROVED SPEECH PROCESSOR

An audio compression amplifier gives you extra punch in the pile

ups and when the going gets rough.

VERNIER TUNING FOR FINAL PLATE CONTROL

A vernier tuning mechanism allows easy and accurate adjustment of the plate control during tune-up.

FINAL AMPLIFIER

The TS-520S is completely solid state except for the driver (12BY7A) and the final tubes. Rather than substitute TV sweep tubes as final amplifier tubes in a state of the art amateur transceiver,

Kenwood has employed two husky 5-200TA (equivalent to 8146B) tubes. These rugged, time-proven tubes are known for their long life and superb linearity.

An effective noise blanking circuit developed by Kenwood that virtually eliminates ignition noise is built into the TS-520S.

The TS-520S has a built-in 20 dB attenuator that can be activated by a push button switch conveniently located on the front panel.

A special jack on the rear panel of the TS-520S provides receiver signals to an external receiver for increased station versatility. A switch on the rear panel determines the signal path... the receiver in the TS-520 or any external receiver.

VFO-520 — NOW REMOTE VFO

The VFO-520 remote VFO matches the styling of the TS-520S and provides maximum operating flexibility on the band selected on your TS-520S.

AC POWER SUPPLY

The TS-520S is completely self-contained with a rugged AC power supply built-in. The addition of the DS-1A DC-DC converter (optional) allows for mobile operation of the TS-520S.

EASY PHONE PATCH CONNECTION

The TS-520S has 2 convenient RCA phono jacks on the rear panel for PHONE PATCH IN and PHONE PATCH OUT.

CW-520 — CW FILTER (OPTIONAL)

The CW-520-500 Hz filter can be easily installed and will provide improved operation on CW.

AMPLIFIED TYPE AGC CIRCUIT

The AGC circuit has 3 positions (OFF, FAST, SLOW) to enable the TS-520S to be operated in the optimum condition at all times whether operating CW or SSB.

The TS-520S retains all of the features of the original TS-520 that made it tops in its class: RIT control • 8-pole crystal filter • Built-in 25 KHz calibrator • Front panel carrier level control • Semi-break-in CW with sidetone • VOX/PTT/MOX • TUNE position for low power tune up • Built-in speaker • Built-in Cooling Fan • Provisions for 4 fixed frequency channels • Heater switch.

TS-520 Specifications

Amateur Bands: 160-10 meters plus WWV (receive only)
 Modes: USB, LSB, CW
 Antenna Impedance: 50-75 Ohms
 Frequency Stability: Within ± 1 kHz during one hour after one minute of warm-up, and within 100 Hz during any 30 minute period thereafter.
 Tubes & Semiconductors:
 Tubes: 3 (5200TA x 2, 12BY7A)
 Transistors: 52
 FETs: 19
 Diodes: 101
 Power Requirements: 120/220 V AC, 50/60 Hz, 13.8 V DC (with optional DS-1A)
 Power Consumption: Transmit: 280 Watts Receive: 25 Watts (with heater off)
 Dimension: 333(13 1/4) W x 153 (6-0) H x 335(13-13 3/16) D mm(inch)
 Weight: 16.0 kg(35.2 lbs)

TRANSMITTER

RF Input Power: SSB: 200 Watts PEP CW: 160 Watts DC
 Carrier Suppression: Better than -40 dB
 Sideband Suppression: Better than -50 dB
 Spurious Radiation: Better than -40 dB
 Microphone Impedance: 50k Ohms
 AF Response: 400 to 2,600 Hz

RECEIVER

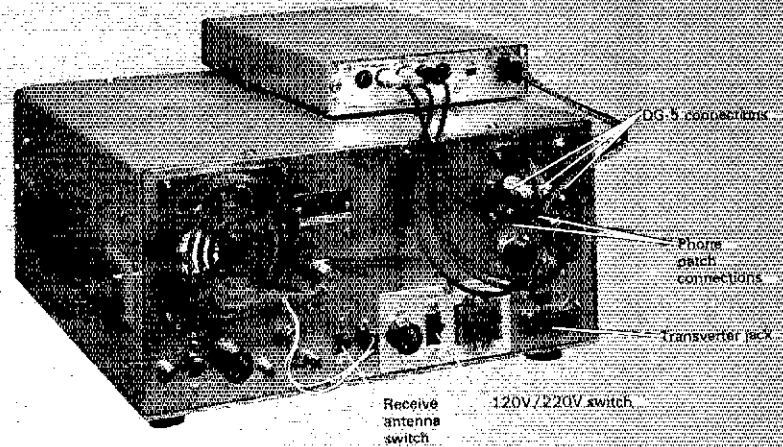
Sensitivity: 0.25 μ V for 10 dB (S+N)/N
 Selectivity: SSB: 2.4 kHz/-6 dB, 4.4 kHz/-60 dB
 Selectivity: CW: 0.5 kHz/-6 dB, 1.5 kHz/-60 dB (with optional CW-520 filter)
 Image Ratio: Better than 50 dB
 IF Rejection: Better than 50 dB
 AF Output Power: 1.0 Watt (8 Ohm load, with less than 10% distortion)

