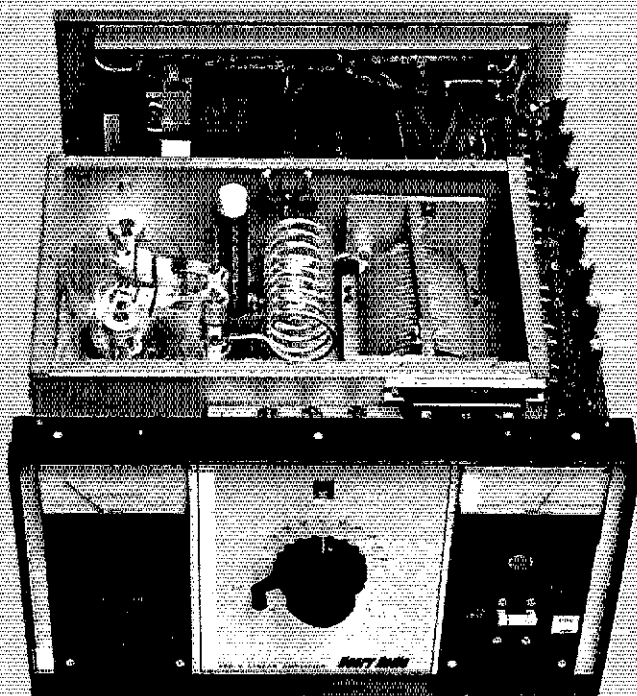


Before you buy an amplifier



Lift the Lid

Before you invest your hard earned money in a linear amplifier, consider what's inside. That's where the difference in quality is obvious. No lightweight, cheaply built components... In Henry amplifiers you will find only the best quality, heavy duty components. We build our amplifiers to perform at peak level month after month, year after year. Both the 2KD-5 and the 2K-4 will operate full legal power continuous duty on all modes. We offer the amateur the linear amplifier that we would want in our own stations.

At Henry Radio we know how to build only one kind of amplifier... the best!

2KD-5 GENERAL SPECIFICATIONS:

- * The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands.
- * Two Eimac 3-500Z glass envelope triodes operating in a grounded grid circuit.
- * 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 15 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...\$1095.00

TEMPO 6N2 brings the same high standards to the 6 and 2 meter bands. A pair of advanced design Eimac 8874 tubes provide 2,000 watts PEP input on SSB or 1,000 watts on FM or CW. Complete with self-contained solid state power supply, blower and RF relative power indicator. ...\$895.00

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.
Tempo 130A02	2W	130W	\$199.
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

Henry Radio also 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.

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

please call or write for complete information

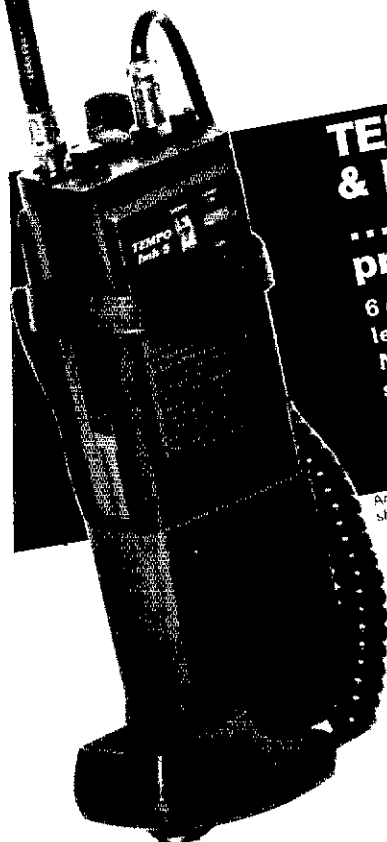
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 931 N. Euclid, Anaheim, Calif. 92801 714/772-9200
 Butler, Missouri 64730 816/679-3122

Prices subject to change without notice

All of the above except the 6N2, 2002, and 2006 are available at Tempo dealers throughout the U.S.

TEMPO ... still the best value in quality 2-meter equipment



TEMPO FMH-2, FMH-5 & FMH-42 (UHF)
... portables you can depend on at a price you can afford

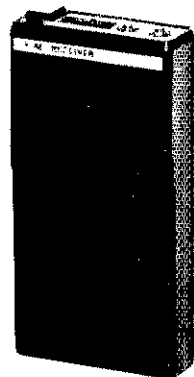
6 channel capability • selectable 1 or 2 - 1 or 5 Watts output (VHF) • Solid-state • Battery level meter • Earphone jack • Built-in charging terminals and separate charging jack for Ni-cad batteries • Flex antenna • Carrying case standard • Excellent frequency stability allows use with booster amplifier for high power output over 100 Watts • External microphone capability • 8 AA batteries or 10 AA Ni-cads.*
 *Batteries not furnished
 FCC Type accepted models available.

Accessory holder shown

TEMPO POCKET RECEIVERS

Low priced, dependable and the most compact receivers available

MS-2, 4 channel scanning receiver for VHF high band, smallest unit on the market. MR-2 same size as MS-2 but has manual selection of 12 channels. VHF high band. MR-3, miniature 2-channel VHF high band monitor or paging receiver. MR-3U, single channel on the 400 to 512 UHF band. All are low priced and dependable. Now available with accessory CTCSS and 2-tone decoders.



TEMPO VHF & UHF solid state power amplifiers

Boost your signal... give it the range and clarity of a higher powered base station.

VHF (135 to 175 MHz)

Drive Power	Output	Model No.	Price
2W	130W	130A02	\$199
10W	130W	130A10	\$179
30W	130W	130A30	\$189
2W	80W	80A02	\$169
10W	80W	80A10	\$149
30W	80W	80A30	\$159

UHF (400 to 512 MHz)

Drive Power	Output	Model No.	Price
2W	70W	70D02	\$270
10W	70W	70D10	\$250
30W	70W	70D30	\$210
2W	40W	40D02	\$180
10W	40W	40D10	\$145
2W	10W	10D02	\$125

Lower power and FCC type accepted models also available



TEMPO FMT-2 & FMT-42 (UHF)

An exciting approach to mobile communication

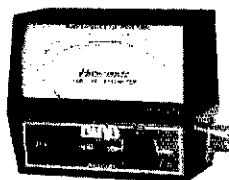
Compact transceivers offering versatility and performance. Supplied with an unbreakable remote control head for hide-away mounting in mobile use and to provide a small neat package for base applications. 6 channel capability with one supplied. A hand-held PTT microphone and 20 foot cable supplied. 2 watt power output for low current, low power applications, but designed for output up to 120 watts on VHF, and up to 100 watts on UHF. With AC power supply becomes a base station with 120 watts VHF or 100 watts UHF.



TEMPO VHF/ONE PLUS

Still the best buy in a mobile transceiver... compare features... compare prices.

Full 2 meter coverage, 144 to 148 MHz for both transmit and receive • 25 watts or low power output selectable • Remote tuning on microphone • Sideband operation with SSB/ONE adapter • MARS operation capability • 5 kHz numerical LED • Full phase lock synthesized (PLL) • Automatic repeater split-selectable up or down • Two built-in programmable channels • All solid state • 800 selectable receive frequencies with simplex and ± 600 kHz transmit frequencies for each receive channel. Still only \$399.



BIRD Model 4362 Thruline Wattmeter

... the perfect accessory for any 2-meter operation. Bird directional wattmeters are insertion type instruments for measuring forward or reflected power in 50-ohm coaxial transmission lines. \$94.00.

HF model 4360 (\$94.00) and a complete line of BIRD products also available.

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The ICOM LSI System



COMPATABILITY IS THE KEY TO SUCCESS

Owning an ICOM LSI radio is a true pleasure for anyone in Ham Radio. Putting two of them side by side in a matching station certainly more than doubles the pleasure and performance. The compatible styling of the **IC-211** and **IC-701** provides an operating station which is a beauty to look at as well as a joy to operate. The compactness of the units and the similarity of controls and switch layout help to take the confusion out of knowing which knob to turn. Microphones and other accessories are also compatible with both radios, such as the **RM-2** remote microprocessor frequency controller, shown above.

When used with the **IC-211** or **IC-701** (or **IC-245**, for that matter), the **RM-2** provides memory and frequency control, including automatic band change and memories for four different frequencies, plus auto-increment or single step tuning in 100 Hz, 1 KHz or 15 KHz steps. The **RM-2** also provides automatic offset for repeater operation when used with the **IC-211** or **IC-245**. The tone generator accommodates operation of telephone type devices or a two-tone signal for an external amp that needs to be tuned. (Naturally there is no tuning needed on an **IC-211** or **IC-701**.)

No one could ask for a better Oscar station than the **IC-211** and **IC-701** together for "mode A"; and adding a transverter to the **IC-701** mode B or mode J opens newer, better satellite horizons. Within the ICOM LSI based radios there is the capacity for the technically minded Amateur to tune one radio of the pair with the VFO knob of the other. (Oscar transceive, anyone?) In addition, the LSI lends itself to being controlled by a parallel port on one of the increasing number of microprocessors now available for Amateur use.

The complexity of features built into these ICOM LSI twins will be used for a long time into the future. The possibilities are so numerous that even we have not thought of all of them yet.

All ICOM radios significantly exceed FCC specifications limiting spurious emissions.

Shown left to right: **IC-211**, multi-mode 4MHz txrxr; **RM-2**, remote microprocessor; **IC-701**, multi-mode HF txrxr; **IC-701PS**, power supply / speaker.

HF/VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

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THE COVER

All roads lead to the ARRL National. See page 47.



Contents

Technical

- 11 A 2-Meter Frequency Synthesizer *David Gray, WB8ZBA*
- 16 Transmitter Design — Emphasis on Anatomy, Part 4 *Doug DeMaw, W1FB*
- 18 Simple Ladder I-F Filter
- 19 The Audiobox — An Amplifier with a Twist *Eric J. Grabowski, WA8HEB*
- 22 Updating Phased-Array Technology *Dana W. Atchley, Jr., W1CF*
- 28 A Programmable Regulated Power Supply *John Bipes, KØYQX*

Basic Amateur Radio

- 26 Antennas — Keeping Them Up *E. W. Ljongquist, W4DWK/W1CQS*

General

- 37 Amateur Radio Shines Through the Blizzard Blitz of '78
Stan Horzepa, WA1LOU
- 40 CQ Ham Radio *Charles J. Harris, WB2CHO*
- 42 What's So Rare as a QST from 1915? *Nell D. Friedman, N3DF*

Operating

- 65 September VHF QSO Party
- 66 Revised Club Competition Rules
- 67 Results, 1978 Novice Roundup *Bill Jennings, K1WJ*

Organizational and Regulatory

- 9 Those FCC Exams
- 47 San Diego, Here I Come *Sybil Albright, W6GIC*
- 49 ARRL Testifies in Support of Goldwater RFI Bill
- 53 Amateur Radio in Pakistan

Departments

- 46 Canadian NewsFronts
- 56 Club Notes
- 54 Coming Conventions
- 44 Correspondence
- 45 Feedback
- 54 Hamfest Calendar
- 49 Happenings
- 31 Hints & Kinks
- 57 How's DX?
- 166 Index of Advertisers
- 53 International News
- 9 It Seems to Us
- 10 League Lines
- 73 Operating Events
- 71 Operating News
- 72 OSCAR Operating Schedule
- 33 Product Review
- 63 Public Service
- 59 QSL Corner
- 56 Silent Keys
- 75 Station Activities
- 61 The World Above 50 MHz
- 52 YL News and Views
- 56 50 & 25 Years Ago

The evolution of the MLA

When the MLA-2500 was first introduced it was a new concept in high performance amplifiers. Low and sleek yet powerful enough for the military. Some wondered . . . needlessly.

A promise kept.

The MLA-2500 promised 2000 watts PEP input on SSB. A heavy duty power supply. Two Eimac 8875's. And as thousands of Amateurs across the world have proven, the MLA-2500 delivers!

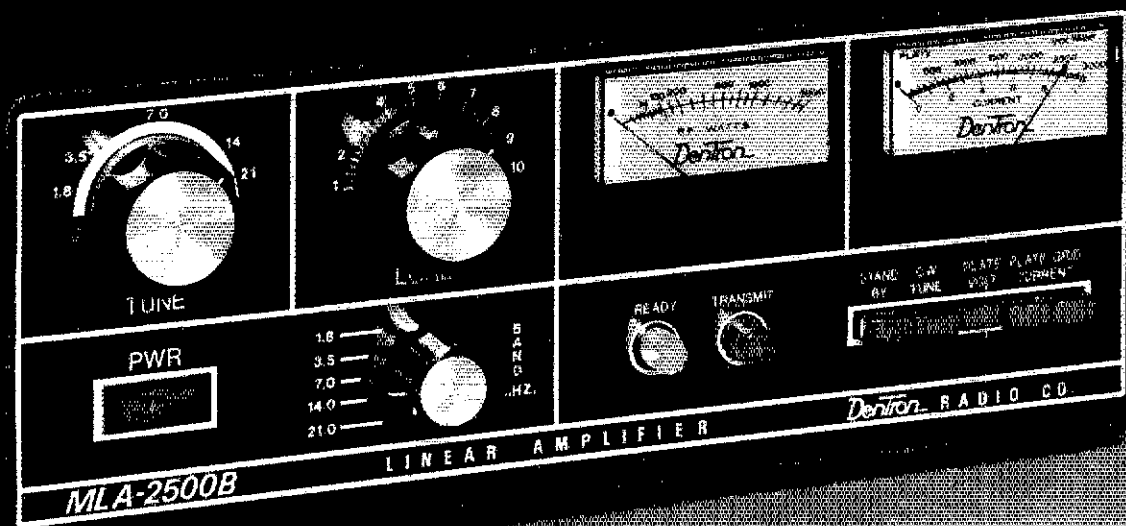
Now DenTron is pleased to bring you **The new MLA-2500 B.** Inherently the same as the original MLA-2500, the B model includes all of the above specifications plus a few refinements. New high-low power switching for consistent efficiency at both the 1KW and 2KW power levels, and 160 - 15 meters.

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What better test for an amplifier than the Clipperton DXpedition? Even after 32,000 QSO's, and an accidental dunk in the ocean, the same 3 MLA-2500's are still amplifying other rare DXpeditions around the world — listen for them.

Convinced? Isn't it time you owned the amplifier that powered Clipperton and thousands upon thousands of radio stations throughout the world?

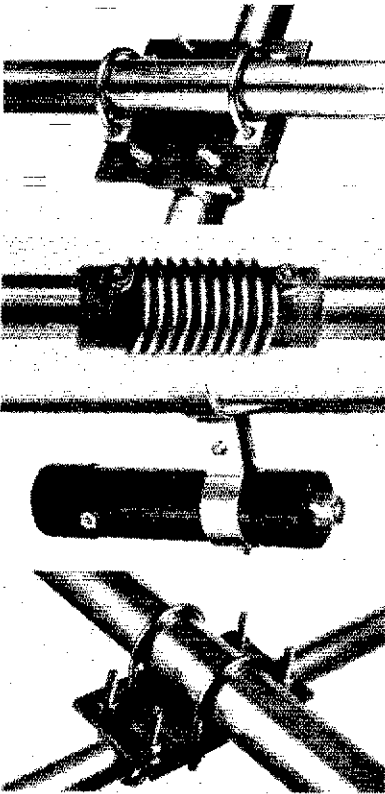
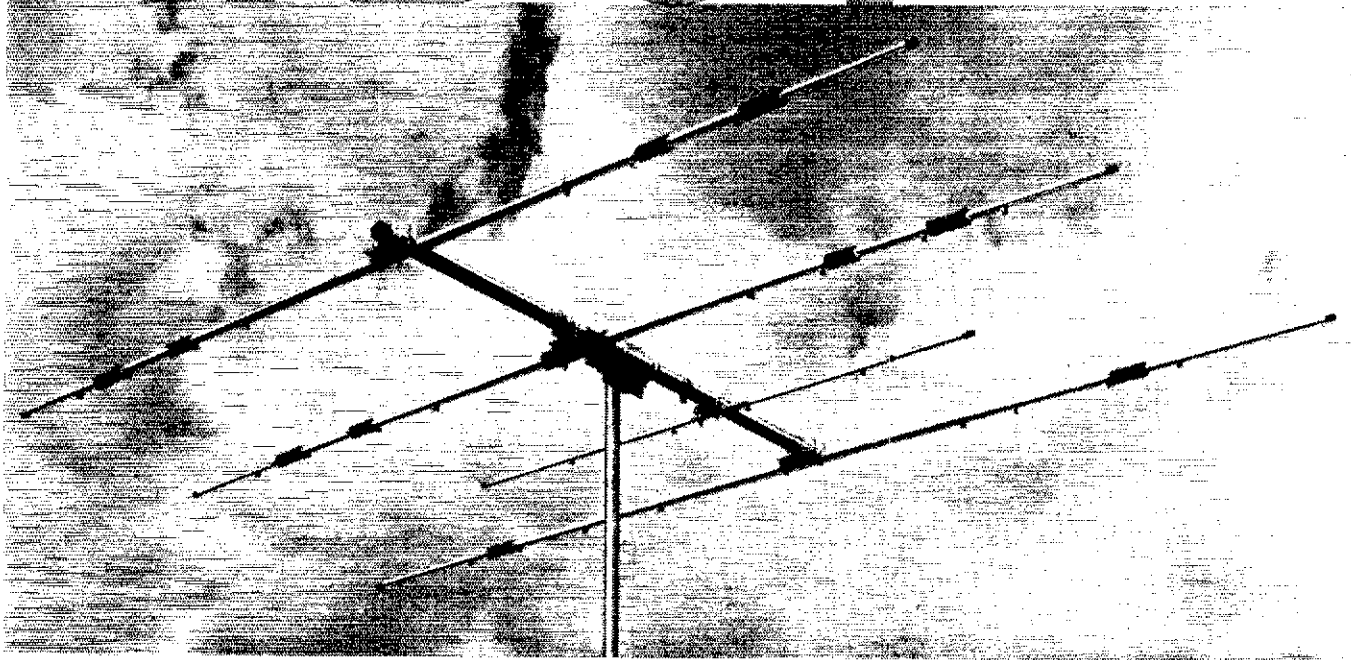
MLA-2500 B \$899.50.



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ATB-34



4 ELEMENT-3 BAND 10-15-20 METER BEAM

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Enjoy a new world of DX communications with ATB-34!

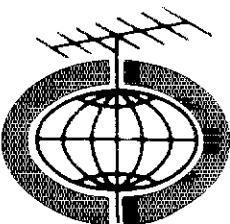
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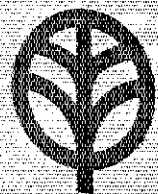
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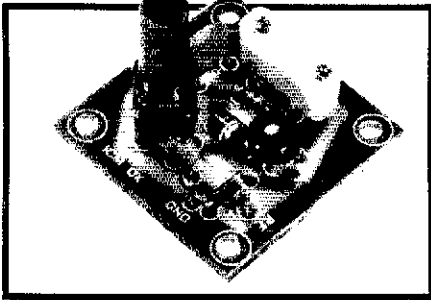
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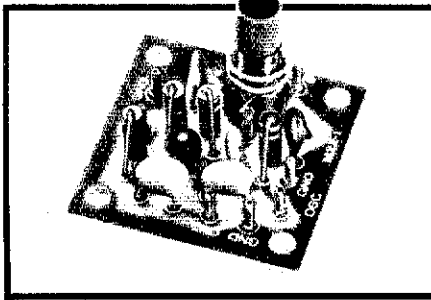


OX OSCILLATOR

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.

\$4.95 ea.

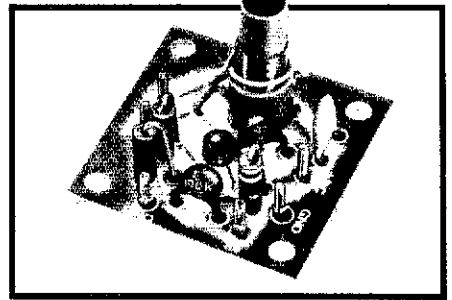


MXX-1 TRANSISTOR RF MIXER

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.

\$5.50 ea.

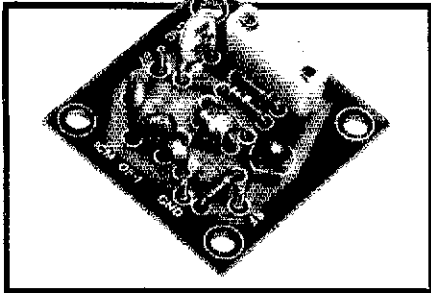


PAX-1 TRANSISTOR RF POWER AMP

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.

\$5.75 ea.

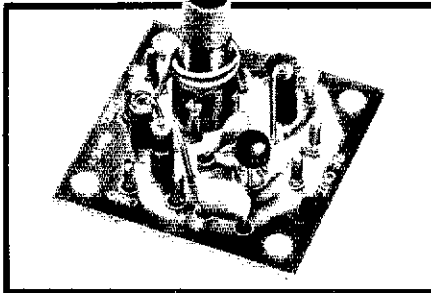


OF-1 OSCILLATOR

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.

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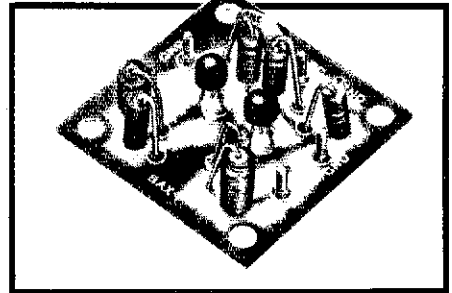


SAX-1 TRANSISTOR RF AMP

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.

\$5.50 ea.



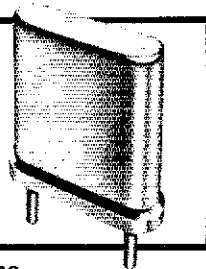
BAX-1 BROADBAND AMP

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.

\$5.75 ea.

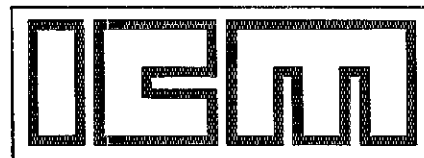
.02% Calibration Tolerance
EXPERIMENTER CRYSTALS
 (HC 6/U Holder)



Cat. No.	Specifications	
031080	3 to 20 MHz — for use in OX OSC Lo	
	<i>Specify when ordering</i>	\$5.95 ea.
031081	20 to 60 MHz — For use in OX OSC Hi	
	<i>Specify when ordering</i>	\$5.95 ea.
031300	3 to 20 MHz — For use in OF-1L OSC	
	<i>Specify when ordering</i>	\$4.75 ea.
031310	20 to 60 MHz — For use in OF-1H OSC	
	<i>Specify when ordering</i>	\$4.75 ea.

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Those FCC Exams

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

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

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

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

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Hardly a day goes by that Headquarters doesn't receive a complaint about the content of the present FCC amateur examinations. From Novice right up to Extra, license applicants perceive that the exams suffer from a variety of ills. Sometimes the complaint is about the study material provided by the League. More often, the problem is seen to be with the test itself. With upwards of 100,000 FCC exams to be given this year, far more than any previous year, this is a serious problem affecting the Amateur Radio Service as a whole as well as the individuals who are trying to enter our ranks or to upgrade. Well-prepared applicants are failing exams for reasons that have nothing to do with their qualifications, and some are sufficiently frustrated by the experience to drop out of amateur radio all together. What's at the root of this problem, and what can be done about it?

The story begins several years ago, when the Commission staff undertook a long-overdue revision of the study guides for the amateur exams. At that time, the decision was made to change the format of the study guide, which was a series of sample questions of the type and difficulty one could expect to see on the exam. The new format was a syllabus that simply defined, in outline form, the scope of the material the prospective applicant should study. One reason for the change was to make it more difficult to memorize one's way past the exams.

The Commission released the new study guides early in 1976. New exams based on the new study guides were to be in use in a year or less. Thus, the writing of all-new study material, based on the new guides, became a top-priority project at Headquarters. *Tune in the World* was written with the objective of providing, in one package, everything needed to pass the Novice exam and be an effective operator on the air. The *License Manual* was rewritten with much the same objective in mind for the other exams. We were committed to providing readable, understandable material which would promote comprehension, not memorization. Compatible instructor materials also were prepared. It was a big job, and we were justifiably proud of our efforts when it was completed.

Then the problems began. First, it took months longer than expected for the exams to be revised; in fact, despite assurances given by the Commission staff last November that the new Advanced and

Extra exams would be in use early in 1978, at this writing they are *still* not in circulation. Then, it became apparent that questions based on the General syllabus were appearing on the Novice exam, and other questions required a knowledge of details which few Novices would ever need to know in actual operation. These were added to the chronic FCC problems of typographical errors on the tests, questions made obsolete by changes in the regulations, and questions which measure English comprehension and test-taking ability more than knowledge of the subject.

Now, as to what can be done about it. As usual, the problem is not that the Commission staff lacks the desire or the will to do the best possible job. It's more a lack of resources, particularly personnel. The more the Commission's Personal Radio Division hears about exam problems, the higher the priority which will be placed on solving them. So, write: Personal Radio Division, FCC, Washington, DC 20554.

What's the League doing? In addition to providing reassurance to frustrated instructors and students in the Training Program, we are making suggestions to the Commission staff on how to structure study guides and tests around specific behavioral objectives, based on current research in testing psychology and education. After all, a test is not supposed to gauge your ability to figure out a convoluted multiple-choice question. Permitting a panel of educators to review the tests before they go to the printer would help immensely.

One thing we would be very reluctant to do is to modify the Training Program to "teach to the exam" instead of teaching for comprehension. The whole concept of the Training Program is to increase the number of amateurs without compromising quality, and we're proud of the speed with which its graduates have entered the mainstream of amateur radio and have upgraded. We like to think that the firm foundation provided by the Training Program has a lot to do with it.

The situation isn't hopeless, by any means. Just a couple of months ago the Commission took a much-desired step to improve its exam program, by granting "element credit" to applicants who pass the code test but fail the written. Further improvements are sure to come — and the harder we press for them, the sooner they'll come. — *K1CD and K1ZZ*

League Lines...

On June 28 the FCC denied the petitions for reconsideration of the 10 meter amplifier ban filed by the League and several other parties. Arguments opposed to the ban were presented to the Commission by the Safety and Special Radio Services Bureau and the Office of the Chief Engineer. The Field Operations Bureau spoke in support of the ban. Commissioner White reiterated her earlier opinion that the ban was regulatory overkill for cosmetic purposes. More details in "Happenings" next month.

FMT buffs please note. Space was tight this issue so look for the May 12 FMT results in September. A reminder, too, that the next FMT is scheduled for Sept. 17. Rules in Op Events, this issue.

Anyone interested in volunteering to be an Official OSCAR Educational Bulletin Station (transmitting bulletins through OSCAR on Mode A) contact OSCAR Education, ARRL Hq.

How to keep track of all the old and new prefixes? That's the problem with the ARRL "dupe sheet" (CD-77). The best idea for a new format, one inexpensive to reproduce, will earn someone a 1979 Handbook, autographed by the hams in the CD (Communications Dept.).

The Eleventh Commonwealth Games DX Award may be earned for contacts made during 1978. Points are based on contacts with CG6A, Commonwealth country stations, and Edmonton, AB stations using the CG6 prefix. Full details from Box 163, Edmonton, AB, Canada. Remember: The Eleventh Commonwealth Games take place August 1-12.

If you hear strange signals between 29.0 and 29.3 MHz during the next two years -- don't panic. In response to a request submitted by ARRL General Manager Richard L. Baldwin, WIRU, the FCC has waived Section 97.65(d) of its Rules to permit five specific amateur stations to conduct A5 and F5 transmissions on the above frequency subband with an occupied bandwidth not to exceed 36 kHz. The five amateurs granted waivers are Don Miller, W9NTP (ARRL Central Division director); Robert Stone, W3EFG; Robert Suding, W0LMD; Michael Tallent, W6MXV; and George Steber, WB9LVI.

Field Day was one of the best ever! W8TN and WD8CPN noticed an airplane circling a small airstrip near their FD site (Ravenswood, WV) about 3 in the morning. Thinking quickly, they placed cars at each end of the runway enabling the "twin Beech" to land safely.

The ARRL-organized technical session (No. 31) at IEEE ELECTRO/78 (Boston) placed 9th in the ratings of the 36 sessions held. Special thanks for our success goes to speakers Dana Atchley (WICF), Merle Hoover (W3TLH), Ed Oxner (ex-W9PRZ) and Doug DeMaw (WIFB).

Through September 30, 1978, W6IRT, North Hollywood, CA will be operating a low power cw beacon on 28.888 MHz. Monthly reception reports should be sent to Norm Lefcourt, W6IRT, 7713 Wilkinson, North Hollywood, CA 91605. A complete list of DX beacons appeared in "How's DX?" June QST.

Etching patterns for QST projects are now appearing in solid black, shown from the foil side of the board. This change from our previous style of presentation will allow direct photographic methods to be used for making your own boards, and will simplify proper location of components. For darkroom or photocopying convenience all patterns for one issue will be grouped in the "Hints and Kinks" section, unless there's just one pattern for that issue. In that case the pattern will appear with the article (see page 21 of this issue).

ARRL Club and Training Dept. is cataloging courses in Amateur Radio by zip code. Students needing instructors or instructors needing students are invited to contact C & T.

U.S. amateurs are now permitted to conduct third party traffic with WD5AIE/SU in the Sinai Field Mission.

A 2-Meter Frequency Synthesizer

Use one inexpensive "CB" chip and build this portable synthesizer for your 2-meter fm rig.

By David Gray,* WB8ZBA

I wanted an *inexpensive* synthesizer for my Drake TR-33C fm rig and I expect I'm not alone. I work as a two-way radio technician and thought one of the many CB PLL chips might fill the bill. The Uniden UPD858 PLL turned out to be the easiest to use. This chip was designed for and can be found in many 40-channel CB sets. I built a synthesizer around it for less than \$50.

Frequencies for the Drake TR-33C are easy to synthesize. The Drake triples the output of the synthesizer on receive and it adds either 10.7 MHz (simplex), 10.1 MHz (-600 kHz) or 11.3 MHz (+600 kHz) on transmit. Hence, much of the synthesizing is built-in before we begin. The size of the unit constructed for the TR-33C is only 1.25 x 4.5 x 3 inches (32 x 114 x 76 mm).

Synthesizer Circuitry

As Fig. 1 illustrates, the synthesizer is

simple and all digital circuitry is on one chip. In addition, all the "garbage" (spurious harmonics from the counting waveforms) stays in the chip, where it belongs. This CMOS chip draws about 5 mA and the *entire* synthesizer draws only 10 mA. The pin-out of the chip is shown in Fig. 2.

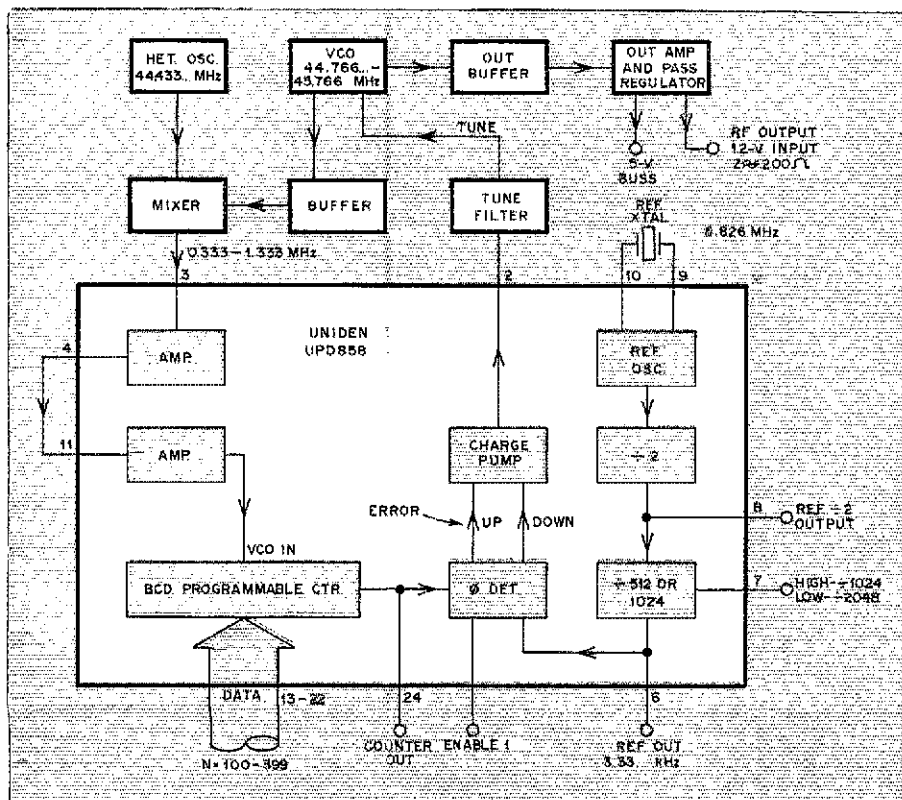
Basic range of the unit is 144.5 to 148.0 MHz in 5-kHz steps. If desired, the heterodyne oscillator can be pulled with a varactor diode to add continuous coverage.

The interface circuit senses a dc level available on the TR-33C "Channel 12" crystal socket to turn on the synthesizer automatically. Tuning voltage on the VCO is about 0.2 to 4 volts. The emitter-follower buffers isolate the VCO, while an FET mixer helps keep the VCO output clean with its high-impedance input.

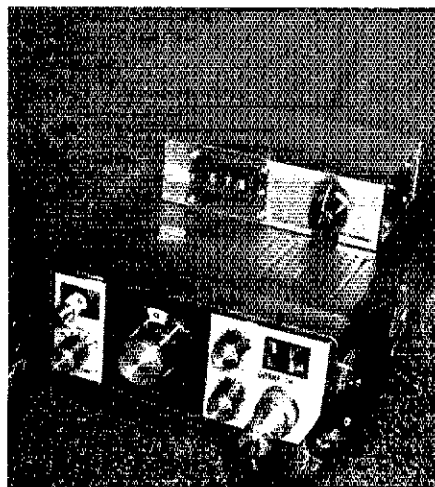
The VCO operates 0.1666 to 1.333

*732 Market St. Rear, Wheeling, WV 26003

Fig. 1 — Block diagram of the inexpensive synthesizer.



Size of the author's homemade synthesizer may be seen in comparison to the 2-meter transceiver.



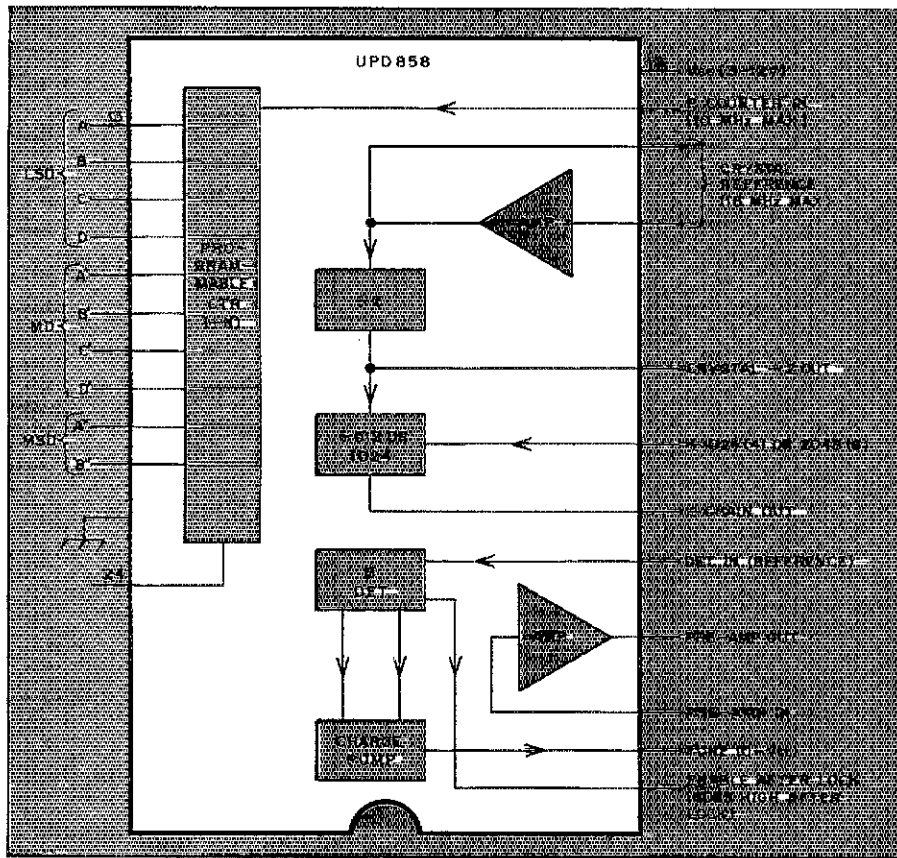


Fig. 2 — Logic diagram and pin connections of the Uniden UPD858 "CB" integrated circuit.

MHz higher than the heterodyne oscillator, and it is this difference which is counted by the chip. It is important to note that the VCO must not operate too close to the frequency of the heterodyne oscillator or the VCO may drift toward the other side of zero beat. If that happens the PLL will stay out of lock. For that reason T1 (which is shielded to keep out unwanted rf) is adjusted during alignment.

The 6.82666-MHz crystal is divided by 2048 to provide the 3.333 kHz reference. (This is 10 kHz divided by three.) Then the programmable counter multiplies this by 50 to 400, which results in 0.1666 to 1.333 MHz. This range of frequencies is added to the heterodyne oscillator at 44.4333 MHz to produce the output 44.6 to 45.7666 MHz. The TR-33C multiplies the output by three on receive to cover 133.8 to 137.3 MHz. Add the 10.7 MHz

i-f to this and the TR-33C will receive on 144.5 to 148.0 MHz in 5-kHz steps.

The chip inputs are diode protected against static electricity, but as an extra precaution a 6-V Zener diode is added from pin 12 to ground. The FET is also diode protected but grounding the soldering iron tip to the ground bus of the circuit is still recommended when soldering to it or the chip.

Construction

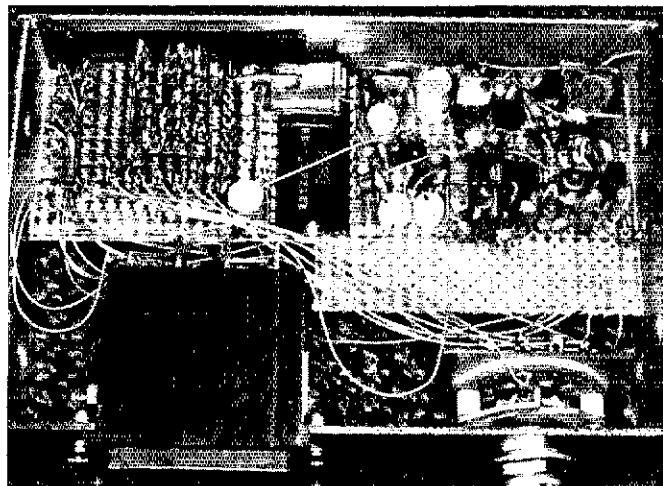
Either printed circuit or perforated-board construction may be used for the synthesizer. The only important precaution to observe is to keep the heterodyne oscillator shielded from the VCO and its amplifiers. An excellent groundplane is maintained by making several interconnecting ground loops on the board around the VCO and other stages, as shown in Fig. 3. A good policy is to surround each stage with a loop. The entire heterodyne oscillator should be isolated with its own ground loop connected to the rest of the circuit *only* near the mixer stage.

It is important to shield the two coils in the heterodyne oscillator to prevent inductive coupling in the other loops. Refer to the pictures of the circuit layout. Candle wax on the VCO transformer T1 eliminates microphonics.

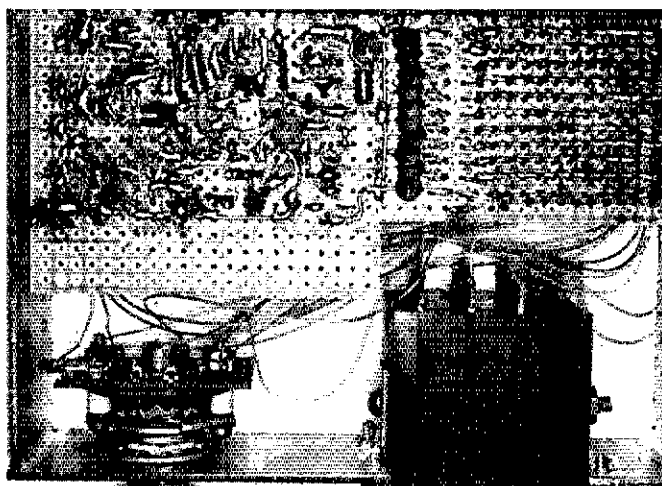
The circuit layout was developed on a large piece of perforated board and the excess board was trimmed off. It is worth mentioning that the circuit was operated with the TR-33C and no shielding before the pc box was ever built. No rf interference was noted even when using the built-in whip antenna on the TR-33C.

Molex connectors are used for the data rows in the diode matrix to make it easier to change frequencies in the matrix. Leave the top bars on the connectors and put a piece of tape between each row. The binary-coded decimal (BCD) input data code is simple . . . for a frequency of 144.5 MHz enter 050 to the programmable

Construction layout of the inexpensive synthesizer. The diode matrix is at the upper left. Note the copper foil shield around the heterodyne oscillator circuitry, right center.



Interior bottom view of the synthesizer. The diode matrix is at the upper right.



counter in the chip (0000 0101 0000). For 147.99 MHz enter 399 (0011 1001 1001). The 5-kHz data line is available in the diode matrix and selector switch. Fig. 4 shows the wiring of the diode matrix to the synthesizer chip, and Fig. 5 is the schematic of the complete synthesizer.

Alignment of the Synthesizer

Tune-up is initiated by setting all trimmers to middle range. Then set the thumbwheel switches to 144.50 MHz and adjust T1 for 0.25 V at pin 2 of the UPD858. Connect a frequency counter to pin 8 and adjust the reference oscillator to 3.4133 MHz. Then connect the counter to the transceiver output through a 0.01- μ F capacitor to block the 12 volts. Set the thumbwheel switches to 146.00 and adjust the "0-kHz" trimmer on the heterodyne oscillator for a frequency of 45.1 MHz. Then dial up 146.005 MHz and adjust the +5 kHz trimmer for 45.101666 MHz. Repeat these last two adjustments as they may interact.

Interface for the TR-33C

The interface circuit, Fig. 6, is built on perf board and tucked above the selector switch. It allows automatic switching of power to the synthesizer so it is off when crystal control is used.

The TR-33C output is clean, with only one spurious response from the heterodyne oscillator, down 68 dB. No problems were noted while operating mobile or from an unregulated power supply. The extra jack in the back of the TR-33C makes the synthesizer easy to connect. The coaxial line from the synthesizer to the crystal compartment is made from RG-174/U, with the center conductor pulled out. Substituting a length of no. 28 wire-wrap wire makes the impedance of the coaxial line about 200 ohms.

Getting the Parts

The PLL chip can be ordered from New Tone Electronics, P. O. Box 1738A, Bloomfield, NJ 07003. The thumbwheel switches, perf board, capacitors, 1/4-watt resistors and Molex connectors can be ordered from James Electronics, P. O. Box 822, Belmont, CA 94022. Cost of the PLL chip, thumbwheel switches and crystals is about \$35.

Adapting to Other Transceivers

Frequencies for the TR-33C are indeed easy to synthesize, and this is true also for most other transceivers. Fig. 7 illustrates a circuit to add to the original synthesizer which permits it to be used with the Drake TR-22 and radios such as the Heath HW-202 and surplus commercial rigs. The additional circuit can be placed on the same board as the synthesizer. One additional coaxial line is required for receive and one for transmit. Full switching is employed to route power only to where it is needed so that excessive battery drain is

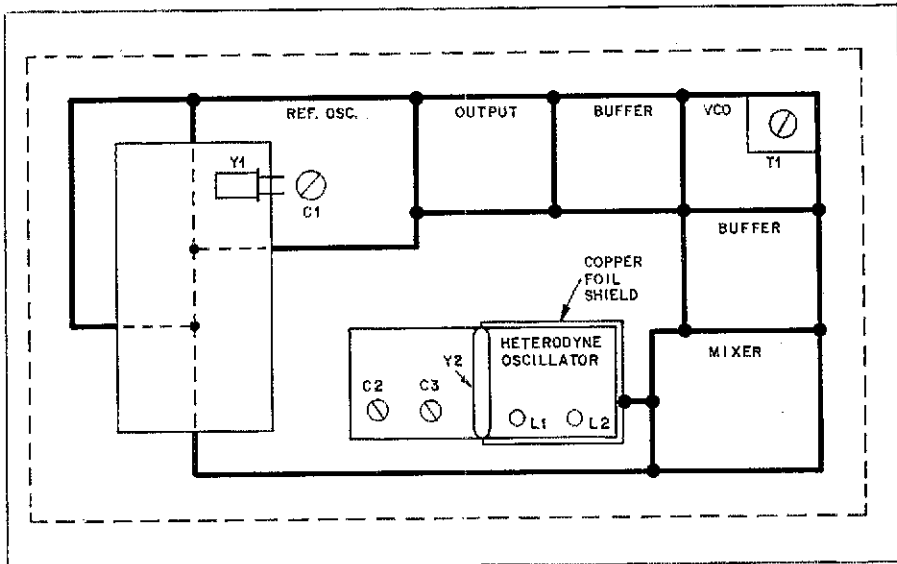
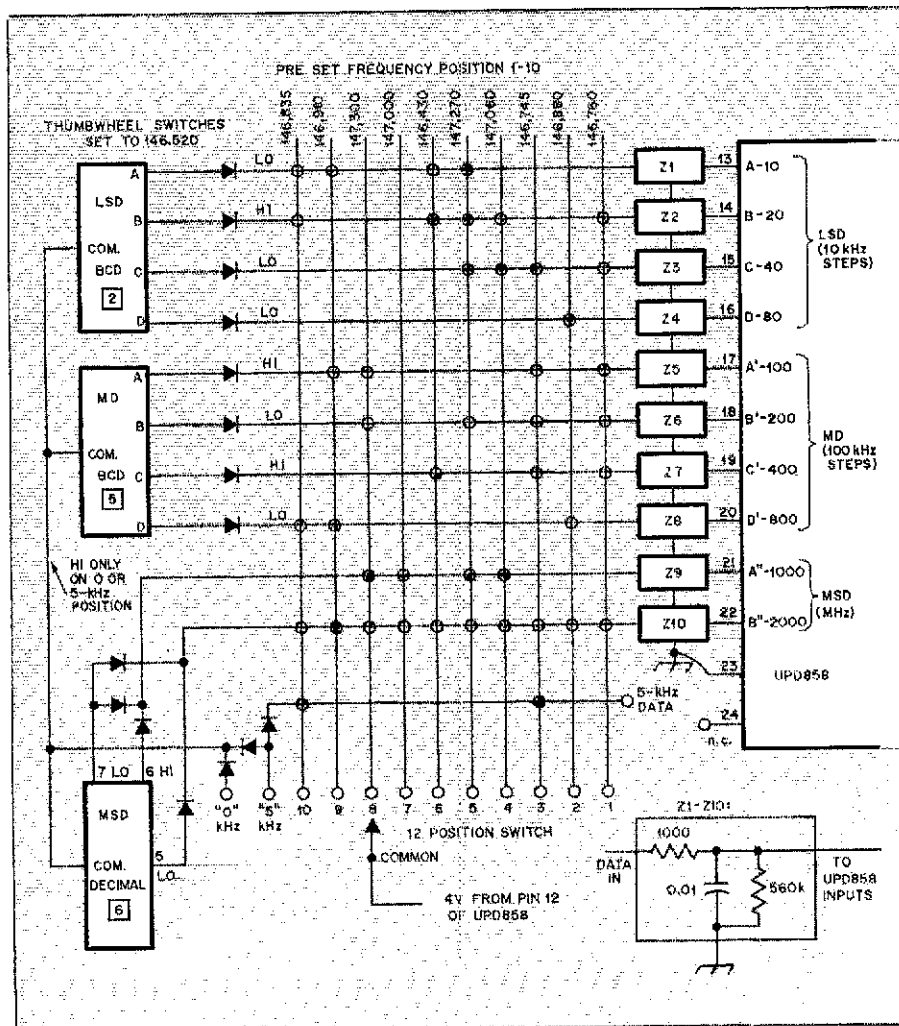


Fig. 3 — The grounding system used when constructing the synthesizer on perforated board.

Fig. 4 — Wiring of the diode matrix and thumbwheel switches to load the UPD858. The switch labeled MSD is a decimal-output-configured switch. The other two thumbwheel switches are BCD-configured types. The circles around crossed lines indicate where a plugged-in diode is inserted, cathode on horizontal lines and anode on vertical lines. Diodes may be any silicon switching diodes. The preset frequencies shown are for illustration purposes only.



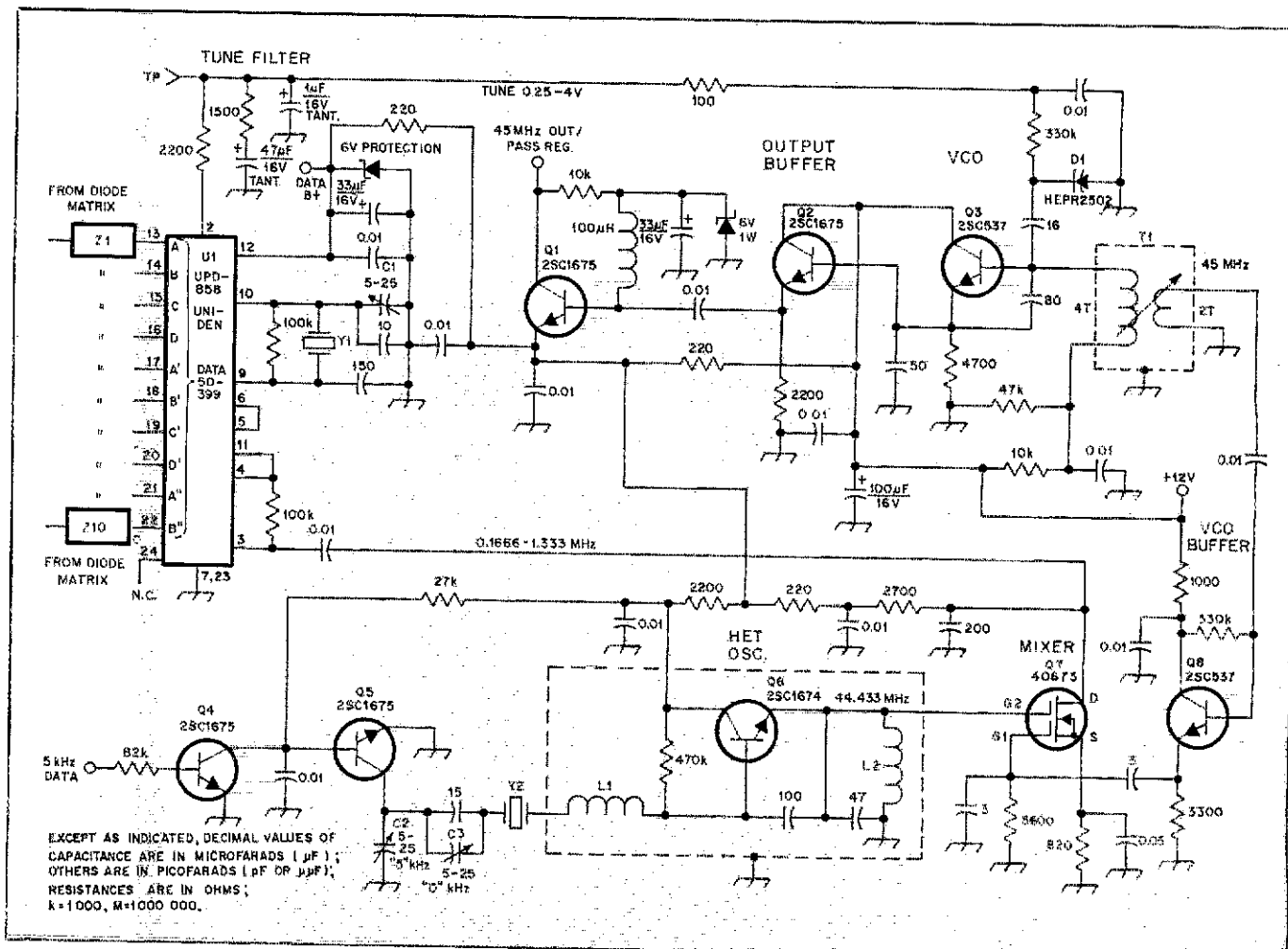


Fig. 5 — Schematic diagram of the synthesizer. Pin numbers not shown on ICs are not connected. Fixed resistors may be 1/4 or 1/2 watt.

D1 — Varactor-type diode, Motorola HEP R2505 or equiv.
 L1, L2 — Inductor, 0.66 μH ; 22 turns no. 28 enam. wire wound on form made from center insulation taken from RG-59/U.
 Q1, Q2, Q4, Q5 — Npn silicon small-signal transistor, 2SC1675 or HEP S0015.
 Q3, Q8 — Npn silicon small-signal transistor, 2SC537 or HEP S0016.
 Q6 — Npn silicon small-signal transistor, 2SC1674 or HEP S0010.
 Q7 — MOSFET, RCA 40673 or HEP F0024.
 T1 — Rf transformer, pri. 4 turns, sec. 2 turns, no. 28 enam. wire wound on 10.7-MHz i-f transformer core.
 U1 — Uniden UPD858.
 Y1 — 6.82666-MHz crystal, parallel resonance, 24-pF load.
 Y2 — 44.4333-MHz crystal, series resonance, 0.0025 percent. (Crystal for listening to 33.733 MHz on Fanon Scanfare VHFHL Scanner may be used.)

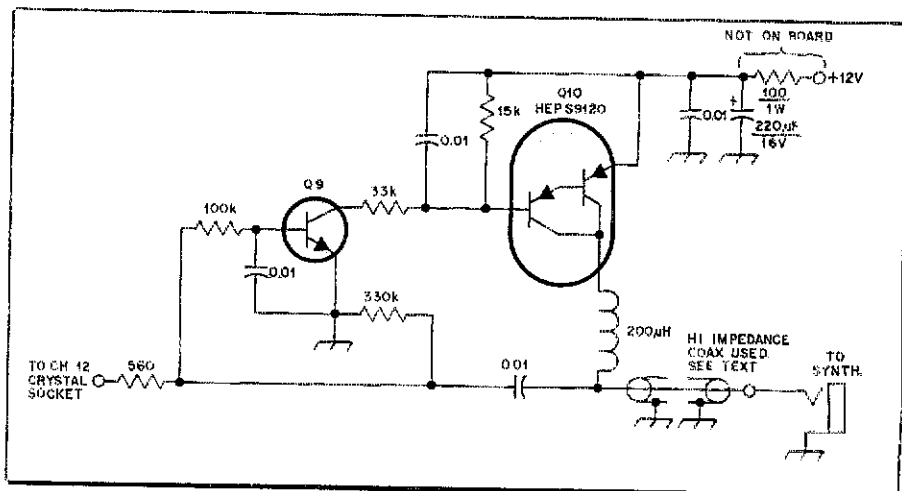
avoided. Two thumbwheel switch banks are used for transmit and receive so that any offset may be used. Most all rigs use the same receive frequency: $(f - 10.7)/3$ MHz, but if the transmit multiplier is 18 or 24 just use "6" or "8" on the transmit divider.

... And Some Afterthoughts

There is no reason why the synthesizer can't be made to scan on receive. Just add the normal logic that any scanner would use to the diode matrix to accomplish that. The tune filter is fast enough to allow three frequencies to be scanned per second.

There is no absolute need for the thumbwheel switches, diode matrix or rotary switch. If a really small synthesizer is your goal just add DIP switches next to the PLL chip and enter the BCD code.

Fig. 6 — This circuit will allow the synthesizer to interface with the Drake TR-33C.
 Q9 — Npn silicon small-signal transistor, 2SC1675 or HEP S0015.
 Q10 — Darlington transistor, HEP S9120.



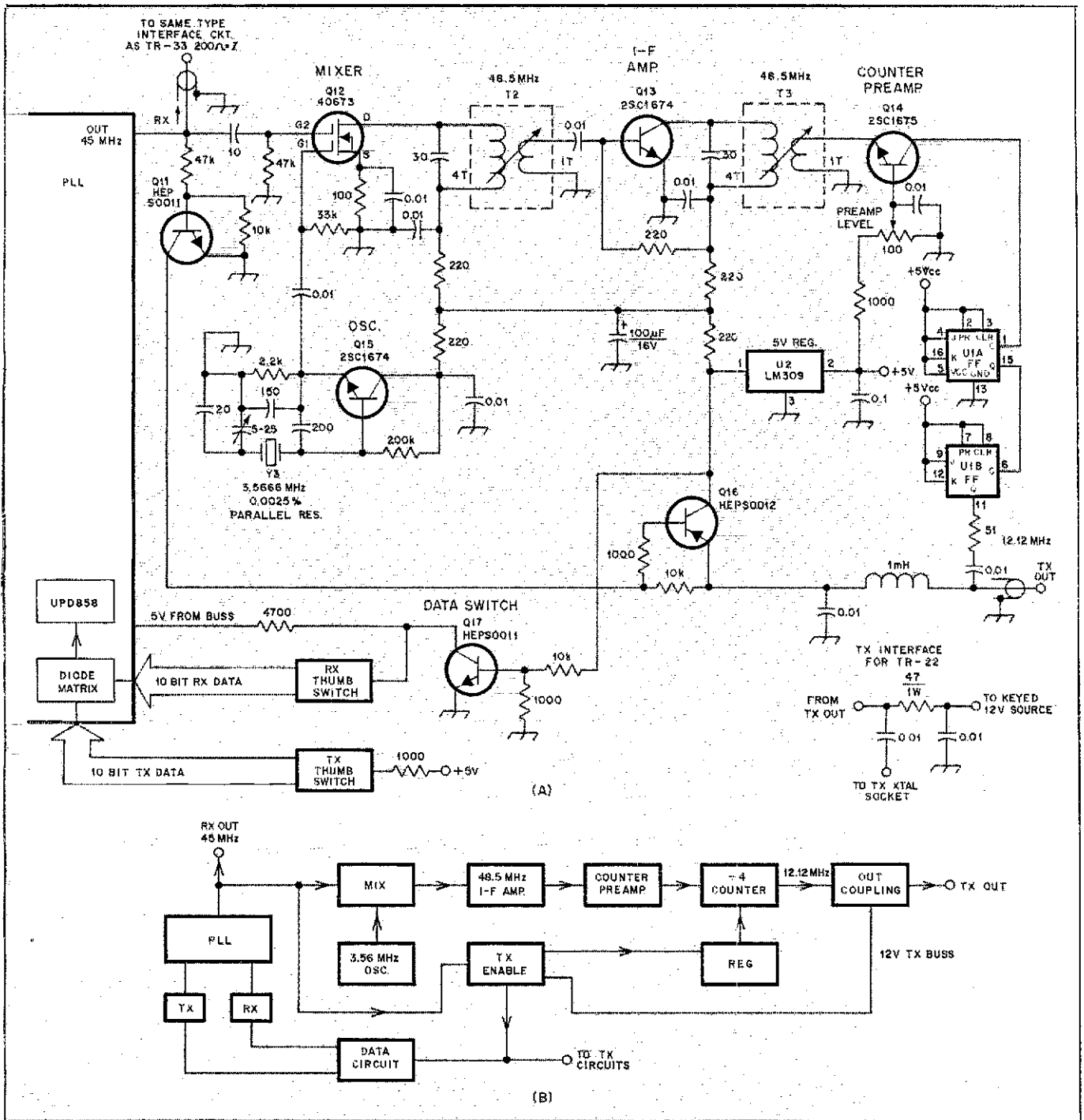


Fig. 7 — Interface to allow use of the synthesizer with the Drake TR-22.

Q11, Q17 — Npn silicon small-signal transistor, HEP-S0011.
 Q12 — MOSFET, 40673 or HEP-F0024.
 Q13, Q15 — Npn silicon small-signal transistor, 2SC1674 or HEP-S0010.

Q14 — Npn silicon small-signal transistor, 2SC1675 or HEP-S0015.
 Q16 — Pnp silicon small-signal transistor, HEP-S0012.
 T2, T3 — Rf transformer, pri. 4 turns, sec. 1 turn; no. 28 enam. wire wound on 10.7-MHz

i-f transformer core.
 U1 — TTL IC, dual J-K flip-flop, type 74S76.
 U2 — 5-V voltage regulator, type LM309K.
 Y3 — 3.5666-MHz crystal, 0.0025 percent, parallel resonant, 32 pF load.

Strays

HAWAIIAN HONORED AT 75

□ Shouts of "Happy birthday, Kiyo!" and "Aloha!" replaced the traditional banzai toast for the 75th birthday luau of

David Clement Kiyo Enomoto, KH6FF, of Kahului, Maui, HI. A special moment in the affair was the reading of a Maui County Council resolution recounting "... his greatest contribution to the people of Hawaii." Kiyo had operated his amateur station as the only radio link between U.S. Navy facilities at Puunene, Maui, and Pearl Harbor, Oahu, for 15

months after the December 7, 1941, attack until the Army and the Navy could set up an adequate system of their own. It required the utmost secrecy, and in September, 1963, the Navy recognized his patriotic effort with its highest award for such duty, Honorary Naval Communicator. "Maui no ka oi!" — Maui is the best!

Transmitter Design — Emphasis on Anatomy

Part 4: The final touches are applied to our transmitter by adding a 15-watt amplifier and an SWR indicator. If all goes well, we will become immune to the "Freddie syndrome"!†

By Doug DeMaw,* W1FB

It is unlikely that the 1.5 watts of output from our broadband amplifier (Fig. 7) would lead to the acquisition of five-band DXCC. But a few more decibels might make such an endeavor a reasonable assignment: The amplifier described in this section will help, as the cw signal should be increased some 10 dB in strength!

The final-amplifier stage is shown in Fig. 10. A 220-ohm feedback resistor is used between the base and collector of Q12. An 1800-pF blocking capacitor has been included to prevent the collector dc voltage from being shorted to ground via T3 of Fig. 7.

This amplifier has an input impedance of approximately 5 ohms at 7 and 14 MHz. The 10-ohm base resistor is used as a preventive measure against instability, but only if needed. To remove some vhf harmonics which appeared at the collector of Q12, it was necessary to include the 330-pF bypass capacitor. At 7 and 14 MHz the capacitor has negligible effect on circuit performance.

As was the case with the stages in our broadband amplifier, decoupling of the 12-volt bus is necessary at Q12. This is accomplished by means of RFC9 and the related bypass capacitors. Once again, bypassing is done for lf, hf and vhf.

Since the amplifier is to operate in the Class C mode, no forward bias is used at the base of Q12. For all practical purposes, Q12 draws no current during key-up conditions. When drive is applied (key closed) the transistor is driven into the cutoff region to establish Class C operation.

The collector load impedance of Q12 is determined in the usual manner, where $Z_o = V_{cc}^2/2P_o$. Thus, for a 12-volt collector supply and a power output of 15 watts, we

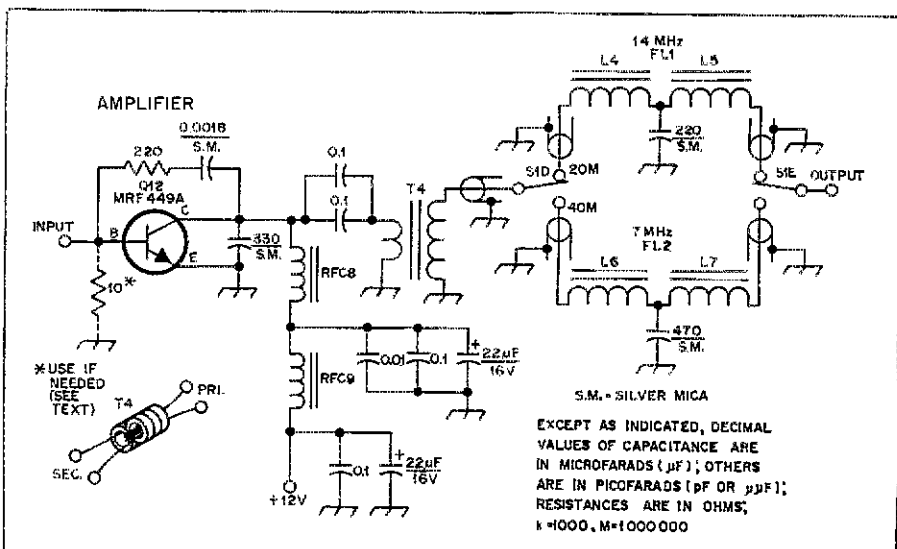
obtain a collector load of 4.8 ohms. T4 is a broadband transformer which is made from six toroid cores (see inset drawing of Fig. 10). It must transform the collector impedance to 50 ohms so that a suitable match and power transfer to the T-network filters can be obtained. A 3:1 turns ratio will suffice despite the slight mismatch (9:1 impedance ratio).

In order to prevent excessive harmonic energy from reaching the antenna it is necessary to include a filter at the output of Q12. FL1 and FL2 are used for this

purpose. Each is a T type of low-pass network. Energy above the operating frequency is attenuated by the filters, but energy below the filter cutoff frequency passes without impairment. A spectral analysis of this transmitter indicated that all spurious output energy was at least 40 dB below peak power at the fundamental frequency. Additional attenuation could be realized by cascading two such filters at the PA output. The characteristic impedance of the filters in Fig. 10 is 50 ohms.

Fig. 10 — Circuit for the 10- to 15-watt Class C power amplifier. Capacitors are disk or chip ceramic unless otherwise noted. Capacitors with polarity marked are electrolytic or tantalum.
L4 — 9 turns no. 18 enam. wire on a T68-6 toroid core.
L5 — 10 turns no. 18 enam. wire on a T68-6 toroid core.
L6 — 12 turns no. 18 enam. wire on a T68-2 toroid core.
L7 — 13 turns no. 18 enam. wire on a T68-2 toroid core.
Q12 — Motorola MRF449A stud-mount transistor.

RFC8, RFC9 — 8 turns no. 18 enam. wire on an FT-50-43 ferrite toroid core.
T4 — Two rows of three each FT-50-43 toroid cores. Join with epoxy cement as shown in the inset drawing. Primary has one turn of no. 18 wire (U shaped). Secondary uses 3 turns of no. 18 enam. or insulated hookup wire. Primary leads exit from core at end opposite to secondary leads.



*Senior Technical Editor, ARRL

cover is press-fitted over the box walls. In the author's unit the SWR-sensor module is bolted to the VFO top cover.

By this time you should have a pretty good "handle" on how the collection of subassemblies are connected together. The block diagram of Fig. 1 provides the essential information. All of the signal leads should be made of shielded cable if they are more than two inches (51 mm) in length. RG-174/U subminiature coaxial cable is excellent for the purpose.

The main-tuning dial is a vernier mechanism (Calectro or Philmore). A large knob can be used as a substitute for the one which comes with the dial, as the original is a bit small for those who have large fingers. A Kurz-Kasch aluminum knob was used on the prototype model after its depth was reduced on a lathe (courtesy of W1SL).

The front and rear panels of the WIFB unit were sprayed a dark green color. Green Dymo tape labels were used to identify the controls: A reasonably professional appearance results from using labels which are the same color as the panel. Finally, four adhesive-backed plastic feet were affixed to the bottom of the cabinet.


Closing Remarks

The toroid cores used in this project are available from Amidon Associates, G. R. Whitehouse and Palomar Engineers (check *QST* ads). It is suggested that the builder ask these suppliers for their catalogs, as some of the other components for the transmitter may be found in their product lines. It would also be prudent to scan the flea markets for parts.

The power supply for this transmitter

should deliver 12 to 13 volts dc (regulated) at 3 amperes. Needless to say, a 12-volt car battery is suitable. A dry-battery pack is not recommended: The life span would be extremely short.

Motorola has included internal protection for their MRF449A transistor (Q12), so damage should not occur during short periods of operation when a mismatch greater than, say, 2:1 exists. This circuit has been tested into a dead short and a full-open load condition (key down) for periods of 30 seconds, and no damage to the PA stage resulted.

This two-band transmitter should provide many years of reliable operation. It is hoped that some useful information was passed along to those who aren't heavily immersed in solid-state design theory. If nothing more, let's hope we have negated the "Freddie syndrome" effectively. 

Simple Ladder I-F Filter

Low-cost CB crystals serve in a four-pole ladder filter for ssb reception. Try this inexpensive circuit in your next homemade receiver.


Suffering from "burst-itis" of the coin purse these days? Certainly the cost of high-quality commercial i-f filters can contribute substantially to that malady if you're building a receiver of your own design.

The simple ladder filter of Fig. 1 was first described by F6BQP in *Radio REF* for May of 1976. This presentation is lifted from a reprint which is contained in *U.R.E. (Union de Radioaficionados Espanoles)* for January 1978, page 37. The details have been translated to English for use in *QST*.

The significant feature of this ladder type of filter is that the four quartz

crystals are cut for the same frequency. They require no alignment after the circuit is assembled and the terminal impedance of the filter is 850 ohms, bilateral.

Four CB crystals (27 MHz) are employed as shown in Fig. 1. They operate on the fundamental mode (9 MHz). The 3-dB bandwidth of the filter is approximately 2.5 kHz. The necessary fixed values of capacitance are given in the diagram. It is recommended that silver-mica or other high-Q, stable capacitors be used. Those who have facilities for laboratory alignment of filters may elect to install ceramic trimmers in place of the fixed-value capacitors listed. This will per-

mit precise tweaking of the filter. — **WIFB** 

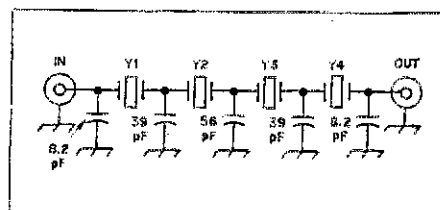


Fig. 1 — The simple ladder filter. All capacitors are dipped silver-mica types. Y1-Y4, incl. — 27-MHz CB transmit crystal (must all be same frequency).

Strays

HIS SEARCH SPANNED 50 YEARS

□ A little detective work paid off recently for H. V. Noble, W8DGN, who recently rejoined the amateur ranks after an absence of more than 40 years. In casually looking through his old log from the late 1920s, he came across a couple of entries that brought him back half a century —

9E1W, Anamosa, IA, and 9EHN, Mechanicsville, IA. He kept skeds with them in those days, and recalled that they were sweethearts who did their courting by radio!

Determined to find them, Mr. Noble asked the League for help. Membership Services Assistant Mark Starin, WAITZK, sent him photocopies of a couple of pages from a *callbook* of that era which listed their names (which W8DGN had long since forgotten). A letter to the Chamber of Commerce of each

town brought no response, so Mr. Noble again turned to the League. Iowa SCM Max Otto, W0LFF, was anxious to assist, and placed a small ad in the Cedar Valley ARC newsletter, asking for information about the two old-timers. A nephew of 9E1W responded and gave her address as Mrs. Herman Gray, Grand Rapids, MI.

Since Herman Gray was 9EHN, Mr. Noble's search had ended as he hoped it might. He enclosed a 50-year-old QSL card from 9E1W with his first letter to his newly rediscovered friends.

The Audiobox — An Amplifier with a Twist

Solid-state modular design, a programmable attenuator, dc volume control and Class B power output stage make this amplifier worthy of attention.

By Eric J. Grabowski,* WA8HEB

A receiver for the serious fm-er? I had mulled that question over many times while working for my BSEE degree. Pounding the books, however, took priority over construction, delaying the day when that thought would become a reality. But, eventually, arrive it did, and the pungent aroma of rosin core soldering marked the beginning of a rewarding project.

The smoldering motivation behind this endeavor was a desire to design and build a unit simulating commercial performance. As a matter of personal choice I had restricted the physical size to being no greater than half the size of the Regency HR-2, with a cost ceiling being pegged at \$100. More than a few sleepless nights were spent in preparations.

Although the building-block approach to construction is not novel, per se, some of the techniques applied to this design may well be. All boards of the receiver are housed in an easy-to-build, inexpensive, reusable enclosure, an adaptation of a practice used by the Atomic Energy Commission for nuclear-instrument modules. Each pc board performs a complete function so that redesigning a board does not affect the other boards in the project. A bonus derived from this arrangement is that a particular board may be employed in many projects.

The rather odd size of the pc boards (3-5/8 inches or 92 mm wide) allows two boards to be mounted side-by-side with the total width equal to one-half of an EIA rack panel. Consequently, a 19-inch (483-mm) panel, when cut down, will provide a front and rear panel. Rails made from 1/4-inch (6.4-mm) aluminum stock are mounted on the panels, and the pc boards are, in turn, attached to the rails. A standard hole spacing is maintained on

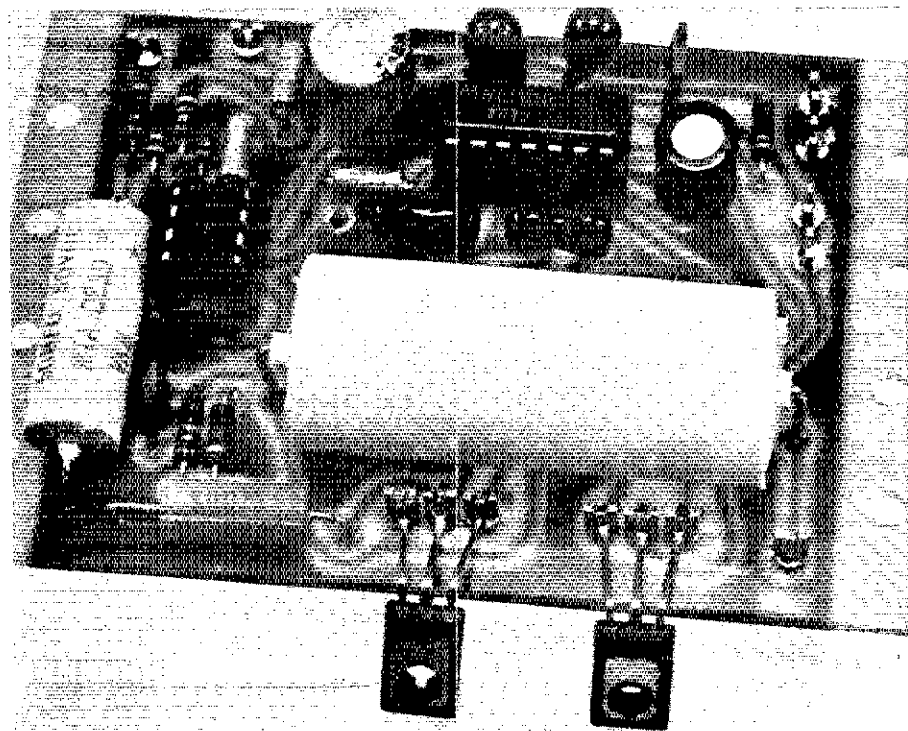
all pc boards to facilitate interchangeability.

The Audio Board

For identification purposes, the audio-amplifier application board has been labeled model 1001. It is intended for use as a complete audio section for communications receivers, public-address amplifiers or for general purposes. The board is one of seven different boards to be incorporated in a complete receiver.

According to plan, the audio section became the first of the receiver assembly units to be completed. The performance is indeed gratifying to me. I must admit that when I first shared my delight with other members of the local radio club by demonstrating the unit, I had some trepidation that others would show little more than casual interest. My feelings, however, were quickly dispelled as they pressed me for more details and literally swamped me with requests for pc boards.

Components for the WA8HEB audio amplifier are neatly arranged on this circuit board. Tie-point hardware for Q1, Q2 and the external leads, visible in the photograph, may be used by the builder. The metallic sides of Q1 and Q2 face away from C14. The transistors are then bent 180° to attach to the heat sink. Both must be insulated from the heat sink by insulated washers.



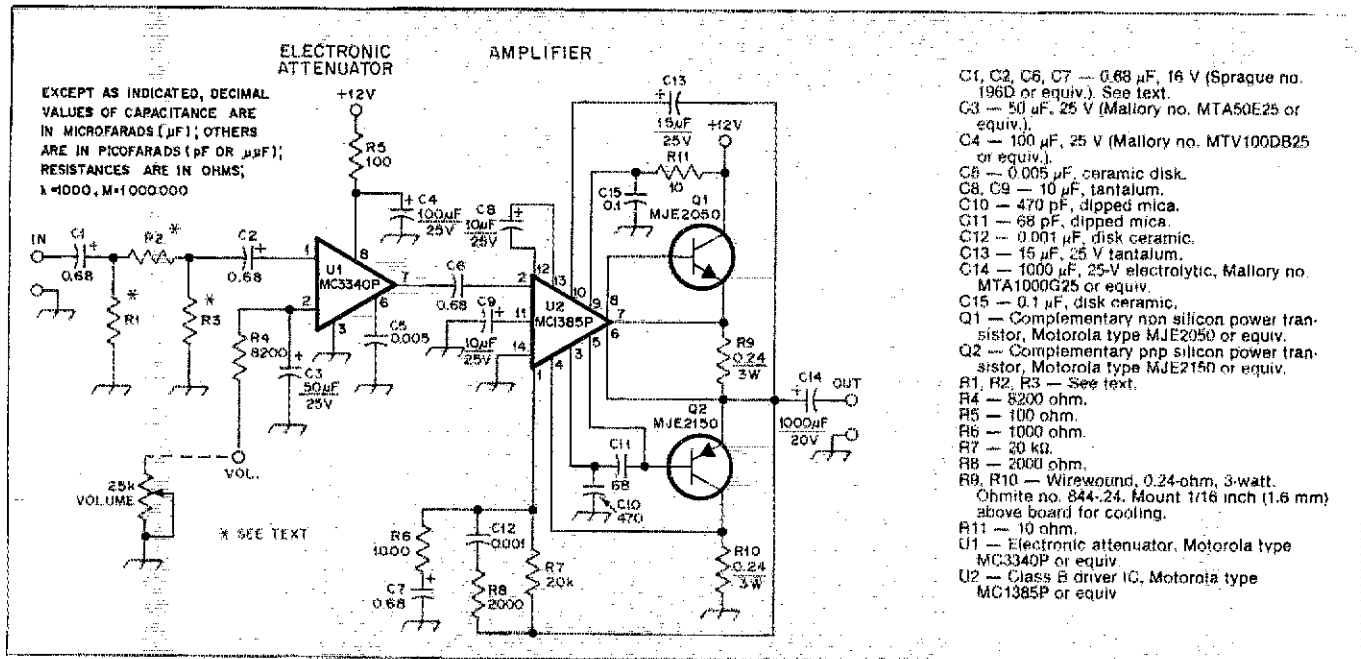


Fig. 1 — The WA8HEB audio amplifier schematic diagram. A pair of complementary-symmetry Class B silicon power transistors in the output stage is driven by an MC1385P containing a fixed-gain preamplifier, an output amplifier, a voltage regulator and a short-circuit protection network. Capacitors with polarity shown are electrolytic, except as noted below. Resistors are 1/4-watt composition, 5-percent tolerance, except as noted. Part numbers not listed above are assigned for identification in the circuit-board layout. The design of the audio output stage is based on the typical application circuit provided in the data supplied by Motorola for the MC1385.

Through the cooperation of a local board maker and printer, the demand for these boards was met. Orders were even received for future boards for the complete receiver.

The model 1001 audio amplifier application board contains an input attenuator, a dc volume control and a power amplifier. Using the board with several input-voltage ranges is facilitated by the programmable attenuator. The dc volume control eliminates the need for using shielded wire between the board and the volume-regulating potentiometer con-

trol. This feature is especially convenient for trunk-mounted equipment. Volume may be regulated by a dc voltage, such as that from the output of a microprocessor, making the function of a potentiometer unnecessary.

When this audio amplifier flexes those electronic muscles, it can provide up to 7 watts output with about 20 microwatts of drive. Frequency response is 300 to 3000 Hz at -3 dB. This response, chosen for voice communication, can be modified to provide a wider response from 20 to 20,000 Hz. Typical performance data are

listed in Table 1. Because of the high gain involved, the location of some components is somewhat critical. Printed-circuit construction is recommended. An industrial-quality, single-sided, plated and drilled board is available (less components) to builders.

A Programmable Attenuator

Refer to Fig. 1 in connection with the following circuit descriptions: R1, R2 and

*Footnotes appear on page 21.

Fig. 2 — Parts-placement guide for the model 1001 amplifier. This view is from the component side of the board, with the shaded area representing an X-ray view of the foil. All components are mounted on the nonfoil side of the board.

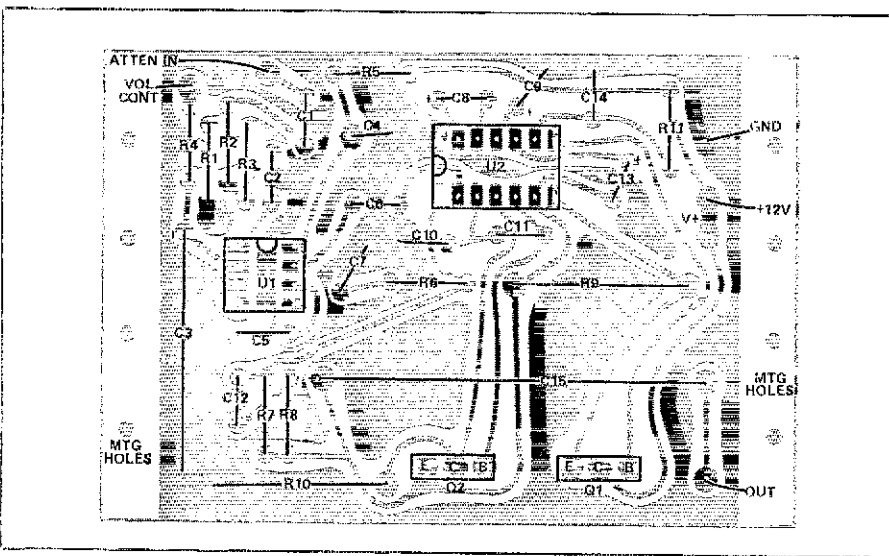


Table 1
Performance Data

Parameter	Value
Input	
Level	0 to 10 mV
Impedance	5000 ohms
Output	
P _{max}	5 watts minimum
Impedance	3.2 ohms
Control	
Resistive	25-kΩ potentiometer
Voltage	4.25 to 6.0 V dc at 2 mA
Thermal	Transistors require heat sink with 6°C/W thermal coefficient
Power	
Voltage	9 to 18 V dc; 12 V typical
Current	3 A max.; 1 A typical
Dimensions	
L x W	2.5 x 3.625 inches (64 x 92 mm)
H	Depends on components

Table 2
Resistor Values

Input	Atten	R1, R3	R2
0-10 mV	0 dB	Open	Short
0-100 mV	20 dB	6200 Ω	24 k Ω
0-1 V	40 dB	5100 Ω	240 k Ω

R3 form the pi-network attenuator. This network provides a convenient method of using the board with input signals greater than 10 mV while maintaining the input impedance at 5000 ohms.

Resistor values for some common input ranges are listed in Table 2. Other ranges are accommodated by calculating the resistances required according to information in the *ARRL electronics data book*.² A network impedance of 5000 ohms should be used in the calculation. Select the nearest standard commercial values. If the input attenuator feature is not required, omit R1 and R3 and use jumper wires in place of C1 and R2.

DC Volume Control

One of the more recent Motorola semiconductor devices that plays a key part in this amplifier is the MC3340P electronic attenuator (U1).³ This IC is capable of providing gain, but because of the effect of R4, the device becomes a unity-gain amplifier. Volume is adjusted by changing the dc voltage at pin 2 by means of a potentiometer or an external dc source.

In applications where more input sensitivity is needed, R4 is replaced with a jumper wire. When this change is made U1 provides an additional gain of about 13 dB.

Low-frequency oscillations could occur in the amplifier if insufficient power-supply decoupling is present. This possibility is minimized by using a large-value capacitor for C4.

The Driver Amplifier

A pair of complementary-symmetry transistors, Q1 and Q2, is driven by the Motorola MC1385P³ Class B driver, U2. This useful device contains a fixed-gain preamplifier, an output amplifier, a voltage regulator and a short-circuit-protection network.

Audio output from U1 is ac coupled to the preamp through C6. Output from the preamp is ac coupled to the output amplifier through C8.

The dc gain of the output amplifier is determined by the feedback voltage developed at the junction of R6 and R7. C7 determines the low-frequency gain. Likewise, R8 and C12 in parallel with R7 determine the high-frequency gain. Should one so desire, the band-pass response can be changed by replacing

these components with ones having other values. When making such changes, an oscilloscope and audio generator will be needed to facilitate component selection.

The output of U2 drives an npn/npn (complementary symmetry) power-output stage operating in Class B. Maximum power output will be realized only when a low-impedance load is used. The output power decreases rapidly as load impedance increases. For example, power output decreases 50 percent when the speaker impedance is increased from 3.2 to 8 ohms.

Builders will appreciate the short-circuit-protection network guarding U2 and the power transistors from an over-current condition. This protection is provided by sampling the current flowing through R9 and R10 (see parts list). When the output current exceeds the design threshold, the U2 shuts down. Q1 and Q2 will be protected as long as a sufficient heat sink is used. The heat-sink requirement can be satisfied by using a piece of aluminum having a total surface area of 40 square inches (25,800 sq mm). A commercial heat sink may also be employed. Jumper wires installed in place of R9 and R10 will defeat the protection network.

Thoughts About Construction

A step-by-step construction sequence is beyond the scope of this brief presentation. Experienced builders, however, should have no difficulty assembling the board. Fig. 2 shows the parts layout, and Fig. 3 shows the etching pattern for the board.


Use of dipped tantalum capacitors will yield a cleaner looking board, but from a functional standpoint larger vertical electrolytics or axial-lead electrolytics mounted on end are just as good. Once the board is assembled, the insertion of all polarized components should be checked.

and the board inspected for solder bridges between foils. Values shown for C1, C2, C6 and C7 establish a band-pass characteristic suitable for voice communications. For high-fidelity response, these capacitors may be replaced by 10- μ F units.

If the power-supply filter capacitor is located more than a few inches from the board, installation of a 470- μ F capacitor across the positive and negative terminals at the board may prevent low-frequency oscillation from occurring.

For public-address application of the model 1001 audio amplifier, a low-impedance microphone is recommended. Compensation for low output from a particular microphone can be provided by replacing R4 with a jumper.

The 1/4-inch (6-mm) clear areas along each side of the board are suitable for drilling mounting holes. If the board is to be installed in a metal enclosure, insertion of standoff insulators will prevent the foils from shorting to the metal enclosure. Troubleshooting is easier if IC sockets are used, but this is strictly a builder's choice. Under no-signal conditions, about 10 mA of current flows through R5 and about 35 mA flows to U2, Q1 and Q2.

I've found a distinct pleasure in the performance of this amplifier. For this reason I'm delighted to share my design with other *QST* readers. "What about the rest of the receiver?" one might ask. In response, I'd simply say that the remainder of my fm project may be considered for a future *QST* article. 

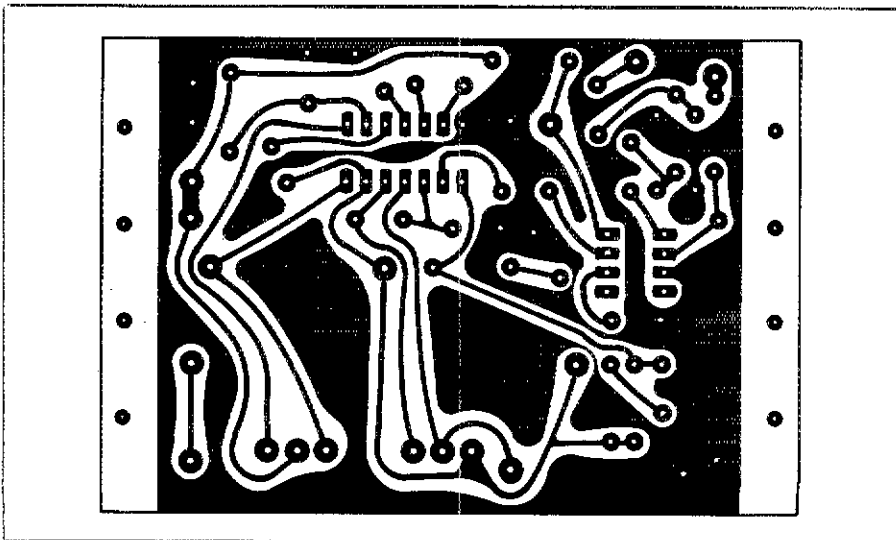
Footnotes

¹Plated and drilled circuit boards, less components, are available for \$3.50 postpaid, from Firstron Electronics, Box 151, Streetsboro, OH 44240. Price subject to change without notice.

²*ARRL electronics data book*, 1976, p. 32.

³Motorola data sheets are available from Motorola Semiconductor Products Inc., Box 20912, Phoenix, AZ 85036.

Fig. 3 — Circuit-board etching pattern for the Audiobox, shown at actual size. Black represents copper.



Updating Phased-Array Technology

Electrical? Mechanical? Both are ways of rotating directional antennas, whether on 80 meters or 432 MHz. This article may just lead you to a vertical phased array for your favorite band or bands.

By Dana W. Atchley Jr.,* W1CF

Worldwide DX on 40 meters has been an acknowledged fact for many years, and 80 meters has become a nightly haunt for countries chasers. As on other bands, the antenna is the most important factor in successful 40- and 80-meter DXing. Rotary beam antennas are, for all practical purposes, impossible on 80 and are more than many amateurs wish to tackle even on 40. For those wishing directive arrays on 40 and 80, electrically switched phased vertical arrays can provide a very cost-effective solution.

I have been heavily involved with such

phased arrays for use in hf work since 1965. In that year a four-element, end-fire array for 3.5 MHz was constructed.¹ This array could be operated in three modes: unidirectional off either end or bidirectional broadside to the array. An article in April 1976 *QST*² showed the construction and operation of a more versatile antenna utilizing four elements in a diamond-shape array. That antenna is switchable over a full 360 degrees in 90-degree steps and is unidirectional.

Many DX-oriented amateurs have constructed the four-element array described in 1976, with excellent results on both 40 and 80 meters. The author has used such a system for over two years, working some very difficult paths (such as long path to

Japan) from a mediocre geographic location. Such niceties as "instant" direction selection have become addictive.

Recommended Circuits and Components

The April 1976 article discussed several recommended circuits and components for constructing 360-degree phased arrays. Two years of experimentation have taken place since that article was written. The *QST* article should be read for background information before one embarks on erection of such a phased array. The information in this article supersedes the circuits shown in 1976, which contained several errors.

Fig. 1 shows the recommended configurations for a four-element array, identical to that in the 1976 article. Fig. 2 illustrates recommended driving circuits, which have changed considerably since 1976 and have given excellent results. Front-to-back ratios on the order of 20 dB have been obtained on 80 meters. The method of power splitting most suitable is the Wilkinson power divider³ since it increases the bandwidth capability of the array and always improves the impedance match seen from the transmitter.

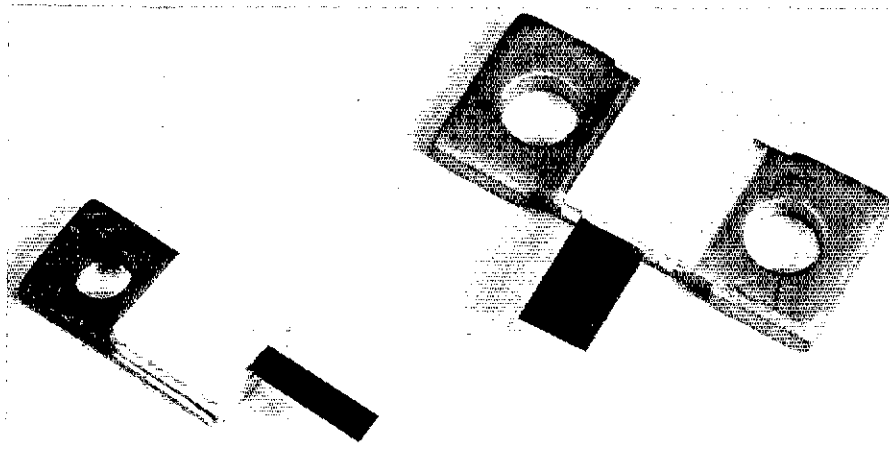
Several builders have complained of difficulty in finding a source of noninductive, 100- Ω resistors. Microwave Associates manufactures the noninductive resistors shown. They are essentially nonreactive well into the microwave region and use a sputtered refractive metalization and hard brazing which makes them very reliable. Both 50- and 100- Ω units are being produced for the military and are now available to amateurs at reasonable prices. (See caption for Fig. 2.) If higher power dissipa-

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¹Footnotes appear on page 25.

Noninductive resistors, 50 ohm on the left, 100 ohm on the right. (photos courtesy of Microwave Associates)



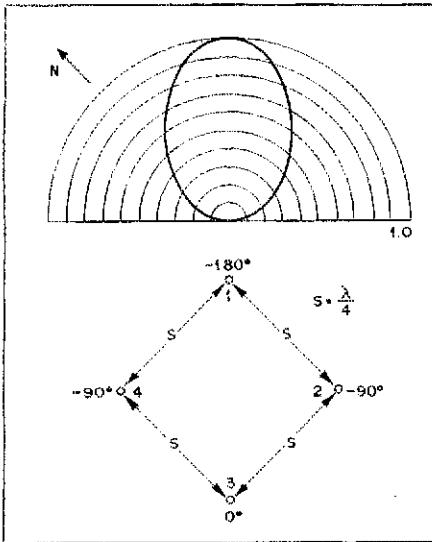


Fig. 1 — Polar plot of relative power and planar view of the 4-element diamond array showing the pattern obtained with no dc voltage on the switching relays, as in Fig. 2. Minor lobes are too far down to show on this scale.

tion is necessary, series-parallel combinations may be constructed by the user without compromising the noninductive characteristics of the resistors.

Various array builders have used different types of relays for switching the delay phasing lines. The writer has used MA-7524 spdt and MA-7525 four-port coaxial transfer switches for the past two years. Both switches pictured operate from 28 V dc. Since these switches are "flat" up to 12 GHz, they represent overkill. On the other hand, perhaps the excellent pattern achieved by the author's system is due in part to the fact that these relays have tremendous isolation.

Although they have not been used by the author, American Design Components Division⁴ offers many coaxial switches suitable for use with the array. For instance, they list both transfer relays and spdt units at reasonable prices.

If economical, open-frame relays are used, there is a possibility of some unwanted coupling unless care is taken in the layout. In any case, the use of unreliable relays or inadequate drive voltage in long cable harnesses will completely negate the effectiveness of any array. Further, no matter how good your relay system is, do not tempt fate by "hot switching" the relay system (switching the beam while transmitting).

For those on a lower budget, the three-element triangle system should be considered. Although the author has not used such a system, listening to the signal from someone who does, WB6HSG, shows very good lobe switching and signal strength. Fig. 3 shows the WB6HSG arrangement on 3.8 MHz. The switching diagram in Fig. 4 is updated and corrected

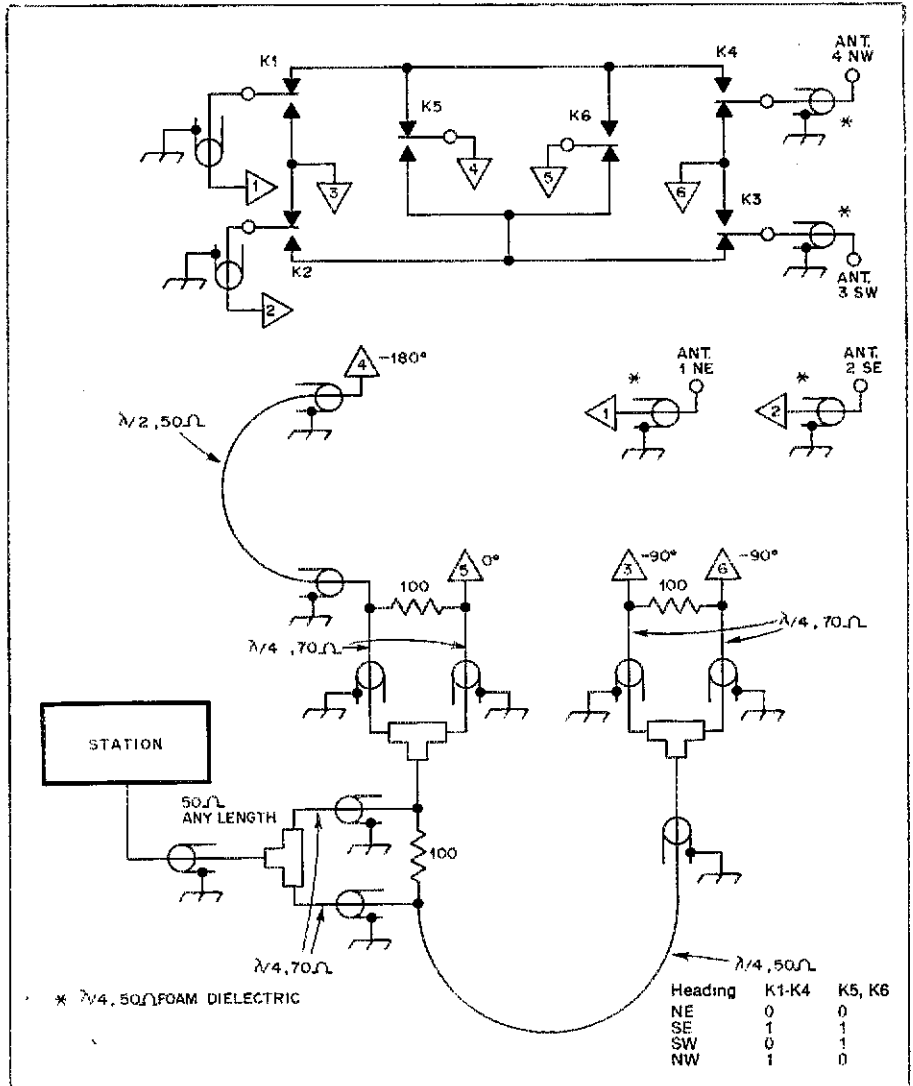
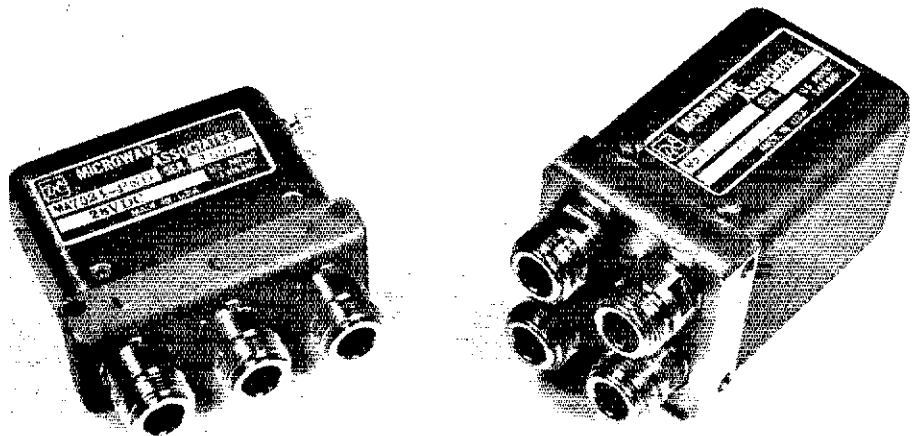


Fig. 2 — Schematic diagram of the Wilkinson power dividers, phasing lines, and switching relays (rf connections only) for the 4-element array. Dc switching commands for the four pattern headings are given at the lower right. See Table 1 for definitions of 0 and 1. All relay contacts are shown in the deenergized position. High-wattage noninductive resistors are available from G. R. Whitehouse, 11 Newberry Dr., Amherst, NH 03031, or from Microwave Associates GMBH, D-8000 Munchen 80 Weltenerburger Str. 33, Munich, W. Germany.