AF Output Impedance: 4 to 16 Ohms

DG-5

SPECIFICATIONS

Measuring Range: 100 Hz to 40 MHz
 Input Impedance: 5 k Ohms
 Gate Time: 0.1 Sec.
 Input Sensitivity: 100 Hz to 40 MHz... 200 mV rms or over; 10 kHz to 10 MHz... 50 mV or over
 Measuring Accuracy: Internal time base accuracy ± 0.1 count
 Time Base: 10 MHz
 Operating Temperature: -10° to 50° C/14° to 122° F
 Power Requirement: Supplied from TS-520S or 12 to 16 VDC (nominal 13.8 VDC)
 Dimensions: 167(6-9/16) W x 43(1-11/16) H x 268(10-9/16) D mm(inch)
 Weight: 1.3 kg(2.9 lbs)

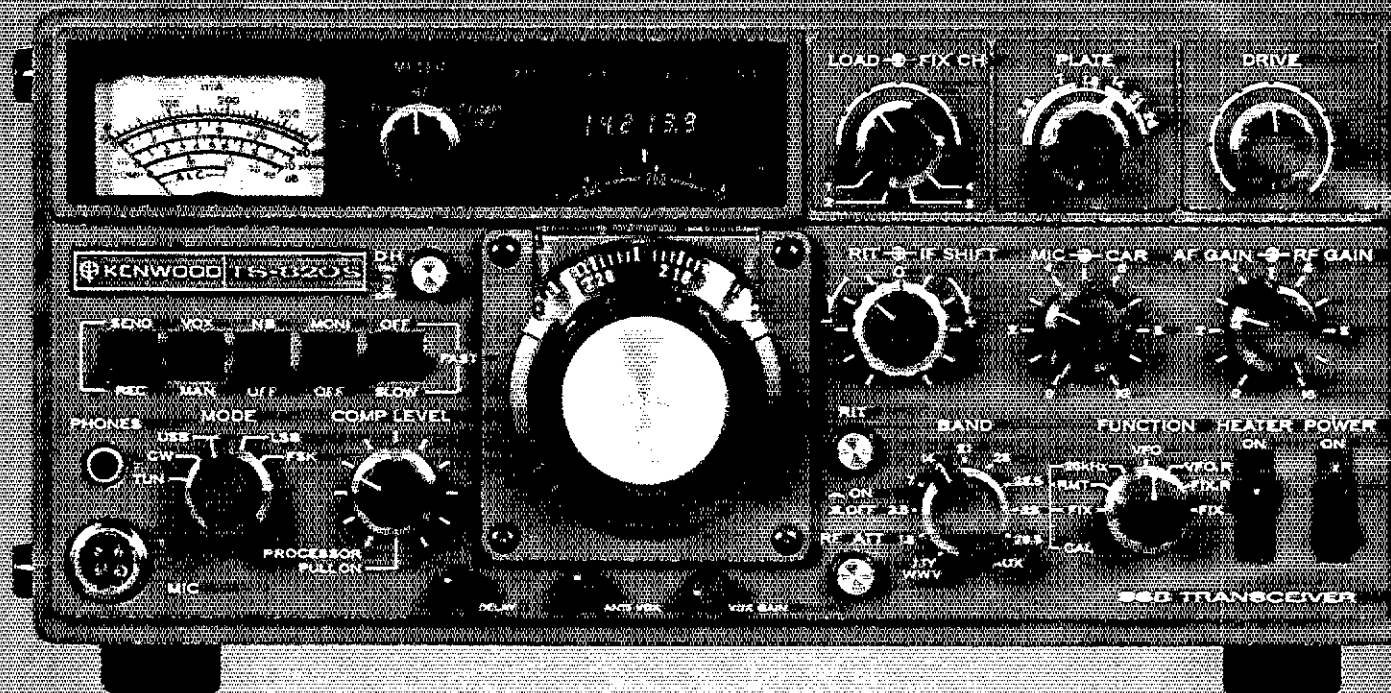


The luxury of digital readout is available on the TS-520S by connecting the DG-5 readout (option). More than just the average readout circuit, this counter mixes the carrier, VFO, and heterodyne frequencies to give you your exact frequency. This handsomely-styled accessory can be set almost anywhere in your shack for easy to read operation... or set it on the dashboard during mobile operation for safety and convenience. Six bold digits display your operating frequency while you transmit and receive. Complete with DH (display hold) switch for frequency memory and 2 position intensity selector. The DG-5 can also be used as a normal frequency counter up to 40 MHz at the touch of a switch. (Input cable provided.)

NOTE: TS-520 owners can use the DG-5 with a DK-620 adapter kit.

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TS-820S

WITH DIGITAL FREQUENCY DISPLAY

We told you that the TS-820 would be best. In little more than a year our promise has become a fact. Now, in response to hundreds of requests from amateurs, Kenwood offers the TS-820S... the same superb transceiver, but with the digital readout factory installed. As an owner of this beautiful rig, you will have at your fingertips the combination of controls and features that even under the toughest operating conditions make the TS-820S the Pacesetter that it is.

Following are a few of the TS-820S' many exciting features.

PLL • The TS-820S employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

DIGITAL READOUT • The digital counter display is employed as an integral part of the VFO readout system. Counter mixes the carrier VFO, and first heterodyne frequencies to give exact frequency. Figures the frequency down to 10 Hz and digital display

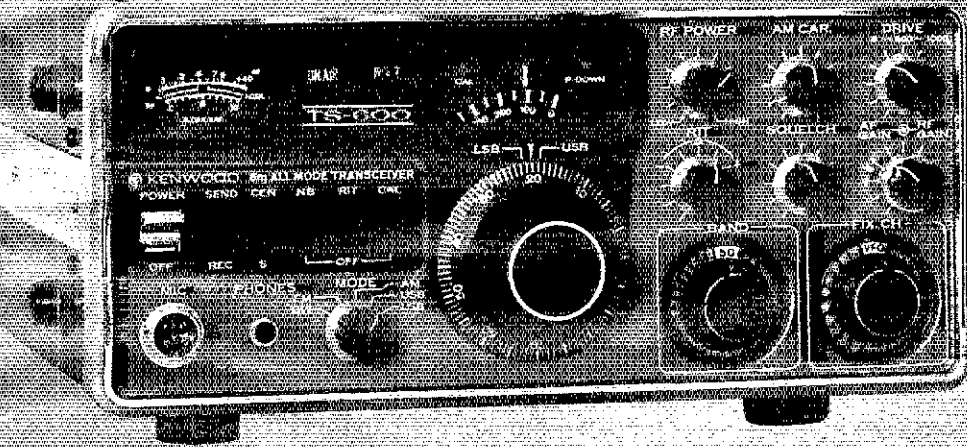
reads out to 100 Hz. Both receive and transmit frequencies are displayed in easy-to-read, Kenwood Blue digits.

SPEECH PROCESSOR • An RF circuit provides quick time constant compression using a true RF compressor as opposed to an AF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control.

IF SHIFT • The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820S a pacesetter.

*The TS-820 and DG-1 are still available separately.

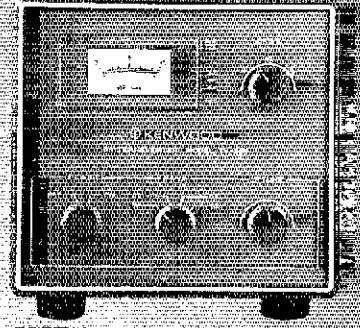
TS-600



Experience the excitement of 6 meters. The TS-600 all mode transceiver lets you experience the fun of 6 meter band openings.

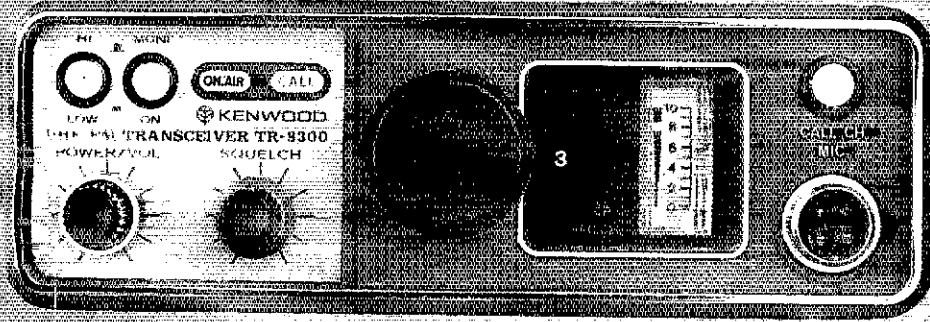
This 10 watt, solid state rig covers 50.0-54.0 MHz. The VFO tunes the band in 1 MHz segments. It also

has provisions for fixed frequency operation on NETS or to listen for beacons. State of the art features such as an effective noise blanker and the RIT (Receiver Incremental Tuning) circuit make the TS-600 another Kenwood "Pacesetter".