Spdt (left) and four-port (right) coaxial transfer switches such as used in the W1CF array.



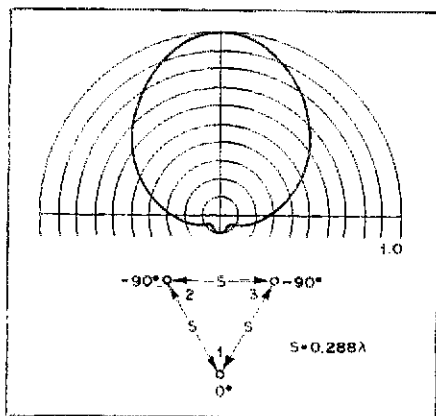


Fig. 3 — Polar plot and planar view of a 3-element phased array.

from the April 1976 article and shows the use of three Y-connected, noninductive resistors in a three-way Wilkinson power divider. Do not ground the junction of the three resistors as was shown in the original *QST* article.

Dual-Band Operation

Richard Moser, W8XM, was one of many amateurs who requested the ARRAY FORTRAN program mentioned in the 1976 article. He explored by computer modeling the possibility of dual-band operation using the four-element array technique. W8XM found that the diamond configuration with 2/10-wave element spacing at the fundamental (F) and 4/10 spacing at 2F would give the polar plot shown in Fig. 5.

Moser has constructed and successfully operated a dual-band array on 40 and 20 meters with excellent results. By the use of double-pole, double-throw relays he divided all delay lines and Wilkinsons by a factor of two when operating at 20 meters. When on 40, they are full length. The antennas used are four trap verticals operating against a radial system.

45-Degree Switching Capability

The author has modified his 80-meter array to provide 45-degree switching capability. In this case, switching techniques are used which allow the four elements to be switched in the traditional -180° for the front element, two sides at -90° and the rear at 0° , which gives directivity along the diagonals of the array, or, alternatively, the two front elements at -90° and two rear elements at 0° . The computer-predicted pattern for this array and the switching techniques are shown in Figs. 6 and 7, respectively.

My 80-meter beam has been on the air since October 1977 using the new switching scheme, with excellent results. My 40-meter array still has only 90-degree switching capability but soon will be modified for 45-degree switching. W0LS

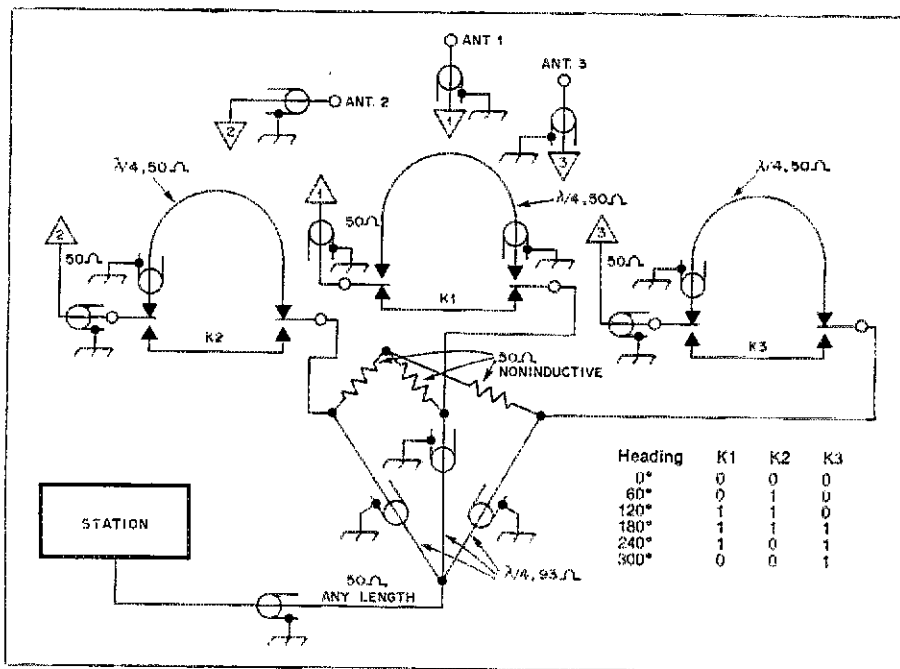


Fig. 4 — Switching diagram for a 3-element array. Note that the junction of the three noninductive resistors is not grounded. See Table 1 for definitions of 0 and 1.

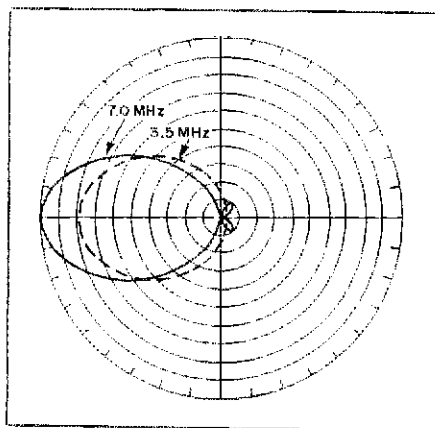


Fig. 5 — Polar plot of a 2-band, 4-element array.

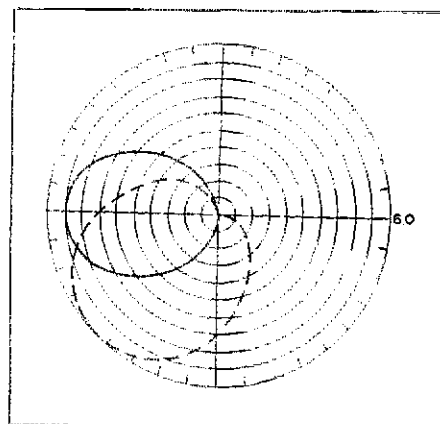


Fig. 6 — Computer-generated plot of a 4-element square array, 0.25-wavelength element spacing, using a four-way equal power split for 45-degree segment, 360-degree coverage. Table 1 lists appropriate switch states for the various element phasings.

has constructed a 45-degree, 40-meter version for \$600 which works very well.

Q and A Session

Since the original articles generated many questions from interested amateurs, I'll take this opportunity to answer some of the more common questions publicly. The following may be some questions you have.

Q. What types of vertical elements do you recommend?

A. The writer uses quarter-wave vertical elements constructed from two-inch OD aluminum tubing made in 5-foot (1.5 m) sections which interlock. This type of

construction requires guying, is very time consuming, and takes plenty of guy wire, anchors and insulators. Self-supporting, quarter-wave, 80-meter verticals with insulated bases and concrete-mounted pipe supports are appealing but may have problems with ice loading in the winter.

Most 40-meter systems can be done more easily; the writer uses slightly modified Dentron EX1 self-supporting quarter-wave elements. For dual 40- and 20-meter systems such as that at W8XM, it is suggested that the experimenter contact commercial firms for their recommendations in trap verticals.

Q. What are the trade-offs in using

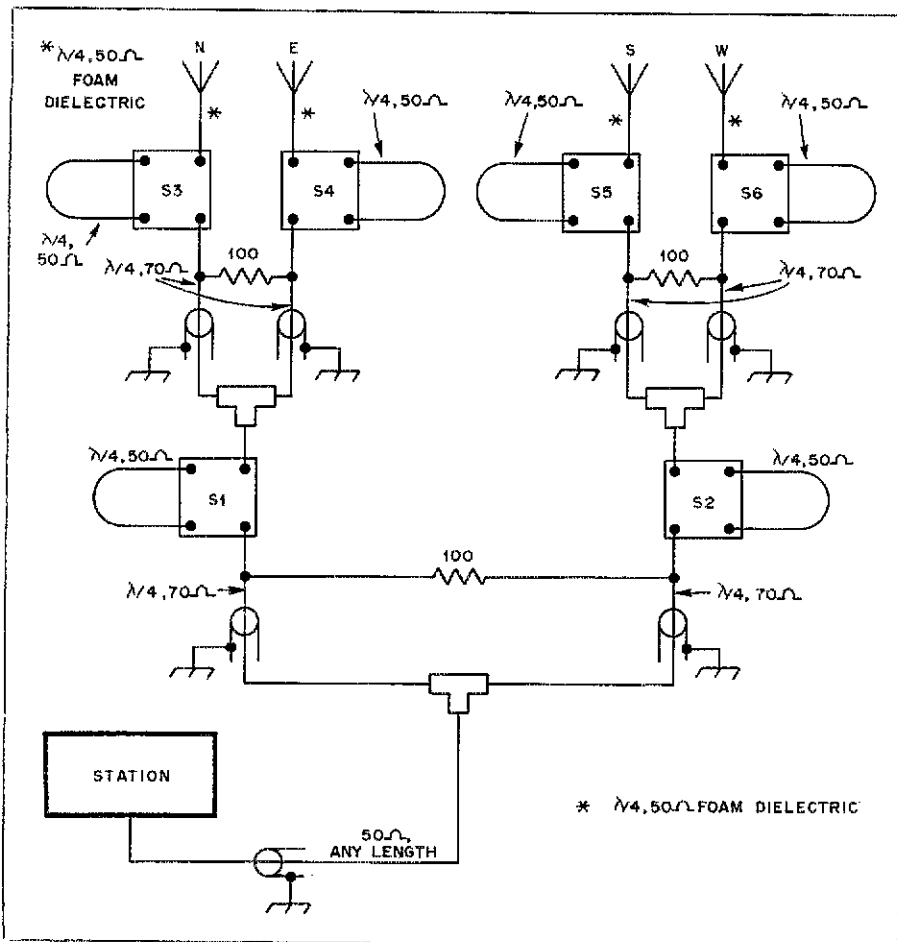


Fig. 7 — Switching diagram for a four-element square array with lobe selection every 45 degrees over a 360-degree range.

1/2-wave or 5/8-wave elements?

A. Obviously, longer elements will cost more and increase mutual coupling. It is my opinion that elements longer than 1/4 wavelength are not worth the trouble, except at frequencies higher than 14 MHz, where Ringo type half-wave construction is economical. Base-fed quarter-wave elements working against radials provide a noncritical match to 50-ohm coaxial line.

Q. What kind of problems should the builder of these arrays anticipate?

A. Many potential problems are addressed in the 1976 article. One which should be mentioned here is ensuring that all interconnections are satisfactory. Make a temporary short at the base of each element and check for dc continuity at the coaxial input during switching.

Next, with the shorts removed, check for short circuits or lossy cables. The input (at the transmitter end of the feed line) should read at least 100 kΩ. Quite often one finds sections of coaxial cable which have aged.

Finally, if you want a good pattern to result, construct your array as far as possible from other metallic objects. Trees do not seem to have any damaging effect on my vertical-array performance, but they would unquestionably deteriorate perfor-

mance of arrays at 14 MHz and higher.

Q. How does your system compare on the air with other systems, such as the handful of 80-meter Yagis being used?

A. The 40- and 80-meter Yagis of W2HCW, located on Long Island, are louder on the long haul than the W1CF vertical array. Both antennas seem to be equal when receiving. Pluses for the vertical system include "instant rotation," greater bandwidth and less monetary outlay. Also, 80-meter Yagis tend to break under loads of ice and in high winds. [W2HCW's were lost in the fierce winter of 1977-78. — Ed.] Vertical arrays suffer virtually no "down time" due to weather damage. In addition, the W1CF array is hidden from view, being located in a forest. To perform adequately, an 80-meter Yagi must be very high (135-plus feet) and is more conspicuous.

Q. Just how does the bandwidth of the vertical arrays compare to other gain systems?

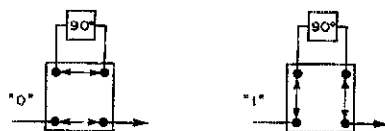
A. The writer's arrays operate over the entire 3.5-4.0 and 7.0-7.3 MHz ranges without noticeable degradation in front-to-back ratio. However, at the band edges the 100-Ω resistors may become warm, although none have blown out yet.

Q. How do your patterns compare with

Table 1
Switch States for Various Element Phasings.
(See Fig 7.) OM = omnidirectional.

Element Phase, Degrees	Switch States									
Pos	N	E	S	W	S1	S2	S3	S4	S5	S6
N	180	90	0	90	1	0	1	0	0	1
NW	90	0	0	90	0	0	1	0	0	1
W	90	0	90	180	0	1	1	0	0	1
SW	0	0	90	90	0	1	0	0	0	0
S	0	90	180	90	0	1	0	1	1	0
SE	0	90	90	0	0	0	0	1	1	0
E	90	180	90	0	1	0	0	1	1	0
NE	90	90	0	0	1	0	0	0	0	0
OM	0	0	0	0	0	0	0	0	0	0

STATES



the ARRAY program computer-predicted patterns?

A. Actual patterns are always slightly worse but close enough so that the user won't be disappointed. For instance, with the computer predicting a 25-dB front-to-back ratio, most four-element vertical beams show 15 to 20 dB F/B. The F/B ratios will always be greater on the really long-haul paths, as with any other low-angle radiator.

Q. Finally, what should I do first if I decide to put up a beam of your design?

A. Before spending all the time necessary to actually construct an array, you should check for latest developments in the area of vertical array design. Write the author for additional information and advice.

Footnotes

- Atchley, "Switchable 4-Element 80-Meter Phased Array," *QST*, March, 1965.
- Atchley, Stinehelfer and White, "360°-Steerable Vertical Phased Arrays," *QST*, April, 1976.
- Wilkinson, "An N-Way Hybrid Power Divider," *IRE Transactions on Microwave Theory and Techniques*, January, 1960.
- American Design Components Division, B.L.B. Inc., 39 Lispenard St., New York, NY 10013.

Strays

NEW 10-METER BEACON

□ A 10-meter beacon is operating in North Hollywood, CA, under FCC special temporary authorization. Until September 30, W6IRT will operate on 28.888 MHz using low-power cw emission. Monthly reception reports are solicited and should be sent to Norman Lefcourt, W6IRT, 7713 Wilkinson Ave., North Hollywood, CA 91605.

Antennas — Keeping Them Up

Basic Amateur Radio: Here is a potpourri of ideas designed to make the installation of your next antenna a little more permanent than the last.

By E. W. Ljongquist,* W4DWK/W1CQS

After 55 years of planning, constructing, and erecting antennas, and with the aid and information from many knowledgeable hams, I feel some of my experiences may be of use to the fraternity. The thoughts are not so much as to how the antennas went up, but why they fell down!

It may seem ridiculous to mention, but the antenna is the most important single item in an amateur's setup. Next comes a good receiver and a good operator who knows the tricks. Of course, an exotic call may be worth a few dB. (I have worked many a DX station who was using 5 watts or less, and a good antenna.) I will not overemphasize the importance of height. Instead I will point out that your antenna system — feed line, supports and the antenna itself — is the most exposed part of your real estate. Night and day, year in and year out, it is up there, being flexed, rained on, iced and contaminated with soot, maybe salt spray, gases and dust. Of course, there are physical and financial limits to construction, and to the strength of an antenna's supports and wire size, or an array's weight and wind-load limits. That, plus a few handy, easily affordable gadgets and adaptations, is what I wish to go into here.

Probably the most popular antennas in use are the half-wave dipole and its cousins, the inverted V and the sloper. All of these antennas require a center insulator. I have bought and used many types, from a completely sealed weather-tight assembly to a simple glass insulator. The simplest and best that I have used is made from an odd piece of Plexiglas, 3/16- or 1/4-inch (4- or 5-mm) thick, drilled as shown in Fig. 1. The rope and antenna wire holes should be smooth, but this is not necessary for the coax mounting holes. I have yet to have one fail. One has been holding up an 80-meter inverted V for eight years. A balun can be mounted on a larger piece, using epoxy to cement

the balun network to the Plexiglas. Baluns, by the way, do not necessarily improve the operation of a dipole antenna. This type of insulator will also work well with open-wire feed line. It will hold a lot.

Wire

Have you tried to buy wire lately? After many years of changes and splicing, some of my wire looked more like solder than copper. That, and the failure of two guys on my "Four Bands on a Pole" last March, sent me in search of some guying material. Four dollars today will buy you 50 feet of extremely fragile-looking stuff. On a long shot, I stopped at a wholesale electrical supply house. A meek request, plus mentioning that I was a ham, got me over 150 feet of electricians "pulling wire" for less than eight dollars. When installing it I did not strip it, but looped plastic and all through the insulators,

*Ljongquist, "Four Bands on a Pole," *QST*, September, 1972.

stripping only enough to make the center connections.

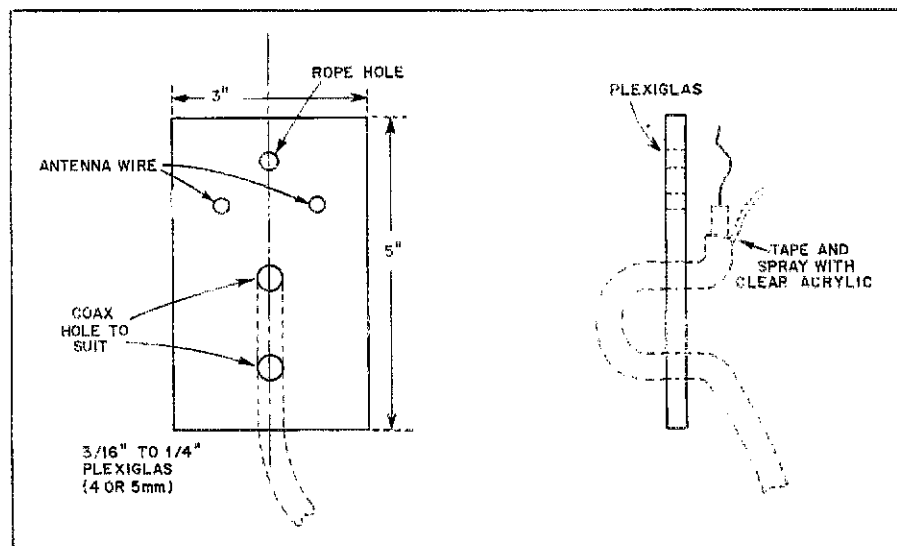
Base for Verticals

Putting something under a vertical or pipe mast to keep it from sinking into the ground or shifting has long been a problem for hams. A simple solution is to punch a hole in an old automobile hubcap, and drive an 18-inch (457-mm) piece of rod or pipe through it into the ground. Small hubcaps work best because they are easier to mow around. I went first class with a Cadillac hubcap, shown in the photograph. Radials can be fastened to the cap by drilling holes around the circumference and using short stove bolts to attach the wires. To insulate the base of a vertical, PVC pipe can be fastened to the base of the vertical and slipped over the ground mounting pipe.

Masts and Supports

Through the years I have used several methods to support my antennas,

Fig. 1 — An inexpensive, nearly indestructible center insulator for dipole antennas.



including the wooden masts described in past editions of *The Radio Amateur's Handbook*. Wooden masts work well, but require a few precautions to assure long life. Never surround wood with concrete. The wood will rot and you may not realize it until too late. It is better to mount upright angle or flat stock in the concrete and fasten the wooden mast to these supports with bolts.

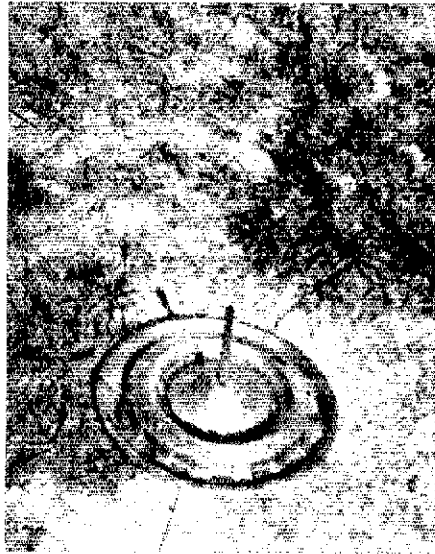
Probably the most popular mast is the telescoping variety, commonly used as a television antenna support. Some amateurs use them to support a small beam and rotator but their performance in the presence of torque leaves much to be desired. A TV mast can be fastened to your house, but do not try to fasten the mast support to the cornice or siding with the lag screws furnished in the mounting kit. Try to find solid support in the framing of the house, and use a backing block of 2 x 4 or heavy plywood to pick up the solid fastening and bolt the mount to this.

Extend the mast after it is mounted. Have a helper hold the bottom section in place and, starting with the uppermost section, extend it section by section. It is possible to put up masts alone, but it is dangerous and takes far longer without help. Gloves and hard hats are a good safety precaution in any antenna work.

I have used nontelelescoping TV mast for heights up to 50 feet but found that its flexibility and the maze of guy wires required can be a problem. After watching several sections of mast buckle, I had come to the conclusion that it is almost impossible to "walk up" a mast with antenna without disastrous results until the following technique was worked out. I use a section of iron pipe for the lowest two sections of the mast. Two guy wires are first anchored at the appropriate distance from the base (see Fig. 2) and the third guy wire is taped to the mast until it is needed. If you are using a second set of guy wires, tape them temporarily to the mast. It is more than annoying to find loops of guy wire dangling out of reach after the mast is vertical!

Trees

One thing can be said about trees; they are almost never where you want them. When my sons were younger, the problem of getting a pulley and line up into a stout tree was greatly simplified. They loved an



No, this is not the start of another strange encounter. It is a nifty way to keep a vertical antenna from sinking into soft soil and provides a junction point for ground radials.

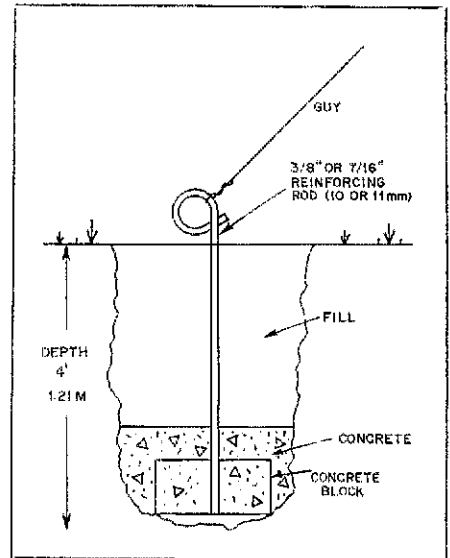


Fig. 2 — A method of making guy anchors from reinforcing rod obtained at a salvage yard. The concrete blocks can be obtained from the same source.

excuse to climb. They did fine jobs wiring a pulley in place, and heaving the line with a suitable weight attached, out through the branches. They have since gone out on their own. Recently, I was raising a long-wire antenna. I spotted a high, willow locust tree the appropriate distance from the house. Through the help of the local ham underground, I located a very experienced "tree shooter." He appeared as arranged, with his bow, arrows and a long pole on the end of which was fixed a cone of grocers' twine. He tied the twine to an arrow. I held the pole as high as I could, and he shot the arrow through the top-most branches of the tree. I tied a length of plastic clothesline to the twine and pulled it up over the tree. The insulator and wire was attached to the plastic clothesline and pulled into place. The feed line was run into the shack, connected to a Transmatch, and some contacts were made. During the night a breeze sprung up, but seemingly nothing unusual. The next morning I turned on the rig and tried to tune up. Nothing doing; I looked out the window, and there was my new long wire on the ground! Going outside I found that the wire had parted. I hauled down the end attached to the tree,

repaired it, and hauled it up again. Just then another gust of wind came along and down came my wire, again. I had never noticed how much a high, thin tree can toss about in the wind. So, sacrificing height for a stable anchorage, I finally ended up with a long wire not quite as high as the original, but one that worked almost as well.

Sheaves and Halyards

Never use "wire-reinforced" line, such as plastic-jacketed wire clothesline, as a halyard. Moisture enters the jacket and the result is hidden corrosion and weakness. A good substitute is plastic clothesline that has a core of stranded fiberglass. Braided nylon rope makes an excellent halyard though it does tend to stretch a bit. This can provide a shock-absorbing action though. Remember to leave enough slack line to allow complete lowering of the antenna.

Good, tight sheaves are hard to find. There is nothing more frustrating than to have a line run off a pulley and jam 50 feet in the air. Try to find a pulley that has the block close to the wheel so there will be less of a chance of the rope falling off and becoming jammed!

QST

Strays

BOTHERED BY LATE QST'S?

□ If you are moving or due for a renewal, you can help us get *QST* to you more quickly by letting us know your new address promptly and by renewing early. *QST* is mailed from our printer at Glasgow, KY, on or about the 20th of the

month preceding the cover date. This can vary by one or two days depending on when the weekends fall. For example, the January, February, March and April issues were mailed on December 22, January 20, February 21 and March 21 respectively. Copies to persons whose renewals are received after the cutoff date

printed on the first notice are mailed on the first available weekly mailing.

If you receive *QST* late every month, you may wish to file a complaint with the Postal Service. Ask for a Consumer Service Card (USPS form 4314). Just fill it out and drop it in the mailbox; Uncle Sam picks up the postage. — *WIGNC*

A Programmable Regulated Power Supply

Here is a supply to power those home construction projects. It will do your bidding and even take over when you goof.

By John Bipes,* KØYQX

Are you still using a string of batteries to power your homemade projects? Maybe the XYL is starting to object to the acid burns on the carpet from the Diehard that you bring in every evening to run your 2-meter fm rig. This versatile lab bench power supply provides many desirable features: programmable voltage and current limits; voltage adjustable to zero; voltage as a *linear* function of the control-knob rotation; positive overcurrent protection indicated by a pilot lamp, with resettability; rf immunity; and low ripple and noise output.

The output is adjustable from 0- to 15-V dc and is programmed with two internal resistors. It automatically shuts down after sensing a current overload of 1.5 amperes and displays a bright red overload indication until reset. In electronic service work this feature is especially handy as the supply does not continue to push the limiting value of current under faulty conditions. It simply notes the overload, then relaxes, awaiting your further instructions! The current threshold is programmable with one internal resistor.

The transformer, bridge rectifier, filter and three-terminal utility regulator portion of the instrument are taken from a CB power supply. Power for the adjustable regulator is taken prior to the fixed regulator. The fixed regulator is used only as a utility voltage source for powering the three indicator lamps in flicker-free fashion!

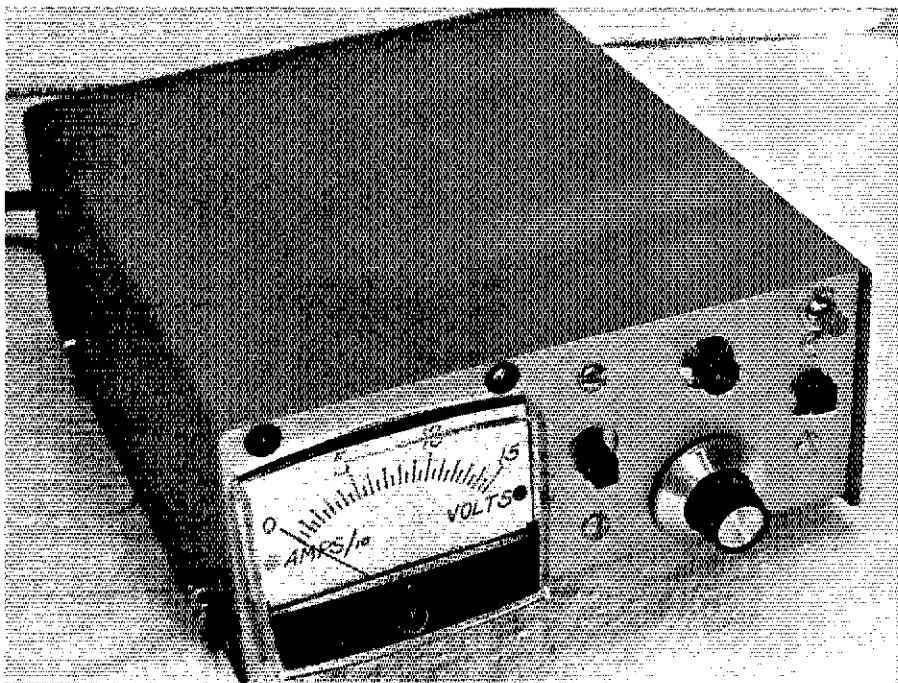
A large-wattage series pass transistor is the workhorse. It is controlled by two smaller devices which, in turn, are driven by a unique application¹ of a popular

precision voltage regulator, the 723C integrated circuit. A silicon controlled rectifier is "tripped" to latch the adjustable regulator into the shutdown mode if too much current is drawn. A momentary switch can be depressed to reset the output to normal, or the ac switch may be switched off, then on again. Simply removing the excessive load from the sup-

ply will not cause reset. It is also fail-safe, as one cannot cause the power supply to exceed its current limit by any manipulation of controls.

Voltage and current metering is designed for economy. One meter is used and is switched using a dpdt slide switch. To reduce the possibility of "cockpit error" some "intelligence" lights are

The completed programmable power supply. Above the meter are the LED indicating current measurement (left) and voltage measurement (right). Dots of matching color are inked onto the meter face. The controls, from left to right, are the meter switch, voltage-adjust pot (large knob) and main power switch. The overload indicator is located above the voltage pot and the reset switch is above the main power switch.



*803 South Ave., North Mankato, MN 56001
¹References appear on page 30.

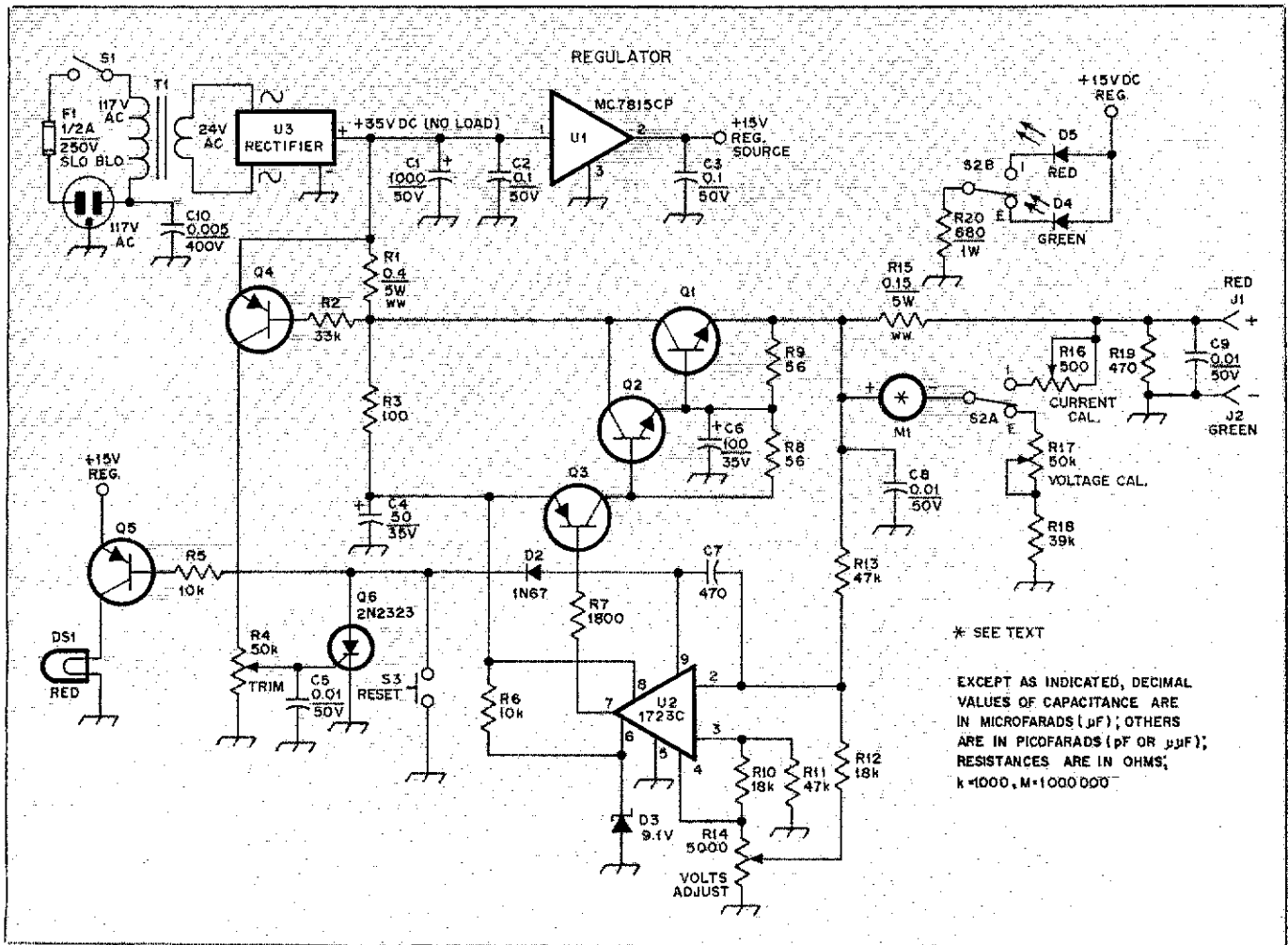


Fig. 1 — The regulated bench supply. Resistors are carbon-composition 1/2-watt types except as noted. R4 is adjusted by trial and error for best current-shutdown characteristics. No connection is made to pins not shown for U2.

- D1 — Not used.
- D2 — Small-signal germanium diode, 1N67 or equiv.
- D3 — Silicon Zener diode, 9.1 (or 10) V, 1 W.
- D4 — Green light-emitting diode, nominal 2-V, 20-mA variety.
- D5 — Red light-emitting diode.
- DS1 — Red incandescent lamp assembly, 14.5 V, 150 mA.
- J1 — Red five-way binding post.
- J2 — Green five-way binding post.
- M1 — See text.
- Q1 — Silicon npn power transistor, 2N3055.
- Q2 — Silicon npn power transistor, 2N5296.
- Q3, Q4, Q5 — Silicon pnp general-purpose transistor, 2N4126.
- Q6 — Silicon controlled rectifier, 2N2323.
- S3 — Spst momentary switch (normally open).
- T1 — Power transformer; 117-V primary, 24-V, 2-A secondary.
- U1 — Three-terminal 15-V, 1.5-A dc regulator, Motorola MC7815CP or equiv.
- U2 — Voltage-regulator IC, Motorola MC1723CG or equiv.
- U3 — Four-terminal bridge rectifier, 100 V, 2 A.

* SEE TEXT

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

added, a green light-emitting diode for volts, and a red LED for amperes. Colored dots matching the respective ranges were inked onto the meter face.

Circuit Description

Operation of the heart of the adjustable regulator can best be understood by considering U2 first. Pin 4 of the 723C provides a precision, temperature-compensated reference voltage of 7.15 V. This terminal is the "WVV" of the entire instrument! The reference voltage is dropped across both the voltage-adjust potentiometer and the resistor string from pin 4 through pin 3 to ground. Therefore, the voltage selected by the setting of the potentiometer, and the voltage on pin 3, are constant. U2, being a differential amplifier, will try to keep the voltage on

pin 2 the same as the reference voltage on pin 3. It follows that if potentiometer R14 is readjusted, the output voltage of the supply must move in the opposite direction to maintain this equality. Or if the load on the power supply attempts to "pull down," or "let up" the output voltage, the pass transistor will have to readjust its internal resistance to maintain equality. It follows also that if the potentiometer is set to the top (nearest pin 4), the output voltage of the supply will have to go to near zero. How close to zero depends on the leakage of the pass transistor, Q1. The minimum output voltage can be kept to an insignificant value of millivolts by using a good-quality transistor for Q1 and by the loading effect of R19 which shunts the leakage current to ground. Finally, if the slider is set to the

bottom (nearest ground) the output voltage will rise to maximum. The maximum voltage may be described by the relation:

$$E_{\max} = \frac{V_{\text{ref}} \times R11}{R10}$$

$$= \frac{(7.15)(47 \times 10^3)}{18 \times 10^3}$$

$$= 18.67 \text{ volts}$$

Note: Adjustment of the supply voltage slightly beyond the full-scale calibration of 15 volts is desirable.

If R10 is held constant, R11 may be said to be programmable, i.e., adjusted by the above formula for any desired output voltage. The limit would be a couple of volts below the input voltage. Note that R10 and R12 are always equal, as are R11 and R13. They are changed in pairs during

programming.

The 723C operates by varying the effective resistance between pins 7 and 8. It raises the power supply output voltage by pulling down on the base of Q3 via R7. This action provides more base current for the quasi-Darlington connected pair, Q1 and Q2, and Q2 conducts more heavily. The reverse action follows in reverse order. U2 pin 8 provides operating input voltage for U2 via the RC filter, R3 and C4. Pin 7 receives regulated 9.1 volts from Zener diode, D3.

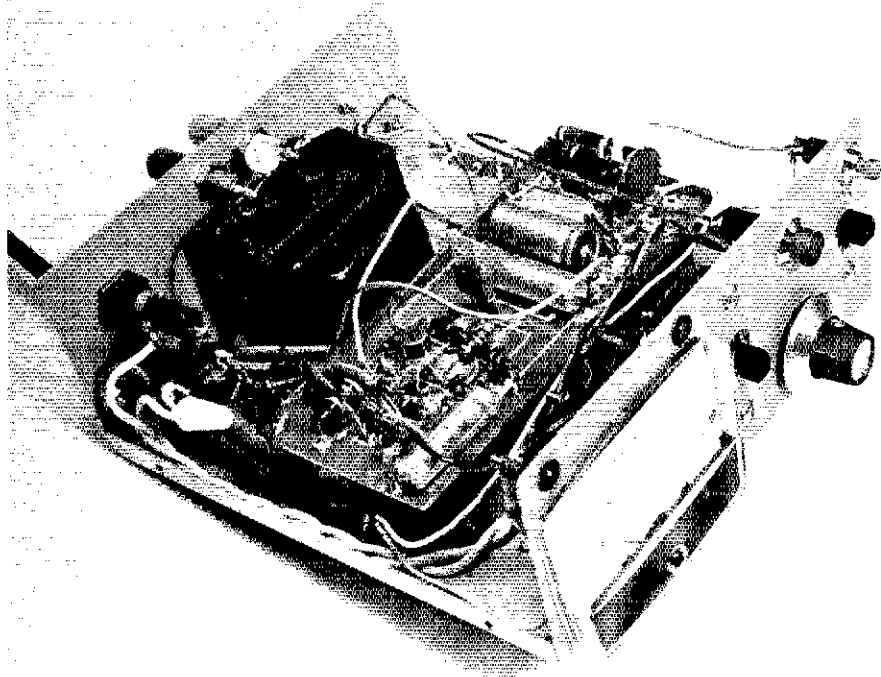
If the supplied current through J1/J2 is large enough to develop approximately 0.6 volt across R1, Q4 will conduct, raising the voltage on the gate of the SCR, Q6. The SCR then fires and its anode goes to ground potential. This action ties down pin 9 of U2, thereby prohibiting U2 pin 6, from providing any bias current for Q3, i.e., inhibiting the output of the power supply. Simultaneously, DS1 is lighted as Q6 drives Q5 into saturation, thereby applying the output of utility regulator U1 to the lamp. This is nominally $15V - V_{CE-SAT}$, or about 14.5 volts. Incidentally, DS1 is an incandescent indicator as it is desirable to note its turn-on out of the corner of one's eye and it should therefore be quite bright. Reset occurs by either closing S3 or opening S1 momentarily; either operation eliminates the current through Q6. The threshold current is approximated by:

$$I_{max} = \frac{0.6 V}{R1} = \frac{0.6}{0.4} = 1.5 \text{ amperes}$$

R1 may be selected by the above criteria to program the threshold to any value within the safe limits of the input circuitry, the pass transistor Q1, and heat sink.

If the output of the power supply should be externally pulled above the voltage for which it is set (during battery charging, for example) the emitter-base junction is merely reverse biased and the output voltage is allowed to float within reasonable limits. Although usually not destructive, this is not a good practice as some leakage current does flow. Component breakdown may occur if limits are exceeded, and U2 is "disappointed" with its lack of control.

The meter is a modified Radio Shack VU meter (internal rectifier removed and meter face changed). The ammeter shunt, R15, and the voltmeter multiplier, R16, were chosen for full-scale indications at 1.5 amperes and 15 volts respectively. A potentiometer was used for R16 to allow voltage calibration. The revised meter face was drawn with a fine-point pen on a piece of glossy cardboard salvaged from an end of the box in which the aluminum case was packaged! The plastic meter window was snapped off, the original face was removed (by removing two tiny screws) and it was used as a pattern for dimensions of the new face.



Interior view of the supply. Note the simple type of circuit-board construction and the use of bypassing directly at the output terminals (rear panel).

It is possible to construct a supply with other features, such as higher current capability. This is easily accomplished by the addition of paralleled and current-equalized pass devices. Additional steps of current-limit threshold may be added by switching in different values of current-sense resistance at R1 or R1 may be made infinitely adjustable through the use of a potentiometer. The supply shown is one of two units built to identical specifications. Three others, each of different capability, were built prior to these two. The first has a 5-ampere rating at 25 volts; the second was designed for commercial-service use with individual voltage and current metering and with a rating of 30 volts and 10 amperes. It has been in service for two years in a commercial two-way radio service shop. The third was designed with four pass transistors and driven by a ferroresonant computer power supply for maximum ratings of 15 volts and 15 amperes. It is excellent for powering older tube-type mobile radio equipment and does an excellent job of powering my new Ten-Tec Triton IV from the ac line.

If constructed with terminal bypassing and thorough shielding, good rf immunity can be obtained. Also, ripple and noise output has been measured by the author at approximately -70 dB during normal operation. Virtually all of the components for the supply were available through hobbyist retail stores such as Radio

Shack. Although this unit was constructed of junk-box items, the parts if purchased new at Radio Shack would cost less than \$60.

References

- Miles, "Regulated Power Supply Is Adjustable from 0-38 VDC," *Electronics*, February 20, 1975, p. 93.
- The Linear Integrated Circuits Data Catalog*, Fairchild Semiconductor Corp., 1973, pp. 3-7.
- The Radio Amateur's Handbook*, ARRL, any recent edition.
- Voltage Regulator Handbook*, National Semiconductor Corp., 1975.

Strays

CANAD-X AWARDS

□ For various combinations of contacts, the Canadian DX Association sponsors three different awards. Each requires a fee of \$1 or 10 IRCs, and a list showing the date, time and specific location of each station worked. The list must be certified by a radio club official or two other licensed radio amateurs. QSLs need not be sent, but should be available for inspection. Address the application to CANAD-X, c/o A. R. Leith, VE1AL/3, 11-311 Bunting Rd., St. Catharines, ON L2M 3Y4. The awards are the Trans-Canada Award, Seaway Award and Provincial Capitals Award.

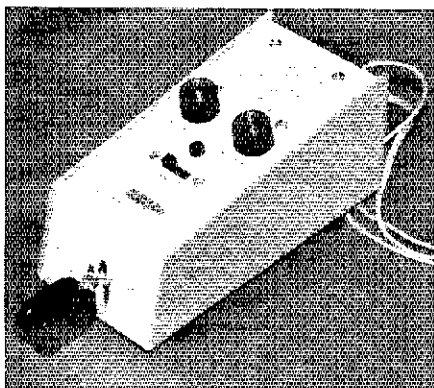
Hints and Kinks

SQUEEZE-PADDLE OPERATION FOR THE HD-10

For just under \$7, I have converted my Heath HD-10 keyer to squeeze-paddle operation similar to that of the HD-1410 keyer. I should point out that this modification produces only squeeze-paddle operation without straight-key functions produced from paddles treated as one.

Only four wires need to be disconnected and most of the work is mechanical. The procedure is to remove the cabinet bottom from the HD-10, extract the key-lever assembly, switch brackets, and to unsolder the four send and receive wires on the switches. Extend the four aluminum supporting posts from the circuit board 1-1/8 to 1-3/8 inches (29 to 35 mm) by

The Heath HD-10 keyer modified for squeeze-paddle operation.



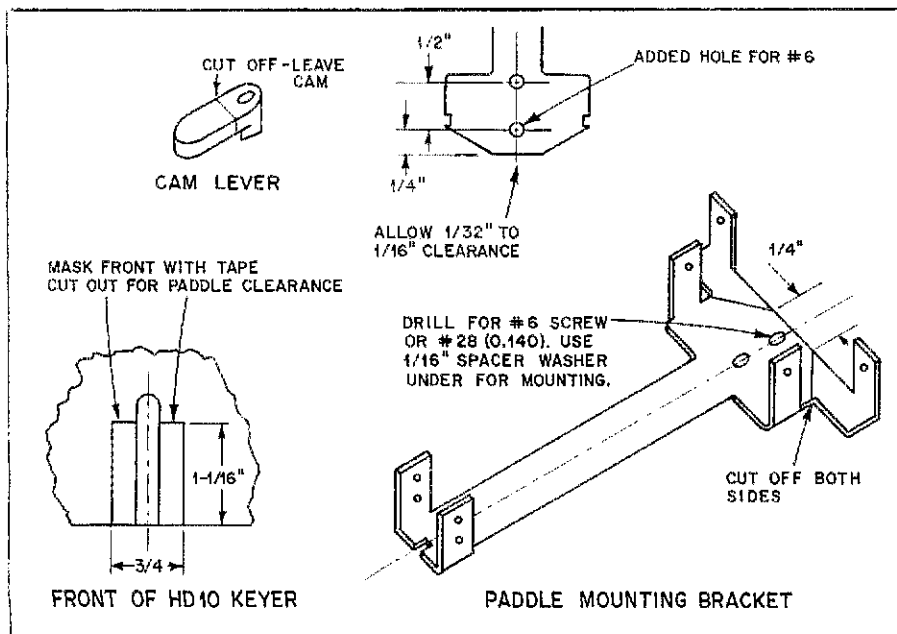
adding two extra 6-32 nuts and two 6-32 x 1/2 inch machine screws at each post. Mask the front of the HD-10 keyer with masking tape. Lay out the area with a ball-point pen or a fine-line marker.

To prevent steel filings from settling on the boards, I placed the board in a box and taped it shut. Next, one should scribe a center line on the bottom of the HD-10 case. Lay a paddle

The following Heath items are needed to perform the WB8JKH modification of the HD-10 keyer for squeeze-paddle operation.