TV-506

An easy way to get on the 6 meter band with your TS-520/520S, TS-820/820S and most other transceivers. Simply plug it in and you're on... full band coverage with 10 watts output on SSB and CW.



TR-8300

Experience the luxury of 450 MHz at an economical price. The TR-8300 offers high quality and superb performance as a result of many years of improving VHF/UHF design techniques. The trans-

ceiver is capable of F₃ emission on 23 crystal-controlled channels (3 supplied). The transmitter output is 10 watts.

The TR-8300 incorporates a 5 section helical resonator and a

two-pole crystal filter in the IF section of the receiver for improved intermodulation characteristics. Receiver sensitivity, spurious response, and temperature characteristics are excellent.

KENWOOD

...faces that in amateur radio

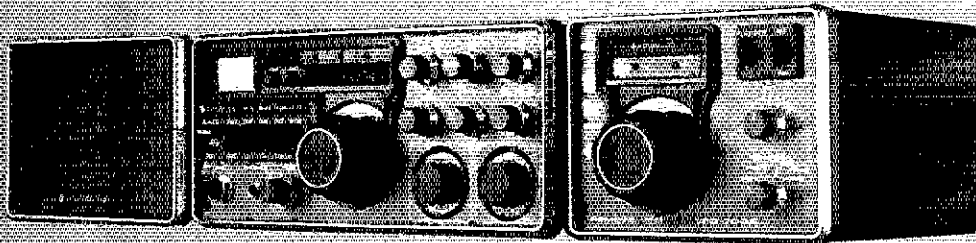
TS-700S

WITH DIGITAL FREQUENCY DISPLAY



Check out the new "built-ins":
digital readout, receiver pre-amp,
VFO, semi-break in, and CW sidetone!
Of course, it's still all mode, 144-148
MHz and VFO controlled.

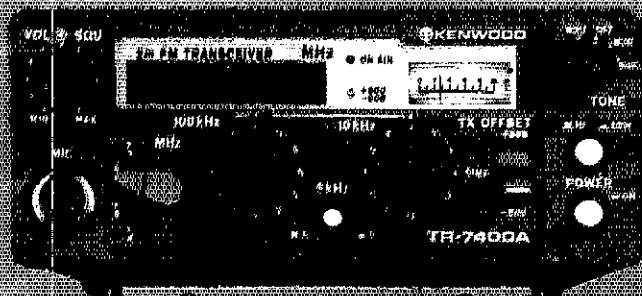
Features: Digital readout with "Kenwood Blue" digits • High gain receiver pre-amp • 1 watt lower power switch • Built in VOX • Semi-break in on CW • CW sidetone • Operates all modes: SSB (upper & lower), FM, AM and CW • Completely solid state circuitry provides stable, long lasting, trouble-free operation • AC and DC capability (operate from your car, boat, or as a base station through its built-in power supply) • 4 MHz band coverage (144 to 148 MHz) • Automatically switches transmit frequency 600 KHz for repeater operation. Simply dial in your receive frequency and the radio does the rest... simplex, repeater, reverse • Or accomplish the same by plugging a single crystal into one of the 11 crystal positions for your favorite channel • Transmit/Receive capability on 44 channels with 11 crystals



VFO-700S

Handsomely styled and a perfect companion to the TS-700S. This unit provides you with the extra versatility and the luxury of having a second VFO in your shack. Great for split frequency operation and for tuning off frequency to check the band. The function switch

on the VFO-700S selects the VFO in use and the appropriate frequency is displayed on the digital readout in the TS-700S. In addition a momentary contact "frequency check" switch allows you to spot check the frequency of the VFO not in use.



TR-7400A

Features Kenwood's unique Continuous Tone-Coded-Squelch system, 4 MHz band coverage, 25 watt output and fully synthesized 800 channel operation. This compact package gives you the kind of performance specifications you've always wanted in a 2-meter amateur rig.

Outstanding sensitivity, large-sized helical resonators with High Q to minimize undesirable out-of-band interference, and give a 2-pole 10.7 MHz monolithic crystal filter combine to give your TR-7400A outstanding receiver performance. Intermodulation characteristics (Better than 66dB), spurious (Better than -60dB), image rejection (Better than -70dB), and a versatile squelch system make the TR-7400A tops in its class.