- 1 — HD-1410 assembly manual.
 - 1 — 6-32 press nut, no. 252-109.
 - 2 — 6-32 thumbnuts, no. 252-23.
 - 4 — Rivets, no. 256-15.
 - 3 — Solder lugs, no. 259-9.
 - 1 — Spring wire, no. 258-179.
 - 2 — Paddle levers, no. 266-843.
 - 1 — Paddle mounting bracket, no. 204-2019.
 - 2 — Flat springs, no. 258-189.
 - 1 — Cam lever, no. 266-844.
 - 4 — Contact plates, no. 469-21.
 - 2 — Paddle knobs, no. 462-931.
 - 1 — 1/2-inch spacer, no. 255-15.
 - 1 — 1/16-inch spacer, no. 255-74.
 - 2 — 6-32 x 1-9/16-inch studs, no. 250-472.
 - 4 — No. 6 shoulder washers, no. 253-2.
- Other hardware:
- 2 — 4-40 x 5/16-inch machine screws.
 - 10 — 4-40 x 1/4-inch machine screws.
 - 4 — 6-32 x 1/2-inch machine screws.
 - 10 — 6-32 nuts.
 - 12 — 4-40 nuts.
 - 12 — 4-40 nuts.
 - 12 — 1/16-inch spacer washers.
 - 2 — 6-32 x 3/4-inch machine screws.

Mechanical information for converting HD-10 keyer to squeeze-paddle operation using HD-1410 parts. White and black wires are to be grounded. Inches x 25.4 = mm.



mounting bracket on the scribed center line in such a manner that the line can be seen through all three drilled holes. This bracket should be in the center and parallel to the sides, but placed 1/32 to 1/16 inch (0.8 to 1.6 mm) from the front edge of the unit. Before drilling the case, refer to the HD-1410 manual for information about assembling the paddle levers and contacts. Make sure the three contact terminals are bent away from the foil. Check for clearance. With reference to the drawings, note that the white and black wires of the key assembly are connected to ground. A new ground lug should be installed near the front of the case at a hole originally used to hold the old bracket. For right-hand operation connect the green wire to S-1038 and the red wire to S-1048.

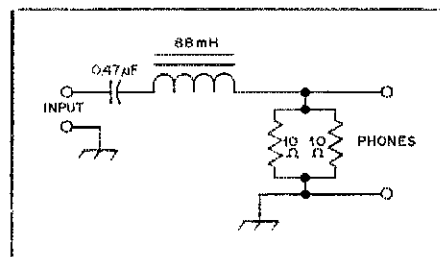
I hope anyone who tries this modification will be as pleased as I am. — Dale R. Errington, WB8JKH

MODIFIED VERSION OF FRANK NOBLE'S FILTER

That cw filter designed by Frank Noble and described in November 1977 *QST* is a gem! Surely, many of the fellows I work can use it.

My version of the filter resulted from a lack of 0.5- μ F, high-grade capacitors. I connected the inductor windings in series, providing a total inductance of 88 μ H. The capacitors are Radio Shack noninductive units, part no. 272-1071. Although two no. 272-1070 (0.22- μ F) capacitors can be employed, switching one out of the circuit to vary the tone, I find the 0.47- μ F capacitor provides a more pleasant result.

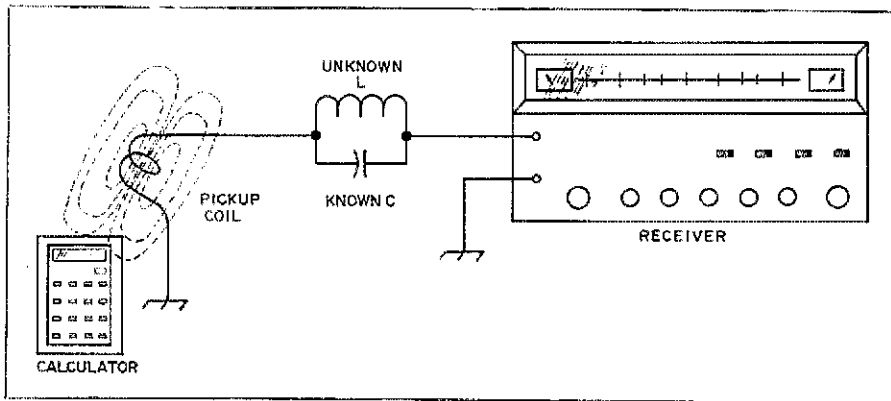
A 1-5/8 x 2-1/8 x 2-3/4 inch (41 x 54 x 70-mm) aluminum box, with a phono jack at each end, houses the components. Even though my SB-303 has a cw filter, the addition of the Noble-style circuit solves a lot of QRM problems! — George Shuart, W4AMN



This circuit, a modification of Frank Noble's audio filter, shows the method W4AMN compensates for a lack of high-grade, 0.5- μ F capacitors.

THUMB INDEX FOR CALLBOOK

A thumb index for your *callbook* can be made by holding the pages of each call area together and feeding them slowly into a grinding wheel. Grind about 1/4 inch (6 mm) deep. — Reggie Brown, WA4YKJ



Rf noise generated by a calculator LED readout circuit may be used in this manner for determining unknown L or C values.

LONG-WAVE CONVERTER

The simple long-wave converter I have built provides surprisingly good results. At Hilton Head Island, SC, I receive bc signals on 164, 180 and 185 kHz plus the San Francisco SFI on 192 kHz. The converter tunes down to 10 kHz.

A random-length wire or vertical antenna will furnish adequate signal pickup. I do not recommend a loop antenna.

As the diagram indicates, the output of the converter is in the range of 7.0 to 7.5 MHz. This is fed to the input of my Tempo One receiver. The oscillator is an International Crystal OX-1 set for 7 MHz. I find that almost any diode type may be employed in the circuit as a substitute for the 1N34. In order to avoid stray rf pickup, the diode cathode should have a short lead connected to the output jack.

For the inductors, I suggest using Miller part nos. 9002, 9004 and 9006. A standard 2.5-mH inductor will provide resonance for a random length wire in the vicinity of 180 kHz. Some experimentation with capacitance and resistance values should result in peak performance. — David Curry

COLLINS OSCILLATOR DROPOUT

Because of hf-oscillator dropout in my Collins 75A-4 when operating on the 10-meter band, I presented the problem to the engineers at Collins Radio and also to Bob Cerrick of Telcom. They recommended that the following checks

be made. The second of these mainly resolved the erratic situation in my receiver, for the B+ voltage was low. A lower value resistor, substituted for R21, restored the correct voltage to pin 6 of V4.

1) Check first-mixer tube V3 (6BA7) and crystal-oscillator tube V4 (12AT7).

2) Measure the B+ voltage at pin 6 of V4 (12AT7). It should be +175 V.

3) Test cathode bias resistors R17 and R18, which should be fairly well matched.

4) Locate the 12AT7 ground connection where R17, R18, R20 and the filament mate. Remove the ground lug and install a good-quality no. 4 internal- or external-tooth lockwasher between the chassis and ground lug. Zinc-plated types are best for this purpose, but other types will work as well. Carefully clean parts, assemble and tighten.

5) Find the ground connections for the 6BA7, R13, R14, C35, C36, R16 and filament ground. Repeat the lockwasher installations as with the 12AT7.

6) If oscillator alignment is necessary, follow the instructions in the Collins manual (page 5-3, item no. 9). — Charles Preston, K4LJH

CALCULATOR NOISE HELPS FIND LC VALUES

The value of an unknown microhenry inductor, including toroids, or of a picofarad-range

capacitor can be found accurately using the broad spectrum of rf noise generated by the interrupted LED readout of a pocket calculator. As indicated by the drawing on this page, the noise is fed to the antenna input of an a-d radio through a parallel LC filter containing one known element. The receiver is tuned for minimum noise with the calculator loosely coupled to a one- or two-turn pickup loop. The audio gain is set high.

Alternatively, the needle of an S meter on the receiver can be observed, or the a-gc voltage level can be monitored to find the frequency blocked by the LC filter resonance. The Q factor may be estimated from the sharpness of the null. There is no problem from broadcast transmitter interference at poor reception locations such as inside steel-framed buildings. — James F. Wilkins

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The following formula may be used to determine unknown L and C values.

$$f_{\text{MHz}} = \frac{1000}{2\pi\sqrt{LC}} \quad (\text{Eq. 1})$$

where: f_{MHz} = MHz
L = μH
C = pF

Thus:

$$\text{Unknown L or C} = \frac{\left(\frac{1000}{2\pi f_{\text{MHz}}}\right)^2}{\text{known L or C}} \quad (\text{Eq. 2})$$

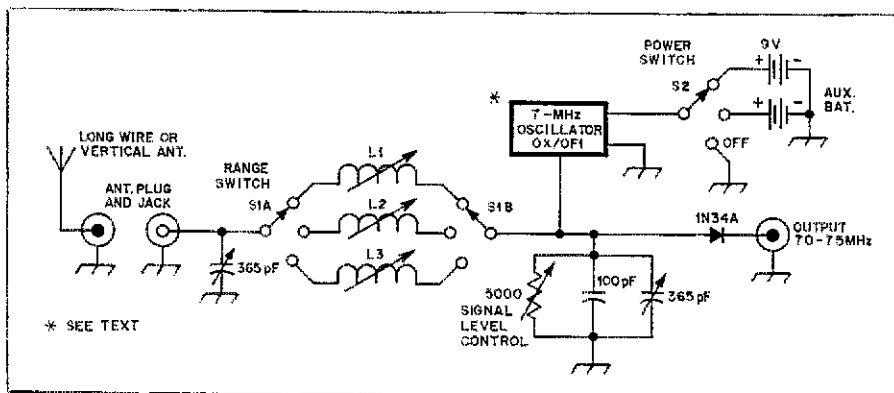
MORE FIRST AID FOR THE TA-33

I refer to repairing a TA-33 antenna, as suggested by Steve Jackson, WA3OHF/6, "Hints and Kinks" for November, 1977. I recommend, when a beam is down for repairs, that all traps and joints be cleaned thoroughly. Moisture, dirt, spiderwebs and other debris can collect in trap containers, leading to the possibility of serious coil damage. Cleaning the joints with a file or steel wool is part of the work. To properly finish the job the joints should be treated with Penetrox (made by Mosley) or an equivalent anti-corrosion solution. Lubrication, offered by the solution, not only frees the joints for easier element adjustment but also electrical contact is properly maintained. An alternative is to use an electrical contact paste such as that used by electricians. — Charles M. Guschke, N5SW

KINK

To strengthen the sidetone in the Swan 500CX or 700CX, insert a 0.01- μF to 0.05- μF capacitor in series with the 0.01- μF capacitor wired to pin no. 2 of V12, the 6GK6 audio amplifier. Increase the delay time for cw in the VX2 unit by changing the capacitor between the collector of Q3 and ground from 30 μF to 100 μF . — Dr. Charles Schwartzbard, WB2IWH

An easily built long-wave converter. The local oscillator is an International Crystal Manufacturing Company OX-LO or OF-1-LO. L1, L2 and L3, respectively, are J. W. Miller adjustable wide-range inductors nos. 9002 (0.180 to 0.800 mH), 9004 (2.10 to 8.00 mH) and 9006 (12.0 to 40.0 mH). A 2-pole, 3-position rotary switch is used for S1. S2 is a general-purpose, single-pole, three-position switch. The 7.0- to 7.5-MHz output of the converter is fed through coaxial cable to a shortwave receiver.



Product Review

R. L. Drake UV-3 VHF FM System

Fm-ers have long been familiar with the R. L. Drake product line. Until now though, Drake has imported its vhf fm gear. The UV-3 system is a radical departure from the norm, especially in these days of the sinking dollar: It's made in the U.S. While frequency-synthesized radios have been with us for a few years, this is the first time, to my knowledge, that a manufacturer has made it possible to work two or three bands with one box using frequency synthesis. For the fm operator who won't settle for separate rigs, with wires snaking all over the place, or, who's tired of grabbing the 220 mic when he wants to talk on 2 meters, the UV-3 may be the solution. From an operating standpoint, about the only disadvantage to this scheme is that you can only talk on one band at a time! If you must have all the bands chattering away at once, stick to the clutter.

Basically a 2-meter rig, the UV-3 allows operation on 220 and 440 MHz by means of add-on circuit boards for each band. For instance, you can start with 144 MHz only and add 220 and 440 later on, or start with two bands, adding the third when needed. Because of its design, 2 meters must be included in the selection of bands, no matter which others you want. Since everyone, it seems, is on 2-meter fm, this shouldn't be a problem.

To chose an operating frequency, the band switch is placed in the 140-, 220- or 440-MHz position. The selector switches are used to dial up a frequency which is added to that indicated by the band switch. For example, if 6.520 MHz is selected, the transmitter will operate on 146.52, 226.52 or 446.52 MHz, depending on the position of the band switch. This feature can get you into trouble if you aren't careful. Trying to operate too far from a band edge causes an audible alarm to sound, but it is possible to transmit on 143.50 MHz, for example. This happened to me when I *thought* I was on 223.50! Once you get used to the rig you'll remember to flip the band switch too. As it is, the radio allows the use of MARS and CAP frequencies just outside the 2-meter band. This is a desirable feature to many hams.

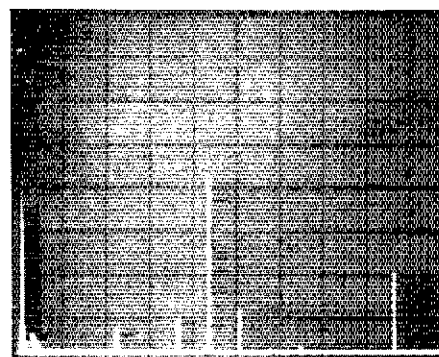
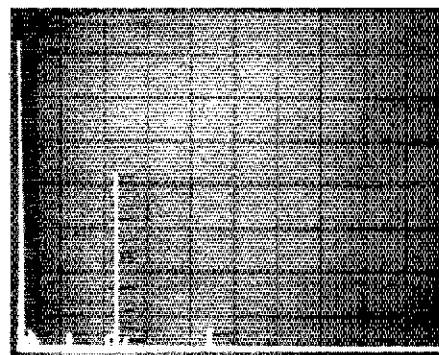
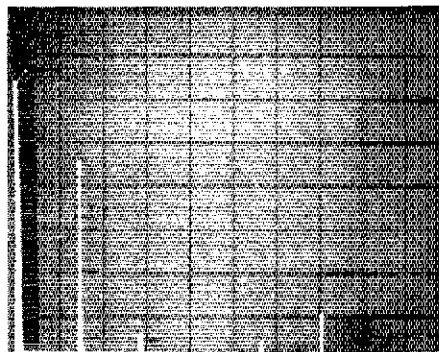
Instead of using seven-segment readouts, the Drake engineers chose a backlighted dial incorporated with the synthesizer rotary switches. While the dial is attractive, it's hard to read when incident light is too strong. Most of the synthesizers I've used suffer from this problem. It can usually be dealt with by careful placement of the rig in the car, using the dash to shield the panel.

Speaking of installation in a car, this is a lot of radio to leave hanging under the dash. Drake includes a very sturdy mount with a quick-release lever to expedite installation and removal. There's no excuse for leaving the radio in the vehicle, even for a minute. Of course you have to disconnect the power cable and up to three antenna cables, but that's hardly worth supporting your local thief!

In addition to one that adds 5 kHz to the synthesizer output for nonstandard channels, toggle switches are provided to select high- or low-power output and to chose between scanning a programmed channel or the dial-selected frequency. Four channels on each band may be programmed by the user. Drake supplies 50 computer switching diodes separately for use in the programmer. The diode leads are gripped in a socket, which makes it easy to change programmed frequencies. You can make one of the four channels a "priority" frequency, in which case the scanner will continuously inspect it for occupancy. If you're operating on the priority channel, the scanner will keep an eye on the frequency you have selected with the dial. Repeater-control-station operators who like to keep an ear on their machine will especially like this feature. They can sneak away to another frequency and yet be alerted when anyone shows up on the repeater. If you and your friends have a special simplex frequency, you can always be sure you'll know when one of them is using it. In addition to the standard 600-kHz offset on 144 MHz, 1.6 MHz on 220, and 5 MHz on 440, three other offsets may be programmed into the UV-3.

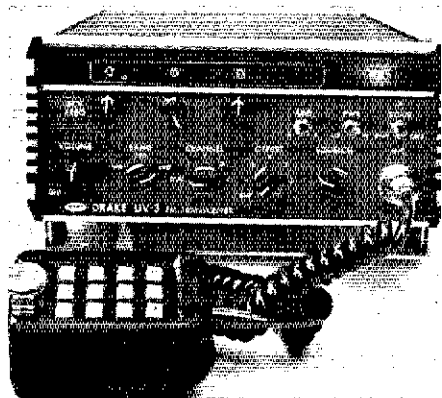
The vital statistics of the UV-3 are contained in the table. Here we can be a little subjective. The UV-3 seems somewhat heavy and oversized until you remember that it covers three bands, not just one. Single and two-band versions are smaller and lighter of course. When you wish to increase your coverage, send the unit back to Drake, where a new case and the necessary electronics are installed. In order to comply with FCC's Part 15 rules for receivers, the work must be done at Drake.

I'm a nitpicker about receiver audio. This one sounds *real*. The microphone doesn't get lost in the palm of my hand, and looks like it might take some abuse. I hope the availability of this rig will lead to more hams trying the other bands. One last feature is worth mentioning: If you *must* leave the radio in the car, or if you have some reason for keeping the under-dash area clear, you can buy a kit (UMK-3, \$70 price class) to mount the radio in the trunk, or somewhere else in the car. The front panel becomes a control head, which mounts in a small box up front, and a cable connects it to



Photographs of the transmitter output of the UV-3 as displayed on a spectrum analyzer. Vertical divisions are 10 dB per division. Horizontal divisions are each 100 MHz. The top reticle line in each photo represents the full amplitude of the fundamental, which is partially notched out here to enhance the dynamic range of the analyzer. The most significant spurious emission on 2 meters (top) is the fifth harmonic at 700 MHz, suppressed 69 dB. The 2-meter second harmonic is 74 dB down. On 220 MHz (center), the second harmonic is the largest spur, down 72 dB. These two bands are subject to FCC regulations concerning purity. The transmitter-output purity greatly exceeds these regulations. At the bottom is the 440-MHz output, not subject directly to FCC regulations. The second harmonic at 880 MHz is suppressed 69 dB. All other spurs are down at least 68 dB. The UV-3 is one of the "cleanest" fm rigs we have inspected. These measurements were made in the ARRL lab.

All-new R. L. Drake UV-3, three-band vhf/uhf fm transceiver, shown with optional 1525-EM Touch-Tone encoder mic.



R. L. Drake UV-3 Specifications

Dimensions 4 x 8 x 15 inches (102 x 203 x 381 mm).

Weight, including microphone: 11 pounds (5 kg).
Accessories: PS-3 power supply 13.8 V dc, 6 A continuous-duty, price class: \$90; 1525-EM encoder microphone, price class: \$50.

Power requirements: 13.8 V dc at 1.1 A (receiver), 2.5 A (transmit-low), 6.5 A (transmit-high).

Freq. band	Power output, watts (high-power position)	Receiver sensitivity in μ V for 20-dB quieting
144	35	0.5
220	15	0.16
440	8	0.18

All measurements performed in the ARRL lab.

the rig. Price class of the UV-3 as tested is \$800. — WJXZ

SWTPC AC-30 CASSETTE INTERFACE AND MF-68 DISK SYSTEM

This product review covers two kits offered by Southwest Technical Products Corp. The first is the AC-30, an audio-cassette interface that provides a low-cost method for using inexpensive audio-cassette tapes to store and load computer programs.

There are many methods of increasing the memory (or storage capability) of a computer. Random-access memory (RAM), usually considered the working memory of a computer, consists of integrated circuits. However, it is impractical to consider random-access memory for long-term storage of programs or data. To do so would be extremely wasteful and expensive. At the inception of the popularity of microcomputers a few years back, it was quickly apparent that there was a need for memory storage which was practical and inexpensive. Audio-cassette recorders appeared to be the best way to go. One of the early problems with audio-cassette-tape storage was that the new hobby needed a standard for tape speeds, tones, etc. Back in 1975 *BYTE* sponsored a symposium in Kansas City and at that time, coordination on the part of manufacturers of microcomputers resulted in a standard method. The standard is simple: Record data serially using the standard UART format at 300 baud (30 characters per second). Marks, or logic ones, are represented by recording a 2400-Hz sine wave on the tape while spaces or logic zeros are represented by recording a 1200-Hz sine wave. With the right kind of circuitry, such recorded data can be read off the tape and converted to parallel data using a self-clocking UART system. Such a system permits ± 30 -percent speed variations in the recording tape. This, in turn, means that low-priced audio-cassette recorders can be used with good success. As a matter of fact, this reviewer is a garage-sale nut and has acquired several "cheapy" recorders. In every case, when used with the AC-30, the recorders successfully "loaded" and "dumped" tapes.

What will the AC-30 do? Well, if your computer uses standard RS-232 serial interfaces through 300 baud with a clock rate that is 16 times the data rate (most are), you can do all

kinds of neat things. The AC-30 is equipped to handle two recorders and have one reading while the other records. The AC-30 can be either manually or computer controlled, for either of two cassette motors in both the read and record modes. Another nice feature is the LED indicators which show when data are going in or coming out both in the record and read modes.

The AC-30 is a self-contained unit in that it has its own power supply built in. Most of the circuitry is mounted on a double-sided circuit board (excellent quality) and the power supply and board are installed in a neat-looking cabinet, 12-3/4 inches wide, 11 inches deep, and 3 inches high (324 x 279 x 76 mm). The cabinet has a perforated metal cover which provides adequate ventilation. One of the best ways to describe the AC-30 and its functions is to go through the switch and connection listings.

If you look at the average cassette player you'll find three jacks, one for EAR, another for MIC and a third for REMOTE. The AC-30 has three connection jacks (RCA type) for the above connections for cassette recorder A, and another three jacks for cassette recorder B. These jacks on the AC-30 are connected via patch cords to the corresponding jacks on the recorders. It should be pointed out that only *one* recorder is required for most operations but if you wish to switch files and "juggle" tape programs or files, the provisions are there for two recorders and such operations.

A RECORD SELECT switch permits you to output data to either recorder, A or B, and a READ SELECT switch lets you read data from either recorder. A three-position switch controls the record status. When this switch is in the center position the computer program commands can be used to set the state of the record latch. Manual override is accomplished by flicking the switch to either end position, ON or OFF. A READ STATUS switch operates in a similar manner to the record switch. In the center position, the computer program controls the read latch.

There are also READ and RECORD data indicators — LEDs. One really comes to depend on the LEDs because they provide a visual indication that data are flowing through the AC-30, either to the tape or from tape to the computer or terminal.

Documentation of the AC-30 kit is excellent and our finished kit worked the first time we turned it on. The kit went together fairly fast; it took about eight hours to assemble.

The AC-30 is relatively inexpensive in the \$80 price class. However, some comparisons are in order. While audio-tape cassettes are an inexpensive way to store programs, and do so accurately, there are some disadvantages. The main one is speed. At the 300-baud rate used, it can take 20 minutes or more to load in an 8-kilobyte (k) program. While not everyone is hung up on speed, microprocessors are more or less rated on how fast they operate, and moving programs in and out of the computer can be important. One of the best methods to date for fast memory program storage is via a floppy-disk system.

The MF-68 Disk System

The SWTPC MF-68 is a dual floppy, meaning two disk drives are available. It is designed primarily for the SWTPC computer but with modifications can be used with other systems.

Before discussing the MF-68, let's first discuss what is meant by "floppy disks." A

Table 1

Instruction Set Summary for MF-68 BASIC

Commands	Statements	Functions
APPEND	CHAIN	ABS(X)
CAT	CLOSE	CHR\$(X)
CONT	DATA	COS(X)
DIGITS = &	READ	DEF FN(X)
DOS &	RESTORE	EOF(X)
KILL &	FOR/exp/to/exp/	EXP(X)
LINE = &	NEXT	INT(X)
LIST &	GOSUB	LEFT\$(X\$,N)
LOAD	DIM*	LEN(X\$)
MON	END	MID\$(X\$,S,Y)
NEW	GOTO*	PEEK(X)
PORT = &	IF/rel.	POKE(I,J)
	exp./THEN/line/	
RENAME &	INPUT*	POS
RUN	ON/exp/GOTO/	RIGHT
	line(s)/	(X\$,N)
SAVE	ON/exp/GOSUB/	RND(X)
	line(s)/	
STRING = &	PRINT*	SGN(X)
TAPPEND	REM	SIN(X)
TLOAD	RETURN	SQR(X)
TRACE ON & STOP		STR\$(X)
TRACE OFF &WRITE		TAB(X)
TSAVE		TAN(X)
		USER(X)
		VAL(X\$)

*Denotes statements that may be used in the DIRECT mode

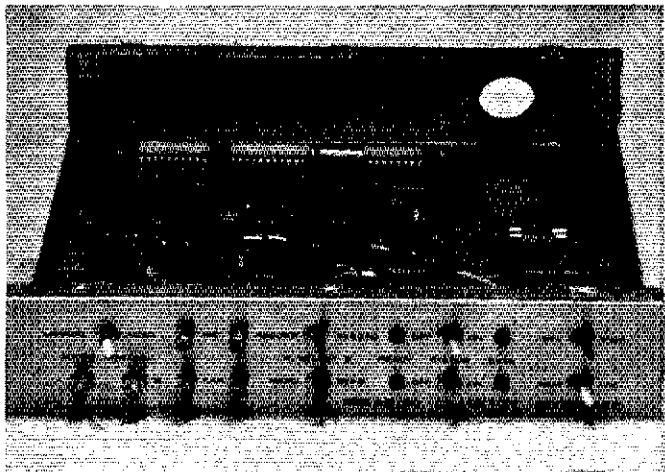
&Denotes commands that may be used as program statement

floppy disk is similar to a phonograph record except that it is made of thin Mylar and coated with a ferromagnetic material. The disk is mounted in a cardboard holder with most of the area of the disk covered. There is a center spindle hole plus a small open area where the floppy-disk read-and-write mechanism can scan the material on the disk. There are several sizes of disks on the market, and the MF-68 uses a size called a Mini-diskette. There are some disks that are double-sided but the MF-68 uses single-sided disks. Memory storage capacity for the MF-68 disks is on the order of 90,000 bytes — that's bytes, not bits! The diskettes cost about \$5 each so one can quickly see that this is an economical method of getting lots of memory capabilities.

The MF-68 kit consists of a cabinet, power supply, two Shugart diskette drives and the interface board for the computer. The interface board is plugged into the mother board of the computer and connected to the floppy drives via a multiconductor cable.

The kit is very easy to build and can be put together in an afternoon. The two Shugart drives are already assembled so there is no work involved there. Also, the cabling for the computer connections comes already wired.

If you are into computers and you have never been exposed to disk systems, you are in for a real surprise. Speed is the word here. For example, the software provided with the MF-68 is a system called FLEX plus an extended BASIC (the BASIC is about 12 k). When the disk with FLEX and BASIC is placed in the drive and the proper keyboard terminal key pushed, it takes about three seconds to bring up the fully loaded system! With any imagination at all you can see the potential of having such a system in your station. Let's say for the sake of discussion that you are interested in contests. It is not at all complicated using the



The SWTPC AC-30 cassette interface shown here from the front with the top cover removed. Two separate cassette machines can be controlled using this device, thus making functions such as program filling and "juggling" much easier.



The MF-68 dual floppy system showing the innards. The computer interface board with its cable is on the right. In front is one of the diskettes used in the drive. It is approximately five inches on a side.

MF-68 and a computer to set up the system so that all your logging would be taken care of. Or while you are working 20 meters, the computer can be searching the other bands for new countries or multipliers and could alert you when one was found — or even make the contact for you! However, that poses an interesting question of single or "multi-op" status; is the computer an "operator"? The MF-68 with its dual disks can be programmed to work back and forth, keeping records. In fact, a fully automated station is here now — not in the future!

FLEX and BASIC

The FLEX system provides the user with a powerful set of commands to control all disk operations directly from the user's terminal. The system is comprised of three parts, the file management system (FMS), the disk operating system (DOS), and the utility command set (UCS). The real power of the system is that it can be greatly expanded simply by adding additional utility commands.

FLEX also uses what is called "fully dynamic file space compression and expansion" on all text files. In effect, this eliminates waste memory areas on the disks. There is an extensive catalog command (CAT) for examining the disk file's directory.

Memory computer requirements (RAM) for the system using dual-disk drives are a total of 16 k. Documentation is excellent and newcomers shouldn't encounter too many problems.

Rather than go into a long dissertation on SWTPC's BASIC, we have listed the instruction-set summary in Table 1. BASIC language is pretty much the common denominator among microprocessor fans, and in our opinion, SWTPC is right at the forefront in this category. If an instruction is needed that *isn't* shown, one can always resort to FLEX and *make* such a function.

The price class of the MF-68 is \$995. Manufacturer: Southwest Technical Products Corp., 219 W. Rhapsody, San Antonio, TX 78216. —W11CP

PALOMAR ENGINEERS VLF CONVERTER

My friends know I'd rather be on vhf. But,

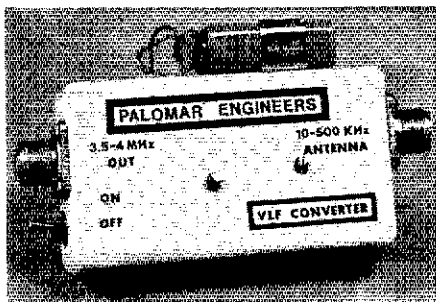
when the chance came along to try the diminutive Palomar vlf converter, I just had to find out what was going on below the broadcast band. After installing a battery I swiped from a portable radio, I connected the converter to the hf receiver I use as a vhf i-f system. After tuning through a maze of RTTY and airport beacon stations I decided to listen in the Experimenters' band from 160 to 190 kHz. What's this? — a beacon sending a wobbly but unmistakable "K2ANR"! A look in the *callbook* told me that K2ANR was about 80 miles (130 km) away. My vlf antenna was just the old 80-meter inverted V I keep up for nostalgic reasons.

Circuit Description

Incoming signals from 10 to 500 kHz are slightly preamplified, passed through a low-pass filter and mixed with the output of a 3.5-MHz crystal oscillator. Converter output is from 3510 to 4000 kHz. If your hf receiver has an accurate dial, you can read the received frequency with great reliability. This is a great help when you're digging for a weak signal.

Shortly after hooking up the Palomar converter I acquired a Navy-surplus RAK-8 vlf receiver. This unit is definitely in the "boat-anchor" class. With power supply, this TRF (tuned-radio-frequency) monster weighs 120 pounds (55 kg)! In side-by-side comparisons with various antennas, the Palomar converter consistently allowed reception of signals I couldn't copy on the RAK-8. This is largely

The Palomar Engineers vlf converter measures only 1-1/4 x 4-1/2 x 1-1/4 inches (32 x 114 x 32 mm) yet it lets you listen to all the action between 10 and 500 kHz! Power is supplied from a single 9-volt battery.



due to the improved selectivity obtained with the hf receiver. As every vhf operator knows, a converter can be no better than the receiver it's used with. If you've already got an hf receiver you can live with and you're interested in vlf, you're better off with the Palomar converter than to add a boat anchor to your collection. The boat anchor may have more "class," but it'll never hold its own when the headphones go on. Available from Palomar Engineers, Box 455, Escondido, CA 92025, price class of the converter is \$65. —W1XZ

KAMPP ELECTRONICS AUTOBRAK KITS

For 20 years the Ham-M rotator has been the most widely used among amateurs. Properly installed with a thrust bearing and appropriate mast, the Ham-M will turn fairly large antenna loads. Stopping those loads is a somewhat different story, however, as is holding position under severe wind conditions. Thus, the brake in the rotator may fail when conditions get tough.

The basic Ham-M unit, still readily available on the used market, allowed no time delay between motor stop and brake engagement. W1FBY dealt with this problem in his May, 1971, *QST* article on delayed braking for the Ham-M. Many users duplicated his scheme, which involved automatic delay of the brake, adjustable over a range of about 1-10 seconds. Others merely "brought out" the supply lines for the brake to an external switch, accompanied by a warning light, so the brake could be controlled completely manually. That was okay so long as the operator was familiar with the system and didn't forget to disengage the brake before rotating (and didn't forget to reengage the brake after the antennas coasted to a stop!).

The CDE model Ham-2, introduced in 1977, uses three push buttons, two for rotation (right or left) and one for the brake. Many amateurs found it inconvenient having to hold two buttons down during rotation. Further, a certain coordination is required to release the motor control button while continuing to hold the brake "out" while the antennas coasted. This becomes nerve-racking during the heat of a contest, for example.

An article by K9CW (*QST*, August, 1977) described a delayed-braking circuit for the

Ham-2. The Autobrak kit discussed here, the AH-2, does essentially what K9CW described. Autobrak makes disengagement of the brake automatic when the motor activate button is pushed, and it allows for variable time delay of brake engagement once the motor button is released. In addition, Autobrak offers a kit for modification of the older Ham-M units, the AHM.

Autobrak comes with eight pages of instructions, three of which are the actual assembly and modification directions. The remainder of the manual includes a parts list and pictorials of the Ham-2 control unit and schematic diagrams. The normal procedure of reading the entire manual before beginning work is recommended. Modification of the Ham-2 can be accomplished easily in one evening session.

All parts are included in the kit, and are mounted within the Ham-2 control box. The potentiometer delay control is adjusted by a screwdriver through an existing hole in the bottom of the cabinet. An LED indicator warns when the brake is disengaged.

Autobrak kits are sold by Kampp Electronics, Inc., 820 E. Roosevelt Rd., Wheaton, IL 60187. Price class is \$20. — *WJSE*

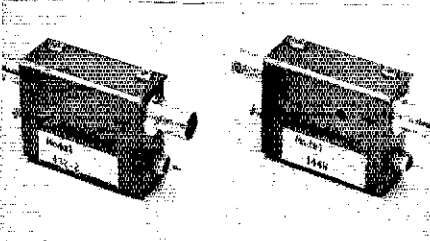
ANGLE LINEAR VHF/UHF RECEIVING PREAMPLIFIERS

Low-noise bipolar and field-effect transistors have made great inroads in the area of vhf/uhf weak-signal reception. In the past, receiver noise figure determined the minimum level at which signals could still be detected. It is now possible to design a preamplifier providing at least 10 dB of gain with a noise figure low enough to make the preamp no longer the weak link in the reception chain. Once the noise figure has been reduced sufficiently, only an increase in antenna gain or a reduction in losses between the antenna and receiver will improve overall reception.

Multimode transceivers have been responsible for an increase in the number of stations operating ssb on vhf. Many of these units have excellent noise figures but could use more front-end gain to improve agc action. A 10-dB-gain preamp will often greatly improve reception.

Ten-meter DX hunters and users of OSCAR 7 Mode A often find that their receivers can use additional gain on this band. ATV (amateur television) operators sometimes find it necessary to detune the rf and i-f sections of their receivers to permit reception of wide-

The preamplifiers are small enough to become lost on a cluttered bench if you aren't careful! A choice of BNC, UHF, N, TNC or SMA connectors is available, or a connectorless version is available. This version may be mounted inside your rig or converter. Preamplifiers specifically designed for installation in commercial multimode transceivers can also be purchased from Lunar.



bandwidth TV signals. Broadbanding in this fashion seriously degrades receiver sensitivity. A preamplifier for this application must have wide bandwidth with uniform gain. Chances are, if you operate vhf or uhf, you fall into one of these categories. If so, the Angle Linear low-noise-figure preamplifiers may be just what you need.

Developed by Chip Angle, N6CA, preamps are currently available for use from 28 through 500 MHz. The units tested were the model 144N for 2 meters, and the model 432-2 for 70 cm. The noise figure of these preamps is advertised as 1.5 and 1.6 dB respectively. At the time of this review, Hq. is not equipped to perform noise-figure measurements. The reviewer was fortunate in being able to attend vhf conferences where noise-figure measurements were conducted, and was able to confirm that the Angle Linear preamps mentioned meet the manufacturer's specifications for noise figure and gain.

Angle Linear preamps may be ordered with or without cases, and with a choice of BNC, TNC, SMA and RCA phono connectors, or without connectors if no case is desired. Installation kits for Kenwood, Yaesu and ICOM transceivers are available, which allow the preamp to be mounted inside the rig. All Angle Linear preamps are designed for operation from 12 V dc. The 144N draws 10 mA and the 432-2 draws 6 mA. * The units have a gain of 12 and 15 dB respectively.

The reviewer could not resist looking inside the tiny, 0.7 x 1.5 x 1.85-inch (18 x 38 x 47 mm) attractive box. Construction is simply top-notch. All components appear to be high quality. Motorola and Hewlett-Packard transistors are used.

Laboratory measurements are useful and necessary, but the proof is in the performance. Both preamps were used in conjunction with commercially made and home-built 144- and 432-MHz receive converters. In all cases, system signal-plus-noise-to-noise ratio was markedly improved, and reception of weak signals was greatly enhanced. To the best of the reviewer's knowledge, no other commercially available preamplifiers can match or beat the Angle Linear components if system noise figure is the criterion. The rugged, professional construction should result in excellent performance over a long period of time.

Angle Linear preamplifiers are manufactured and distributed by Lunar Electronics, 4519 Narragansett Ave., San Diego, CA 92107. Price class of the 2-meter preamp with BNC connectors is \$35. Price class of a similarly equipped 432-MHz preamp is \$40. — *WIXZ*
*Measured in the ARRL lab.

NEW BOOKS

Tune In The World With Ham Radio, 2nd edition, edited by Anthony R. Curtis, K3RXX/W8TIZ and Judith G. Curtis, WB3AIQ. Published by ARRL, Newington, CT. Paperback 8-1/2 x 11 inches, 112 pages. Manual plus 44-page Student Workbook and Morse code instruction cassette. Price: \$7.

This is a completely revised edition of the popular instructional package used by many of today's new amateurs in licensing classes across the country. New graphics and a completely rewritten technical section head up the changes in this edition. Also included for the first time is a workbook that allows the student to work right along with the textbook theory. *Tune In*

The World With Ham Radio was revised in order to incorporate changes that were suggested after the original edition had been used by thousands of students in hundreds of licensing classes. Input from students as well as instructors should make this revised edition even more useful than the first. Chapter headings include Exploring Ham Radio, Managing the Radio Spectrum, Understanding Basic Theory, Learning Your New Language, Setting Up Your Station, and Getting On the Air: Your Final Step.

The text is well illustrated and is indexed. This book should continue to provide an excellent introduction to amateur radio for the prospective ham regardless of his age, occupation or previous radio experience. — *WBICUJ*

PARTS PROCUREMENT CORNER

Last month we extolled the virtues of quantity buying and how club members could band together and save themselves a bundle of money. Finding the best prices can be a rather time-consuming job since there are many suppliers for any given product. Don't expect all large distributors to quote the same price for a particular item. In the process of making large orders we recently discovered some distributors quoting prices that were as much as three times that of other large distributors!

The first step toward knowledgeable purchasing is to gather as many parts catalogs from as many distributors as possible. Some will send their catalog free and others will charge a nominal handling fee. This usually amounts to only the postage required to get the book to you. In some cases the distributors do not print a catalog but will supply a listing of the manufacturers' product lines that they carry. In those cases you'll have to call or write for prices. Remember, large-quantity buying means the best per-unit price.

Listed below are the names and main addresses for some of the larger distributors. In general, the best prices can be obtained from the larger distributors. Next to each name is the area of the country that the distributors serve. (E) East, (MW) Mid-West, (W) West, (S) South.

- E, MW, W, S — Cramer Electronics Inc., 4035 N. 29th Ave., Hollywood, FL 33022.
- E, MW, W, S — Newark Electronics, 500 N. Pulaski, Chicago, IL 60624.
- E, MW, W, S — Hamilton/Avnet Electronics, 10916 W. Washington, Culver City, CA 90230 (and 4445 Sigma Rd., Dallas, TX 75240).
- E, MW, W, S — Graybar Electric Co. Inc., 420 Lexington, New York, NY 10017.
- E, MW, W, S — Allied Electronics, 1355 McLean Blvd., Elgin, IL 60120.
- E — Gerber Electronics, 852 Providence Highway, U.S. Rte. 1, Dedham, MA 02026.
- E, MW, W, S — Lafayette Radio Electronics Corp., 111 Jericho Tpke., Syosset, NY 11791.
- E, MW, W, S — Marshall Industries, 9674 Telstar Ave., Elmonte, CA 91731.
- E, S — Reliance Merchandising Co., 651 Winks Ln., Cornwells Heights, PA 19020.
- E, MW, W, S — Radio Shack, 2617 W. 7th St., Fort Worth, TX 76107 or through local store.

In next month's parts procurement corner we'll have a list of suppliers for ready-made circuit boards and some of the harder-to-find components. See you then. — *W1VD*

Amateur Radio Shines Through the Blizzard Blitz of '78

'Twas the winter you'll recount to your grandchildren. Amateur radio kept many shacks warm through the duration.

By Stan Horzepa,* WA1LOU

"Simulated emergency test? You gotta be kidding. This is the real thing!" Storms raged all across the Midwest, South and Northeast in late January and early February, dumping megatons of snow and ice right into the middle of ARRL's regularly scheduled Simulated Emergency Test. Real emergencies were declared by several state governors and some states were officially shut down to all but emergency vehicular traffic.

A Blizzard of Reports

Many amateur radio operators in the affected areas actively participated in

*Communications Assistant, ARRL

varied relief efforts, while many others stood by on weather emergency nets in case their assistance was needed. This involvement brought a blizzard of mail to ARRL headquarters. Due to space limitations it has been impossible to report on and acknowledge all the reports. However, the Public Service Branch of the Communications Department sincerely thanks all who responded to its request for blizzard accounts. Here is a cross section of actual amateur radio reports from the areas ravaged by the blizzard of '78.

Everyone Pitched In

Some of us were at the Massachusetts Area 1 civil defense bunker providing

communications for the c.d. director. One of the shortcomings of the effort was the lack of provisions for relief operators. When we asked for assistance, Bob Underwood, W1GAT, although in pain and under strong medication, came out during the storm with his own equipment to help us through the emergency. Hundreds of others also helped.

On April 3, W1GAT died of cancer. He was only 30 years old and leaves his wife (WB1DFH) and two young sons. Bob was an active and dynamic ham and a premier cw operator; he was a dedicated ham of the highest degree and I will especially remember him for his supreme efforts during the blizzard of '78. — KIPAD

It's a Girl!

Chris and Sue Lockwood of Stony Point, MI, were stranded at home in the midst of the blizzard without heat, water or telephone service and Mrs. Lockwood was ready to give birth. Their next-door neighbor, N8RE, used an emergency generator to power his 2-meter transceiver and attempted to find transportation to a hospital for Mrs. Lockwood. Snowmobiles with sleds attached were unavailable, so N8RE abandoned his initial effort and attempted to contact a doctor for advice.

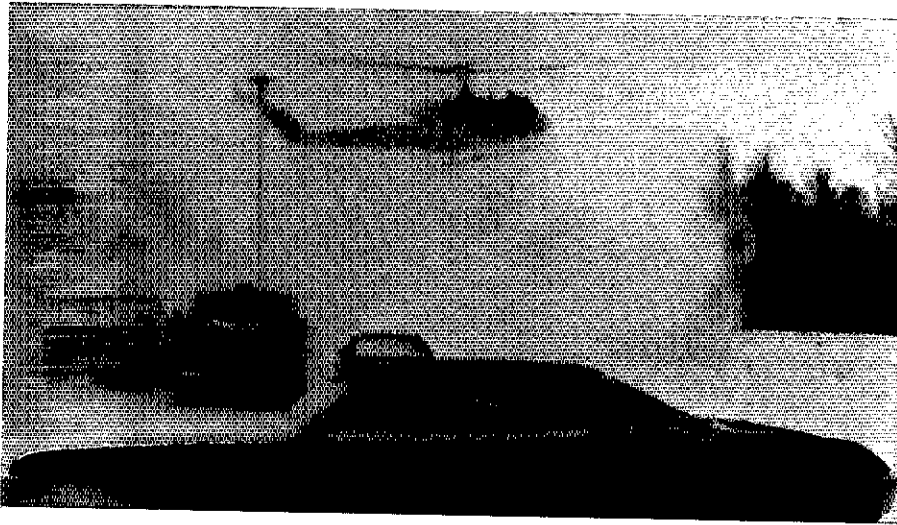
WB8LPY was able to telephone Mrs. Lockwood's doctor and his instructions were relayed via WB8LPY to N8RE to the midwives in attendance. A daughter was born without any problems and the mother and child were later transported to a hospital via a four-wheel-drive vehicle. — W8YIQ

"4 x 4s" and Handhelds

Hams who owned snowmobiles or four-wheel-drive vehicles ("4 x 4s") were very busy. Often these forms of transportation were the only kind possible or permissible. Nurses, doctors and victims of the weather often found themselves being transported by someone with the controls in one hand and a handheld transceiver in the other.

Dan Lynch's cartoon in the *Fort Wayne (IN) Journal-Gazette* was especially apropos in light of the blizzards which cloaked the scheduled Simulated Emergency Test of January 28-29. (submitted by WA9YOS)





National Guard helicopters flew missions throughout northern Ohio with amateur radio operators aboard to provide communications for the weather emergency operations. (Miami Valley FM Association photo)

During the storm, a request was broadcast for owners of four-wheel-drive vehicles to help transport medical personnel from their snowbound homes to hospitals. As emergency coordinator of Wallingford, CT, and owner of a "4x4," I immediately phoned the local hospital to offer assistance.

The first call from the hospital came in with the name and address of a nurse needing transportation from her home to the hospital. WA1SJX and WA1CCR started out over unplowed roads, but the snowdrifts were too deep to permit the volunteers to arrive at the nurse's front door. Members of the Wallingford ARES had been standing by on the Wallingford

Emergency Net (WRIAKG), and they plotted a new route to bring the "4x4" within walking distance of the house. A quick telephone call alerted the nurse to the situation and she began trudging to the vehicle.

Meanwhile, WA1CCR had hailed a passing snowmobile, explained the predicament and the snowmobiler volunteered to pick up the nurse and bring her to the waiting "4x4." — WISY

RACES Activated

The Genesee County (MI) ARES was active during the blizzard with more than 100 participants, and for the first time in county history the c.d. director activated

RACES, "the maximum emergency group." These groups dispatched National Guard and privately owned four-wheel-drive vehicles and ambulances on medical emergencies and to transport nurses and physicians.

In one case, three "4x4s" were stuck attempting to reach an ill child (each vehicle took a different route) and only a large National Guard ambulance succeeded. The progress and problems with all vehicles were known at c.d. headquarters through radio contact, and the local repeater autopatch was used to alert the hospital to the nature and time of arrival of the patients. This insured that the emergency room was fully prepared and that doctor's advice was instantly available if needed by the medics. — W8WN

Storm Causes Evacuation

In addition to transportation, the weather had other disruptive effects. Many communities were without heat and electricity. Food became scarce in some areas. When living conditions deteriorated completely, evacuation was often necessary.

By providing communications, the Clark County (IN) ARES assisted local sheriffs and the National Guard in two large evacuations. Heavy equipment was used to clear snow drifts on a road leading to a trailer park that was without power and heat and 41 people were evacuated to a nearby schoolhouse that had been converted into an emergency shelter.

Large ice floes breaking loose from the Markland Dam caused the Ohio River to rise, threatening to strand or flood inhabitants along the riverside. A two-

K1ILB readied the Salem (NH) c.d.'s 2-meter-equipped snowmobile for a mission of mercy with medical doctor, WA1UER, aboard. K1RCT, WA1YLC and WA1SOT stood by on 2 meters to direct the mission. (W1PFA photo)



Ohio was literally knee-deep in snow, as demonstrated by K8YQH. (Miami Valley FM Association photo)





K8TOA relayed information for the Ohio National Guard via 2 meters for the Wooster blizzard cleanup operation. (WD8LLD photo)



The 75M Kentucky Traffic Net held emergency sessions during the weather emergency and WB4NHO and WA4RXZ (a blind operator) monitored the net to handle traffic for the Owensboro area. (K4EMX photo)

pronged effort was initiated; one group began clearing the roads leading into the affected area, while another group set out in a towboat to attempt evacuation. When the boat arrived, the evacuees refused to board, fearing the large ice floes in the river, so they waited six hours for the roads to be cleared by the other group. — K9TE

Stranded on the Highway

While many people were stranded in their homes, others were stranded on snow-covered roads and highways.

VE3GCP was commuting home and became stuck in the snow on a main thoroughfare. Visibility was nearly zero and many people were immobile in vehicles with dead, smothered motors. With much difficulty, Fred plodded to a nearby church to seek shelter. After gaining entry into the building, he rescued stranded people in nearby cars (including a pregnant woman) and with the help of other men, 30 people were eventually sheltered in the warmth of the church.

Fred took his 2-meter transceiver out of his car, borrowed a car battery and, using a lamp cord for a power connection and a coat hanger for an antenna, he was on the air to pass health and welfare traffic for the evacuees in the church who wanted to inform their families as to their whereabouts. — VE3FHQ

Emergency Brings Out 3000 Hams

The blizzards of the past winter were the most widespread and devastating in recent years. More than 3000 hams are known to have participated. Their involvement saved numerous lives and eased the burden on the relief and governmental agencies involved in the rescue and cleanup operations. Without the communications provided by ham radio, it is

difficult to predict what might have occurred, but certainly the weather disaster would have been a greater tragedy.

The blizzard did have some beneficial effects. Some hams had their first taste of emergency communications during the winter of '78 and have since become active members of their local ARES, RACES, and NTS groups. Nets that were born during the storm have had continued lives as healthy emergency and traffic operations. And now that more hams have gained experience during adverse conditions, they will be better prepared for future calamities.

Out of the "Icebox"

Several heart attack and frostbite victims were evacuated by amateur-radio-coordinated airlift. (W8ILC) Acted as NCS/liason between a doctor, WB1FEL, and a medical team transporting a kidney dialysis patient in need of immediate treatment. (WA1BLG) Many hams were snow-bound like everyone else and could not get to points where communications were needed. (WA3PZO) The town of Needham (MA) became the temporary home for nearly 2500 stranded motorists. (WB1CTI) Due to school closings and general concern, the public was using the telephone at such a rate that most central offices were reluctant to give dial tones. (Four Lakes ARC [WI] newsletter) More than 200 persons important to the operation of Memorial Hospital were transported to and from work during the snow emergency; some were brought out of isolated areas by snowmobiles to meet four-wheelers who then completed the trip. (K8DTG) W1DFR stayed in his automobile for countless hours directing the Massachusetts State Police in the rescue of many motorists who otherwise

would have been stranded for days without help. (WA1EAT) The Wayne Amateur Radio Technical Society spent five days handling over 800 pieces of emergency traffic. (WD8LLD) Automobile and pedestrian permit and ban information was received and distributed to surrounding communities. (W1XA) Local TV stations used weather reports and road conditions as relayed by the ARES network and credit was given over the air. (K8JH) The weather system was so intense that the barometer at the Atlanta airport dropped to 29.06 inches, the lowest for that city since records were first kept in 1878. (WB4CXD) ARES assisted the Indiana State Police with road information, assisted stranded motorists and rerouted traffic because of a 20-car pileup on I-65. (WB9HCH) A helicopter was used to spot stranded vehicles and a ham from the Toledo area stayed on the job with a handheld transceiver in the chopper to assist the pilot in identifying landmarks around the city. (WA8HGH) Winds of 92 mph were reported off Nantucket. (K11QA) W8LBB, using a state-owned four-wheel-drive truck, made numerous trips to check on isolated families, deliver medicine and supplies and transport medical personnel. (WB8TRK) During the first two days of the storm, amateurs provided radio communications linking towns otherwise isolated by downed lines or overloaded circuits. (WB8PHO) The local broadcast stations put announcements on the air every hour informing people where to call to get their messages or inquiries onto the amateur airwaves. (WD8AMZ) Normal communications were not disrupted, however, *our* means of communications proved to be much faster and more reliable than the overloaded telephone lines in an emergency. (WB9VJO)

CQ Ham Radio

Amateur radio and television work together to bring a Novice class to Connecticut viewers. What city will be next to air this newest TV show?

By Charles J. Harris,* WB2CHO

“**G**ood dinner, Jean. Anything good on the tube tonight?”

“Well, let’s see. We can look at a rerun of ‘Lassie,’ ‘Concentration,’ a Doris Day film rated one star and ‘CQ Ham Radio.’”

“Ham what?”

“Radio.”

“Some new science fiction show?”

“No, it’s an educational program on the cable channel. Paper says it’s a complete course in amateur radio.”

“A guy at work is one of those ham radio types. Talks to people in different countries.”

“Want to watch it?”

“Sure, why not.”

All over the Danbury, CT, area television viewers spurned “Lassie” recently for a first in amateur radio: a completely televised Novice course! Dozens of students tuned in to the twice-a-week programs on channel 6. At the completion of

the course there was an “in-person” meeting, at which 25 students took their Novice exams.

Producer Joan Sage, WIIZ, Ken Bolin, W1NG, and members of the Candlewood Amateur Radio Association (CARA) and the Danbury Public Library Video Department put hundreds of hours into producing “CQ Ham Radio.”

Why Television?

When CARA was offered air time on the local cable station, they jumped at the chance. “What better way to introduce people to a space-age hobby than through a space-age communications medium?” Handicapped students, unable to travel, could participate, as well as those whose schedules did not permit them to attend a regular class.

Everyone involved also recognized the many benefits of videotaping the ARRL Novice course, so that it could be run in other cities by duplicating the tapes.

However, potential problems loomed as

large as the many benefits. “How can we achieve student involvement and student-teacher interaction through television? How can the students ask questions about material? How much work is really involved?”

The Show Takes Shape

Chief taskmaster Joan Sage joined with Paul Morton and Phil Lebowitz, of the Danbury Library to try and solve these problems. In consultation with members of the ARRL Club and Training Department, the production group decided on a varied format.

Each one-hour program would consist of a theory discussion and demonstration, a 10-minute “entertainment” segment, and a couple of code practice sessions sandwiched in between.

The “entertainment” sections included a visit to the WIIT Field Day operation, a walking tour of WIAW, visits with prominent local amateurs and footage of the ARRL New England Division convention.

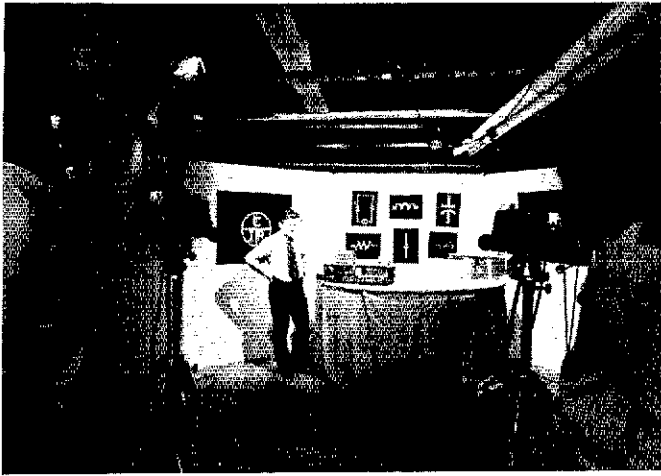
*32 Walker Lane, Bloomfield, CT 06002

Co-star Jack Traub, W1ER, demonstrates receiver tuning. Easy-to-read audio-visual material provides the backdrop.

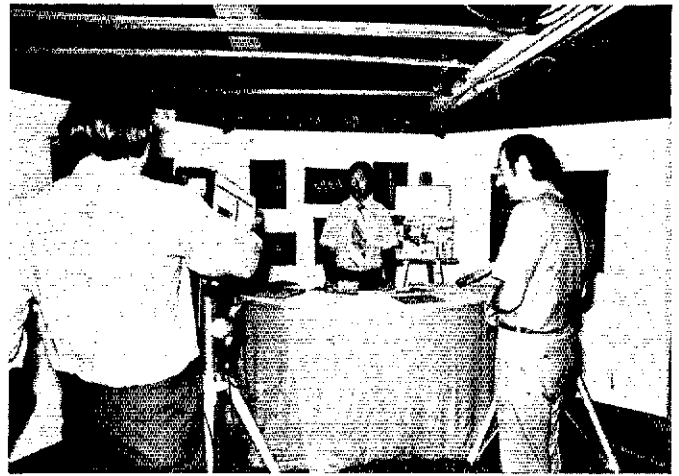


Dah . . . Dahdit . . . Co-star Ken Bolin, W1NG, sends code practice while producer Joan Sage, WIIZ, puts the translation on camera 2.





Camera operators Bill Waggoner, WA1JGS, and Joan Sage prepare to tape another segment of "CQ Ham Radio." Jack Traub is the instructor.



Phil Lebowitz focuses on QSL held by Connecticut SEC John Lindholm, W1XX, while consultant Chod Harris, WB2CHO, kibitzes.

Since the ARRL Novice course was not written for television, the crew had to make many adjustments in the theory presentations. "CQ Ham Radio" star Ken Bolin, WING, rewrote and rehearsed the programs. The taping crew spent many more hours filming and editing each one-hour segment.

The entire CARA membership chipped in on the project. Volunteers acted as "big brothers" to answer telephone queries from the students. Other club members provided "entertainment" segments and helped the new hams with their rigs and antennas. The combination of a well-planned format and the enthusiasm and involvement of the club members helped maintain the vital student interest throughout the series.

On the Air

After a full five months of planning, filming, editing and hand-wringing, the

Peter Kemp was just an industrial arts teacher before "CQ Ham Radio." Now he's WB1FZX!



show was ready for its premiere. ARRL Public Relations Consultant Don Waters, WB1CUJ, and photographer Joe Davidson provided superb local publicity for the send-off. Channel 6 aired a half-hour "teaser" segment a few times. And, of course, "CQ Ham Radio" appeared in the television listing for the evening.

The student response was excellent! Requests for student workbooks poured into the Danbury Library. The local radio store sold out their stock of *Tune in the World with Ham Radio* and code practice oscillators. "Lassie's" ratings slipped!

Still apprehensive about the indirect nature of the course, the CARA group invited the students to a club meeting. The large number of students and friends attending was a strong indication that the format worked. As a result of the program CARA enjoys both new members and a renewed interest from older members.

A Student's Viewpoint

We asked one student, Peter Kemp, an industrial arts instructor, for his opinion of "CQ Ham Radio."

"As an SWL (shortwave listener) for many years, I have always had an interest in amateur radio. But I never found the time or courses convenient to my schedule. This TV series seemed ideal.

"The most appealing part of the show was that I could stay right in my own living room. I invited some of my industrial arts students to join me, and our 'minigroup' of two or three people would meet at my house for the class. This added some socializing to the program, and turned out to be useful in other ways. We could help each other over some of the rough spots, and practice the code together.

"When they started repeating the shows on Saturday morning, it gave us a 'second chance' at the material. Also, the extra code practice

The number of viewers continued to rise throughout the series. An instructor of a more conventional, in-person class advised his students to watch the series if they missed a class, or if they needed a review. Viewer interest convinced channel 6 to air the series on Saturday mornings in addition to the regular evening runs. A success? No one involved would call the series other than a smashing one!

Coming Soon to Your Local Station

"CQ Ham Radio" is now available for showing in other cities. FCC regulations require local cable stations to include local interest shows in their program schedules. "CQ Ham Radio" is a natural for both TV station and viewer. For details, contact the Club and Training Department, ARRL hq. And congratulations to Joan Sage, Ken Bolin, the Danbury Library video crew and CARA for a job well done!

helped. However, it was a little difficult to wrestle the TV away from the kids.

"An important part of the course was the reinforcement given by Producer Joan Sage. At the end of the course, she was always on the phone, encouraging us to hang in there, and generally keeping our spirits high.

"Another good feature was the in-person class for review. I offered my regular classroom for a few evenings, and most of the students took advantage of the opportunity to get together in person. The instructors were also there, so we got to watch them on the TV, and then ask questions directly. It was a super review!

"Yes, I wouldn't hesitate to recommend this course to anyone. I wish the FCC tests were better constructed, but the course is tremendous. Thanks a lot."

And thank you, Peter, and congratulations on getting your ham license, WB1FZX!

What's So Rare as a QST from 1915?

Turn those amateur journals in the basement, attic or garage into a prized collector's set.

By Neil D. Friedman,* N3DF

QST for March, 1917, included this advertisement in its "For Sale and Exchange" section: "WANTED — December, 1915, January, March, April, May, June and September, 1916, issues of QST. Must be in good condition. Address Harry Wilcox, 147 Oakland Terrace, Hartford, Conn." Just 16 issues had been published, but the era of QST collecting had begun!

Whether by design or not, thousands of today's amateurs now collect QST. If your back issues are already piling up beside the operating position, you've got the makings of a complete set. It's a natural for any League member!

Building a complete set is a distinct challenge; fewer than 30 are believed to exist. Enough early issues can be collected with reasonable effort, however, to provide their owner with a well-deserved sense of accomplishment. A QST collection need not bankrupt its owner and should retain its value. And unlike a collection of Yagi beams or antique cars, an aggregation of QSTs stores easily in an apartment or ham shack.

Best of all, even a partial set will provide literally years of fascinating reading on the technical, regulatory, organizational and operational evolution of the Amateur Radio Service. Would you like to know the full story of the first "transatlantics"? How traffic passed in the days of King Spark? What QST's reviewers thought of that vintage rig you just bought? Consider joining the growing ranks of QST collectors.

What's to Collect?

All 725 regular issues through December, 1977, comprise a complete set

of QST. The first 22 monthly issues, beginning with December, 1915, were privately published by ARRL Founder Hiram Percy Maxim and QST Editor Clarence D. Tuska. Publication was suspended after the December 1917 QST, as amateur activities were halted during the war emergency and its editor entered the armed forces. Regular monthly publication resumed under the League's ownership in June, 1919, and has continued uninterrupted to date.

Early QST volume numbers do not coincide with calendar years. Volumes I and II begin with December, 1915 and 1916, respectively, with the first two postwar issues (June and July, 1919) completing the latter. Volumes III to VII begin with August of each year from 1919-1923. Volume VIII runs August through December, 1924. Beginning with Volume IX (1925), all QST volumes run January-December.

Many QST collectors also seek to acquire such peripheral items as the eight-page "midget" issue circulated in March, 1919. Not a part of any regular volume, this flyer promoted League membership and sales of ARRL bonds following World War I. Various early issues had supplements, including a "pink sheet" announcing an end to the WW I transmitting ban (October, 1919); a directory of amateur calls (January, 1920); and indices to early volumes issued throughout most of the 1920s.

How Much?

The market trading in QST is tiny and irregular in comparison with that for stamps and coins, or even Chinese snuff bottles (my wife, WB3EJN). As is typical of such markets, prices will vary widely from transaction to transaction. Your investment in QST will therefore depend, to

some extent, on your negotiating skills and ability to ferret out (and wait for) bargains.

Supply and demand, as usual, determine the price of a particular issue. The December 1915 (about 600 printed) and May 1916 issues are the scarcest and most expensive. Many present collections are complete but for these two. Volume I as a unit will usually cost more than the entire remainder of the set. The 10 prewar issues of Volume II sell for as much as a complete postwar (or "ARRL") collection.

After World War I, prices per issue decrease rapidly. Issues after 1925 or so are usually traded in complete volumes or runs of volumes. Naturally, the demand by most collectors is for issues in good condition. Even Harry Wilcox's advertisement reflects this principle. Taped, damaged or missing covers significantly reduce the trading price of any copy. Such issues are often easier to locate than "mint" copies, however, and the collector whose primary interest is in completing a set for historical reference may consider these lower-priced issues a real find. There is little market for copies with damaged or missing pages.

In short, the cost of a postwar ARRL set (1919-77), with some covers missing, might roughly equal that of a new 2-meter fm rig and a few sets of crystals. A complete QST file, in good condition, could bring 10 times as much — your largest investment in amateur radio.

Both offer a lot of satisfaction to the individual. The choice is yours.

Where to Find Them

Ready to plunk down your money for a complete set? It's not that simple. The 20-odd sets in private hands are jealously guarded and change owners infrequently. Years may pass before a single set

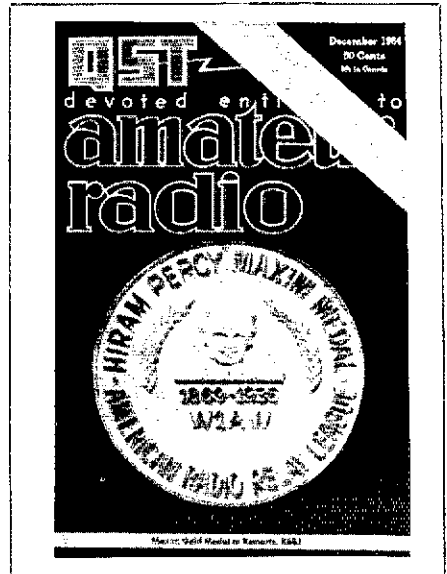
*2301 E St., N.W., A-701, Washington, DC 20037



The first monthly issue of *QST* was published in 1915 by ARRL Founder Hiram Percy Maxim and *QST* Editor Clarence D. Tuska.



The 25th anniversary issue, published in December 1940, included a complete review of "A Quarter of a Century with *QST*."



The golden anniversary issue recorded the first Hiram Percy Maxim Gold Medal Award. Recipient was John L. Reinartz, K6BJ, early ham pioneer.

becomes available, and then competition to acquire the offered set can be intense.

A more practical strategy is to purchase a file dating back to the mid or late 1920s, adding the earlier issues as they become available. Such partial sets are advertised in *QST* Ham Ads almost every month. Or perhaps an old-timer would like to clean out his shack. A local sale will allow you to inspect the file before purchase and also save substantial shipping charges.

Widely publicizing your wants is the key to locating the hard-to-find early issues (before 1925 or so). Advertise in Ham Ads. Join the Antique Wireless Association¹ and other vintage-radio groups, and attend as many of their conferences and flea markets as possible. Antique-tube and vintage-radio collectors, even those with little interest in collecting *QST*, are additional valuable sources of leads. Write to collectors advertising to buy *QST* issues, rather than just those seeking to sell. Other collectors may have some unadvertised duplicates or they might someday acquire an entire volume from which they need only a few issues. If you do respond to the various ads, enclose an s.a.s.e. when requesting lists or descriptions of items.

When purchasing the expensive early issues through the mails, always insist in advance on the right to return after inspection. Make this a firm condition of your offer to buy, even if it costs you a sale or two. The problem is not one of dishonesty; rather it concerns such subjective terms as "good" condition, "small" tear, and "slightly" frayed. They may mean different things to different collectors. These differences can be amicably settled when the return privilege is clearly understood in advance by both parties.

Even with the best of luck, assembling a

QST collection of the completeness (and in the condition) that you desire may become a lengthy process. Do not become discouraged! My experience, and that of many I have dealt with, has been that, with persistence, most of the early issues can be located and acquired in good condition.²

Where to Put Them

An early question that every *QST* collector must face is how to store the collected file. One answer is have it permanently bound into books at a commercial bindery. Bound sets look neat on a shelf, and styles and colors can be selected to match the owner's tastes. More important, permanent bindings protect issues from deterioration better than other storage forms. They also prevent misplacement of individual copies. The primary disadvantage of permanent bindings is their cost. In the case of post-WW II volumes, the binding fees will typically exceed the cost of acquiring the issues.³

If you choose permanent bindings for your collection, the pre-1925 issues can be bound by volume or calendar year. My preference is to bind by volume, as this is the way they were indexed. An informal poll of some other collectors, however, indicates that I am in the minority.

The League's maroon binders which use metal rods to hold a year's worth of *QST* are far less costly than permanent bindings and look almost as neat.⁴ I do not recommend them, however, for the frail, pre-1921 issues.

A final option is to store your *QST* collection entirely unbound. Cardboard magazine boxes, available from office supply stores, will aid in keeping your collection organized. The collection will cost less and occupy less shelf space than a

bound one, but the deterioration of valuable copies is more of a problem. The spine of early issues is normally the first place that signs of wear become apparent.

QST on *QST*

Over the years, *QST* has published several fine articles on its own early history. Read them to become more knowledgeable about your collection. The 25th anniversary issue, published in December, 1940, included "A Quarter of a Century with *QST*" and "*QST*'s Diary, Volume I." The latter article, by Clarence Tuska, was reprinted again in the 50th anniversary issue (December, 1965). A reprint of Volume I, number 1, covers and all, appeared in the 40th anniversary issue (December, 1955).

Sumner B. Young, W0CO, wrote an excellent series of 11 articles that appeared from 1954 to 1957, summarizing and commenting upon the contents of the first five *QST* volumes. Additional accounts of early *QST* history can be found in Clinton B. DeSoto's *Two Hundred Meters and Down*⁵ and in *Fifty Years of A.R.R.L.*,⁶ a reprint of historical articles which appeared in 1964 *QST* issues.

Good luck in hunting for those early *QST*'s! And if you find a clean February 1920 issue, I can trade you a nice April 1921 copy with just a small peanut butter stain that you will never notice. . . .

Footnotes

¹Main St., Holcomb, NY 14469.

²Most long-term searches boil down to a hunt for a half dozen or so issues from Volume I.

³ARRL offered bound volumes of *QST* for 1976, in two books, at \$35.

⁴Small size (pre-1976) are \$5, and large size are \$6.

⁵Postpaid from ARRL for \$3.

⁶Postpaid from ARRL for \$2.

Correspondence

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

A WOULD-BE HAM'S LAMENT

□ I've studied all the dahs and dits;
Work steady all week long;
And even when I try to sleep
They come through loud and strong.
I've protons about electrons,
And protons — plus and minus —
And when in violation, what
The FCC might fine us.
I've learned about the Ohm's Law
E-R-I and all the rest.
And thought that it would be a cinch
To pass the Novice test.
For when I practice sending
I can do a bang-up job;
But then I listen to code practice —
And it's all one great big blob!
— Francis Ellsworth Asher, Eustis, FL

SUPERSTRUCTURE RESTRUCTURE

□ I think the FCC's new plan which allows requesting a new call sign at the time of upgrading is great but prejudicial. I hold an Advanced class license and I'm proud of that accomplishment. Yet there is no means of being identified as such to other amateurs. Extra Class people have the prestigious distinction of 1 × 2 calls available and rightly so. Advanced class people should be allowed 2 × 2 calls if they choose. There are some who will never master 20 wpm and will never upgrade again. Upgrade to General and you may now request a 1 × 3. This should be extended to those presently holding General class licenses if they desire. A little identity goes a long way. — Harry Coates, WB8VNY/KB8??, Grandville, MI

□ I have just read "Call Me Anything, but Don't Call Me 'Good Buddy'" (page 49, May QST). Now we all know where the cuckoo's nest really is. I thought their clerical staff was overburdened! — Dan Saewert, NTDS, Scottsdale, AZ

□ I feel that I must take exception to the FCC's call-sign policy. To me, this is just a resurrection of the old "separate call sign for different license levels" proposal that was hooted down 12 years ago. I feel that an amateur call sign should reflect some sort of seniority that a ham has built up within the ranks. — George McCouch, WA3DNC, Harleysville, PA

STRANGE FIST — DIFFERING OPINIONS

□ I was amused by the letter "Forward and Backward" (May "Correspondence"). I too hear some strange-sounding code sending, such as the W6 who sends NN MET for CQ. Like N5SM, I am appalled at the poor quality of some cw today. It is becoming only too obvious that there is no longer a sending requirement for the upper levels of license. — Joseph Leisenring, WA6VHL, Landers, CA

□ The --- --- CQ you wrote about is common. It is caused by a slow-acting VOX clipping the dash to make a dit. When the VOX drops out after the "C" it will not pick up as fast as it did on the original "C" and hence changes Q to ---. The problem is easily fixed in most cases. Next time, call the station and tell him of the problem. He may not know of it if he is monitoring a keyer sidetone which is before the VOX. — Bob Cox, W5SQW, Houston, TX

□ After many years of listening and operating on the code portions of the amateur bands it appears that the deterioration in the quality of sending parallels the increased use of electronic keyers. Any cw operator

should appreciate perfect machine-sent code and any good electronic keyer can be so adjusted. This brings to mind the old rule that dashes should be three times longer than dots. Far be it from me to put down automatic sending devices but I still believe that anyone taking up amateur radio should first learn to send well with a straight key. If this statement arouses a lot of criticism, carefully listen across the cw bands before making a rebuttal. — Clark Chamberlain, W5RSH, Mustang, OK

CONSTRUCTION ASSISTANCE

□ A suggestion for QST: Why not have the construction projects published in QST accompanied by pc-board layouts? Not each of us can transform a schematic into a neatly designed, functional, non-shortening operating board. Some of us are lucky to be able to walk and chew gum! — Bob White, WB4TNV, Coral Springs, FL

[Editor's Note: For the convenience of those who build projects that appear in QST, separate, full-size, black templates for each project appear in that issue. This policy began with the July issue as a result of suggestions such as this. If there are several in a given month, they are published together, in "Hints and Kinks." Otherwise, they will appear with the article.]

□ About six months ago a group called "The Builders Round Table" began operating on or near 7240 kHz at 1900 UTC each Sunday. Hams are providing all kinds of construction project information including sources for hard-to-find components. This began in 5 land, Texas and Oklahoma, and has progressed to the point where 25 check-ins are not unusual. Whoever is available at 2 P.M. calls "CQ the Builders Round Table." Then, proceeds to accept check-ins by call, name, QTH and pertinent information. — H. O. Cantrell, WBSLOT, Comanche, TX

[Editor's Note: Caution should be taken to avoid statements that can be construed as business traffic.]

□ I would like all ARRL members and readers of QST to know how far ARRL will go to assist. Last December the radio operator on a Mexican ship brought an electronic speed key to me for repair. The unit was manufactured in Denmark and was pretty well scorched due to over voltage. ARRL provided me with the name and address of Space Electronics in Copenhagen. They in turn sent me the needed components to make it go. Without the assistance of the ARRL Technical Department this repair would have been impossible. — Frank Sheehan, W1DHX, Brownsville, TX

VIEW OF VT FROM IL

□ I offer this rebuttal to WB1BWV from Vermont ("Correspondence," May). While his referral to ratios of hams in other states compared to Vermont may be valid, his view of his own admirable situation is negative. Think of how great it must be for a new ham in Vermont to have the world looking for him all the time. The WAS award could be accomplished in a day or two. DX working on WAS and needing the elusive Vermont would be more than happy to reciprocate with that rare DX contact. With reference to s.a.s.e.s: His point would be valid if he were cranking out production-line QSOS, DXpeditions, special events, and some rare DX (many of whom don't require an s.a.s.e.). When one calls CQ-DX on the low bands it usually means CQ any foreign station, but it also means that this station is operative and ready to perform a public service as well as assisting other hams. This includes signal reports and requests for confirmation from my state. I don't think hams in general try to irritate other hams by requesting QSLs but perhaps

some of us lack the patience to the degree that some other folks possess, and when that long-sought-after state is heard he's anxious to make himself heard lest you get away. To a lot of us, getting the last contact that brings a nice award is as thrilling as getting the last bingo number that brings the big prize. — Bob Zuiker, WA9VIR, Lansing, IL

ONLY AN AMATEUR

□ Early on an October morning in 1933 I was among a small group of people who gathered at the Dearborn Street station in Chicago to greet Marconi, who was to be a guest of the "Century of Progress." A modern amateur radio station was one of the exhibits at the fair and was shown to the great inventor. The individual in charge, probably for lack of better words, made some apology for the equipment being built by only an amateur. It was then, I believe, that the "father of radio" made his often-quoted statement: "Don't forget, young man, that I, too, am only an amateur." — Lewis Coe, W9CNY, Crown Point, IN

THE LONG IDENTIFIER

□ Upon pondering my new interim identifier, I discovered that my elongated call sign is one syllable short of "supercalifragilisticexpialidocious" and one longer than "antidisestablishmentarianism." If brevity be the soul of wit, the FCC is lacking in humor. — Michele Bartlett, WB1FAU/interim BS, Newington, CT

$$\frac{11}{19} = \frac{DX}{\text{U.S. Hams}}$$

□ Several years ago I picked up an ARRL series called "Good Operating Procedures for DX." One of the listed items was for a DX station never to come back on the same frequency as the station calling him. I had just purchased a transceiver and immediately felt the need to purchase a separate VFO. At a local club I discussed this with a veteran ham. He told me that was not necessary as he had never heard of such a procedure. I located the ARRL publication where this was listed and showed it to him. He was amazed. When you hear the pileups on the bands today you know that my friend wasn't the only one who had never heard of this good operating practice. I have heard that Clipperton worked about 29,000 contacts which does prove that with split frequencies the job can be done much more effectively and with a lot less frustration. Due to different frequency regulations throughout the world many of the frequencies out of band for U.S. stations are legal for DX stations. This means that the DX stations can transmit on a frequency that is virtually quiet. The ham radio fraternity is constantly patting itself on the back for all the improvements it has made in the art of radio, and, how much different it is than the 11-meter band, I see a parallel between 11 meters and the DX pileups compared to channel 19 and the hams wiping out Mr. DX. It is the responsibility of ham radio leadership to set up standards and constantly encourage everyone to follow through. The ARRL must assume this position. — Wes Strauch, W3VBX, New Orleans, LA

CB — HAM PUBLICITY

□ This year the Central New England Net, one of the larger 75-meter nets, had increasing complaints from our members. "Why does CB get so much more publicity than ham radio?" Of course it's a matter of superior numbers. Politicians, news media, etc., react to these larger numbers. We decided that we should toot our own horns. This bumper sticker is one result. Each CNEN member will sport a pair of these. We hope other groups like ours will do likewise. — John Titterton, W1EOF, Riverside, RI

CENTRAL NEW ENGLAND NET
C N E N
AMATEUR RADIO OPERATOR

Feedback

□ The Hi Line Amateur Radio Klub of Cut Bank, MT, was affiliated May 20, but accidentally left off the list published in July *QST*.

□ The name of newly elected life member Lewis I. Reinberg, W2BIE, was listed incorrectly in June *QST*.

□ Misinformation appears in the parts-placement guide for "The Micro-TO Message Keyer" (Opal, February 1978 *QST*). Although the etching pattern on page 14 is correct, the orange overprint is not. Reproduced here is a corrected parts-placement guide.

In Fig. 1, the circuit diagram, a connection to +6 V should be shown for the line running horizontally beneath the identification, MONITOR AMPLIFIERS, to

provide collector voltage for Q3 and Q4 and emitter voltage for Q1.

□ In the schematic on page 23 of "A Low-Cost Dot-Memory Keyer," (June 1978 *QST*) the anode of D5 should be connected to pin 9 of U3B, and not pin 8. In addition, power supply connections should be shown for U4, pin 14 to +V and pin 7 to ground. On the foil pattern, pin 1 of U2 should be connected to the pad shown just above pin 1, and to the pad just to the right (the junction of the two jumper wires should be connected to pin 1). Similarly, pin 1 of U4 should be connected to one end of R6 and the TUNE input pad.

□ In "Producing Weather Satellite Pictures at Lower Cost," by Lindsay Winkler, W7AVE (June 1978 *QST*), R8 in Fig. 2 on page 34 should be 190 kΩ.

□ In "A Low-Cost Burglar Alarm for Home or Car," (Arnold, June 1978 *QST*, page 35) C2 should be rated at 10 μF instead of 33 μF. — *NIFB*

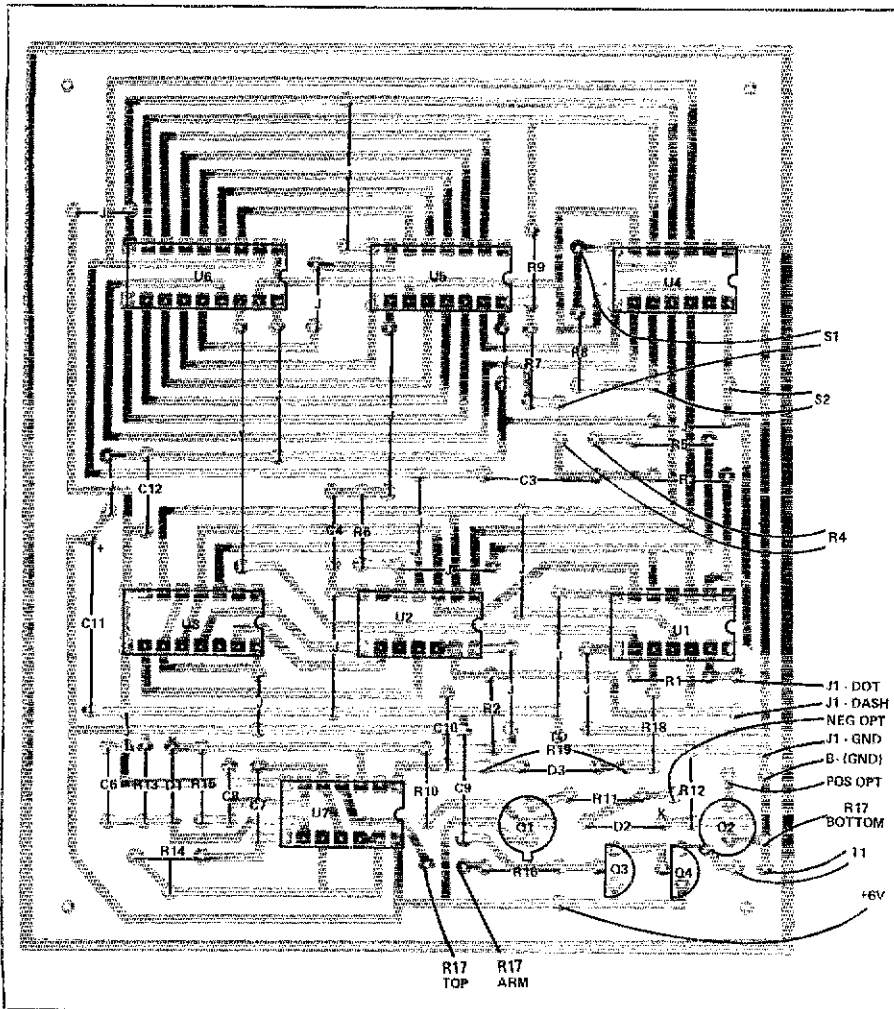
□ A number of readers noted that some items were missing from the Oblast (regions) list ("From Russia with Love!" March 1978 *QST*, page 50). Several others commented that a similar list by prefix would be even more helpful in identifying Oblasts by call. Anyone sending an s.a.s.e. to League hq. can get one. Just ask for the Oblasts list.

Also, in the article, *Bsego* should have been *Wsego*. In the Russian alphabet, the backward N is an I, not an L (of course). Ah, those trick transliterations!

A copy of the Oblast list printed in N6JM's (W6KYA) *Worldradio News* column and a list of Japanese cities (see "JARL Awards Program," June 1977 *QST*, pages 56-59) is obtainable by sending a self-addressed business envelope, with 28-cents postage, to John Minke, N6JM, 6230 Rio Bonito Dr. Carmichael, CA 95608.

A hearty *spasibo* (thanks) to the following hams for their interesting and helpful feedback: W1OX, WA1SPM, K3EST, N4IA, N6JM, W6TGL, W6UA, W7TE, W7WQ, W8JIC, N8XE and PA0BE. A very special thanks to Walt Supina, N3WS, whose information and sample awards made possible the article in the first place. — *W1YL*

Corrected parts-placement guide for the Micro-TO Message Keyer, shown at slightly reduced size. This view is from the component side; the shaded area represents an X-ray view of the copper pattern. J = wire jumper. K indicates the cathode of a diode.



□ In "Public Service," (June 1978 *QST*) the Diary notation from Honolulu did not tell the whole story. The original SOS from the Ketch *Spellbound* was answered by WB6YID on February 24. WD5GBZ, WA6FQB, WA6UWZ/mm3 and WD6BTV/mm3 later assisted. And the *Spellbound* was not near Hawaii but actually 300 miles northeast of Tahiti.

□ On page 44 of "Happenings," (July 1978 *QST*) the call of Dave Hill should be WA8PDJ.

Strays

PLAY IT AGAIN, SAM!

□ If you can't understand a question or answer on an FCC amateur radio license examination, bring it to the FCC's attention. Write to Bob Kite, Federal Communications Commission, Personal Radio Division, Room 5114, 2025 M Street, N.W., Washington, DC 20554. Specify which questions, answers or wordings you think need rewriting.

AACS SECOND REUNION

□ Former members of the Army & Air Communications Service will hold their second reunion in Orlando, FL, October 13-15. Contact Wally Bailey, 4688 Posada Dr., Orlando, FL 32809 for complete details.

Canadian NewsFronts

CRRL Response to Experimenter License Proposal

As previously advised, following the DOC proposal, the CRRL immediately formed an ad hoc committee to study the proposal and to draft the official CRRL response to same. In addition to those initially named to this committee (July *QST*), we were fortunate to have later been able to add Gerry Hannah, VE1KW, head of the Engineering Department of Mount Allison University and also head of that university's computer center.

Following is a brief summary of the 31-page brief to DOC. Copies of the full brief may be obtained for \$1 to defray mailing costs, by writing CRRL Headquarters, P. O. Box 418, Sackville, NB E0A 3C0.

The League supports the general concept of a broadly based vhf/uhf/shf code-free Experimenter license. This would be in the arts and sciences of radio communication *and not computer technology*. We are opposed to the computer-based license as portrayed in the DOC notice. Furthermore, while we are in favor of permitting packet radio transmissions on the 220-MHz band, we strongly believe the whole band should be available to *all modes of emission*. Actual working frequencies for packet radio and *all* other forms of emission

should be left to the amateurs to decide, according to generally accepted band plans. Following are the specific recommendations made.

- 1) A3 and F3 should not be permitted below 21,100 MHz.
- 2) F5 should be permitted on all bands above 420 MHz.
- 3) No pulse modes should be permitted on 2 meters.
- 4) The Experimenter should not be permitted use of A1, F1 or P1 modes.
- 5) Pulse should be available to the Advanced Amateur.
- 6) The Experimenter should have in addition to proposed frequencies, all those above 1300 MHz.
- 7) All existing modes should be permitted on 220-225 MHz.
- 8) The expression "packet radio transmission" appearing in the schedule should be replaced with standard terminology of A, F and P modes.
- 9) Following modes should be permitted on 220-225 MHz: A0, A2, A3, A4, F2, F3, F4, P2, P3, P4 and P9.
- 10) Maximum bandwidths for all modes

should be specified for 220 MHz and higher. Except for mode 5 emission, we suggest the following: 220-225 MHz, 30 kHz; 420-450 MHz, 50 kHz and above 1215 MHz, 5 MHz.

11) Maximum power for packet radio transmissions should be in terms of power input to the final amplifier, not erp, and in this respect we have suggested 15 watts.

12) There should be no limitation on packet size.

13) Regulations should be amended to permit station identification on packet radio by ASCII code within the packet.

14) Maximum power for pulse modes should be specified and we have suggested 2.5-kW peak and 25-W average power.

15) Examination for the Experimenter should be in advanced radio theory, not computer theory.

We are grateful to all of those who responded to our opinion poll. Unfortunately, the mail service delayed delivery, in many cases, beyond the suggested mailing date which militated against the return we had expected. As this report is being written, returns are still coming in. Results will be given on this page next month.

CRRL AMATEUR OF THE YEAR — 1977

In 1976 the CRRL instituted an amateur-of-the-year award. The nomination and election procedure was that all recipients of the CRRL National Certificate of Merit would automatically be on the ballot and that additional nominations could be made by SCMs and assistant directors. Voting would be done by the vice director and assistant directors only. The recipient of the 1976 award was Brit Fader, VE1FQ.

We are pleased to announce that the recipient of the 1977 award is Noreen Nimmons, VE3GOL. The award presentation will be made to Noreen at the RSO Convention in October. Coming in a close second and third, respectfully, were Gordon Steane, VE3BMG and Fred Hammond, VE3HC. Votes were also received for VE1FQ, VE3SAT and VE3GJH. Congratulations, Noreen!

DOC LIAISON

We have long felt that the Canadian amateur's liaison with our regulatory agency has often been weakened by the fact that the two national societies (CARF and CRRL) have always made individual and uncoordinated representation which often, unfortunately, is at considerable variance. On several occasions within the past few years we have proposed various suggestions by which the two societies could achieve a working arrangement insofar as this liaison is concerned. The object, of course,

would be to present to the Department a common front, so as to speak. For one reason or another, all of our attempts were without success.

Recently, we have made a new proposal to CARF, by which a democratically representative council would be formed (The Canadian Amateur Radio Council?), with but one designated official to represent the council's deliberations and decisions to the Department. Should this proposal meet negotiated acceptance by both societies the result would be that both organizations would basically end their individual representation to DOC in favor of this council concept.

CRRL Senior Assistant Director Gordon Steane, VE3BMG, presents the ARRL Charter of Affiliation to Rick Proudfoot, VE3ILP, president of the Thornhill Radio Amateurs Club. Rick is also a CRRL public relations assistant.



Delegates to the council should, of course, relate to the membership statistics of the two organizations, with the chairmanship rotating between the CARF president and the CRRL director, on a yearly basis. That is, so many delegates from each society would be constituted according to the membership of that society. For example, one delegate could be named for each 2000 members, or whatever figure could be mutually agreed upon. In this example, according to recent figures, the council would then be made up of the chairman, three CRRL and two CARF members. A secretary and DOC liaison official would then be appointed by the council. Further details would have to be worked out; however, we feel that the concept is a sound one and we hope that CARF will accept it as such.

POTPOURRI

□ The CRRL was allocated the special call of C3ITU in commemoration of World Telecommunication Day in May. The call is in the custody of the Scarborough Amateur Radio Club (an ARRL Honor Roll Club — 100-percent ARRL membership) who operated the official station, and which also will be in operation during the entire period of the 1979 World Administrative Radio Conference.

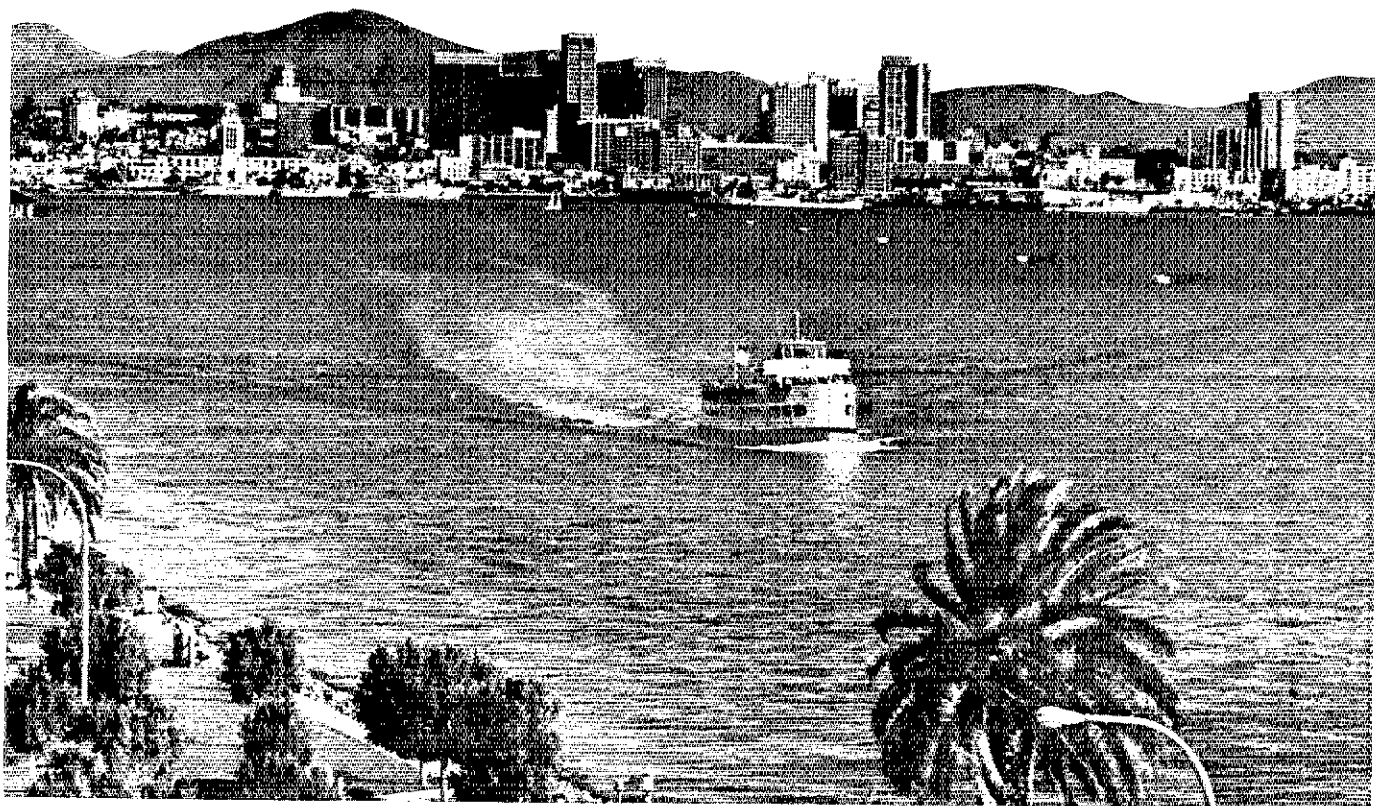
□ Congratulations to the Pioneer Amateur Radio Club (Toronto), operators of the 70-cm repeater VE3PRT, for their successful "launching" of the alternate input on 1297.12 MHz (23 cm). It is believed that this is a first for Canada and one of the very few in North America.

*Director, Canadian Division

San Diego, Here I Come

... to the 1978 ARRL National on September 22-24.

By Sybil Allbright,* W6GIC



Enjoy *real* western hospitality, sun and fun, and a truly outstanding convention. It's just a month away. The San Diego County Amateur Radio Council has prepared a great agenda including sessions on ATV, SSTV, RTTY, OSCAR, DX public relations, public service, computers and the latest news about narrow-band voice modulation and coherent cw. In addition, the Quarter Century Wireless Association (QCWA) will hold their national convention at the same time.

Your Convention Hotel

The setting is the fabulous Town and Country — a truly one-of-a-kind convention resort hotel. It features 1000 guest rooms contained in single-story garden cottages and two spectacular high rises. It's California's largest private convention facility — four swimming pools and every convenience one could ask for — all set within a 32-acre palm-studded tropical garden.

For those special needs, there are gift shops, apparel shops, a beauty salon, a barbershop, even a florist. Ample parking

*8658 Encino Ave., San Diego, CA 92123

facilities allow guests to park within a few steps of their rooms — underground and multilevel lots provide convention attendees with plenty of space.

Minutes from everything, Mission Valley is San Diego's action center. Fashion Valley and Mission Valley shopping centers provide a diverse array of exclusive shops, major department stores, and fine restaurants. Famous Old Town is nearby, with out-of-the-ordinary shopping and dining in the Bazaar del Mundo.

Your Convention City

San Diego offers an exciting variety of pleasurable experiences. The Pacific Ocean washes miles of sun-drenched sandy beaches. There's Sea World, the world-famous San Diego Zoo, the fantastic new Wild Animal Park, 69 golf courses, every conceivable water sport, horse racing, major league sports, and sumptuous dining. The color and thrills of enchanting Mexico lie just 30 minutes to the south.

There is exciting sports fishing, or you can take a leisurely harbor cruise. San Diego is home port of the U.S. Pacific

Fleet, as well as the huge tuna fleet. In luxuriant Balboa Park, beside the Zoo, there are botanical gardens and the unique 180-degree screen of the Ruben H. Fleet Space Center Theatre, an experience every visitor should see.

There are historical missions and modern churches in Mission Valley, too. Come early and stay after the convention to enjoy these featured attractions of our city.

Your Convention Program

Registration for the convention opens at 2 P.M. on Friday and continues until 10 P.M. It is open again on Saturday from 9 to 4 P.M.

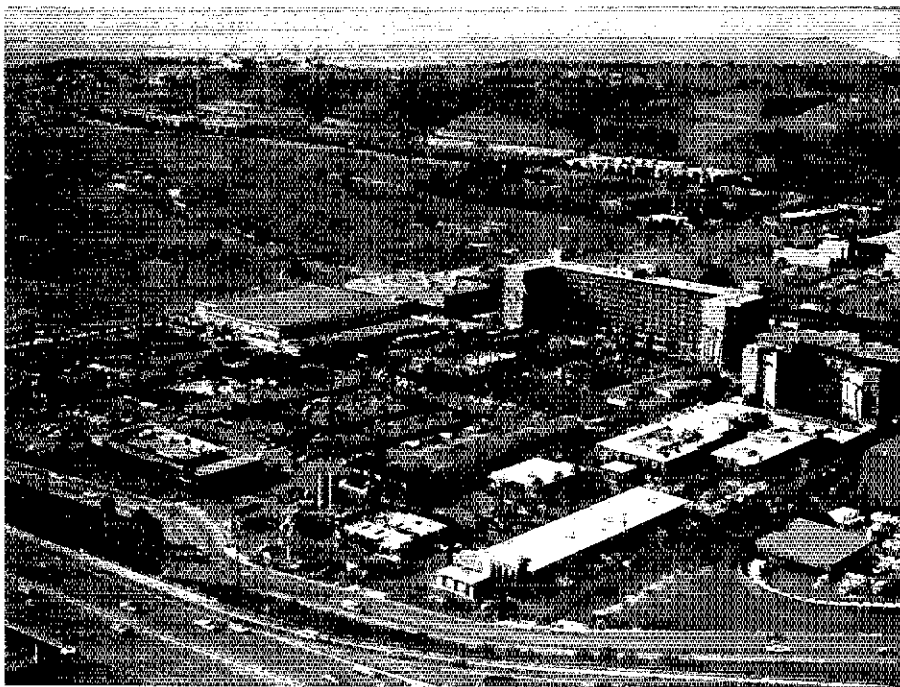
Exhibits featuring the latest in amateur radio gear will be open Friday evening from 3 P.M. to 10 P.M., again Saturday from 9 to 4, and Sunday from 9 to 2. You'll have ample time to see all 115 booths!

There will be FCC exams on Saturday, 9 A.M. for the Extra, 11 A.M. for the General, and 1 P.M. for the Technician. Any no-code exam may be taken at 9 A.M. or at 1 P.M.