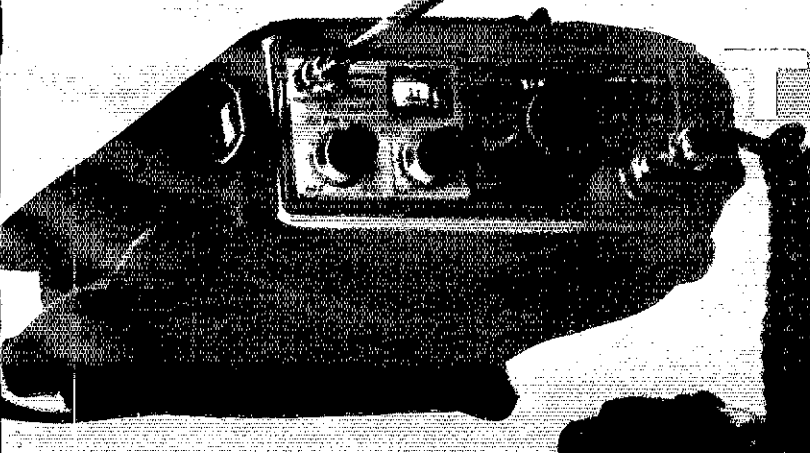
Shown with the PS-8 power supply

(Active filters and Tone Burst Modules optional)



TR-7500

This 100 channel PLL synthesized 146-148 MHz transceiver comes with 88 pre-programmed channels for use on all standard repeater frequencies (as per ARRL Band Plan) and most simplex channels. For added flexibility, there are 6 diode-programmable switch positions. The 15 KHz shift function makes these 6 positions into 12 channels. 10 watt output, ± 600 KHz offset and LED digital frequency display are just a few of the many fine features of the TR-7500. The PS-6 is the handsomely styled, matching power supply for the TR-7500. Its 3.5 amp current capacity and built-in speaker make it the perfect companion for home use of the TR-7500.



TR-2200A

The high performance portable 2-meter FM transceiver, 146-148 MHz, 12 channels (6 supplied), 2 watts or 400 mW RF output. Everything you need is included: Ni-Cad battery pack, charger, carrying case and microphone.

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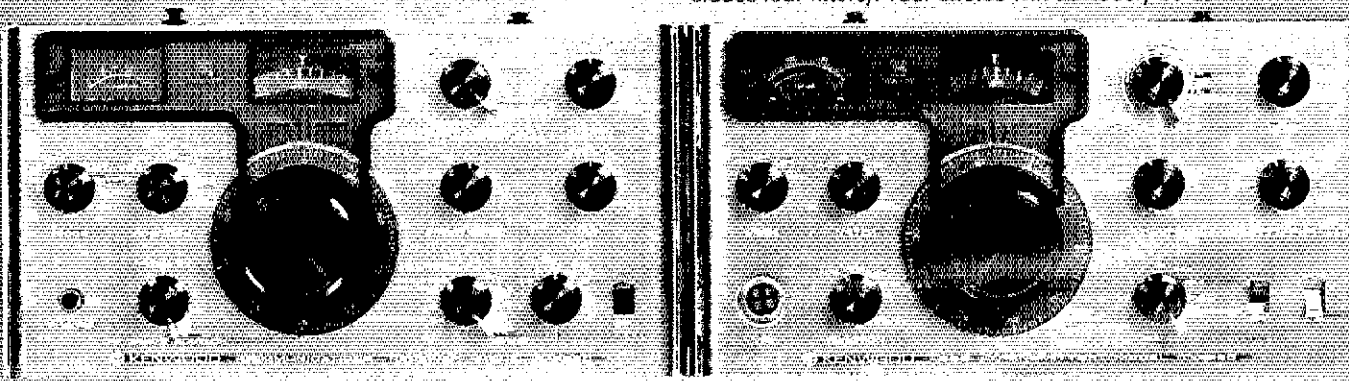
...pacesetter in amateur radio

Kenwood developed the T-599D transmitter and R-599D receiver for the most discriminating amateur. The R-599D is the most complete receiver ever offered. It's entirely solid-state, superbly reliable and compact. It covers the full amateur band, 10 through 160 meters, CW, LSB, USB, AM and FM.

The T-599D is solid-state with the exception of only three tubes, has built-in power supply and full metering. It operates CW, LSB, USB and AM and, of course, is a perfect match to the R-599D receiver.

If you have never considered the advantages of operating a receiver/transmitter combination... maybe you should. Because of the larger number of controls and dual VFDs the combination offers flexibility impossible to duplicate with a transceiver.

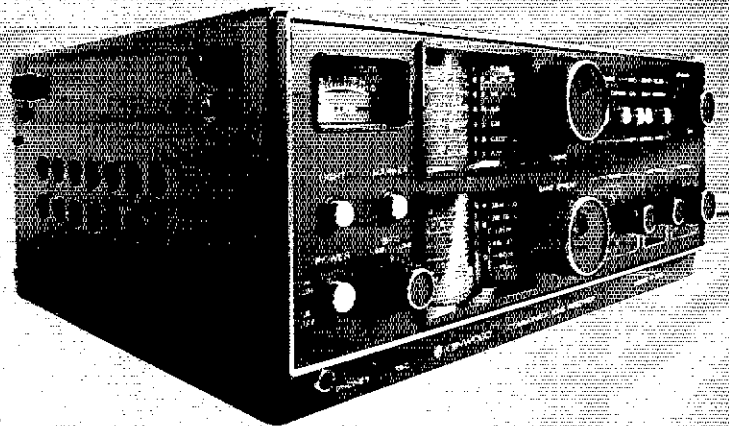
Compare the specs of the R-599D and the T-599D with any other brand. Remember, the R-599D is all solid state (and includes four filters). Your choice will obviously be the Kenwood.