Technical sessions will start on Saturday at 9 A.M. In addition to the ones listed on page 51 in the June *QST*, there will be (1) A DX program, "Ham Radio World Wide," with Lloyd and Iris Colvin, W6KG and W6QL. (2) Charles "Woody" Woodson, W6NEY, will speak on "Coherent CW." (3) John Stork of Speech Technology will talk on "Microcomputers and Voice Synthesis." (4) Bill Nelson, WA6FQG, of Southern California Edison will speak on "Radio Frequency Interference." (5) Chuck Albrecht, WA0YNQ, will present a two-hour "10-X" forum. (6) Art Smith, San Diego SCM, W6INI, will present a two-hour public service forum. (7) The Office of Disaster Preparedness and L.I.F.E. will be the topic of Don Hamilton. (8) There will be an RTTY forum, two hours, with Brian Oberg, W6ODZ and Arny Gamson, K6PXA. (9) Mac Chapman, K6SDX, of UCSD will speak on hf design. (10) Bruce Gordon, W6GUX, of L-Tronics will speak on radio direction-finding. (11) Norman Hansen, W0RAN, will talk on microphones and headphones. (12) Joe Lynch will speak on propagation forecasting. (13) Rosalie White, WA1STO, manager of the ARRL Club and Training Department will speak on "Common Club Problems." (14) OSCAR 8 and Phase III will be covered by Norm Chalfin, K6PGX and Jay Holladay, W6EJJ, ARRL Southwestern Division Director. (15) Bernie Williams, WB6BAP, will speak on ATV. (16) Jim Bartlett, K1TX, *QST* Basic Radio Editor, will speak on buying at hamfest flea markets. (17) Ellen White, W1YL, ARRL deputy communications manager, will speak on contests and awards and the ARRL QSL Bureau. (18) April Moell will speak on helping the disabled or the therapeutic values of amateur radio.

The Banquet

The banquet will be at 7 P. M. on Saturday and you will be entertained by Alvin Rey, W6UK, and his musical group. The evening will end with the



The 1978 ARRL National Convention will be held at the Town and Country, a superb convention center and guest hotel combined, just off a major freeway in beautiful Mission Valley.

Royal Order of the Wouff Hong ceremony as staged by the Santa Barbara Amateur Radio Club.

Sunday morning you will have a choice of breakfast meetings including DX, QCWA, fm, 220 and more. Following breakfast, there will be an hour of entertainment. The convention will end with a 2-meter T-hunt on 146.76.

Are You Registered?

If you wish to have the convenience of staying at the convention hotel, you should reserve your room now! There are only 1000 rooms and we expect 5000 guests. Call the hotel at 714-291-7131 for your reservation or write to Town and Country, 500 Hotel Circle, San Diego, CA 92108. Mention that you will be attending the ARRL or QCWA Convention. A registration form appeared in July

QST, page 124. Or you may obtain one from Sam Dear, K6BWT, Convention Chairman, 13031 Papago Dr., Poway, CA 92064.

How Do I Get There?

If you fly in to Lindbergh Field, you will be landing about 3-1/2 miles from the convention. Catch a limousine, a cab, or a rent-a-car to the hotel. If you are driving, from L.A., come south on I-5 to the El Centro off-ramp (I-8 east) and then go east to the Hotel Circle off-ramp. If you are driving from Arizona, take I-8 and get off at Hotel Circle. Call in on 2 meters on 146.04-64 or 147.75-15. On 220, call in on 223.30-224.90, or on 222.60-224.20, or when you get close, on .5. Call on 450 on 444.50-449.50 with a 1B PL read. QCWA will be manning 3900 on hf, so you surely can't get lost. We'll be looking for you all.

Strays



OSCAR ED NEEDS MORE STATIONS

□ Do you have a good signal into OSCAR 8 on Mode A? Are you interested in furthering the amateur satellite effort by helping hundreds of classrooms across North America? OSCAR ED NEEDS YOU! There are several openings on the OSCAR Educational Bulletin crew for those interested in periodically transmitting bulletins through OSCAR. You should be familiar with OSCAR operation, be capable of transmitting a healthy phone signal on at least Mode A, have

school-day mornings free and be willing to reliably fulfill your commitment to the program. Anyone who meets these criteria is asked to contact Steve Place at Headquarters for more detailed information.

THE FIRST WITH A T-BRACE?

□ Amateurs who build long-boom Yagi antennas often use a T-brace to support the boom and to reduce its lateral movement. (See these *QST* references: "Hints and Kinks," April, 1971, page 51; Rhodes, "The Log Periodic Dipole Array," November, 1973, page 16; Rhodes and Painter, "The Log-Yag Array," December, 1976, page 18). Lindsay Specialty Products, Ltd. of Lindsay, ON, reports that it holds Canadian patent no.

632004, December 5, 1961, on the idea, which it calls the "no side sway brace," and claims to have been the first to develop the idea. Are there any prior claims?

Of course, the status of the patent has no bearing on the home constructor who builds an antenna for his own use. — *K1ZZ*

NEEDS BRAILLE EQUIPMENT

□ New General desperately needs any information on obtaining Braille amateur equipment. Having just purchased a Kenwood 520, I am anxious to get on the air. Ray Leonardo, WB3JVY, 219 Colfax Rd., Havertown, PA 19083. Tel. 215-449-3083.

ARRL Testifies in Support of Goldwater RFI Bill

On June 14, at the invitation of the Subcommittee on Communications of the Senate Committee on Commerce, Science, and Transportation, ARRL President Harry J. Dannels, W2HD, testified in support of Senate Bill 864, which would give the Federal Communications Commission authority to regulate the interference-rejection capabilities of electronic devices. Senator Goldwater himself chaired the session, which was held before a standing-room-only crowd in the Russell Senate Office Building. Other testimony, in support of and in opposition to the proposed legislation, was also heard.

Senator Goldwater opened the session with a statement which defined the scope of the RFI problem, and included some anecdotes from his own experience as an amateur radio operator since the age of 12. The Senator emphasized that he would prefer to see industry solve the problem itself through voluntary means, and that ideally the introduction of his bill would serve as an encouragement in that direction. However, the testimony which followed clearly showed that industry is not yet ready to adopt an adequate voluntary program, in spite of the steady worsening of the RFI situation. Furthermore, FCC testimony showed that the Commission has fallen far short of coming to grips with the problem, and has not defined the problem to its own satisfaction even at this late date.

FCC Chairman Charles D. Ferris was the first to testify. Mr. Ferris presented an FCC position on the bill which had not been developed until the previous Thursday, in an open meeting which showed that the Commission staff — and the commissioners themselves — were sharply divided on the issue. The Office of the Chief Engineer and the Field Operations Bureau recommended support for the objectives of the bill; the Office of the General Counsel, the Office of Plans and Policy, and the Safety and Special Radio Services Bureau urged the issuance of a Notice of Inquiry inviting comments and supporting documentation from interested parties before taking a position. In presenting the more cautious "Notice of Inquiry" approach as the Commission's majority position, Mr. Ferris found himself subjected to harsh questioning from the committee members and staff. He was forced to admit that there was "probably a cause and effect relationship" between the scheduling of hearings on S-864 and the consideration of a Notice of Inquiry on RFI. He was unable to explain why the Commission had not requested authority to regulate the interference-rejection capabilities of receiving devices, when its own bulletins on the subject of RFI place much of the blame on their inadequate design. He also could not identify any benefit gained to date by "jawboning" with manufacturers for voluntary standards, and

admitted that a Notice of Inquiry would take from nine months to a year to develop a draft position. Despite decades of experience with the problem, the Commission had not yet defined what the problem was and needed time to do so, Mr. Ferris stated. Senator Schmitt of New Mexico joined Senator Goldwater in the incisive questioning which expressed their irritation at this go-slow policy. Unfortunately, Mr. Ferris did not remain to hear all of the subsequent testimony.

In his oral testimony, which supplemented extensive written remarks, President Dannels dramatized the length of time the RFI problem has been with us by displaying publications more than 25 years old which dealt with the subject. Mr. Dannels also showed filters, shielded wire, and capacitors of the type which, if required in electronic home-entertainment devices, would greatly alleviate the RFI problem. While such measures would increase the cost of such equipment slightly, the number of devices subject to RFI has increased so markedly in recent years that it is now less expensive to install the necessary safeguards at the factory than to install them in the field, as they are needed. Mr. Dannels emphasized that the RFI should really stand for radio frequency *interception*, since the problem is largely one of devices intercepting signals they are not supposed to receive, and not one of transmitters radiating unwanted signals. The forces of the marketplace will not solve the problem, because neither consumers nor retail salespeople have the necessary knowledge and no manufacturer is presently touting the interference-rejection capabilities of his equipment in advertising. From the amateurs' standpoint, the problem is one of public relations: It is difficult, if not impossible, to explain to a neighbor that his expensive stereo or television is at fault, when "it only picks up your signal when you're transmitting, and works fine the rest of the time."

Representative Charles A. Vanik of Ohio, who has introduced a similar measure in the House, spoke in support of the bill, stating that he had "received more mail on this issue than on tax reform." He suggested that the mail of the 535 members of Congress might be a better indicator of the problem, than the number of complaints received at the FCC, since the Commission was no longer accepting RFI complaints by telephone! Mr. Vanik said that the measure, if adopted, would have the potential of reducing the interference level by about 50 percent.

Speaking in opposition to the bill was Mr. J. Edward Day of the Consumer Electronics Group, Electronic Industries Association. Mr. Day disputed the 50-percent figure, saying that EIA's experience suggested it was more like 20 percent (a number which still represents many hundreds of thousands of RFI cases annually). He stated that interference was his industry's second-biggest problem, with survival being

the biggest: He cited the depressed prices for home-entertainment equipment as the reason people in his industry were being driven out of business. Other opposition testimony was presented by high-fidelity audio interests, who suggested that a complete cure of RFI was more complex than had been represented by the bill's supporters (Senator Goldwater pointed out that the bill was "not a panacea") and that audio enthusiasts would not willingly accept *any* compromise in performance in exchange for interference-free equipment.

The last speaker, Steve Jarrett, K4FJ, presented two case studies from his own experiences in dealing with RFI which showed that in at least some cases, manufacturers were either unwilling or unable to correct problems in their own equipment when those problems were called to their attention. His testimony contradicted the impression of complete cooperation which had been left by the industry representatives. The National Association of Broadcasters and the Capitol Hill Amateur Radio Society also presented written testimony in support of the proposed legislation.

Final action on S-864 and its companion bills in the House is apt to be many months away, since it is unlikely that Congress will have time to consider them in this session. However, the holding of hearings on S-864 is an important step down a road which *must* be traveled if radio transmitters and the exploding number of electronic devices are to coexist. — K1ZZ

RFI BILL — VOX POPULI

Representative Joseph L. Fisher of the Tenth District of Virginia has introduced another RFI bill (HR-11812) into the House of Representatives. According to Adele Faber, legislative assistant to Congressman Fisher, the bill is similar in intent to the Goldwater, Vanik and Benjamin RFI Bills before the House and Senate (*QST* — May, 1977, page 64; October 1977, page 57 and September 1977, page 64). Ms. Faber also indicated that the congressman had introduced this legislation as a direct result of the number of letters that his office had received regarding the problem of RFI.

In the article on the Goldwater Bill, above, it was noted that well-financed lobbyists testified against the RFI bills; presumably, these lobbyists and their associated groups have taken other actions in addition to testifying before the Subcommittee. As President Dannels pointed out, solutions to most of the RFI problems have been known for over a quarter of a century, yet the FCC and Congress have failed to take positive action. Whether the failure to act by the government can be attributed to the work of special-interest groups is a matter of conjecture.

However, the action of Representative Fisher indicates that the individual amateur can have an impact upon the functioning of the

*Public Information Officer, ARRL



Affiliated for only two years, the Jackson County (WV) Amateur Radio Club, Inc. has been most active with ARRL events. In addition to holding an annual ARRL approved hamfest, the group recently presented the Jackson County Library and the Ravenswood (WV) Library with a complete set of League publications under the League's Club Library program. For more information on this program, contact ARRL Sales Manager.



Ed Tilton, W1HDQ (fourth from left), was the guest speaker at the ARROW (Amateur Radio Repeater of Washtenaw) club banquet April 20 in Ann Arbor, MI. Although officially retired from the Technical Department, Ed still makes himself available for talks before affiliated clubs when his schedule permits. Others present were (left to right) WB8MTD, WB8VWY, W8MPD, Ed, WB8ZWP and W8LMT.

government in this crucial area. Certainly Congress responds to special-interest groups, but it also is influenced by the needs and wishes of its constituents — assuming that the constituents let their representatives know of their needs and wants.

Some amateurs tell us that they have never taken the time to write their congressman because they don't know what to say or how to address an important official. Some have told us that they feel that it is useless — Congressman Fisher has demonstrated the fallacy of that excuse. These other concerns that might cause one to hesitate writing are easy to handle also.

When writing a member of the House of Representatives, simply address the letter "The Hon. _____, House Office Building, Washington, DC 20515." For a member of the Senate, the proper address is "The Hon. _____, Senate Office Building, Washington, DC 20510." The proper address of these officials is simple yet important.

Identify the issue at the beginning of the letter and specify the number of the bill if you know it. Be brief. Write in a constructive tone — don't threaten! If you have enough electronic expertise, then use it to inform and educate your representatives of the true nature of the RFI problem. No one expects each congressman or senator to be an expert on each of the twenty to thirty thousand bills that will be introduced in the 95th Congress.

Your own words and experiences when intelligently presented have far greater impact than any form letter. ARRL representatives have been in frequent touch with Capitol Hill staffers concerning these bills. We have submitted papers and presented testimony. But *vox populi* — the voice of the people — has been missing up to now. You are facing a choice: You can hope that RFI goes away or you can take action to help end this problem once and for all.

DIVISION ELECTION NOTICE

As was mentioned in last month's "Happenings," it is time for ARRL Full Members in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions to begin picking a

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

Balloting Later

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

Since all the powers of the director are transferred to the vice director in the event of the director's death, resignation, removal out-

side the division, or inability to serve, careful selection of candidates for vice director is just as important as for director.

Nominating Form

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

Executive Committee

The American Radio Relay League
Newington, CT 06111

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

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

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

"Absentee Ballots"

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

Even within the U.S., Full Members temporarily residing outside the ARRL division they consider home may now notify the secretary prior to September 11, giving the current QST address and the reason why another division is considered home (as for instance, holding an amateur call appropriate to the division). So if your home division is the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf, but your QST goes elsewhere, please let the ARRL secretary know; as soon as possible but no later than September 11, so you'll receive a ballot for your home division.

The Incumbents

Presently these persons hold the office of

director and vice director in the divisions conducting elections this year: *Central* — Don C. Miller, W9NTP and Edmond A. Metzger, W9PRN; *Hudson* — Stan Zak, K2SJO and George A. Diehl, W2IHA; *New England* — John C. Sullivan, W1HHR and Fred E. Evans, W1JFF; *Northwestern* — Robert B. Thurston, W7PGY and Ronald D. Mayer, K7BT; *Roanoke* — L. Phil Wicker, W4ACY and Gay E. Milius, Jr., W4UG; *Rocky Mountain* — Charles M. Cotterell, W0SIN and Maurice O. Carpenter, K0HRZ; *Southwestern* — Jay A. Holladay, W6EJJ and Peter F. Matthews, W6UUA; *West Gulf* — Jack D. Gant, W5GM and Thomas W. Chance, Jr., K5YM.

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

For the Board of Directors:
June 1, 1978

R. L. Baldwin, W1RU
Secretary

PAST DIRECTOR MIDDLETON, W7ZC, SILENT KEY

A. David Middleton, W7ZC, past director ARRL West Gulf Division, suffered a fatal heart attack June 10, 1978. An active amateur at the time of his passing, Middleton was AMSAT coordinator for Utah as well as an avid vhf enthusiast.

He served as director from 1951 to 1955 and was the father of the ARRL Technical Merit Award. Prior to moving to Utah he held W5CA. — WAITZK

AMATEUR EXAM CHEATERS CAUGHT

In an initial decision, an FCC administrative law judge revoked the amateur radio station

license of one man and suspended for one year the station license of another for attempting to obtain, by fraudulent means, an Advanced class license. An FCC investigation determined that Howard Levine, WB2CGE, of Rockaway Park, NY, paid \$50 to a 17-year-old fellow radio amateur to take the Advanced class examination for him. (The youth's name is being withheld because of his age.) The judge found that although the youth initially did not want to help Levine, after thinking it over for a week he agreed to do it because he was "broke."

Because both men at the time were living in the New York City area, they went to Philadelphia to take the test to be sure they were not recognized. The youth practiced Levine's signature several times before the examination and changed Levine's date of birth on the application to conform with his younger physical appearance.

Though the judge held that Levine was the instigator of the fraudulent examination plan and took advantage of the youth, he recognized that the young man knew that what he was doing was wrong. Therefore, because of the seriousness of the violation, the judge concluded it appropriate to suspend for one year his amateur station license and amateur Advanced class and Radiotelephone First Class operator licenses. He also ruled that the youth's application for an Amateur Extra Class license not be granted at this time.

As for Levine, the judge decided that his instigation of the fraud and subsequent attempts to cover up his involvement by lying to Commission investigators justified a ruling that "Mr. Levine does not possess the requisite qualifications to be a Commission licensee and that the granting of his applications to be a licensee would not serve the public interest, convenience and necessity." Therefore, the judge denied Levine's application for amateur radio station and Advanced class operator licenses and his application for a Radiotelephone Third Class operator permit. The judge also revoked Levine's license for amateur radio station WB2CGE, and suspended his General class operator license. — WA3NLO

LEE AURICK, WISE, BEHIND THE DIAMOND

The responsibility for insuring the availability of advertisers and coordinating the placement of ads in the League's most conspicuous membership service, *QST*, rests with Advertising Manager Lee Aurick, W1SE. He is one of our most active operators as well.

Lee was born in Manhattan but shortly afterward moved with his family to suburban Mount Vernon, NY. After graduating from Valley Forge Military Academy in 1940, he attended the Newark College of Engineering before being called into service in World War II. He served with the 84th Signal Company of the 84th Infantry Division as chief radio operator and communications chief in England, France, The Netherlands, Belgium and Germany.

Following the war, Lee went to work for the Western Electric Company as a field engineer. In 1954 he joined the Headquarters staff as an assistant secretary. "In those days," he explained, "the assistant secretaries did everything from opening mail to conducting tours." Three years later he returned to private industry in the RCA Advertising and Sales Pro-

motion Group, where he remained until 1975. During this period he also attended Rutgers, Seton Hall and Franklin and Marshall Colleges. One of his fondest memories is of the time RCA stole a march on a competitor. "Our counterparts at the competitor were preparing a big ad campaign to introduce the 6146A. I inquired of our engineers if they had enough improvements on the original 6146 design to call it a 6146B. They said yes, so we brought out the 6146B at the same time the competitor began touting the 6146A."

Lee rejoined League hq. in January, 1977 as advertising manager, with responsibility for ads in *QST* and other League publications. Despite interruptions from school and military service, a boyhood interest in ham radio reached fruition in 1946 when he was licensed as W2QEX. Since then, Lee has held many calls, including K3AZ, K2LS and W2LE. He enjoys chasing DX and award collecting. His collection includes DXCC, WAC and WBE (Worked the British Empire). Lee is also the proud holder of the ARRL 30 wpm code proficiency certificate. Aurick's favorite bands are 40 and 15 meters where he dabbles with a hobby within a hobby — antennas. He has written numerous articles on that subject as well. Another hobby is flying; Lee is a licensed private pilot who flies Cessna 150s and 172s. He and his wife, Mary, live in Newington. Four children, Lee II, Caryl, Marjorie, Sharon and two grandchildren have dispersed to Pennsylvania, Wisconsin and California. — WAITZK

Visitors to League hq. are likely to spy Advertising Manager Lee Aurick in just this position, as he negotiates with advertisers and potential advertisers, pipe in hand.



YL News and Views

Conducted By Louise Moreau,* W3WRE



The YL Speech

Often in our speeches before local groups we are asked "What do you do with your radio?" One YL used that theme to point out our innumerable activities. For some examples, she mentioned Clara Reger's (W2RUF) work with a victim of muscular dystrophy, teaching him to use a special help to be able to send with his feet to master the code, and Harriet Creighton, WA3ATQ, and her affiliation with the Eyebank Net to help secure eyes for hospitals. Another example was Madge Mason, WA6LWE, better known on Navy MARS as N0RAG, relaying messages to the families of Navy men to tell them of their safety after the fire aboard the carrier *Enterprise*. She told of

the long-distance telephone call to Mae Burke, W3CUL, late at night to alert her of the Alaskan earthquake; of Dr. Chris Haycock, WB2YBA, giving medical help to the victim of an automobile wreck; and Betty Gillies, W6QPI, and her selfless dedication in keeping in touch with the servicemen in Little America that earned from them the special title "Angel of the Antarctic."

She spoke of the 20 consecutive years that Carolyn Currens, W3GTC, planned and set up communications centers for the "Powder Puff Derby," making sure that there were operators available along the route so that the participants could keep in touch with the officials.

She also pointed out that we enjoy meeting each other on the air and in the many openings in radio that are available to us. We may be found working with other women amateur radio operators from many countries in YLISSB, helping to relay requests for medicine from another country, maintaining communications in a disaster halfway round the world, and helping here at home, as WB3CCU from a mudsoaked doorway to lend assistance to municipal workers in the 1977 Johnstown Flood.

These she explained were some of the things we do because we enjoy meeting and knowing people everywhere.

TWO-LAND YL CLUB PLANNED

Women in the Second Call Area are planning a new club to include all YLs in New York and New Jersey. It is hoped that a constitution and bylaws will be ready for discussion by July 15, 1978.

All YLs in the Second Call Area who are interested in this newest of YL clubs are asked to contact Phyllis Shanks, W2GLB, 3 Honey Lane W., Miller Place, NY 11764.

OZ4DZ, RTTY CONTEST WINNER

Rose Hansen, OZ4DZ, very active in RTTY was the top scorer for Denmark in the recent CARTG Annual RTTY Sweepstakes. She is the first married YL to receive an award in this contest.

Rose, who lives on Barholm Island in the Baltic Sea, became interested when her husband decided to attend a class if she would join him. She built her first transceiver from a kit and to her delight it worked at once. From there her interest turned to RTTY and she took a course in typing to make operating easier. At present she has confirmed contacts with 80 countries working on 20 meters daily.

Rose is active in her local radio club where she is editor of the club magazine.

[Editor's Note: "YL News and Views" thanks OZ4FF for translating this material about Rose from Danish into English.]

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

YLRL CONVENTION DATES

Dr. Christine Haycock, WB2YBA, chairwoman of the YLRL International Convention, has announced that the dates will be June 29 through July 1, 1979. The following YLs have been appointed committee chairmen: Sylvia Soble, W3SLF, committee chairman; Ruth Schlitt, WA2RIX, prizes; Janice Scheurman, WB2JCE, secretary; Dottie Scialdone, K3YPH, treasurer. The Penn Jersey YL Club will host the convention in Philadelphia.

NEW FRENCH YLS

The interest of French women in amateur radio is evidenced by the number of calls recently assigned to women listed in the publication *Ondes Courtes Informations*. The newly licensed YLs are F1EUP, F1EUJ, F1EUZ, F1FAJ, F1FBV, F6FAM, F6FAQ and F6FEZ. These YLs welcome all contacts and request that we speak slowly if we use English in our transmissions.

YLISSB MEMBERSHIP

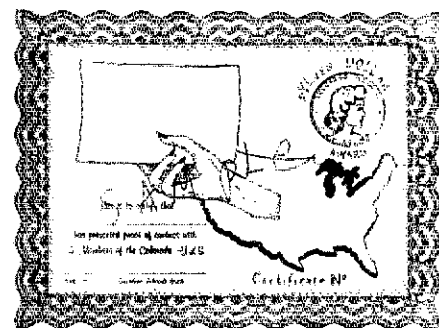
To answer the queries to "YL News and Views" regarding YLISSB membership, the information may be obtained from Dr. Fred Holzapfel, W0UJE, 422 Clover Leaf Drive, Golden Valley, MN 55422.

COLORADO YL FIELD DAY PLANNED

The Colorado YLs will sponsor a YL Field Day July 15, 1978 and plan to have as many members as possible working on as many bands as they can to help pro-

mote the club's Silver Dollar Certificate. The requirements are to contact and QSL five Colorado YL members; DX stations contact three members. Send list, log, data with statement of contacts that have been confirmed and 50 cents (DX - 2 IRCs) to the club station trustee, The Colorado YL Club, WA0ESM, 15715 N. 107th, Longmont, CO 80501.

The award certificate has pictures of the YL operators worked. Endorsement credit and pictures will be given for additional contacts.

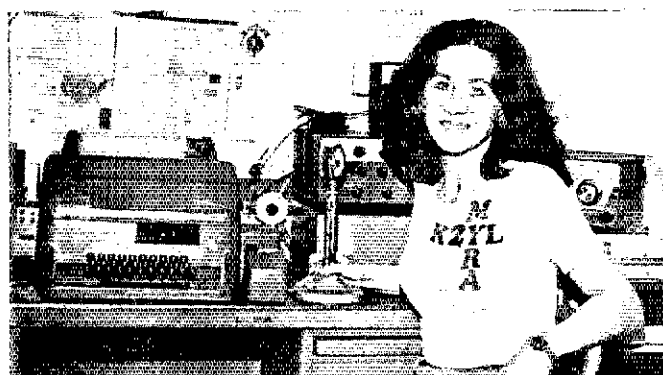


The Colorado YL "Silver Dollar" Certificate will be awarded for contacts with members of the Colorado YL Club.

Rose Hansen, OZ4DZ, very active RTTY contest operator. (VE3AYL photo)



Myra Itchkow, K2YL, received her Extra Class license 32 months after she had passed Novice. She can usually be found working on 20-meter RTTY or 15 meters.



Amateur Radio in Pakistan پاکستان میں شوقیہ ریڈیو

You haven't worked too many AP2s, have you? Well, read on, and find out why.

Headquarters was privileged recently to have as a visitor Mr. S. Parvez A. Bukhari, AP2PA, of Lahore, Pakistan. Parvez is the international officer for the Pakistan Amateur Radio Society, and was in Newington for the IARU WARC Fellowship Program. The program gives IARU societies an opportunity to send a delegate to Newington for one week, where he or she is given intensive training in helping his society prepare for the upcoming World Administrative Radio Conference. Mr. Bukhari was our most recent participant, and other national societies are expected to send delegates soon.

There are, to begin with, only 56 amateurs in the Islamic Republic of Pakistan. But PARS, the IARU member-society, has undertaken to train more amateurs and there are presently 60 students throughout the country. To become a licensed amateur, applicants must be at least 21 years old, must complete a written examination in general radio, antenna, and communication theory, and pass a 12 word-per-minute code test as well.

"To be an amateur in Pakistan," Parvez told us, "means that one must be absolutely committed to amateur radio in order to vanquish the many pitfalls he'll encounter." Until recently, for example, it required three years to receive a license! PARS worked to get this waiting time reduced to six months. Study materials? Whatever one can beg or borrow. One popular source is the nearest U.S. Information Service Library, where one can frequently find such ARRL publications as *The Radio Amateur's Handbook*. (While the national language of Pakistan is Urdu, English is taught in the schools from grade 5, and the amateur exams are given in English.)

When one finally does receive his license, he is allowed to operate a transmitter which does not exceed 100 watts plate dissipation — a considerable contrast to the kilowatt privileges of American and Canadian amateurs. But now to find a transmitter! The amateurs of Pakistan face the same problem as those in every developing country: a severe scarcity of parts and equipment. This lack of components is becoming a major hindrance in recruiting new amateurs, and confronts the determined licensees with a formidable challenge. "The only sources of parts for us," said Parvez, "are the junk and scrap markets — and occasionally friends in other countries." So when a Pakistani amateur comes across a usable radio part, he works backward: he literally begins to design his receiver or transmitter around the part he has. Quite the opposite from the approach we're used to, isn't it?

The result is predictable: some awkward and cluttered circuits, but circuits which nevertheless serve the purpose well by putting Pakistanis on the air.

As if these weren't enough obstacles,

*International Services Officer, ARRL



Pakistan weather presents two months of dangerous monsoon rains each summer, when flooding becomes a threat to life and property. But here is where the Pakistani amateur is striving to come to the aid of its national government. PARS conducts an emergency communications training program for its members, so that more lives and property can be protected and vital communications can be provided during national and local emergencies. Still, the difficulties of providing a national network of communications can be frustrating. Pakistan is roughly the size of the state of California, and has as its western border the Himalaya mountain range. These mountains create winds and air currents which cause temperatures to range from below freezing to more than 120° F (50° C).

Those amateurs who are fortunate enough to be in a position to import foreign-made amateur gear are still faced with paying a high import duty tax. Have you ever thought what it might be like to earn only \$120 a year, and still be a radio amateur? This is the official per capita income of Pakistan (and many other less developed countries). Add this handicap to a national literacy rate of only 17 percent, and one can quickly see why there are so few amateurs in Pakistan.

But PARS is working hard to recruit new amateurs, focusing most of its efforts, of course, on the student population. Both PARS and the Pakistani government have come to see that amateur radio is much, much more than just a hobby: It's the unique source for providing a corps of self-training technical experts so vital to a developing country. And the more



Mr. Parvez Bukhari, AP2PA, of the Pakistan Amateur Radio Society, and International Services Officer Johnson, WA6IDN, compare notes on the new IARU low-cost transmitter and receiver kits (see April 1978 QST, page 11 for information on the receiver). As mentioned above, poverty and a scarcity of parts and equipment are formidable obstacles to amateurs in developing countries. These new rigs help to meet the challenge and enable these countries to recruit new amateurs. (WBTADL photo)

technical experts a country can acquire, the higher the standard of living to be enjoyed by that country's people.

Coming Conventions

August 12-13
Pacific Division, Reno, NV

August 18-19
Saskatchewan Prov., Regina, SK

August 26-27
Alaska State, Anchorage, AK

September 1-3
West Gulf Division, El Paso, TX

September 10
Illinois State, Rockford, IL

September 22-24
ARRL National, San Diego, CA

October 13-15
Midwest Division, Kansas City, MO

October 14-15
New England Division, Boxboro, MA

November 11-12
Hudson Division, McAfee, NJ

November 25-26*
South Florida Section, Clearwater, FL

*Date Change

WEST GULF DIVISION CONVENTION

September 1-3, 1978, El Paso, TX

On Labor Day weekend, the El Paso Hamfest Committee hosts the ARRL West Gulf Division Convention at the Airport Hilton Inn, located about one mile north of I-10, on Airway Blvd. and one block from the entrance of the El Paso International Airport. The convention will follow a western theme, so if you have them, wear your boots, your Stetson, and jeans.

Friday, events will start at 5 P.M., with registration. Saturday, registration begins at 8 A.M. During the day, we will have seminars on solar power, AMSAT, computers, pyramid power and, of course, the ARRL forum. There will also be contests, exhibitors, displays, and a transmitter hunt. Saturday evening, a no-host cocktail party precedes the western-style banquet, followed by a dance with the famous Charlie Russell and his versatile band. Of course, an ARRL convention would not be complete without the Wouff Hong Ceremony — don't miss it.

Bring your ladies as there will be a luncheon, shopping trip and some general prizes. If enough people so indicate, we may arrange a trip to Juarez, Mexico, for shopping or a bullfight.

On Sunday, the famous El Paso Swapfest will begin at 8 A.M. and shut down around 3 P.M. There will be 100 tables available, so bring your swapping gear. A general registration entitles the holder to one free table and/or to browse. Please indicate when you register if you want a table and how many. Additional tables will be \$5. Also, on Sunday morning, QCWA will hold its annual breakfast for members and nonmembers; time and price to be announced later.

General registration fee, before August 15 deadline, is \$14 (\$15 thereafter), which includes exhibits, seminars, prizes, banquet, hospitality

room, and swapmeet (one table free). Without banquet, general registration is \$10; banquet only, ticket \$10. The dance will be \$2 each. Your name tag is your "door opener" to all events you sign up for, so make sure you wear it at all times. General registration does not include the QCWA breakfast, ladies' activities, bullfight (if scheduled), or dance. If you only want to browse Sunday at the swapmeet, it will cost you \$2.

For information and/or registration, write to West Gulf Division Convention/El Paso Hamfest, P. O. Box 4573, El Paso, TX 79914 or telephone Milly Wise, W5OVH, 915-751-4160. Come to the nation's largest border city and enjoy two countries, two cultures and one great hamfest/swapmeet/convention!

SASKATCHEWAN PROVINCE CONVENTION

August 18-19, 1978, Regina, SK, Canada

The Regina Amateur Radio Club is the host for the provincial hamfest this year in conjunction with the ARRL Saskatchewan Province Convention. It is also the 75th birthday of the city of Regina.

The event will be held at the University of Regina and accommodations are available on the campus. Our program includes contests, technical seminars, equipment displays, flea market and the annual meeting of the Saskatchewan Amateur Radio League.

A ladies program is also planned with a couple of guest speakers, a microwave oven demonstration and a fur fashion show.

A banquet and dance is planned for Saturday evening.

Our club extends a special invitation to all. For further information, please contact our registration manager, W. C. Munday, CH5WM, 132 Shannon Road, Regina, SK S4S 5B1 or check into our hamfest inquiry station, which is on Sunday mornings after ARES net, 3780 at 9:45 or Wednesday evenings, 3785 after the SK Phone Net.

Include the Saskatchewan Hamfest in your vacation plans. Remember the dates, August 18, 19 and 20.

ALASKA STATE CONVENTION

August 26-27, 1978, Anchorage, AK

The Anchorage Amateur Radio Club will sponsor the Alaska State Convention on August 26-27 at the Anchorage Westward Hilton Hotel, in downtown Anchorage. In support of the convention and in thanks for communications support in emergencies, Governor Jay Hammond has proclaimed August 21-27 as Amateur Radio Week.

Programs will include discussions of hf propagation in northern latitudes, vhf propagation and repeaters in Alaska (including use of Mt. McKinley as a passive reflector), and microprocessors, plus film of KL7EOK's hang-glider flight from the top of Mt. McKinley and a presentation on ham support to the Yukon "800" Marathon Boat Race. An FCC "Meet the Man" is scheduled on August 26 and exams will be given to anyone who sends in a form 610 in advance and a note requesting testing at the convention.

A variety of commercial and amateur displays, a luncheon style show, an ARRL forum with Northwestern Division Director

Robert B. Thurston, W7PGY, and ARRL First Vice President Victor C. Clark, W4KFC, and the traditional banquet will round out the formal ham activities. Visitors to KL7 land will find great salmon fishing during the Seward Silver Salmon Derby on August 12-20, fantastic scenery in America's last wilderness, and a chance to see the auroras that you've been bouncing signals from.

RV sites are available in the city. Talk-in on 34/94. For information and pre-registration, contact AARC Convention '78, P. O. Box 1987, Anchorage, AK 99510.

ILLINOIS STATE CONVENTION

September 10, 1978, Rockford, IL

The Rockford Amateur Radio Association will sponsor the Illinois State Radio Convention to be held at the Winnebago County Fairgrounds, Pecatonica, IL, 10 miles west of Rockford on U.S. Highway 20. Display area of 40,000 square feet under roof will house dealers and flea markets.

Seminars include "VHF Propagation" with Jim Kearnan, W1XZ, ARRL assistant technical editor; "Micro-Processors and Ham Radio" with Vito Fiore, K9UCM and Gene Streitmatter (associate professors in Electronic Technology at Rock Valley College); "OSCAR" with Jurgen Nittner, N9RD and "Contests" with Vic Shields, K9UIY. A separate room has been set aside for get-togethers of the "Midwest Country Cousins" and the "Breakfast Club."

Doors open at 8 A.M., Sunday morning. Free camping (electricity \$4), tables \$3 each, snack bar, ladies events, talk-in on 01/61 and 52. Registration, \$1.50 advance, \$2 at the door. Send s.a.s.e. to Rockford Amateur Radio Association, P. O. Box 1744, Rockford, IL 61110.

Hamfest Calendar

*Alabama: The North Alabama hamfest is August 20 at the Huntsville Mall. Details from Decatur or Huntsville ARC, or NAHA, P. O. Box 9, Decatur, AL 35602.

Alabama: The Central Alabama hamfest is September 10 in the new Montgomery Civic Center. Indoor and outdoor flea markets, air-conditioned exhibit area, and prizes. Free parking and admission. Contact Al Erdman, W4CNO, 3025 Pelzer Ave., Montgomery, AL 36109. Tel. 205-272-9130.

California: The Tri-County ARA holds its annual hamfest/picnic on August 13 at 10 A.M. in Westmont Park, Pomona. Prizes, flea market and auction. Tickets \$1 at park or 50 cents advance from Joe Lydon, WB6UFX, 6879 Sard St., Alta Loma, CA 91701.

Connecticut: The WELI ARC flea market and auction is August 20 (rain date, 27th) from 10 to 4 at Radio Towers Park, Benham St., Hamden. General admission 50 cents, vendor space \$5. More info from Mike Gaetano, WA1PXM, Tel. 203-943-1063, or Dave Smith, WA1ZWB, Tel. 203-467-3258.

*Florida: The Five Flags ARA Ham-A-Rama is Labor Day weekend at the University of West Florida field house, Pensacola. On September 2, a transmitter hunt begins at 1 P.M. and a dinner/dance at the Casino, Pensacola Beach, starts at 6 P.M. On

*ARRL Hamfest

September 3, activities include a swapfest, auction, Navy MARS and contests. Info from FFARA, P. O. Box 17343, Pensacola, FL 32522.

Georgia: The Cedar Valley ARC hamfest is August 13 from 9 to 4 at the Polk County Fairgrounds, one mile east of Cedartown on U.S. 278. Talk-in on 72/12. Food, drinks and prizes. Contact Jim T. Schlietett, W4IMQ, President, CVARC, P. O. Box 93, Cedartown, GA 30125. Tel. 404-748-5968.

Idaho: The 46th WIMU (Wyoming, Idaho, Montana, Utah) hamfest is August 4-6 at Macks Inn, ID, 25 miles south of West Yellowstone, MT. Talk-in on 34/94 and 3935. Registration \$7 adults, \$2.50 children. Send to WIMU Hamfest, 3645 Vaughn St., Idaho Falls, ID 83401. Tel. 208-522-9568.

Illinois: The Hamfesters 44th annual picnic and hamfest is August 13 at Santa Fe Park, 91st and Wolf Rd., Willow Springs. Exhibits for OMs and XYLs; famous swappers row. Tickets at gate \$2; advance \$1.50 from Bob Hayes, W9KXW, 18931 Cedar Ave., Country Club Hills, IL 60477 (s.a.s.c., please).

Illinois: The Shawnee ARA hamfest is August 19 and 20 at the North Marcum Access Area of Rend Lake, with complete recreational facilities available. Vendors free. Flea market and prizes. More info from Gary Wheeler, WB9SWG, RR 2, Box 229, Carersville, IL, or Nick Koenigstein, WB9ELP, 2009 Gray Dr., Carbondale, IL 62901. Tel. 618-549-5931.

Illinois: The Centralia Wireless Association hamfest is August 27, starting at 9 A.M., at the Lions' Club Park, Centralia. Contact Bill Keller, WA9IUF, 4 Parkview Dr., Centralia, IL 62801.

Illinois: The Fox River Radio League hamfest is August 27 from 8 to 5 at the Kane County Fairgrounds, St. Charles. RV parking available. Exhibits, flea market and prizes. Tickets \$2 at gate or \$1.50 from Don Berridge, WB9PAC, 2303 Deerfield Way, Geneva, IL 60134. Tel. 312-232-0093.

Indiana: The Delaware ARA hamfest is August 12 from 8 to 5 at Springwater Park, Country Club Rd., east of Muncie. Free flea-market space. Prizes. Talk-in on 52 and 25/85. Tickets \$2 at gate or \$1.50 advance from DARA, P. O. Box 3021, Muncie, IN 47302.

Indiana: The Lafayette hamfest is August 20 at the Tippecanoe County Fairgrounds, 18th St. and Teal Rd. (Rte. 25 south of I-65). Set up anytime after Saturday. Limited electric hookups for full weekend. Prizes. Talk-in on 94 and 13/73, W9REG, Tickets \$2. S.a.s.c. before August 10 to Tippecanoe ARA, Bill Bayley, WA9ZDI, 1021 Beck Ln., Lafayette, IN 47905.

Indiana: The LaPorte County summer hamfest, sponsored by the Michigan City and LaPorte ARCs, is August 27 at the county fairgrounds. Dealer setup at 6 A.M., open at 8. Free tables, good food. Talk-in on 01/61, 37/97 and 52. Donation \$2 at the gate. More info from LPARC, P. O. Box 30, LaPorte, IN 46350.

Indiana: The Tioga ARS of Monticello is sponsoring a "ham radio cruise day" aboard the *Madam Carroll*, the state's largest inland boat, on August 27. Decks open at 1 P.M., cruises at 2 and 4, with four rigs aboard. Advance tickets \$2, at dock \$2.50. S.a.s.c. to Byron Robbins, WD9EXI, 571 S. Bluff Ave., Monticello, IN 47960.

Iowa: The Des Moines RAA hamfest is August 19 and 20 at the Veterans Auditorium. Proceeds go toward equipment purchase for Des Moines Science Center display station W0AK. Tickets \$4 at the door or \$3 advance. Contact Gary Lijfergen, W0SH, Chairman, 605 54th St., Des Moines, IA 50312.

Iowa: The Iowa 75-Meter Net holds its annual potluck picnic and hamfest on August 20 at Riverside Park, Marshalltown, starting at noon. Write to Lovelle Pederson, WB0JFF, Hudson, IA 50643.

Kansas: The Concordia hamfest is August 12 and 13 at Cloud County Community College. Admission \$2. Details from Bob O'Connell, WB0ZIT, Hamfest Chairman, 312 E. 5th St., Concordia, KS 66901.

Kansas: The Boothill ARC of Dodge City will have a hamfest on August 20 in the 4-H Building, west of the racetrack in Wright Park. Covered dish dinner, swap tables and activities for all. Sales space \$1.50 each. Talk-in on 01/61 and 52. Info from Foster W. Smith, Minneola, KS 67865.

Kentucky: The Lexington Bluegrass ARC hosts its annual hamfest on August 13, starting at 8 A.M., at the National Guard Armory near Bluegrass Field. Forums, prizes, refreshments, indoor exhibit area, outdoor flea market — spaces \$1. Tickets \$2.50 advance, \$3 at the door. Contact Paul Hefflin, WA4PAB, 434 Potomac Dr., Lexington, KY 40503. Tel. 606-278-0646.

Michigan: The Jewish Community Center of Metropolitan Detroit ARC Swap 'n Shop is August 20 at 6600 W. Maple Rd., W. Bloomfield. Free parking. Call Bob Aronson, W8DGR, at 313-838-3534.

Minnesota: The St. Cloud RC hamfest is August 13 at Sauk Rapids Municipal Park. Free camping and overnight parking at Lions Park. Registration at 10 A.M. Swapfest, prizes and refreshments. Talk-in on 34/94 and 3925. Further info from Bill Zins, WA0OTO, Rte. 4, St. Cloud, MN 56301. Tel. 612-253-3428.

Minnesota: The 12th annual Central States VHF-S conference is August 18-20 at the Midway Motor Lodge, Rochester. An extensive technical program will address the extension of amateur radio by pushing the state of the art. Write to CSVHFS, c/o Mr. Mel Larson, 2429 N. W. Viking Ct., Rochester, MN 55901.

Missouri: The Zero-Beaters ARC hamfest is August 6 at the city park in Washington. Traders row, displays and exhibits at no charge. Refreshments, lunch and picnic area available. Prizes. Free pickup from airport. Write to ZBARC, WA0FYA, P. O. Box 24, Dutzow, MO 63342.

Missouri: The St. Charles ARC hamfest is August 27 at the Wentville Community Club, a new and better site 25 miles east of St. Louis on I-70. Admission \$1 per car; flea-market space free. Prizes and games for all. Talk-in on 34/94 and 07/67. Contact SCARC, P. O. Box 1429, St. Charles, MO 63301.

Missouri: The Southwest Missouri ARC picnic and swapfest is August 27 in Springfield. Meal charge \$1. Talk-in on 31/91. Details from SMARC, Drawer B, Glenstone Station, Springfield, MO 65804.

New Jersey: The 550 ARC and Oakland Repeater flea market is August 26 from 9 to 5, rain or shine, at the American Legion Hall, Oak St., Oakland. Talk-in on 52 and 147.49/146.49. Write to 550 ARC, P. O. Box 364, Oakland, NJ 07436, or call Mark Kirschner, 201-337-3259.

New York: The Mt. Beacon ARC hamfest is August 19 from 9 to 5 at Stewart Field, Newburgh. Auction and flea market; bring your own table. Admission \$1, sellers \$2, under 12 free. Talk-in on 52 and 37/97. Info from Ron Perry, RD 1, Glen Ave., Fishkill, NY 12524.

New York: The Hall of Science ARC late summer flea market is September 10 from 9 to 4, rain or shine, at the municipal parking lot, 80-25 126th St., Queens, one block off Queens Blvd. Free parking. Buyers \$1, sellers \$2. Talk-in 52 and 40/00. For info call 212-699-9400 daytime.

North Carolina: The Cape Fear ARS hamfest is August 19 and 20 at the Dunn National Guard Armory, Dunn. Admission \$3. Details from CFARS, P. O. Box 36353, Fayetteville, NC 28303.

Ohio: The 21st annual Warren ARC hamfest is August 20 at the Trumbull KSU campus, Rtes. 5 and 45. Talk-in on 31/91 and 37/97. Registration \$2. Huge lawn for flea market. Family recreation nearby. Contact Dick Ellers, K8JLK, 426 Central Pkwy. S.E., Warren, OH 44483.

Ohio: The Union County ARC hamfest is August 27 at the Plain City Fairgrounds, Rte. 42 off Rte. 33 east. Free camping Saturday night. Admission \$1.50 advance, \$2 at door; no charge flea-market space. ARRL, ARS, MARS and more. Food service on the grounds. Contact Gene Kirby, WB8JN, Secretary, 13613 U.S. 36, Marysville, OH 43040 (s.a.s.c. please).

Ohio: The 36th annual Findlay RC hamfest is September 10 at Riverside Park, Findlay. Tickets \$1.50 advance, \$2 at the site. Further details from FRC, c/o Randall Peterson, 420 Central Ave., Findlay, OH 45840.

Ontario: The Lakehead ARC is sponsoring the Lake Superior region hamfest on August 5 and 6 at Trowbridge Fall Park, Thunder Bay. Registration \$3/person, \$5/family. Events and prizes. Talk-in on 52 and 46/06. Contact LARC, P. O. Box 2571, Thunder Bay, ON.

Oregon: The Willamette Valley DX Club hosts the Northwest DX convention on August 5 and 6 at the Sheraton Hotel, Lloyd Center, Portland. Films, technical discussions and prizes. Preregistration \$23.50 hams, \$21.50 nonhams; at the door \$25.50/\$23.50. Send to Clyde Sylvester, W7KSA, Convention Chairman, 15350 S. Holcomb Blvd., Oregon City, OR 97045.

Pennsylvania: The Beaver Valley ARA hamfest is August 19 from 9 to 5 at Brady's Run Park, five miles north of Rochester on Rte. 51. Advance tickets \$3 or 3/48, at the gate \$4 or 3/50. Sellers \$1, bring your table. Talk-in 52 and 25/85. Write to Wayne R. Sphar, WA3ZMS, Secretary, 1200 Atlantic Ave., Monaca, PA 15061.

Pennsylvania: The Tioga County ARC hamfest is August 26 from 9 to 5 at the Tioga County Fairgrounds, Rte. 660 off Rte. 6. Registration \$2. Flea market, technical forums, latest news, homebrew display. Prizes, activities for all. Food available or bring your picnic. Talk-in 19/79 and 52. Info from

Denny Vorhees, WA3FWQ, RD, Millerton, PA 16936. Tel. 717-537-6520.

Pennsylvania: The 23rd annual York County hamfest is September 3rd from 8 to 4:30, rain or shine, at U.S. 30 Dragway, Thomasville Airport, 10 miles east of York. Self-contained campers welcome Saturday night. Registration \$3, XYLs and children free. Display under roof by reservation. Talk-in 37/97, 93/33 and 52. Contact Leroy Rey, K3FOR, 170 S. Albermarle St., York, PA 17403. Tel. 717-854-1203.

Pennsylvania: The 29th annual Uniontown ARC Pie Gahfest is September 9 on the club grounds, Old Pittsburgh Rd., Rte. 51 bypass, north between Hills Plaza and town. Flea market. Registration \$2, free coffee. Write to UARC, W3PIE, 438 Braddock Ave., Uniontown, PA 15401. Tel. 412-438-9488.