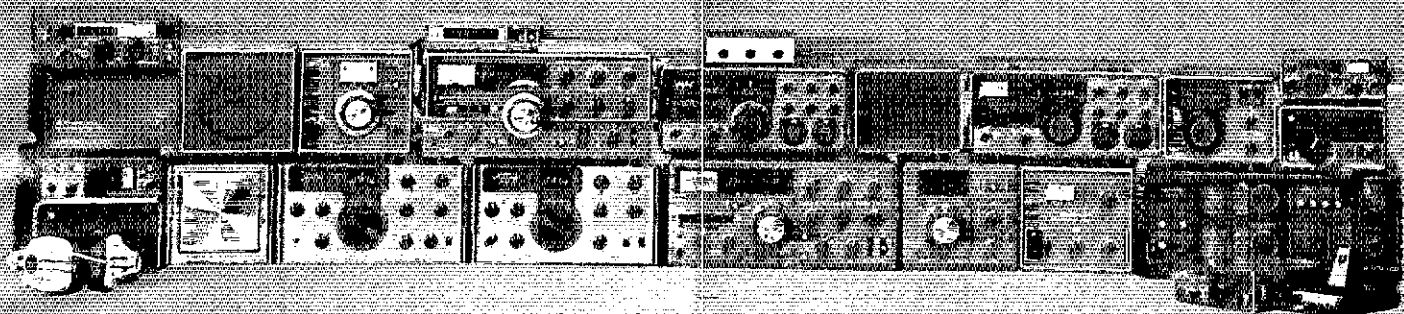


R-599D & T-599D

R-300

Dependable operation, superior specifications and excellent features make the R-300 an unexcelled value for the shortwave listener. It offers full band coverage with a frequency range of 170 KHz to 30.0 MHz • Receives AM, SSB and CW • Features large, easy to read drum dials with fast smooth dial action • Band spread is calibrated for the 10 foreign broadcast bands, easily tuned with the use of a built-in 500 KHz calibrator • Automatic noise limiter • 3-way power supply system (AC/Batteries/External DC) take it anywhere • Automatically switches to battery power in the event of AC power failure.





Fine equipment that belongs in every well equipped station

HF LINES

820 Series

- TS-820S TS-820 with Digital installed
- TS-820 10:160 M Deluxe Transceiver
- DG-1 Digital Frequency Display for TS-820
- VFO-820 Deluxe Remote VFO for TS-820/820S
- CW-820 500 Hz CW Filter for TS-820/820S
- DS-1A DC-DC Converter for 520/820 Series

520 Series

- TS-520S 160-10 M Transceiver
- DG-5 Digital Frequency Display for TS-520 Series
- VFO-520 Remote VFO for TS-520 and TS-520S
- SP-520 External Speaker for 520/820 Series
- CW-520 500 Hz CW Filter for TS-520/520S
- DK-520 Digital Adaptor Kit for TS-520

599D Series

- R-599D 160-10 M Solid State Receiver
- T-599D 80-10 M Matching Transmitter
- S-599 External Speaker for 599D Series

- CC-29A 2 Meter Converter for R-599D
- CC-69 6 Meter Converter for R-599D
- FM-599A FM Filter for R-599D

SHORT WAVE LISTENING

- R-300 General Coverage SWL Receiver

VHF LINES

- TS-600 6 M All Mode Transceiver
- TS-700S 2 M All Mode Digital Transceiver
- VFO-700S Remote VFO for TS-700S
- SP-70 Matching Speaker for TS-600/700 Series
- TR-2200A 2 M Portable FM Transceiver
- TR-7400A 2 M Synthesized Deluxe FM Transceiver

- TR-7500 100 Channel Synthesized 2 M FM Transceiver
- TR-8300 70 CM FM Transceiver (450 MHz)
- TV-506 6 M Transverter for 520/820/599 Series

POPULAR STATION ACCESSORIES

- HS-4 Headphone Set
- MB-1A Mounting Bracket for TR-2200A
- MC-50 Desk Microphone
- PS-5 Power Supply for TR-8300
- PS-6 Power Supply for TR-7500
- PS-8 Power Supply for TR-7400A
- VOX-3 VOX for TS-600/700A

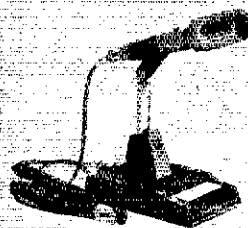
Trio-Kenwood stocks a complete line of replacement parts, accessories, and manuals for all Kenwood models.