Pennsylvania: The Butler County ARA hamfest is September 10 from 11 to 4 at the Butler County Farm Show Grounds, adjacent to the Butler Roe Airport. Check-in on 90/30 and 52. Contact Cliff Fescrura, WB3CDA, 107 Randy Dr., Butler, PA 16001.

Tennessee: The 20th annual Cedars of Lebanon hamfest is August 27 at the Cedars of Lebanon State Park, 10 miles south of Lebanon on Rte. 231. Camping and drinks available, bring food. Talk-in on 3980 and 2 meters. For info write Richard C. Brown, W4VJW, 203 W. Main St., Gallatin, TN 37066.

Texas: The 13th annual Northwest Texas Emergency Net picnic and swapfest is August 6 in the Levelland City Park. Donation \$2. Registration at 8, lunch at 12:30. Bring your picnic. Swap all day, tables provided. Also sponsored by Hockley County ARC. Talk-in on 28/88. Write to John R. Bell, W5NGX, 208 Pat St., Levelland, TX 79336.

Texas: The Panhandle ARC Golden Spread Amateur Radio Convention is August 11-13 at the Holiday Inn West Motor Hotel, 601 Amarillo Blvd. W., Amarillo. Events include six tech sessions, ARRL forum and hospitality suites. Exhibitors and flea market. Preregistration \$4. Ladies program, plus outdoor musical drama *Texas* in Palo Duro Canyon. For info write GSARC, P. O. Box 10221, Amarillo, TX 79106.

Vermont: The Burlington ARC International Field Days and hamfest is August 12 and 13 at Old Lantern, Charlotte. Camping by reservation. Flea market, prizes and games for all. Early birds \$3, at the gate \$3.50. Write BARC, P. O. Box 312, Burlington, VT 05402.

Virginia: The Bristol (TN) ARC hamfest is August 19 and 20 at the Washington County Fairgrounds, Abingdon. Admission \$1, plus \$2 for flea market. Details from Tony Stitt, P. O. Box 3643, Bristol, TN 37620.

Washington: The fourth annual Spokane hamfest is August 12 and 13 at Eastern Washington University, Cheney. Program includes a microwave seminar, planetarium show and ladies handicrafts. Exhibits and flea market. Preregistration \$9, includes both days and Saturday night banquet. For info write Spokane Hamfest, P. O. Box 3606, Spokane, WA 99220.

West Virginia: The second annual Monongalia Mon Hamfest is September 3 from 10 to 5 at Westover Park, off I-79 near Morgantown. Talk-in on 16/76. Contact John Curtis, WB4AHF, 817 Willowdale Rd., Morgantown, WV 26505.

Strays

QST congratulates . . .

□ Enrico Davoli, WB4GKN, recently named Pediatrician of the Year. He helped I2RRI track down an epidemic that was killing postop babies in an Italian pediatric-cardiac hospital.

□ Harold R. Richman, W4CIZ, who has been elected a senior member of The Institute of Electrical and Electronics Engineers. This is the highest professional grade for which application may be made.

REACHED THE TOP IN 35 DAYS

□ Mike Cousins, WD5IOU got his Novice ticket on January 17 and 35 days later, on February 21, he sat down in the FCC office in New Orleans and passed his Extra Class exam! Mike was a member of an amateur radio class conducted by a group of "West Bankers" headed by Al LeBlans, N5EH. — Bill Barrett, WD5DSD

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1ALC, Edward F. Donnellan, Quincy, MA
 WA1BDK, Kenneth N. Shade, Skowhegan, ME
 W1CO, Henry A. Highman, Holliston, MA
 W1DRP, John C. Tirrell, Nashua, NH
 W1ESG, Elmer W. Dunscombe, Springfield, MA
 W1GAT, Robert D. Underwood, Wilmington, MA
 W1KHU, Howard B. Fleming, S. Portland, ME
 W1KW, Percival R. Allen, Auburndale, MA
 W1OJM, Frank S. Shaw, Hyannis, MA
 W1PBQ, Willard K. Fiscus, Lynnhfield, MA
 K1RCS, George W. Carignan, Manchester, NH
 WA1SWD, Ralph E. Ford, Montpelier, VT
 W1TNR, Lawrence J. Peiffer, Jr. Cape Elizabeth, ME
 K1UPZ, Lloyd S. Girard, Weymouth, MA
 K1VWZ, Thomas B. Martin, Southington, CT
 W2BCB, Otto Tichacek, Douglaston, NY
 WA2BRI/W8JTW, Rod F. Meany, Oceanport, NY
 K2CPL, Dr. Paul Baldrige, Geneva, NY
 WB2EON, Howard F. Smith, Delmar, NY
 WB2FNQ, Jerry E. Harrison, Blasdell, NY
 W2FYP, William H. Greenbaum, Demarest, NJ
 K2HVB, Raymond J. Kunz, Sr., Wayne, NJ
 W2IEM, Benjamin F. Rhymer, Kingston, NY
 WB2JKT, Leon Archer, W. Long Branch, NJ
 W2NID, Alan R. Dreyfus, Endicott, NY
 W2PW, William H. Wilson, Ithaca, NY
 WB2RYH, Michael J. Colantonio, Batavia, NY
 W2WH/K4WH, Ralph Venegas, Sr., Fort Lauderdale, FL
 W3AFX, Ross R. Keech, Coatesville, PA
 W3DXL, Dolores C. Schupbach, Monroeville, PA
 W3EQY, H. Weston Taylor, Chester, PA
 K3LFN, C. Martin Brand, Bethesda, MD
 W3LYU, John J. Adams, Sunbury, PA

WA3NCC, Robert J. Mildner, Erie, PA
 W3NXQ, Rudolph J. Mikolies, McKeesport, PA
 W3OSG, Enoch T. Gifford, Philadelphia, PA
 W3ZIN, John J. Curtis, Sr. Shavertown, PA
 K4CEE, Chester W. Bolg, Bradenton, FL
 K4CND, Chamar G. McInnish, Childersburg, AL
 W4CXZ/W4YVD, Robert R. Viverette, Black Mountain, NC
 K4DQU, Max Carney, Erin, TN
 WA4EXM, Clarence O. Shackelford, Nashville, TN
 W41HN, Charles S. Colley, Fredericksburg, VA
 W41OW, Richard M. Groves, Mt. Sterling, KY
 K4IVA, Moe Segal, Fort Lauderdale, FL
 W4JKX, Inez E. North, Punta Gorda, FL
 N4KU, Joseph A. Baril, Bonita Springs, FL
 K4LL, Charles A. Roberts, Ft. Lauderdale, FL
 N4QC, Asa E. Vinson, Gay, GA
 W4VGO, Robert A. Moose, Mt. Pleasant, NC
 W5CU, Harvey E. Cunningham, Zapata, TX
 W5FHY, Clarence J. McCoy, Tulsa, OK
 WB5MID, Michael L. McKinley, Austin, TX
 K5SWL, James H. Weaver, Duncan, OK
 W5ZED, Benjamin Van Wye, San Antonio, TX
 KH6AJT, Errol B. McLean, Honolulu, HI
 W6AOD, Vernon Gebhart, Watsonville, CA
 W6FUJ, Lewis A. Gage, Santa Clara, CA
 W6HWM, William A. Letcher, Jr. Ft. Jones, CA
 W6LJ, James L. Ham, Madera, CA
 W6OHT, Karl W. Krell, Visalia, CA
 WA6OWI, Herman H. McClard, El Cerrito, CA
 K6QQI, Edward W. Sears, Santa Rosa, CA
 W6RXT, George A. Hall, Torrance, CA
 W6SDR, Russell T. Mitchell, Canoga Park, CA
 W6SOM, Lyle M. Husted, Cherry Valley, CA
 W6T5, Edward N. Willis, Los Angeles, CA

WB6UBJ, Oliver C. Gilbert, Jefferson, LA
 Ex-K6VNW, Robert B. DeGraff, Sr., El Monte, CA
 W6VXM, Lester D. Holerman, Laverne, CA
 W6WXK, Joseph F. Abreu, Santa Clara, CA
 W7BVK, Roy A. Kayler, Moscow, ID
 W7GLJ, Chester B. Dugger, Athena, OR
 W7RY, James A. DePartee, Vashon, WA
 W7ZC, A. David Middleton, Springdale, UT
 W8GJQ, Edward L. Goon, Perrysburg, OH
 WA8IY, William M. Wendt, Richmond, MI
 W8SXM, John C. Rupert, Jackson, OH
 K8UZG, Harold A. Crawford, Pontiac, MI
 K9ARC, William I. Shaunnessey, Chicago, IL
 K9EMS, Evelyn Cudia, Berkeley, IL
 W9JYR, Richard L. Newport, Tinley Pk., IL
 W9LG, Darl F. Wood, Mishawaka, IN
 WB9OCW, Kenneth C. DeGross, Mission, TX
 WA9TZP, William R. Washburn, Culver, IN
 W9UAM, Robert J. Leins, Rock Island, IL
 W9UJN/WB5URM, Oscar L. Olsen, Hemet, CA
 W9WNU, Dr. C. M. Bechtol, Champaign, IL
 W9WGT, Jay H. Smith, Villa Park, IL
 WA0ASY, Sydney A. Ginsberg, Mission, KS
 W0FHH, Fred J. Ramer, Minneapolis, MN
 W0FLK, John M. Gowen, Cohasset, MN
 K0GBM, David J. Shinn, Peru, KS
 WB0LKG, Claudie L. Johnson, Trenton, MO
 W0VRA, Jack P. Henry, Eagle Grove, IA
 W0ZKM, R. Dayton Sigler, Colorado Springs, CO
 WB0ZSF, Clarence B. Shoemaker, Farmington, MO
 VE1BE, E. E. Lunney, St. John, NB
 VE3DHY, James W. McKinty, Peterborough, ON
 VK2ABD, Colin Galbraith, Bay View, Australia
 SM5AQV, Ake Andersson, Sodertalje, Sweden
 ZETJX, Peter Lowth, Marandellas, Rhodesia

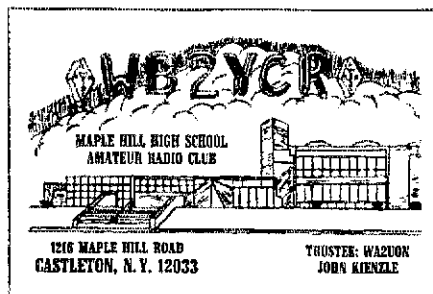
Club Notes

School teachers — college students: Interested in starting an amateur radio club in your school? We have a "club kit" you can write for, which tells how to organize a club and make it go. Affiliation for school clubs and youth groups involves a special deal. Understanding that students aren't rich, we changed the membership requirements in 1974, so that only the president, faculty advisor or sponsor, or trustee must be a League member. (For other clubs, the requirement is 51 percent of your members must be ARRL members.)

What good do school clubs do? Below is a QSL from Maple Hill High School Amateur Radio Club (NY). The local paper runs a regular column on the club's activities — receiver clinics, homebrewing (schoolbrewing?), first-aid communications at football games — the list which sponsor, WA2UON, sends us is endless.

"Visit to an Amateur Museum" is a slide/cassette-tape show produced by the Antique Wireless Association of Holcomb, NY. This show, narrated by Bruce Kelley, W2ICE, is a tour of the Antique Wireless Museum in Holcomb. It features 42 slides covering most of the museum's exhibits. An interesting excursion into the past, it would make a good addition to an "Old-timers" night at your local club meeting. If you don't have an order form, CT-20, send an s.a.s.e. to C&T D. — WA1STO

This high school club always has projects which attract and train proficient radio amateurs.



50 Years Ago

August, 1928

□ This issue is largely concerned with problems arising from decisions of the 1927 international conference providing for narrower amateur bands, and presents some appropriate answers.

□ Ross Hull, newly arrived from Australia, has been placed in charge of a technical development program to help amateurs meet the new standards. His first treatise stresses the need for high capacity in tuned circuits to achieve stability, a good filter to achieve a pure note, and loose coupling to the antenna.

□ IANA draws on experience as chief engineer with the Maxum Silencer Company to produce an acoustic filter consisting of tubes and cavities — a parallel to L-C electrical filters.

□ The Southern Cross made a series of successful hops from the West Coast to Australia, and amateurs kept in touch via the short-wave rig aboard — built by 6XBB (now W6RH).

□ Initial television "standards" have changed — to 24 lines, 20 frames; you may have to cover up every other hole in your old 48-hole scanning disc for a suitable picture — like Crazy Kat.

□ Staffer Louis Huber (now W7UU) reports results of the 1928 "International Relay Party," forerunner of our DX contests, with IASF as the winner.

□ QST plugs hard for more occupancy of the 28-Mc. band, newly opened. ISZ has a 204-A transmitter with 2-turn coils to reach that very high frequency.

□ There are erudite presentations on filter circuits by Clyde Farrar of the University of Idaho, and on iron core reactances by D. Replogie of Raytheon.

□ Canadian amateurs now have the new VE prefixes, but U.S. hams will have to wait for license renewals to use the new W and K prefixes.

□ Thousands of coveted DX cards lie uncalled-for in the various volunteer QSL bureaus, and the editor urges anyone who has ever had a foreign QSO to send in an s.a.s.e. for the goodies.

□ "Eighty Watts on Six Bands" by WITS and "A Four-Band Miniature 'Phone-C.W. Rig'" by W6RET are inspirations to get out the old soldering iron and update our gear.

□ The Rothman system of modulation is highly efficient but exaggerates non-linearities; W9JRO shows how a negative-feedback circuit can overcome this disadvantage.

□ We're by no means out of the woods on TVI, and W2UOH adds to the practical approaches by use of electronic weatherstrips.

□ W2ZXM lost all his gear when the *Flying Enterprise* went down, but "Captain Stay-Put" now has a complete new station aboard.

□ The BC-221 is a popular surplus item for close frequency checking, and Bev Dudley describes his modification to produce greater bandspread and thus more accuracy.

□ You can feed your antenna on six different bands without changing coils if you use the setup rigged by W2JJI.

□ W6OWP uses a reactance-tube modulator to control carrier shift and obtain f.s.k. simply.

□ You won't need a machine shop or unlimited funds to build the "plain" ground plane antenna W2ZBY has concocted. — W1RW

Strays

ANOTHER KP4KD

□ The call KP4KD is raising many an eyebrow among old-time DXers around the globe, who fondly remember the ever-present signal of the late Everett W. Mayer. Well, wonder no more! The famous call is once again active and belongs to Ev's grandson, Eric R. Mayer, ex-KP4DIW. He requested it upon attaining his Amateur Extra.

NEW PREFIXES

□ ITU has allocated J4A-J4Z to Greece, and J5A-J5Z to Guinea-Bissau.

25 Years Ago

August, 1953

□ There are new tubes on the market designed for TV, and W1HDQ shows how they can be used to advantage in low-noise r.f. amplifiers for 144 and 420 Mc.



QSLs Sent vs. QSLs Received — How to Improve Your Ratio

One of the biggest complaints of DXers is the difficulty in obtaining QSL cards. In fact, it's not unusual to spend far more time chasing down the card than was used in making the initial contact. And under the heading of sad but true, substantial expenditures of time and money will not guarantee receipt of a card. Fortunately, the situation is not completely hopeless. While you can't control the actions of the DX operator, you can take steps to increase the probability of receiving a QSL card in return for yours.

Help the DX Operator

The fundamental law of QSLing is to make it as easy as possible to answer your QSL. There are several things you can do to accomplish that, but above all, make sure your card is filled out completely and accurately. After all, the more inaccurate your card, the more difficult it becomes to find your QSO in the log, and the less likely the DX operator will reply. Nevertheless, cards are received with an incorrect time, day, month or year. At times some of those items are omitted entirely. So double check everything before sending it.

To avoid confusion, express hours and minutes in UTC instead of your local time. (UTC is the abbreviation for Universal Coordinated Time, which was formerly known as Greenwich Mean Time — GMT. As Greenwich, England, is on the zero meridian of longitude, GMT is sometimes abbreviated to Z, or *zulu* if spoken phonetically.)

The date can also cause difficulties. In the U.S., March 6, 1978, is expressed as 3/6/78. In most of the rest of the world, this same date is

written 6/3/78. To eliminate the confusion these two methods cause, many DX operators express the month in Roman numerals; i.e., 6 III 78. It's a good method, but if you use it be sure you know the Roman numerals! Also, any sevens in the Arabic numeral form in the date can be written the European way (7) so they are not confused with ones.

Send Valid QSLs!

Make sure your QSL is usable for DXCC and other awards. If it isn't, the irritated DX operator may not respond. What is a valid QSL card? According to the DXCC desk, your outgoing card should include the call of the station worked, your call, your state or country (if it is not clear from the prefix), and the date. The frequency and mode (or RST or RS report) are also needed, as the card may be used for awards such as five-band DXCC or the cw DXCC. While not essential, the time and exact QTH are obviously useful information. The card should make it clear that two-way radio communication was established. Moreover, WB9MFC reminds us that cards can be ruined by careless corrections to essential information. If you make a mistake draw a single line through it, and write the correct information close to the original entry. Be sure to write your initials after the new information, as non-initialed changes make a card invalid. Unfortunately, this procedure makes a messy card, reducing the probability of receiving one in return. If you make a mistake, it's better to throw away the card and make out a new one.

Use a Self-Addressed Stamped Envelope (s.a.s.e.)

What if you send your card directly to the

DX station or QSL manager? To make it easy to reply to your QSL, include an s.a.s.e., or s.a.e. with International Reply Coupons (IRCs). Many QSL managers and rare DX stations will not reply unless they receive a return envelope and postage. Generally speaking, the U.S. QSL managers want an s.a.s.e. Foreign operators or managers usually cannot use U.S. stamps, so your QSL to them must include an appropriate number of IRCs (obtainable at U.S. Post Offices). At present each IRC, which costs 42 cents, is exchangeable at a foreign post office for the postage on a minimum-weight first-class letter. Reliability and speed are usually better, however, for air mail. That requires more than one IRC. The exact number you need is listed in the front part of the *callbook*.

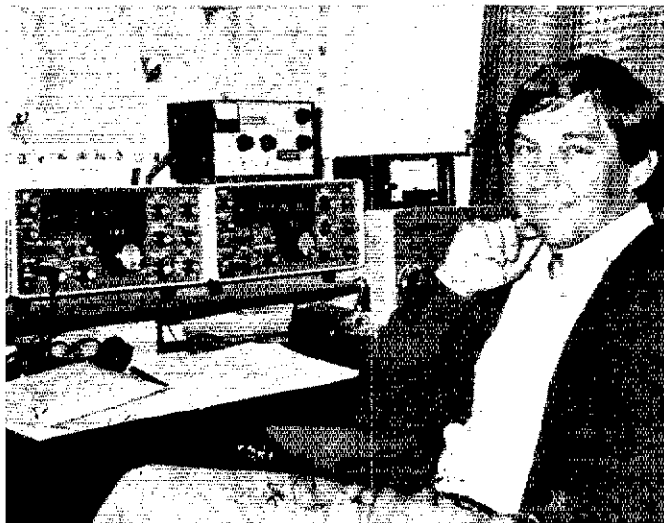
Incidentally, it is possible to send an s.a.s.e. to foreign stations. Unused (mint) foreign stamps for many countries may be obtained from the DX Stamp Service, 83 Roder Parkway, Ontario, NY 14519. Also, if the DX station has an APO or FPO mailing address, CT2BB reminds us that first-class U.S. postage (now 15 cents) is sufficient on both the outer envelope and the s.a.s.e. Anything more is wasted.

Where Do You Send Your QSL?

Major alternatives are through a bureau or "buro," or directly to the DX operator or his QSL manager. The bureau route is simple and usually relatively inexpensive. Unfortunately, it is often slow, and extra steps and handling are involved. Nevertheless, this traditional route is preferred by many DX stations, as it greatly reduces mailing tasks. (To be continued next month).

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

Bahrain operators Malcom Prestwood, A9XBC — on the left — and Les Anstead, A9XBJ — on the right — were visited earlier this year by Nick Berg, K9NB.



THE DX SCENE

Beam headings from your own QTH to each country on the ARRL DXCC list are available as a computer printout for \$5 from Joe P. Markowski, N0WL, 900 Dyerdown Ave., Ferguson, MO 63135. All proceeds will be used for nonpersonal expenses of the Navassa Island DXpedition described elsewhere in this column and in previous issues. (N0TG)

CPIAT. Phil Urquiola reports he has left Bolivia. All QSLs go via W0GX or WB0GFV.

EA9. Rio de Oro, becomes a deleted country on August 1. (DXCC desk)

FP0UN may be activated in late August or early September by VE2EHG, VE2EWH and WB1EZ1. QSL via VE2UN. (VE2EHG)

FQ3AT (1946-47) is now F3AT. Ivan reports he was also FE8AB (47-50) and FF8AG (51-53).

FQ8AJ (1958) is now F6FKV. (F3AT)

Grupo Argentino De CW, dedicated to promoting cw activity and to furthering the general interests of amateur radio, publishes a bulletin in Spanish six times a year. For details about subscriptions, write to Carlos Alberto Rodriguez, Bolivar 1266, 1854 Longchamps, Buenos Aires, Argentina. (GACW)

H4, Solomon Islands. This new prefix replaced VR4 in July.

K5CO/5A QSLs are acceptable for DXCC credit.

KG6JH plans to retire from the U.S. Navy in January after 20 years of service. Depending on employment opportunities, Jerry will stay on Guam or become N6AJ. He reminds us that a 15-cent s.a.s.e. is sufficient for a QSL from Guam. (KG6JH)

KPI/KCA Navassa Island DXpedition. Landing permission has been secured for the November 26 — December 4 trip planned by N0TG and others listed in the May column. Note that the KC4 reference in the June column is to this same group, and the Mississippi Valley DX Contest Club is not a sponsor. Solid support from the Northern California DX Foundation and others makes this DXpedition possible. (N0TG)

LZ100, the special prefix used in Bulgaria this February, applied to both LZ1 and LZ2 stations, which used their regular suffixes. Thus, for QSLs, it is simplest to go via the bureau. (WB2AMU)

MIC, at a new QTH in San Marino, continues providing cw action on 10, 15 and 20 meters. QSL direct with four IRCs for \$1. (N3MM/9)

N6NB has been elected to serve as an advisor to the Northern California DX Foundation.

PJ2VD, who has also operated as P11, PJ4 and PJ7VD, recently left Curacao permanently and is now PA0VDV. QSLs for him and his daughter, PJ2YL, go to his Netherlands QTH. (PJ2VD)

ST0RK, Southern Soudan. Hans has been on vacation but is expected to return in August.

TOPS club contest winner in 1977 was YU3TYX, followed by HA8UB and OK2BNR, in second and third place, respectively. The 1978 TOPS contest will be on December 2-3. (G3IRM)

U.S. Callbook donations wanted. Send copies of the 1977 issue to WA4JQS, who will forward them to DX stations. (WA4JQS)

VK2AGT, a permanent resident of Lord Howe Is., keeps a weekly sked on Wednesday, 0600 UTC, 14.255 MHz, with AA4AR and WA4OOM. If you QSL direct, please note that his wife collects stamps. (WA4OOM)

VK9ZR, Mellish Reef, DXpedition appears set for last few weeks in August. (LIDX)

VP2M and VP2MT. JA1KSO/WB6NLH is QSL manager for QSOs of November and December, 1976, only. He says QSLs he has received for other VP2M/MT operations will be mailed to other QSL managers.

VP2MAS was operated by WA4AVJ from May 11-20 this year. QSL via the home call. (WA4AVJ)

VP8PL, South Georgia, should be on duty now. VERON reports he operates cw exclusively, about 25 kHz up from the low ends of 20, 15 and 10 meters.

Y1BGD. An international effort is being made to improve the station. Both Kan Electronics, Japan, and

the Northern California DX Foundation have shipped extra equipment.

ZF2AD. QSL manager is W4BAA, and not W3PLP, as erroneously reported in the June column. (W4BAA)

ZL2MHF, a 10-meter beacon, has become operational and seeks reception reports. (ZL2BHK)

3A0, Monaco, will be put on the air by DK7AH and DK8AG, July 21-28, 10-80 meters, cw mode. QSL via home calls. (DK7AH)

3D2CM wants West Coast stations to listen for him daily on 50.110 MHz between 0600 to 0700 UTC. He can hear the KH6EQA beacon then, so contacts seem possible. (WA4JQS)

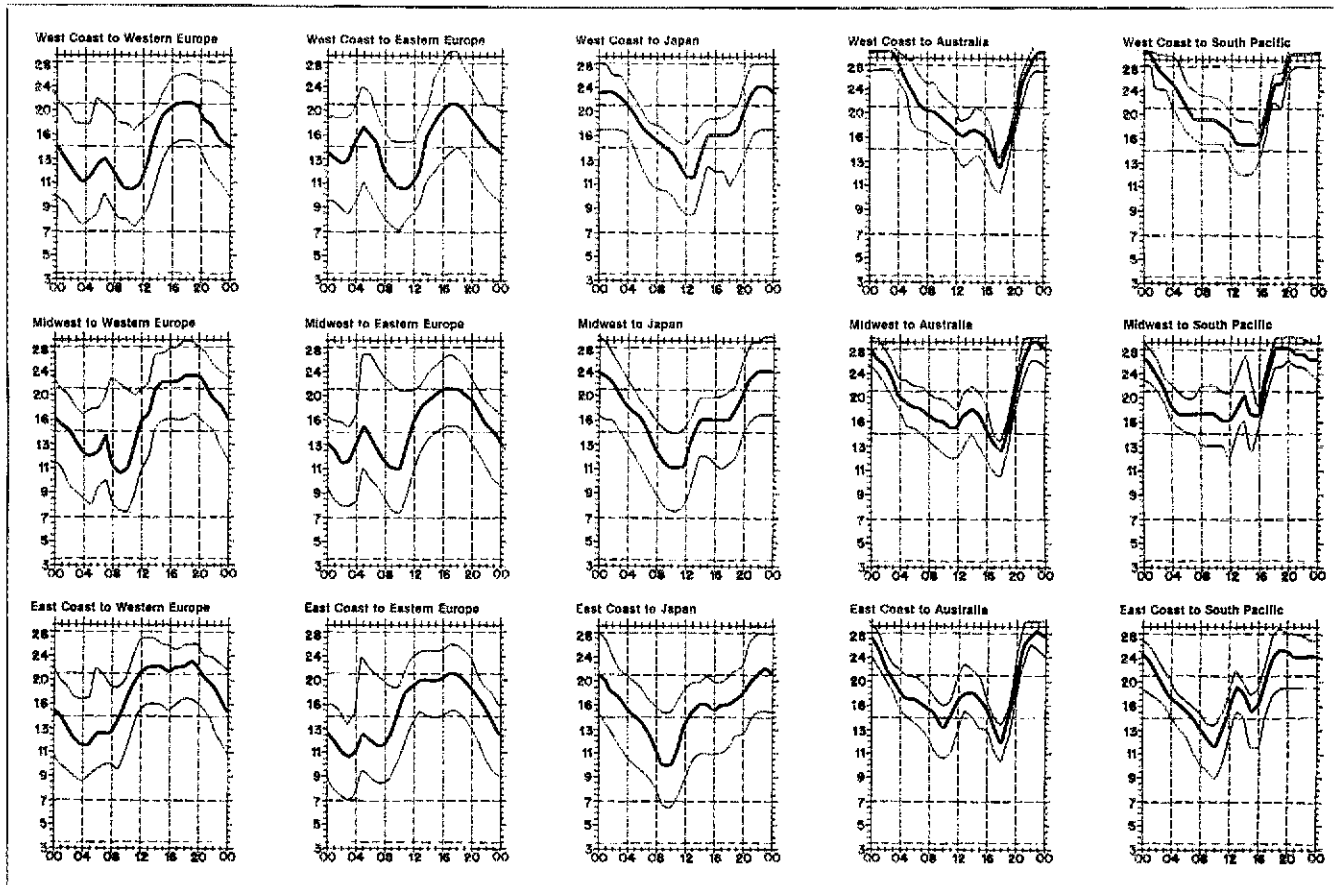
3Y, Bouvet. Some believe that this could appear in September! Keep listening!

PROPAGATION CHART CHANGES

This month, some changes have been made in the propagation charts in an effort to make them more useful. The long-path charts, which very few members reported using, have been replaced with charts of the paths of most interest to members in Alaska, Hawaii and Puerto Rico. The new charts will also help those in Europe and the mainland U.S. to work into those areas. Also, to offset the late QST delivery to some areas, the charts now will be valid from the 15th of the issue month to the 15th of the following month. For example, this month's charts cover the period August 15 to September 15.

QSL INFORMATION NEEDED

If you know the QSL route for any of the following stations, please write directly to the ham needing the help: F18XX (48) needed by ZL1HY — FG7XA, HR3SM, VP2GLE, ZL2JS needed by N3AX — TA3AY (10/70), VP7DY (7/74), VQ9TF (9/70), ZK1MC (11/69) needed by WA4MTS — CT1SX (72), CR7FM (72), CO8HJ (73), CO2FC (72), CO7SG (74) needed by WB2AMU — VR3AO and VSSDX needed by WA4JQS.



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hpf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the



Felix, HR6SWA, shown enjoying the beautiful beach and ocean breezes on Swan Island, in a recent photo relayed by Steve, WA1ZGR.

QSL Corner

Administered By R. L. White, W1CW

The workings of the QSL bureaus are something of a mystery for some of us, so this column will touch on one part of their operation. We did discuss the way to make use of the ARRL Membership Overseas QSL Service last month, so I won't belabor it again. The use of the ARRL DX QSL System is another story though and is entirely separate.

The ARRL DX QSL System is for "incoming" DX cards. It is a system everyone can use, whether ARRL member or not. The cost is only that of supplying the call area bureau with envelopes and postage for return of the cards from the bureau.

Each of the call areas in the U.S. and Canada has its own "incoming" QSL bureau and is part of the ARRL DX QSL System. A list of them is run in *QST* six times per year. DX QSLs sent "via the buro" will go to the bureau in which the individual resides. I.e., if you have a WDØ call your cards will go to the Ø call area QSL bureau, if you have a WD6 call then the cards go to the 6th call area bureau. The 4th call area differs a bit inasmuch as it is divided into two bureaus. Currently, single-letter prefix calls go to one bureau, double-letter prefix calls go to the other. Check the list of bureaus in *QST* for the proper address.

Once you have the address for your bureau, address some 5 x 7 1/2-inch envelopes to yourself, put your call letters in the upper left-hand corner of the envelope, in letters about 1/2-inch high. Put a single 15-cent stamp on each of the envelopes, put the envelopes in another envelope, that has been addressed to your QSL bureau, and put the envelope in the mail.

Some of the bureaus, but not all of them, offer to supply the envelope and postage for a fee. The bureaus that do are shown in the list with an asterisk mark. The details of that service can be obtained by writing directly to your bureau, asking for the details. Be sure when writing to the bureaus, for any reason, to include a s.a.s.e. for the reply.

If you have just started working DX stations in the last six to 10 months, don't be surprised, or overly concerned, if you are not immediately inundated by cards coming back to you from the bureau. By the very nature of the QSL bureau system it is slow and no amount of impatience makes it any faster. One way to help keep a steady incoming flow of cards from the bureau is to work as many DX stations as you can, regardless of how "common" the DX is, and QSL all your DX contacts. It is a simple matter of percentages — the more you work and the more cards you send out, the better the chances will be that you will get cards.

For those of you who already have envelopes on file at the bureaus, but you send them with 13-cent stamps, be sure and send the bureaus some additional 2-cent stamps to bring the postage up to the 15-cent rate.

Making a quick switch, from QSLs "via the buro" to that of QSLs coming direct, or via a QSL manager, here are a few tips that we hope will be helpful. Thanks to the following for their thoughtfulness in passing along the helpful hints: DF2RG, FH8CY, K2TV, N5TC, N6MA, PJ2VD, W1EWD, W3GQC, W4KA, WA4AVJ, WB4OSN, WD5DKY, WB6YDT, WAØTKJ and WBØGFV. Please keep in mind though that we pass along information that has been given to us and cannot guarantee the accuracy:

FH8CY, FH8CJ, Box 50, Dzaoudzi 97600, Mayotte, Indian Ocean.

GU5CIA, 3800 South "J" St., Oxnard, CA 93030
 PJ1VD, PJ2VD, PJ4VD, PJ7VD, PJ2YL, Joeke van der Velde, PAØVDV, Fazantenhof 57, Eemnes, Netherlands

P29BL, Box 7412, Boroko, Papua, New Guinea
 S79RB, Box 391, Victoria, Mahe, Seychelles
 YI1DGB, Bajid Abdul Hamid, Police City 41063, Iraq

A35MB (DF2RG)
 CP1AT (WØGX)
 DA1GJ (W3GQC)
 FH8OM (DJ1TC)
 FH8YL (I8JN)
 HP1XYA (W3HKN)
 KØAX/ØU2 (WB4OSN)
 KG6DX (K1RQE)

ØA4ARB (WB5JJD)
 ØA4CBE (WD5DKY)
 P29NKV (WA7ILC)
 VP2MAS (WA4AVJ)
 VYØCA (WA4SSU)
 XF4JJ (WB4KPZ)
 YBØADI (WA2DWE)
 ZF2AD (W4BAA)

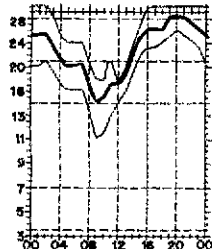
QSL MANAGER VOLUNTEERS

These worthy hams want to handle QSL chores for DX stations: WA1GXE, WB4AEJ and WB5MAH.

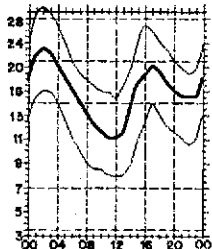
THANKS TO OUR MANY CONTRIBUTORS

Without their help, this column would not be possible.

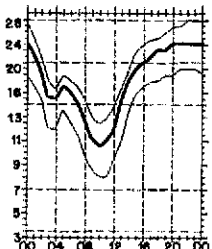
West Coast to South America



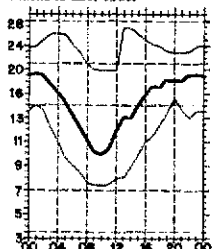
West Coast to Central Asia



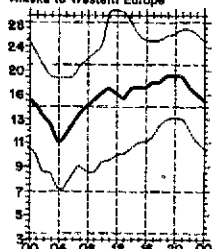
West Coast to Southern Africa



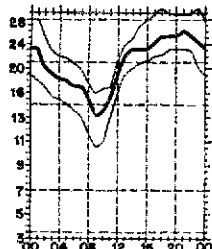
Alaska to East Coast



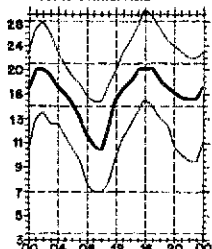
Alaska to Western Europe



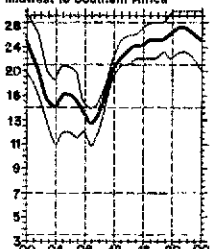
Midwest to South America



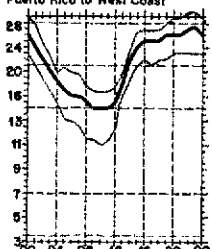
Midwest to Central Asia



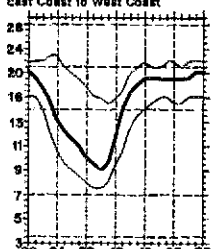
Midwest to Southern Africa



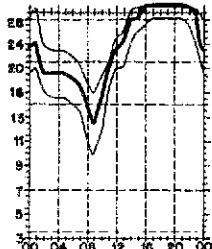
Puerto Rico to West Coast



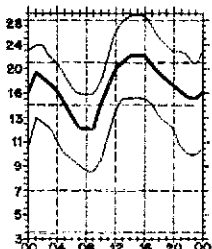
East Coast to West Coast



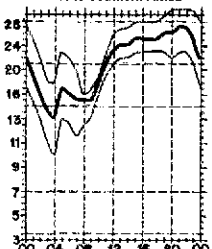
East Coast to South America



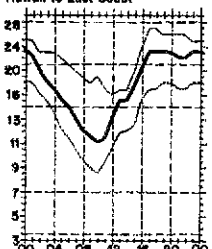
East Coast to Central Asia



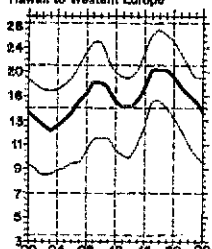
East Coast to Southern Africa



Hawaii to East Coast



Hawaii to Western Europe



lowest curve (optimum traffic frequency, or fof). See January 1977 *QST*, page 58, and September 1977 *QST*, page 35, for a complete explanation. The horizontal axis shows Universal Coordinated Time (UTC); the vertical axis, frequency in MHz. Asterisk indicates long-path circuits. Data are provided by the Institute for Telecommunication Sciences, Boulder, CO. These predictions for August 15 to September 15, 1978, assume a sunspot number of 103, which corresponds to a 2800-MHz solar flux of 148.

ZK1DR (W0WP)
ZK2AV (DF2RG)
ZS2MI (WA4SSU)

3D2BB (DF2RG)
9K2FX (W4KA)
9V1TE (WA0TKJ)

DX Century Club Awards

Administered By Don Search, W3AZD

ARRL DX QSL BUREAU SYSTEM

□ First Call Area: all calls* — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.

□ Second Call Area: all calls* — North Jersey DX Assn., P. O. Box 8160, Haledon, NJ 07508.

□ Third Call Area: all calls* — Jesse Bieherman, W3KTC, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.

□ Fourth Call Area: K4, N4, W4 — National Capitol DX Assn., Box DX, Boyce, VA 22620.

□ Fourth Call Area: AA4, WA4, WB4, WD4, WN4 — Sterling Park Amateur Radio Club, P. O. Box 599, Sterling Park, VA 22170.

□ Fifth Call Area: all calls* — ARRL W5 QSL Bureau, Box 1690, Sherman, TX 75090.

□ Sixth Call Area: all calls* — ARRL Sixth (6th) District DX QSL Bureau, P. O. Box 1460, Sun Valley, CA 91352.

□ Seventh Call Area: all calls — Willamette Valley DX Club, Inc., P. O. Box 555, Portland, OR 97207.

□ Eighth Call Area: all calls — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.

□ Ninth Call Area: all calls — Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.

□ Zero Call Area: all calls* — W0 QSL Bureau, Ak-Sar-Ben Radio Club, P. O. Box 291, Omaha, NE 68101.

□ Puerto Rico: all calls* — Radio Club de Puerto Rico, P. O. Box 1061, San Juan, PR 00902.

□ U.S. Virgin Islands: all calls — Graciano Belardo, KV4CF, P. O. Box 572, Christiansted, St. Croix, VI 00820.

□ Panama Canal Zone: all calls* — KZ5 QSL Bureau, Box 407, Balboa, CZ.

□ Hawaiian Islands: all calls* — John H. Oka, KH6DQ, P. O. Box 101, Aiea, Oahu, HI 96701.

□ Alaska: all calls — Alaska QSL Bureau, 4304 Garfield St., Anchorage, AK 99503.

□ SWL — Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

□ QSL Cards for Canada (VE and VO) may be sent to: ARRL Central QSL Bureau, P. O. Box 663, Halifax, NS, Canada, B3J 2T3. Or, QSL cards may be sent to the individual bureaus.

□ VE1* — L. J. Fader, VE1FQ, P. O. Box 663, Halifax, NS B3J 2T3.

□ VE2 — A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal, Quebec H3R 2E3.

□ VE3 — The Ontario Trilliums, P. O. Box 157, Downsview, Ont., Canada, M3M 3A3.

□ VE4* — W. A. Stundén, VE4BJ, 578 Oxford St., Winnipeg, Man., Canada, R3M 3J9.

□ VE5* — A. Lloyd Jones, VE5J1, 2328 Grant Road, Regina, Sask., S4S 5E3.

□ VE6* — G. D. Holton, VE6AGV, 4003 1st St., N.W. Calgary, Alta., T2K 0X2.

□ VE7* — Howard Martin, VE7AFY, No. 45-9960 Wilson Road, Ruskin, BC V0M 1R0.

□ VE8* — A. Sturko, VE8NS, P. O. Box 72, Fort Smith, NWT X0E 0P0.

□ VO1, VO2 — William Coffen, VO1KM, P. O. Box 6, St. John's, Nfld., A1C 5H5.

*These bureaus sell envelopes or postage credits. Send an s.a.s.e. to the bureau for further information. QSL bureaus for other areas can be found in the December 1975 issue of QST, page 64.

DXAC NOTES

The ARRL DX Advisory Committee welcomes comments regarding the following external agenda items. Proposed new rule to the countries list criteria: Rule 5. Unusual miscellaneous areas

(a) any area which is classified as a demilitarized zone, neutral zone or buffer zone will not be eligible for consideration as a separate entity.

(b) embassies, consulates and extraterritorial monuments will not be eligible for consideration as a separate entity from the host country.

If we accept this proposal shall it be made retroactive with countries not meeting the new criteria (with a deletion date of Feb. 1, 1978)?

Please direct your comments to ARRL hq. for distribution to DXAC.

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 May 1 through May 31, 1978. An s.a.s.e. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed W6YO/320 SK6AW/287 WA1EUJ/250 W9OBF/246 JA6AGS/225 N6JT/222 N2NN/204 DK5FJ/199 N4DW/197 JF1DSN/179 JH6XOD/176 W8LJP/168 G2HKW/159 JA1RIG/PZ/159 N9BB/158 JA2YKA/153 SM6FKF/148	K9RU/145 WA1TFE/140 W3WNU/140 V56DD/138 G4FAM/131 JA2APV/131 KZ2UH/130 KM6FC/129 AA4TP/127 K3FB/127 W8CBA/122 VE3BRM/121 JH7BDG/120 JA7AMA/118 JH1BUW/117 WB4FPH/116 W7HZL/115	EL2ET/113 W6SSC/113 W7JIT/113 AA4BA/110 JA1QOP/110 JA4PPH/110 WA4QHV/110 WA0LYO/110 JH2PDS/109 WB0RZY/109 DA1AZ/107 WB5QBV/107 DK8NU/103 DF1SV/106 JH6HYC/106 WB4TAI/106 E8LK/105	I3JGP/105 I6GMQ/105 JH6BZ/105 K5WG/105 W1ING/105 WB6OTC/105 GU4CHY/104 K6SMH/104 WA7OSO/104 WB8ZJW/104 WB9TJ/104 K4BKX/103 K9AUJ/103 WD5DUD/103 N4PY/103 N6ZJ/103	W3OQ/103 WB3EPC/103 W4JTL/103 WB9NOV/103 CX2AG/102 N3IK/102 W4WB/102 WB5ZO/102 WB6JKU/102 WB6TT/102 WA7GZA/102 W9ZS/102 AA4NC/101 K7NR/101 K5BO/101 ON6HR/101	SK4BX/101 WA3EEE/101 WA4DAN/101 WB8NU/101 WB9ZBE/101 W0UBT/101 K2NN/100 K5PR/100 VP2EG/100 WB1CT/100 WA2ECA/100 WA3GLQ/100 WA4DPJ/100 WB4VSO/100 W7WB/100 WA0LHK/100
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Radiotelephone

W5UAW/311 VK6LK/302 W8TAN/294 WA3ELE/238 W8LJP/167 G2HKW/151 K9RU/140 WB7ETJ/136 WA1TFE/137	K1YHM/134 JA2APV/127 N9BB/127 VE3HHS/125 WA3WNU/125 DK1YV/124 W8GMH/119 K6HD/118 W2SM/118	JH1BUW/117 DJ1HB/110 K88IP/110 W7QGT/110 VK3OT/109 YB6ACH/109 K0DYV/105 N4SV/108 CN8CX/106	K4TJJ/106 VE3MRS/106 WB0RZY/106 YB2SV/106 I8WES/105 N8II/105 WA2LCW/105 W2YZ/104 WA4HNL/104	WB5QBV/104 JE1XRZ/103 WA2LNG/103 WB5SV/103 W6SDU/103 WA0LYO/103 WA4QFS/102 W6SSC/102	KL7AF/101 WD4AAD/101 K4D07/100 N1AC/100 W3HGT/100 WA5MLT/100 W7GYG/100 WB7BFK/100
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CW

W9DWQ/222 WA6TYQ/140 SM6FKF/139 JA1PIG/PZ/130	JF1DSN/126 I79GLJ/122 W2LZX/114 JA7AMA/118	W2SM/111 N4SV/110 N4SX/109 N8II/105	JH6HYC/106 N4SV/106 JA1GLT/105 W8GMH/105
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Satellite

W2BXA	160 Meters	K4CIA
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5BDXCC

W3ATP	G13VJ	N4RR	N4RA	K8EJ	JA1DQT	G3AAE
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Endorsements

Mixed ZL1HY/357 W2CR/352 K4YR/351 K6KH/345 W9BZW/335 DL1CF/332 W1TFJ/331 K4CEB/323 F8RU/321 JA2HPN/321 K8VUR/321 W1OHA/321 W3CDO/320 N5RR/313 W8FAW/312 O2BZ/310 PP5UJ/310 VE4XJ/310 W8CFG/310 N4CQ/308 W4JD/308 W9CAW/304 K4SMX/302 W1OR/300 W3B1X/300 W4BV/300 ZL1TY/300 K1JO/298 W7XA/295 DK9WB/290	K9CT/290 DL3ZA/289 W1GDC/289 K8CSG/286 W5GEL/285 W2RS/283 W2YD/283 PA0INA/282 WA1JMP/280 W2PSU/280 W2VYX/280 W3CDO/280 JA3GM/279 N4VZ/277 JA6XA/276 N3UN/276 WA2AIO/275 W4OY/275 G3GIQ/271 K0SGJ/271 W4CZU/270 W7DV/270 W7JUO/270 K4IR/269 W9NB/269 W1AJG/267 K4JEY/265 K4HRG/263 OH2VZ/261	W3SQ/260 W5LW/258 F9YZ/256 K6ICE/255 W7FP/252 K4BYN/251 DJ1BV/250 K3RT/250 N4GE/250 WA3NGS/250 WB4FJO/250 DL0WV/247 W4DZZ/247 K9RL/246 K2MF/Y242 K4KFH/240 K6CBL/240 W8CFR/240 KH8CF/239 W7OK/239 JA6SV/239 WA1UAD/231 WA6TLA/231 AA4DR/230 K7LJA/227 W1LKY/226 W7SF/224 WB4MAR/223	LA8CJ/222 W0JF/221 DJ8CR/220 W2SM/220 DL9EY/219 W3BZN/218 N1YL/203 K4PHE/202 VE6HT/201 K4TXJ/200 KP4EBQ/200 N4BG/200 W2QIP/200 WA4OUF/200 WB4ASV/200 W1DQW/199 9J2IE/199 K6OYE/195 W6TJI/189 K1SF/184 LUBADK/183 W1BL/183 W3UJ/183 WD4BRE/183 K1WJ/182 W1LK/182 W2PK/182 VE6CV/181	W4BUW/181 WA4WYN/181 W8DEQJ/181 KZ5FR/180 N4YY/180 WA4HDD/180 W6TPR/180 JA6SUO/177 N3GB/172 JA8FBM/166 W6V5Z/166 ZS2EM/166 N9OK/164 K9WHL/164 K1YHM/162 N8II/162 W4JIK/161 KL7HR/160 VE3GFN/160 WB4BHQ/160 WB4WSB/160 WB0GZ/160 WA6TYQ/155 SM5AKT/153 K1EM/152 K6ASI/151 CT1DF/146 VE3HHS/146	JA1KQX/145 W4QO/144 OH2KP/143 WA3FXJ/141 WB6NJW/141 AA4NA/140 W1TEE/140 W4NQi/140 W7XN/140 WB9POH/140 WB9VIO/140 N8FB/139 K9WHL/138 N2WS/137 N2US/135 6Y5MP/133 N4MY/130 N7SW/129 WA1YAX/126 K5VV/122 WA1SQB/122 K2ZZ/121 K1DP/120 N8JK/120 WA6TKT/120 WB1DGD/119 W5EW/119
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Radiotelephone

Z1LHY/356 PY4TK/341 W9BZW/322 K8VUR/319 I79TAI/316 F8RU/315 K4YFQ/313 W6USG/312 K4PDV/310 W8CFG/307 W9LA/305 W1DQ/303 ZL1TY/300 W6TMBV/299 JA2HPN/295 F8BFH/290 DK9WB/289 K8CSG/283	N4CC/283 SK6AW/283 K1EJO/279 W2SAIO/275 W2SUJ/271 N3UN/270 W5FJA/269 VE9AH/267 N9NB/267 K0SGJ/266 EA3CJ/263 I1TBE/260 W5CB/252 WB4QGI/251 W7FP/251 W9XM/250 DJ6FN/244 K4PI/244	JA3GM/241 K3RT/240 W3CDO/240 W3FZE/240 W5LDH/240 K0UC/239 W5EFA/235 DJ1BV/233 WA4SSU/232 JA6SV/222 N6JT/221 K3BCG/220 K4FRS/220 WA1UAD/220 K7LJA/211 K7SA/203 K0IET/202	W8PCA/201 K2GAT/200 W47L/200 W6ORD/200 W4BUC/200 ZPSYW/199 K4HRG/191 W2RS/183 K1SF/182 WA4HDD/180 WB4ASV/180 W8SDV/180 W8SDV/180 W0JF/180 ZP5EF/180 9M2CT/180 WD4BRE/179	K9RL/170 DL9EY/164 CT25H/161 W4BUW/161 W9P9CF/160 WA4QMCP/160 W9VWV/160 N3GB/159 WB5UKJ/159 K0EPE/157 WA3AXV/156 W8ADT/153 WB2AIO/151 W6LHL/150 K6ASI/149 N9BA/149 EP2TY/143	WB6ICJ/142 WA7KNK/142 WB8HL/142 K1ATL/140 W23FQ/140 HB9L/139 W9VWV/139 W5VZ/139 WASVW/139 6Y5MP/133 DJ8TP/131 K1WJ/128 K1WH/126 W4DZZ/123 WA1SQB/120 ZP5CBL/120 WB8PCN/116
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CW

K4YFQ/281 N4RJ/270 K3FN/252 ON4QX/225	K9RL/209 WA6TLA/207 W9BZW/192 JA2EY/180	W7WN/172 K6WII/160 W8RT/160	N2AC/160 EA2QP/158 DL3BK/144	VE3BX/142 SM5AKT/140 WB4KZG/140	LUBADK/127 W2MIG/124 N4YM/121
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Corrections

June Listing: Phone Endorsement. N5IX should have appeared as N5UX/140. Mixed Endorsement. K4TXJ/180

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



How Goes It with the 2-Meter Band Plan?