MORE ACCESSORIES:

| Description | Model # | For use with |
|---------------------------|--------------------|-------------------|
| Rubber Helical Antenna | RA-1 | TR-2200A |
| Telescoping Whip Antenna | T90-0082-05 | TR-2200A |
| Ni-Cad Battery Pack (Set) | PB-15 | TR-2200A |
| 4 Pin Mic. Connector | E07-0403-05 | All Models |
| Active Filter Elements | See Service Manual | TR-7400A |
| Tone Burst Modules | See Service Manual | TS-700A; TR-7400A |
| AC Cables | Specify Model | All Models |
| DC Cables | Specify Model | All Models |



The Kenwood HS-4 headphone set adds versatility to any Kenwood station. For extended periods of wear, the HS-4 is comfortably padded and is completely adjustable. The frequency response of the HS-4 is tailored specifically for amateur communication use. (300 to 3000 Hz, 8 ohms).



The MC-50 dynamic microphone has been designed expressly for amateur radio operation as a splendid addition to any Kenwood shack. Complete with PTT and LOCK switches, and a microphone plug for instant hook-up to any Kenwood rig. Easily converted to high or low impedance. (600 or 50k ohm).

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UP TO 400% MORE RF POWER PLUGS BETWEEN YOUR MICROPHONE AND TRANSMITTER



\$ 49⁹⁵

LSP-520BX. 30 db dynamic range IC log amp and 3 active filters give clean audio. RF protected. 9 V battery. 3 conductor, 1/4" phone jacks for input and output. 2-3/16 x 3-1/4 x 4 inches.



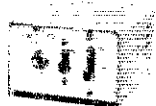
\$ 59⁹⁵

LSP-520BX II. Same as LSP-520BX but in a beautiful 2-1/8 x 3-5/8 x 5-9/16 inch Ten-Tec enclosure with uncommitted 4 pin Mic Jack, output cable, rotary function switch.

SUPER LOGARITHMIC SPEECH PROCESSOR

Up To 400% More RF Power is yours with this plug-in unit. Simply plug the MFJ Super Logarithmic Speech Processor between your microphone and transmitter and your voice is suddenly transformed from a whisper to a Dynamic Output.

Your signal is full of punch with power to slice through QRM and you go from barely readable to "solid copy OM".



\$ 27⁹⁵

CWF-2BX Super CW Filter

By far the leader. Over 5000 in use. Razor sharp selectivity. 80 Hz bandwidth, extremely steep skirts. No ringing. Plugs between receiver and phones or connect between audio stage for speaker operation.

- Selectable BW: 80, 110, 180 Hz • 80 dB down one octave from center freq. of 750 Hz for 80 Hz BW
- Reduces noise 15 dB • 9 V battery
- 2-3/16 x 3-1/4 x 4 in. • CWF-2PC, wired PC board, \$18.95 • CWF-2PCK, kit PC board \$15.95



\$ 49⁹⁵

CMOS-8043 Electronic Keyer

State of the art design uses CURTIS-8043 Keyer-on-a-chip.

- Built-in Key • Dot memory • Iambic operation with external squeeze key • 8 to 50 WPM • Sidetone and speaker • Speed, volume, tone, weight controls • Ultra reliable solid state keying +300 volts max. • 4 position switch for TUNE, OFF, ON, SIDETONE OFF
- Uses 4 penlight cells • 2-3/16 x 3-1/4 x 4 inches



\$ 39⁹⁵

NEW

MFJ-16010 Antenna Tuner

Now you can operate all band — 160 thru 10 Meters — with a single random wire and run your full transceiver power output — up to 200 watts RF power OUTPUT.

- Small enough to carry in your hip pocket, 2-3/16 x 3-1/4 x 4 inches • Matches low and high impedances by interchanging input and output • SO-239 coaxial connectors • Unique wide range, high performance, 12 position tapped inductor. Uses two stacked toroid cores



\$ 29⁹⁵

SBF-2BX SSB Filter

Dramatically improves readability.

- Optimizes your audio to reduce sideband splatter, remove low and high pitched QRM, hiss, static crashes, background noise, 60 and 120 Hz hum
- Reduces fatigue during contest, DX, and ragchewing • Plugs between phones and receiver or connect between audio stage for speaker operation
- Selectable bandwidth IC active audio filter • Uses 9 volt battery • 2-3/16 x 3-1/4 x 4 inches



\$ 27⁹⁵

MFJ-200BX Frequency Standard

Provides strong, precise markers every 100, 50, or 25 KHz well into VHF region.

- Exclusive circuitry suppresses all unwanted markers • Markers are gated for positive identification. CMOS IC's with transistor output. • No direct connection necessary • Uses 9 volt battery • Adjustable trimmer for zero beating to WWW • Switch selects 100, 50, 25 KHz or OFF
- 2-3/16 x 3-1/4 x 4 inches



\$ 49⁹⁵

MFJ-1030BX Receiver Preselector

Clearly copy weak unreadable signals (increases signal 3 to 5 "S" units).

- More than 20 dB low noise gain • Separate input and output tuning controls give maximum gain and RF selectivity to significantly reject out-of-band signals and reduce image responses
- Dual gate MOS FET for low noise, strong signal handling abilities • Completely stable • Optimized for 10 thru 30 MHz • 9 V battery
- 2-1/8 x 3-5/8 x 5-9/16 inches



\$ 27⁹⁵

MFJ-40T QRP Transmitter

Work the world with 5 watts on 40 Meter CW.

- No tuning • Matches 50 ohm load • Clean output with low harmonic content • Power amplifier transistor protected against burnout
- Switch selects 3 crystals or VFO input • 12 VDC • 2-3/16 x 3-1/4 x 4 inches

MFJ-40V, Companion VFO \$27.95

MFJ-12DC, IC Regulated Power Supply, 1 amp, 12 VDC \$27.95



\$ 15⁹⁵

NEW

CPO-555 Code Oscillator

For the Newcomer to learn the Morse code.

For the Old Timer to polish his fist.
For the Code Instructor to teach his classes.

- Send crisp clear code with plenty of volume for classroom use • Self contained speaker, volume, tone controls, aluminum cabinet • 9 V battery • Top quality U.S. construction • Uses 555 IC timer • 2-3/16 x 3-1/4 x 4 Inches

TK-555, Optional Telegraph Key \$1.95

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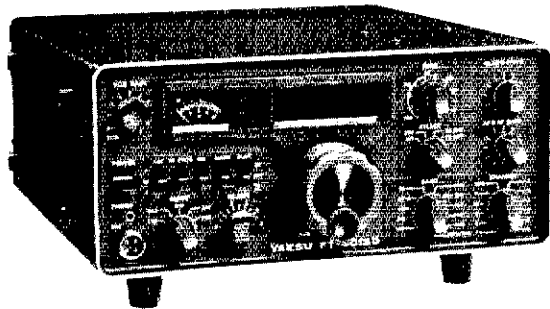
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Analog Dial-20 Watts PEP

OR



FT-301SD
Digital Dial-20 Watts PEP

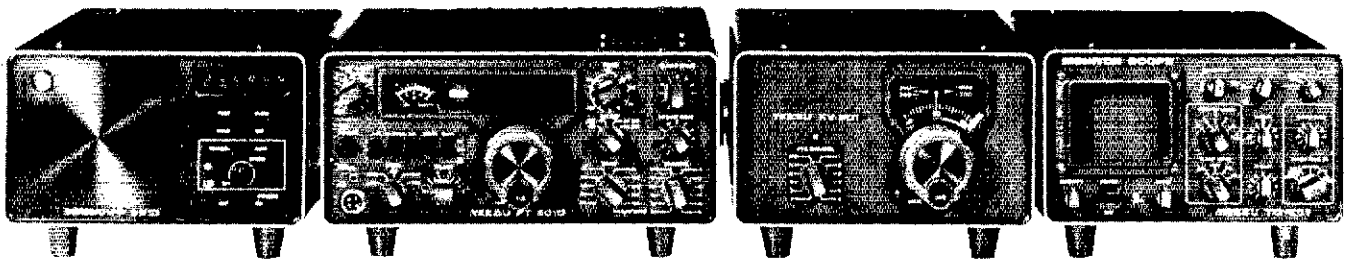


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200 Watts Output-Power When You Need It

CUT YOUR ELECTRICITY BILL!

Do your part in Uncle Sam's energy conservation program. Obey FCC rules that tell you not to run more power than is needed. But when the going gets tough, switch in the linear!

Yaesu's Deluxe Accessories Complete Your Station



Shown above: Deluxe Power Supply/Speaker/Digital Clock and Programmable CW Identifier
• FT-301SD Transceiver • External VFO • Monitorscope

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TR-7500



KENWOOD'S NEW PLL SYNTHESIZED 2-METER FM TRANSCEIVER

- 146 to 148 MHz
- 100 channels (83 preprogrammed)
- 12 extra diode-programmable channels
- ± 600 KHz offset for repeater operation
- 15 KHz split channel offset
- Digital frequency readout
- 10 watts (1 watt to-power)
- Compact and dependable

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