Comments on the 2-meter band plan proposed by VUAC Chairman WIJR and publicized in the "World Above 50 MHz" for June have, in general, been favorable and activity patterns seem already to be falling into those suggested. This involves using 144.2 as a calling frequency and conducting ragchews above that spot while preserving the 144.1 to 144.2 segment for short contacts such as in contests and long-haul schedules. In the cw assignment below 144.1, it was proposed that the lower end of the band be kept clear for the extremely weak-signal moon-bounce mode, while the upper part be used for general cw work. Beacons would be squeezed in between, if FCC decides to permit us to operate unattended beacon transmitters as is already allowed for repeaters. This general occupancy pattern for the lowest 100 kHz has been in current use in most parts of the country so it does not represent anything new.

The few negative comments which were received on the plan fell into the following four general categories:

- 1) Why do we need a band plan anyway and who is WIJR that he can dictate what we do?
- 2) Why do we need more space for repeaters and why should we move off 145.1 to make way for them?
- 3) What about a-m operators? Most of them are crystal controlled so it's harder for them to move and why should they, when they have been in the same part of the band for years?
- 4) Where does AMSAT get off "grabbing" 200 kHz of the 144.0 to 144.5 range and why do they need more satellite frequencies?

I will try to offer brief justifications or perhaps rationalizations for the first three this month and then attempt to explain the problem which confronts the amateur satellite community in the September column.

First, WIJR, the VUAC, or the League itself

is not trying to dictate anything. The VUAC was set up, as were the other advisory committees, to provide amateurs with a better means of communicating their ideas and opinions. The plan presented in the June column was just what it was labeled, a proposal for discussion, not an edict. Your VUAC representative provides a ready and knowledgeable avenue through which to express your opinions on it or any other matters pertaining to vhf/uhf. Besides, no band plan, even if it does meet with general acceptance, is a set of rules which *must* be followed. It is advisory in nature, a set of norms to be observed voluntarily. But a good band plan, observed by most of us most of the time, will enable all of us to do our "thing" with minimum impact on others.

The question of the need for more space for repeaters is, of course, a controversial one. The answer depends on whom one asks. In any case, FCC has decreed that repeaters can now operate in the range 144.5 to 145.5 MHz. Such a rule change was not sought by ARRL. The original commission proposal called for allowing repeaters anywhere in the 2-meter band. The only parts of the vhf/uhf spectrum which would have been off limits were 50 to 52 and 435 to 438 MHz. Thanks to intervention by the League, the Central States VHF Society and a few individuals, this did not happen and a few preserves were carved out for the weak-signal operators. Whether or not many of us feel that more space is needed for repeaters, it is quite certain that "machines" will be placed in the 144.5 to 145.5 range, particularly in the heavily populated parts of the country. On the other hand, in other areas the fm interests have indicated that repeaters are not expected in this range in the foreseeable future. According to WASHNK, the southeast portion of TX and adjoining states is in one such area. Joe adds

that the sentiment among the sidebanders in that region is strong for remaining on 145.1. They promise to watch 144.2 from time to time, however, so as not to miss band openings. In other parts of the nation, particularly along the East Coast, just about everyone was eager to get down to the 144 part of the band "where the action is." Since all sidebanders have VFOs, the move has been absolutely painless.

In the case of a-m operators, VFOs are not as universal. Many are crystal controlled and have only a few rocks. Certainly, if no other activity crops up in a particular locale there is no need to move from 145.1, 145.2, or whatever frequency is in use. On the other hand, if a strong new repeater appears, it's a sign that times do change. I recall one local radio club which, many years ago very commendably, set out to populate the almost unused upper part of the 2-meter band. So they bought a bunch of crystals and distributed them to their members. The weekly club net, a-m of course, was held on the stratospheric frequency. Everything went well for a long time until interference started to develop from fm operators. Who would have thought that anyone else would ever be on 146.52? Needless to say the club net eventually moved. The new spot selected was 145.2 where most already had crystals. The most-frequently-heard suggestion for a-m operation is just above 145.5 where repeaters cannot tread and far enough from the present satellite band to not present a problem with that activity, for at least a few years, if ever.

Next month I will outline the problems which beset the amateur satellite people in their search for frequencies for the upcoming super spacecraft which most of us will be using routinely in just a few years.

GIBRALTAR 6-METER BEACON HEARD ON EAST COAST

Six-meter operators from New England to the Mid-Atlantic states were startled Sunday, June 4, to hear the cw beacon signals of ZB2VHF on 50.003 MHz. The signal peaked well over S9 at some locations including that of WA1OUB, NH. WB2VWW, NJ, began hearing it at 1802 UTC and played the signal over the telephone to this conductor's answering machine. I was also able to hear ZB2VHF a few minutes later although it never got as strong here as farther to the north. Nevertheless, WB2TNC/3, just a few miles to the east of me, reported hearing the beacon on his IC-502 using the built-in whip. WA1OUB said the signal peaked about 1900 and faded soon afterward. Between 1900 and 2045 UTC Bob also heard what appeared to be video carriers on 48.24 and 48.25 MHz.

CENTRAL STATES VHF CONFERENCE SET FOR AUGUST 17 THROUGH 20

This year's Central States VHF Conference will be held at the Midway Motor Lodge, Rochester, MN, on

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730, or call 301-384-6736 and record your message.

the above dates. The MN group has an interesting program planned. Dick Knadle, K2RIW, will talk on optimizing Yagis. Jan King, W3GEY, will detail the technical capabilities of the new Phase III satellite series which are certain to make a big impact on the world above 50 MHz and ham radio in general. S. Spero of RCA will discuss microprocessors. The featured speaker will be ARRL President Harry Danals, W2HD, an old friend of vhf and an active participant himself. Of course there will be the stimulating informal gatherings for which Central States has become famous. Bring your antennas, preamps and converters and have them measured.

For further information, contact Terry VanBenschoten, W0VB, 2326 N.W. 11th Ave., Rochester, MN 55901.

C U there!

THE WORD FOR BOTH CONFERENCES — GREAT

Both the West Coast VHF Conference, held in Las Vegas May 12 through 14, and the Northeast VHF/UHF Conference, the following weekend at the University of New Hampshire, were outstanding successes. Both were well planned and held in quite different, but excellent, facilities. This conductor had the unexpected good fortune to be on the West Coast at the time of the Las Vegas affair and had already planned to go to Durham so ended up attending both

conferences. At the West Coast gathering, the San Bernardino Microwave Society arranged the technical program, and a fine job they did. A presentation on solid-state linear amplifier design was made by Roy Hejhall, W7QWR, of Motorola. An interesting talk using tapes entitled VHF Operating in Europe was given by Fred Brown, W6HPH/GSAWI. Paul Shuch, N6TX, in a very well-prepared presentation, told us how to receive the microwave transmissions from the new generation of weather satellites. Also in the satellite realm, Norm Chalfin, K6PGX, outlined, with many fine photographs, the history of the amateur satellite program from OSCAR 1 to the present. There was a fine hospitality room hosted by Gordon West, WB6NOA, as well as noise-figure and antenna-gain measurements and, of course, a chance to meet and talk with many people who previously were just voices on the air or calls on a page. Bruce Clark, K6JYO and Gary Frey, W6XJ, corralled many fine prizes and Al Olcott, K7ICW, did a superb job of coordinating the whole affair. Despite the enticing location, I didn't hear of any hams losing too much hard-earned loot in the casino!

At Durham, NH, the following weekend, Tom McMullen, W1SL and his crew, consisting of WIHR, WIJR, K1LOC, WA1UPB and W1XZ, turned in an equally fine job of putting on an interesting and informative conference. The technical program included a talk on high-power amplifiers by K1FO in which Steve presented some good design tricks for coming up with stable amps, the latest techniques in the design of

low-noise GaAsFET preamps by WA2ZZF, and an extremely informative discussion of cavity construction and metal work in general by WIGAN. W1JR discussed and demonstrated some simple but effective measurement techniques, while WB6NMT talked about a subject with which he has become very familiar — solid-state power amplifiers. Filter techniques by WIGGM, antenna stacking by W1JR and high-dynamic-range receivers by W1OOP rounded out the program. A noise-figure-measurement session took up most of Sunday morning with time left over for a general forum to discuss various subjects from TE to new band plans. The food was wonderful and the company was even better. The prize committee did such a good job that there were more prizes than attendees.

For those of you who have never been to a vhf conference, try one, you'll like it. As noted above, the Central States Conference will be held this month. The Pack Rats' bash is coming up September 30. More about that next month.

TWO VHF SILENT KEYS

It is with regret that I report the passing of two well-known inhabitants of the world above 50 MHz. Andy Malowanchuk, known to many as VE4MA and later as VE6JX of Calgary, AB, will be missed by the many friends he made on 6 meters, 2 meters and 70 cm. As well as general operation, Andy was active on the satellite and 70-cm EME.

Dave Middleton, W7ZC, Springdale, UT, went back to the early days of radio and most recently was very active on the satellites and served as AMSAT's area coordinator for UT. I met Dave for the first time at the West Coast VHF Conference and found him to be very enthusiastic regarding all aspects of vhf/uhf although his location pretty much limited him to satellite operation.

Appreciation is expressed to K7ICW for the information on W7ZC, and W7FN who informed me of VE6JX's passing.

ON THE BANDS

Contest Summary — Conditions on 6 meters during the SMIRK contest, the first Saturday in June, were spotty at best. Only a few Es contacts were made in scattered parts of the country. The story was much different the following weekend when the ARRL June QSO Party was held. Things got off to a slow start, at least in this part of the country, but K5ZMS reported quite good conditions in the western states. The next day was a real turnaround for the easterners. Es abounded with much short skip in evidence but little double hop was reported limiting section totals. Another disappointing feature was the lack of propagation to the south, limiting participation of the various Caribbean stations. WB4TMT, SC, worked ZF2BU two days after the contest and was told by operator N6CW that he was the fourth contact since arrival on the island the previous Friday. WB2RLK/VP9 fared better, however. This conductor heard Bob engaged in some good runs with stations in the East. QSLs for that operation, as well as Bob's VP2MX work and the FP000-SM operation should go to VE1ASJ. W2BN/KL7 also ran into propagation problems. Dave made only 14 contacts in four sections, all the hard way.

On 2 meters and higher, tropo was unusually good for a contest weekend. Openings from 5th call area stations in OK and TX to 8s, 9s and even VE13 were in evidence throughout much of Saturday evening and Sunday morning. W5KHT near Oklahoma City worked all of the above plus W2SZ/1, MA. Bob wonders if the 1370 miles involved isn't a record for overland tropo. The East Coast had its turn to the 8s and 9s during the wee hours of Sunday with signals so strong that many concluded that Es was responsible. Along the East Coast, ducting was in evidence much of the time with many 2-meter and 70-cm contacts between VA and NC stations with New England. Even WB2SIH/VE1 was worked from that area on 70 cm.

The West Coast did not fare quite as well according to N6NB. Wayne says that except for some Es on Saturday and a JA opening 6 meters put on a lackluster performance. Information is sketchy but it is understood that W6XJ worked seven JAs and K6MEP landed several. The 23-cm band was the highlight as far as N6NB was concerned. XE2BC, operating 90 miles south of San Diego, completed what are probably the first contacts on that band between Mexico and the U.S., working Los Angeles area stations AA6DD and K6ZMW, along with K6OKC, Camarillo and WB6IMM, Tat, farther to the north. The group, consisting of WB6NMT in company with a number of XEs from the Tijuana Radio Club, was also active on 6, 2 and 1-1/4 meters as well as 70 cm. N6CA, operating from Mount Potosi, NV, was active on all bands through 23 cm giving several CA stations

their first out-of-state contact on 23 cm. N6NB could not get to his planned Mount Pinos QTH and had to settle for a much poorer location and correspondingly lower score.

All in all however, it was one of the most interesting contests in many years.

Many worked GW3NJY/W9 during the contest and at other times and have asked about QSL information. Cards may be sent to M. M. Bibby, 990 N. Lakeshore Dr., Apt. 21C, Chicago, IL 60611.

6 Meters — Characterizing the current season to date, mid-June, is very difficult. Most would say that it is noticeably below the last few years. WA5IYX says that May, 1978, was the second worst May in the past five years in terms of the number of minutes the band was open for Es in San Antonio. On the other hand, some of the goings-on, such as reception of the ZB2VHF beacon on the East Coast, and the West Coast openings to JA during and following the contest, at least partially made up for the poor Es showing. K7ICW points out that W1HDQ and others have noted in the past the effect of diminished Es during years of higher solar activity. Al echoes WA5IYX's observation with respect to May results. On the other hand, WA0MRH, Omaha, found quite good Es on half the days in May. WB3AIT, PA, found the band productive in May and early June. Ed came up with three new countries: working VY0CA on May 22, FP000 and SM on the 31st and WB2RLK/VP9 on June 4. Nevertheless, N0LL's OVS report agrees with those who found May conditions down. In 1978, Larry noted 15 days of openings in May compared with 29 in the same month last year.

The period around May 2 was very interesting, following, as it did, three solar flares in three days. Many aurora reports were turned in including one from WA4SJI, East Point, GA. Ron had buzz QSOs with Cincinnati stations WB8UNT and K8VVV and heard 1s, 3s and more 8s between 2140 and 2230 May 1. At 0110 UTC May 2, K6RNQ, 130 miles northeast of San Francisco, worked KH6IAA and two southern CA stations via F2 backscatter with his beam to the south. At about 0200 UTC Bob began hearing aurora from N7DB, Boring, OR. He QSOed him and heard other 7s with the beam due north. From Fairbanks, AK, KL7DJ notes working a string of 7s and 6s including K6RNQ beginning about 0315 UTC May 2. Dave also reports KL7AG active and working about eight stations. It all ties together quite nicely.

May 29 produced a 45-minute opening from the Tulsa area to Ketchikan according to K5SW in which Sam and several other area stations worked KL7IHP.

Those West Coast to Japan openings that began during the contest continued for at least several days thereafter. WA7BJU, OR, reports contacting JAs TGS, and VOK as well as JA3ILA and JA7ROK around 0500 UTC June 16.

Bermuda will not be absent from the 6-meter scene with the departure of WB2RLK. A few days after the contest, WB5CHW reports that he and several other TX stations worked VP9WB who now has an SB-110 and expects to be active.

From the Far East, JA1UT and JA1VOK both report a very successful late April-early May DXpedition to Hong Kong and Macao. Operating as VS6HK the group had 942 6-meter QSOs in seven countries. At CR9AJ they had 874 contacts in six countries. The large preponderance of contacts from both locations were with the Japanese homeland.

2 Meters — As can be seen from the 2-meter standings published last month, there are now four WAs on a

Setsubo, JA1UPA, XYL of JA1UT, operating CR9AJ during recent JA 6-meter DXpedition to CR9 and V66.



band that some people still think of as "local." Thanks to N6NB's May 20-21 EME operation from the UT-NV border, N0JA and K9HMB have now joined the ranks of those who have completed 2-meter contacts with all 50 states. In his camper journey to the boondocks, which resulted in eight other moon-bounce QSOs, Wayne was assisted financially by the Northern California DX Foundation. That same group is also helping to fund another N6NB project. Wayne has a trunk packed with gear for 2 meters through 23 cm ready to hop a jet to HI at the first indication of a tropo duct in hopes that it's still there by the time he arrives on the slopes of Mauna Loa. The vhf/uhf community is certainly indebted to the Northern California DX Foundation, a primarily hi group, for its continued help in funding projects benefiting the world above 50 MHz.

Es reports on 2 meters have been rather scarce so far this season. Two such reports note an opening May 12. WB5ZRH, Taylor, TX, worked W0HCO, Williston, ND, on 146.52 fm at 1230 CDT. Both stations were running about 10 watts to beams. At about the same time W5FF/K5FF took advantage of the same cloud to hook up with WB9RYG, a 10-watt station in WI. Unfortunately due to it being a workday there was little activity.

The TE path between Cyprus and Rhodesia remained open through May 25, according to a letter of that date from SB4WR to K1ZZ. Roland reports hearing the ZE2JV beacon on 144.118 during 14 evenings so far that month. Because of the flutter nature of the signals, the Cyprus group has evolved a reporting system involving T for TE followed by 1 to 3 indicating: 1, signal present but not readable; 2, readable with difficulty and 3, readable without difficulty. Several people have been studying this propagation phenomenon, including W1JR who has submitted an article for possible publication in QST. Joe refers to the supporting mechanism as Field Aligned Irregularities, or FAI. Another looking at the mode is Jurgen Rottger, DJ3KR. I have supplied him with the various reports I have received and, from talking with him, my impression is that his thinking parallels that of W1JR.

70 Cm — From two ends of the country come reminders of a mode of propagation which many of us have forgotten and newer converts to vhf/uhf have probably never heard of. It can be used to extend the range of even low-power stations to about 400 miles. The mode to which I refer is aircraft bounce. Both W1JR and W5FF call attention to it, citing recent 70-cm contacts, with low-power stations. W1JR, near Boston, mentions regular contacts with K3QCO, York, PA, about 325 miles and notes how good the signals become when an airplane gets in between them. K3QCO is running 10 to 30 watts. From his QTH just east of Albuquerque, W5FF reports working K7NII, near Phoenix, when the latter was running only 20 watts. A successful contact had to wait for the passage of an aircraft but there are a lot of them flying these days.

On their early May jaunt to the Delta Division Convention in Baton Rouge, WA5TBE and W5GVE tried some 70-cm mobile. The band opened for tropo to FL as they approached their destination and several strong signals were heard. Unfortunately, due to the high attenuation of the trees along I-10, they were not able to make any DX contacts. The setup was installed in the same pickup that housed the mobile 2-meter m.s. station with which they worked K0MQS last summer.

From HI, KH6IHP reports that his EME work is going well. Steve has now worked 10 stations. You 70-cm state, country and continent hunters take note. KH6 counts for all three. According to the K2UYH 432 EME Newsletter, another new country has joined the ranks of 70-cm moonbouncers. This is Argentina represented by LU3AAT. Hugo has worked both K3NSS and K2UYH with his eight K2RIW Yagis. Equipment improvements are in the works so the number of successful contacts should increase in the near future.

The first running of the EME Contest was quite good for many 70-cm moonbouncers. For example, YV5ZZ completed 15 QSOs on the band and added 11 on 2 meters. ZE5JJ racked up 13 contacts, three with stations not previously worked. This was in just the second weekend as Peter was away in April K2UYH completed 32 exchanges in all, 25 the first weekend and seven the second. Al teamed up with the Pack Rats in this effort which included operation on 2 and 1-1/4 meters as well as 70 cm. A complete report on the contest will appear in an early issue of QST.

As this is being written, K2UYH is off on an EME DXpedition to ND, SD, MT and WY. I'll try to have results in the September column.

For those interested in learning about ATV, check into the very fine book put out by WB9WWM. Contact Henry at Box 1347, Bloomington, IN 47401 for information.

Getting to Know You

The largest convention ever held in Hartford, CT, was the recent American National Red Cross Convention on May 21-24, with well over 3000 delegates in attendance. As far as we know, this was only the second time amateur radio in general and the League in particular participated, surprisingly enough. And the participation was extensive.

ARRL was officially represented by Communications Manager WINJM and Section Emergency Coordinator W1XX, leading a brilliant support cast of W1EFW, W1OD, K1DFS, K1CD and K1XA. These hams were able to touch base, as it were, with Red Cross people from all over the country.

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On Sunday (May 21) an open house was held at the well-appointed Connecticut Division Red Cross Hq. Building in nearby Farmington for those delegates who chose to venture out of Hartford. With the assistance of Wilber Walker, Connecticut Red Cross director of Disaster Services, an amateur radio informational display and message service was set up. Visitors were offered the opportunity to send radiograms back home and, if they wished, actually watch the traffic being dispatched into the National Traffic System from the Red Cross station WA1UNE. Many delegates came in totally unaware of amateur radio but they left extremely impressed.

The next day, convention activities focused in downtown Hartford. Through the courtesy of the Pioneer Valley Repeater Association (by previous arrangement), message traffic was passed over 04/64 from W1XX/1 at the Hartford Civic Convention Center to the operators manning WA1UNE, who then put the traffic on NTS nets. Several hundred messages were originated on behalf of the delegates.

But let's face it; more important than the traffic handling was the great opportunity to explain to the conventioners what amateur radio is all about and how important our communications service is during a crisis (remember the blizzards?). Though the League and the Red Cross have had a long-standing national agreement of cooperation, some of



Section Emergency Coordinator W1XX operates the Connecticut Red Cross headquarters station WA1UNE during the national convention, as Wilber Walker, director of Disaster Services, looks on. (W1OD photo)

the local chapters still don't know ham radio from beans. So . . . plenty of copies of the ARRL/Red Cross agreement were distributed, along with a list of the League's Section Emergency Coordinators. This way, the delegate knows immediately whom to contact back home.

Now the Red Cross representatives have been exposed to ham radio, they have the paperwork, they're interested and they're home. What's the next step? The delegates have seen ham radio in Hartford — the local hams must convince them that ham radio actually exists in their own communities!

When the SEC (and the EC) is contacted, it is, as W1XX says, "incumbent upon the hams to carry the ball." The local EC and the

Amateur Radio Emergency Service must "sell themselves" and the voluntary emergency communications support they offer, in order to establish a good working relationship with the Red Cross in their town. Ideally, each Red Cross Chapter House should have a fully equipped hf and vhf station with emergency-power capabilities, under ARES aegis, or at least a room set aside for hams to set up their own gear, should the need arise.

So the bottom line is for us communicators to open the lines of communication with the community Red Cross. It certainly will be easier to get to know each other and get a preparedness program started now, rather than waiting until the dead of winter, when the world is slip-sliding away. Fair enough?

PUBLIC SERVICE DIARY

□ Atlantic Ocean — December 29. A maritime mobile station broke into W6PJ's QSO with a distress call: His vessel was on fire off the coast of New England. W6PJ alerted W1ZNK who contacted the Coast Guard for assistance. (WD0FFG)

□ Springfield, IL — March 24. After a severe ice storm knocked out electrical and telephone service, hams linked the various Red Cross shelters and emergency services.

□ Ardmore, PA — May 7. The Mid-Atlantic ARC provided communications for the Lower Merion chapter of the National Association for Retarded Children Sixth Annual Bike-a-thon. Activities included search and escort of lost riders, and first aid for minor injuries; when a rider was struck by a car, the police were contacted via autopatch. (WA3RPG)

□ Caribbean Sea — May 23. HR6SWA contacted AA4CM seeking aid for his foundering ship, *Flavessa VI*. The ship's parent company was contacted and assistance from Key West, FL, was sent. (AA4CM)

□ Repeater Log. According to reports received to date, repeaters and fm simplex frequencies were used in conjunction with 95 vehicular emergencies, 11 fires, three crime reports, two weather emergencies, one medical emergency, one search and rescue and eight miscellaneous incidents. Repeaters involved were WR2ADM, WB4s ALL HHN, WR4s ACO ADQ ARI AXL, WR5s ABA ABY ADI ADP AIB, WR6ACT, WR8s ABC ADC AGA, WR0ALU, VE1AEH.

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Evansville, IN — May 19-20. Two tank cars containing a highly explosive gas overturned and local amateurs provided communications in the rail yards as 2100 people were evacuated. (WA9QCF, EC Vanderburgh Co.)

□ Sakhalin Island, USSR — March 11. UV0EX contacted W7PHO and requested a drug to save the life of a boy whose skull had been accidentally punctured. W7PHO relayed the request to Japan where the drug was located and shipped to the USSR and the boy survived. (W7IEU, SCM WA)

□ Lompoc, CA — March 4. The Lompoc ARES was activated when heavy rains threatened to flood the Santa Ynez River. The group placed operators on the two main bridges to observe and relay river-level information. (WA6ZLC, Asst. EC Lompoc)

□ Platte River Valley, NE — March 18-25. The Douglas/Sarpy County ARES coordinated the movement of people, food, helicopters, amphibious vehicles and buses and the setup of Red Cross shelters after the Platte River overflowed its banks. Hams also reported water-level readings of the Platte and Missouri Rivers and assessed the damage in the flooded areas. (K9BL, EC Douglas/Sarpy Cos.)

□ Utica, MS — April 18. Members of the Vicksburg ARC and SKYWARN Net were active when a tornado struck and hams were dispatched to help assess damage and to run the club's 10-kilowatt portable generator. (W5XT, SCM MS and WB5SXX)

□ Hampton and Norfolk, VA — April 26-27. Hams in the Tidewater area were at the forefront of the emergency operations when heavy rains, tidal flooding and 70-mph winds struck the area. Communications were provided to coordinate evacuations and relay current weather information. (K4BKX, SCM VA)

□ Pinellas County, FL — May 4. The Pinellas

*Asst. Communications Mgr., ARRL

Emergency Net was called to session after a tornado touched down on an elementary school. Emergency traffic was handled and the local repeater autopatch was used to locate lost children. (K4SCL, EC Pinellas Co.)

□SEC Report. For May, 32 SEC reports were received denoting a total ARES membership of 14,082. This represents a 6 percent decrease in reports received one year ago (34), but a 5 percent increase in ARES membership (13,433). Sections reporting were Alta, Ariz, Ark, Colo, Conn, Del, EBay, ENY, EMass, EPa, Ga, Ind, Kans, Mar/Nfld, Mich, Mont, NC, NFla, NTex, Ohio, Ont, Oreg, SCV, Sask, SDgo, SDak, SFla, SNJ, Va, Wash, WVa, WMass.

The ARRL Ham Radio Newsline: 203-667-0138

Our Public Information Office's 24-hour Newsline should be used to report items of interest to the general public, so that this information can be passed on to the news media. News dies a quick death, usually within hours, so please call before, during or immediately after the newsworthy event.

We suggest that you write down the essential details of the event before calling and when you do call, please follow the directions on the recorded message. Don't forget to supply your name, call, address and telephone number(s) where you can be reached. Names and phone numbers of other contacts in your area would also be appreciated. Remember, your story is for the public at large, which for the most part, is unfamiliar with amateur radio. So, for publicity purposes, names are more important than call signs.

Please note: In order to have emergency communications reports duly covered in the Public Service Diary or elsewhere in QST, follow up your phone call with a complete written report, directed to the Communications Department. — K1XA

NATIONAL TRAFFIC SYSTEM

It is with deep regret that we report the passing of Gene Dotson, K6HW (ex-W6IPW), who was a mainstay of TCC/PAN/RN6 operations and one of the last of the Pacific Area iron men. The combination of high reliability, great operator and excellent signal exemplified by Gene was something most of us could only dream of. On top of that, he was a very FB human being. He'll be missed by all. — K5MAT/W7EP

May Reports

Area Nets

(evening sessions)
(daytime sessions)

1	2	3	4	5	6	7
EAN	31	1575	50.8	1,234	99.4	
EAN	61	526	8.6	399	91.9	
GAN	31	1023	33.0	802	98.9	
GAN	62	353	5.6	243	95.1	
PAN	30	1397	46.6	1,064	98.9	
PAN	29	392	13.5	302	90.3	

Region Nets

1RN	91	683	7.2	485	89.9	92.8
2RN	115	629	5.4	433	77.8	92.8
3RN	93	318	3.4	365	99.1	99.2
4RN	121	1084	8.8	352	67.8	98.4
RN5	93	1018	10.9	372	88.5	98.4
RN6	91	855	9.4	408	91.1	91.9
RN7*	62	760	12.6	574	94.2	92.8
8RN	77	372	4.8	355	63.9	96.6
9RN	124	605	4.8	316	91.0	96.8
1EN	71	365	5.1	288	42.1	85.9
ECN						96.8
TWN	90	615	6.8	336	82.4	94.4

TCC

TCC Eastern	108 ¹	682
TCC Central	88 ¹	622
TCC Pacific	110 ¹	883
Sections*	5032	20248
Summary	6304	34170
Record	5593	32642
		18.4

*Incomplete report

TCC functions not counted as net sessions.

*Section and local nets reporting (152): BCEN (BC), MEPN MMPN MSTN MTN WRIN (MB), APN (Mar/Nfld), CMN GBN GBSSN LN ODN OPN OSN (ON), SATN (SK), AENB AENL AENJ AENM AENS AENW (AL), ASN (AK), ATEN (AZ), AMBN ARN OZK (AR), HARC NCN SDNN (CA), CWN HNN (CO/WY), GN CPN NVTN WESCON (CT), DEPN DTN (DE), FAST FMTN FPN FPTN GN NFPN PBTN QFN QFNS SPARO TPTN (FL), CGVHFN CVEN GARES GCN GSN GBSSN NGSN WGN (GA), IMN MTN (ID/MT), ILP ILN (IL), ITN QIN (IN), I75M TLCN (IA), KPN KSN KWN QKS (KS), KNTN (KY), LAN LRN LTN (LA), MSN PTN SGN (ME), MDD (MD/DC), EMRI EMRIPN EMRISS EM2MN HHTN RIEM WMPN (MA/RI), MACS MNN M6M MTN QMN WSSBN (MI), MSN MSPN MSSN PAW (MN), MSBN MTN (MS), MOSSBN NEMOE (MO), CN WNN (NE), MCN NJN (NJ), NMRR SWN (NM), NLI NLIPN NLIVHFN WDN (NY), A2MN NCSSBN SCSSBN THEN (NC/SC), OSN (OH), OAN OLZ OPEN OTWN STN (OK), ARES BSN 1876 OSN WCN (OR), EPA EPAEPTN PPN PTTN WPA WPA2TN WPA2MTN (PA), SDN SDEN SDMM (SD), TEX TTN (TX), BUN UCN (UT), PHSN SVSN VFN VNTN VBSN VSN (VA), NTN WRPON WSN (WA), WVN (WV), BEN BWN WIN WNN WBSN (WI).

1 — NET	5 — RATE
2 — SESSIONS	6 — % REP.
3 — TRAFFIC	7 — % REP. TO AREA NET
4 — AVG.	

Transcontinental Corps

1	2	3	4	5
Eastern	124	87.1	1864	882
Central	93	94.6	1221	622
Pacific	124	88.7	1807	883
Summary	341	90.1	4892	2187

1 — AREA	4 — TRAFFIC
2 — FUNCTIONS	5 — OUT-OF-NET TRAFFIC
3 — % SUCCESSFUL	

TCC Roster

The TCC Roster (May): Eastern Area (VE3SB, Dir.) — W1s KX NUM QYY, WA1ZAZ, K1s BA EIR GN PAD SSH XA, W2s CS FR GKZ MTA RQ, WA2IGB, W3s FAF PQ YQ, K3s KW NGN, N3HR, W4s SQQ UQ, K4s BKX KNP, N4KB, W8PMJ, K8KMQ, VE3s GOL SB. Central Area (W5GHP, Dir.) — AA4KB, W4ZJY, WB4SKI, W5s MI RB, K5s GM MC TTC, N5s TS YL YX0, WA5s HNN IQU, WB5FDP, W9s CXY DND FC NXG, N9TN, W0AM, WA0TNN. Pacific Area (K5MAT, Dir.) — N5MR, W5s JOV KH, K5MAT, N6GW, W6s EOT MLF OZ VZT, K6s HW OE, W7s DZX EP GHT VSE, K7IWD, W0s ETT KON LQ, K0s BN DJ TER, WB0TAQ, VE7JK.

Independent Nets (May)

1	2	3	4
Amateur Radio Telegraph Society	31	297	441
Central Gulf Coast Hurricane	31	120	1910
Clearing House	31	266	519
Empire Slow Speed	31	66	360
Hit and Bounce	61	827	404
IMRA	27	443	957
North American SSB	28	343	269
North American Traffic and Awards	31	45	582
Southwest Traffic	31	139	1149
20 Meter ISSB	27	496	488
75 Meter ISSB	31	608	1184
7290 Traffic	44	364	2662

1 — NET	3 — TRAFFIC
2 — SESSIONS	4 — CHECK-INS

Public Service Honor Roll May 1978

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

Handling emergency traffic directly with a disaster area 1 point each message; (9) Serving as net manager for entire month, 5 points. This listing is available to Novices and Technicians who achieve a total of 20 or more points.

80	WA5HNN	K7GXZ	WDBDMX
WBSOP	WB5NKD	WA7MEL	WDBNYN
70	W60A	K7NTG	N8VT
WA5RKU	WB8MTD	W0FT	WB9KPX
68	WD9CQC	WA0TNN	WA0CZA
W5KLV	K0EZ	48	N6SN
64	55	N8CW	43
WB9YXN	W2MTA	47	VE1ST
WB0ZAL	K5OWK	WB1DXR	K3YL
63	WB8ZNC	K1PAD	WD4COL
N5TC	WB0HOX	WA4LGT	W4FMN
WB6SHD	W00YH	AA4NC	WB4OXT
62	54	WD5AAH	WB4ZDJ
OSN WCN (OR)	W655DD	K5TL	K5SOR
N6ES	53	N6YL	42
61	WA4CNY	N6GW	K5DG
K1BA	W5BGE	K0DJ	WB5LBR
W1RWG	WB5LAT	46	WA5VBM
W1TN	WB8YDZ	K3JL	W0HXB
WA1UWF	WD9AUD	WB8WTS	41
WA1ZAZ	52	K0PIZ	VE3FHZ
N2YL	WA3NAZ/4	45	WA2EPK
W5GHP	W4MEE	WD4OGO	WA2ZJP
N5TS	W5JOV	44	N3QA
N8CY	W7GHT	44	WA4UYD
W6RFF	WA7YCM	VE3GOL	W6JXK
W6UAZ	50	VE4JZ	WB6VJW
59	VE3GT	VE4QU	N7AM
WA1ZXB	VE4PG	WA1MJE	40
WA2SPL	WB1CPF	WA1OFX	W2XD
WA4JHD	WA1HYN	N1RI	K3QRW
N4PQ	WB4CAK	W11M	WD4LUG
58	WD4IQF	K1UZ	N4SS
WA1YMN	WN4KKN	K2YX	N4VY
57	K5ZSI	K3HI	WDBNKA
WB5NKC	WB7TPY	WA3WPY	K9SAO
W8DIL	49	W4ANK	28
56	VE1WF	WA4CCK	WA4QGV/T
W1KX	VE3DPO	WB4DHC	22
WA1UNC	VE5AAE	W4HON	WD4BAJ/T
WA2JKG	W2RQ	W5VMP	W4MHO/T
WA3YEQ	WA2YEI	WB6FTY	WA4MJ/T
K4BKX	K3NGN	WA7JRC	WA4VKD/N
N4NK	WB5MMI	WD8DIP	WDBJYN/N
WB4QBB	WB8PMH		
N4WA	WB6UZX		

Brass Pounders League May 1978

BPL Medallions (see December 1973 QST, page 59) have been awarded to the following amateurs since last month's listing: WA1UNC WB9YXN.

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	582	1677	1845	73	4177
WA4JDH		654	623	5	1282
W3VR	327	314	498	12	1151
W7DZX	20	509	527	5	1081
W9ZGQ		642		359	1001
W7VSE	15	402	410	20	847
K0YFK		374	24	350	748
WA2SPL	3	338	376	20	737
K0JAN		426		302	728
KL7JDI	10	348	281	67	708
WA0AUX	72	262	381	3	688
W0WYX	14	323	105	218	660
N4PO	1	300	338	3	642
WA3ZRY	54	284	283	23	624
WA4JPV	1	301	253	2	557
WA4LGT	7	207	336	4	554
WB9YXN	87	204	235	7	535
K0DJ	2	288	250	8	528
W8JLJ	22	247	241	6	516
W5KLV	12	297	169	22	500
K0YFK (Apr.)	1	478		478	957
WA2SPL (Apr.)		395	444	28	867
WB8KWD (Apr.)	1	340	342	2	685
WA0HJZ (Apr.)		300	30	330	660

BPL for 100 or more originations-plus-deliveries

WA3ATQ	297	VE3CDK	103
W7TZK	160	WB1DXR	102
N8TM	149	WA3THT	100
K7VWA	140	W0FQB (Apr.)	147
W7SQT	131	WA0VRE (Apr.)	139
WB0ZAL	105	WB0ZEB (Mar.)	106
WB6SHD	104	WB0TUK (Mar.)	106

1 — CALL	4 — SENT
2 — ORIG.	5 — DEL.
3 — RCVD.	6 — TOTAL

September VHF QSO Party

Tired of the QRM on the lower frequencies? Try a vhf contest for a change. You'll be surprised!

The June VHF QSO Party provided plenty of action with excellent openings. What will September bring? The addition of DXCC countries as multipliers inspired several DXpeditions. Recent reports that a few JAs have been worked from the West Coast and European beacons heard from the East Coast on 50 MHz point toward real fireworks in the near future. Who will be the first with a DXCC on 6 meters during this sunspot cycle?

Official entry forms are available from Hq. for an s.a.s.e. Official forms or a reasonable facsimile must be used. Don't forget to check your log for duplicate QSOs.

Rules

1) The 1978 September VHF QSO Party begins at 1900 UTC, Saturday, September 9, and ends at 0600 UTC, Monday, September 11. Entrants may operate no more than 28 out of the 35 hours. The seven hours of off-time must be taken in increments of 30 minutes or more. Listening time counts as operating time. All contacts must be made on amateur bands above 50 MHz using authorized modes of emission.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange does not count.

3) Fixed, portable or mobile operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOC). Multitransmitter operations are limited to *only one signal per band* (6, 2, 1-1/4, etc.).

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e., able to communicate over at least a mile).

Contacts made by retransmitting either

or both stations do not count for contest purposes. In addition, use of the 146- to 148-MHz segment of 2 meters is restricted as follows: Contest contacts may be made only on these recognized simplex frequencies: 146.49, .52, .55, .58 and 147.42, .45, .48, .51, .54, .57 MHz. Contest contacts may *not* be made on any other frequency between 146 and 148 MHz; this restriction includes all repeater frequencies (including 146.76 and 146.94 MHz). Also, use of the national calling frequency (146.52 MHz) is restricted to four-hours total operating time for each participating station during the contest period (including both listening and transmitting time). These four hours may be taken in operating periods of not more than one hour each and must be clearly indicated in the log. After each operating period on 146.52, the participating station may not transmit on 146.52 MHz for at least 15 minutes.

4) Scoring: 1 point for *completed two-*

way exchanges on 50 or 144 MHz; 2 points for such exchanges on 220 or 420 MHz; 3 points for such exchanges on the higher uhf bands. The sum of these points will be multiplied by the number of different ARRL sections and different DXCC countries *not* included in an ARRL section, worked per band. Crossband work does not count. Aircraft mobile stations cannot be counted for section multipliers.

5) Foreign entries: All contacts with foreign countries count for score. Each different DXCC country (*not* included in an ARRL section) worked per band counts as a separate multiplier. Foreign stations may only work stations in ARRL sections for contest credit and will give their country name as part of the exchange.

6) A contact per band may be counted for each station worked. Example: W2EIF (SNJ) works K1YON (Conn) on 50, 144 and 220 MHz for complete exchanges. This gives W2EIF 4 points (1 — 1 — 2) and also 3 section-multiplier credits. (If W2EIF contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.) Each station may be worked only once per band, regardless of mode.

7) Each section/country multiplier requires a complete exchange with at least one station. The same section/country can provide another multiplier point only when contacted on a new vhf band.

8) Awards: Entries must be postmarked no later than October 9, 1978, and should be made on ARRL form CD-68. A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multioperator station will receive a certificate in each section from which three or more valid multiple-operator entries are received or where exceptional effort has been displayed.

9) Disqualifications: See February 1978 QST, page 83.

ARRL VHF QSO Party

CD-68 (1978)
Printed in U.S.A.

Revised Club Competition Rules

“Three cheers for three tiers!”

As early as mid-1976 the Contest Advisory Committee was studying the problem of ARRL-affiliated club competition because the giant clubs in metropolitan areas were dominating the standings. This left the smaller clubs and those in areas with few hams out of the running.

After review in early 1978 the ARRL Board of Directors approved a three-tiered competition which will allow clubs of approximately equal size to compete against each other. The revised club competition rules will be in effect for the 1978 ARRL November Sweepstakes, and the 1979 January VHF Sweepstakes and International DX Competition.

Club Competition

Only ARRL-affiliated clubs may participate in the club competition. A member must be listed in the regular score listings before he can be counted for a club.

In order for a club to be listed, two points must be met:

a) At least three entries from members of the club must be submitted.

b) All members wishing to be included in the club scores must indicate the club name on their summary sheet and the club secretary must send a list of all club members eligible to compete for the club and which level (unlimited, medium, local) they wish to enter for each competition. Remember to meet the mailing deadline!

There are three levels of club competition:

Unlimited. Any club submitting 51 or more entries would be in this class. (One station can submit two entries, one on phone and one on cw in the November Sweepstakes and the DX Competition.) All stations and all operators must reside within 175 miles of the club's center. All members more than 50 miles from the club's center must attend at least 50 percent of the club's meetings to be eligible to submit an entry. If, however, he has not been a member for a year's time, he must have attended at least 50 percent of the meetings since he became a member. There would be no attendance requirement for those members within 50 miles. However, to be considered bona fide, a member must be active in club affairs. Members living outside of 175 miles and/or members operating stations outside of 175 miles may not compete in the club competition. The club must be an ARRL-affiliated club.

Medium. Any club submitting more than 10 but not more than 50 entries would be in this class. There would be the same mileage and attendance requirements as the unlimited class club. The club must be an ARRL-affiliated club.

Local. Any club submitting 10 entries or less would be in this classification. All members must reside within 20 miles of the club's center. There would be no attendance requirement. Again, the club must be an ARRL-affiliate.

Single- and multioperator station scores may be counted. At a guest-operated

single-operator station, both the guest-operator and the station licensee must be members of the same club in order to count the score for that club. At multi-operator stations at least 66 percent of the operators must be members of the same club in order for the score to count for that club.

In conjunction with the 50-percent attendance rule, the club must hold at least four in-person meetings per year. A club's entry classification may be changed if, in the opinion of the ARRL Awards Committee, the club has manipulated its number of entries to fall into a lower classification (i.e., if a club with 100 members submits only the 50 highest scores, even if more than 50 of its members wish to compete).

It is not within the intent of these rules that a club should vote out a member or a member resign and then be voted back into the club later in order that he can meet the 50-percent attendance rule.

The highest affiliated-club entry will be awarded a gavel in each category (unlimited, medium, local.)

The highest single-operator cw score and the highest single-operator phone score in any club entry will be rewarded with a club certificate when at least three single-operator cw and/or three single-operator phone scores are submitted.

Disqualifications

The disqualification criteria remain the same as printed on page 83 of February 1978 QST.

Strays

LONG-DISTANCE DELIVERIES

From all across the United States, amateurs and doctors teamed up in February to help a missionary doctor deliver twins in a remote Guyanan village. After the mother-to-be had become two weeks overdue, then gone into prolonged labor, Dr. Larry Schacht asked Al Touchette, WB6MID/8R3, to call for

assistance. His first transmission, on the 20-meter Maritime Mobile Net, was answered by N2EI/4, K4ZP, KP4DGT, WB5QAV and W7BIG. Changing band conditions, however, prevented completion of the exchange.

Amidst the patient's complications, Al established contact later that night with more U.S. hams. They were able to phone patch various specialists or relay the messages to and from Dr. Schacht. Among them were K3DML, Potomac, MD, who patched in Dr. Albert A. Green-

field, an obstetrician; W3JBJ, Williamsport, PA, an orthodontist, who patched in Dr. Kenneth L. Cooper, an obstetrician; and WA1YAX, Wallingford, CT, who relayed for Dr. Sturla Stefason, an anesthesiologist at Yale-New Haven Hospital, in Connecticut. Despite the lack of modern facilities, Dr. Schacht was talked through a Caesarean section and delivered healthy, identical twin girls. The next day, Valentine's Day, the mission doctor reported over the air that all were doing well.

Results, 1978 Novice Roundup

All for fun and fun for all.

By Bill Jennings,* K1WJ

Preheat ionosphere for best propagation. Liberally sprinkle with sunspots. Blend in those long hours of hard work on hardware improvements. A dash of top-notch operator ability. Add a pinch of good luck, and you have the recipe for "winning" the Novice Roundup . . . maybe. Unlike a recipe, which, if followed exactly, produces a uniformly consistent result, the formula for a winning Novice Roundup entry (or any other contest for that matter) contains enough variables to at least make the competition interesting.

We will attempt to offer pertinent operating facts and a few tips, taken from the various NR entries, not in an effort to hypothesize a formula for winning the NR, but as a basis for comparative analysis. Take it for what it's worth. The fun, enjoyment and satisfaction derived from participating in the Novice Roundup, whether you make one or one thousand contacts, can't be measured in facts and figures anyway.

The 27th running of the Novice Roundup, held February 4-12, 1978, brought a total of 700 entries, representing Novices and Technicians from every possible ARRL section, except Nevada and Canal Zone. Logs were also received from two Canadian provinces and five other DXCC countries.

The top ten Novice scores of 1978 average 63k, compared with 49k points by those in the same category in 1977. Conversely, the average score of the top ten Technician entrant decreased by 5000 points to 26k compared with the 1977 "top tenners." The top ten Novices (who are the top ten scorers of the contest, anyway) on the average made 636 QSOs, worked 70 of the possible 75 ARRL sections, and logged an average of 28 additional DXCC countries.

I've decided that I want to be one of the top-scoring entrants in the next NR; how do I go about it?

When should I get on the air to make the best use of my operating time?

A look at the 1978 NR entries shows that the best rates (most QSOs made per

Division Leaders

Novice	Division	Technician
WA2IGK	Atlantic	WA3WIW
WD9HEY	Central	WB9HGN
WD0BNI	Dakota	WD0EPE
WA4UYJ	Delta	WB5YLT
WD4HCF	Great Lakes	WD8DJB
WB7EME/2	Hudson	WB2SUW
WD0BGB	Midwest	WD0DBZ
WB1AVA	New England	WB1BWV
WB7RHF	Northwestern	WB7QOY
WB6TCO	Pacific	WA6MZR
WD4NES	Roanoke	WA8TCG
WD0BZY	Rocky Mountain	WD5FMB
WD4DUF	Southeastern	WD4GSF
WD6ETC	Southwestern	WB7OWA
WB5LVL	West Gulf	WD5EEF

hour of operating time) are made on the weekends and after normal (9 A.M.-5 P.M. local time) working/school hours during the week. Some of the less common multipliers are liable to be on the air during the less congested hours of the contest (some folks don't enjoy pileups — honest!).

When is the best time to try working some of the DX stations for those additional multipliers?

DX QSOs can be turned into extra

multipliers and a large bonus in accrued points by an operator who knows when and where to find them. Operating experience will tell that chances are mighty slim for a U.S.-to-Europe QSO at 1400 UTC on 80 meters, but 10 or 15 meters might very well be chock-full of European signals. There is no reason to tune the bands blindly in search of DX QSOs. The charts that predict the month's average propagation conditions, found every month in *QST* (right after the "How's DX?" column), are as good a place as any to start gathering information on when and where one is most likely to be successful in making DX QSOs.

What station equipment and antenna systems are the best?

"Best" is what works well in each individual operator's situation. A chart is included in this report, showing the equipment (by brand name, if any), antennas used on each band, number of ARRL sections worked, and number of DXCC countries worked for each of the top ten entrants. This is not meant to endorse any particular brand of gear. An individual operator's needs, wants and personal preferences determine what is best for that particular operator.

Once the contest is over and the logs are filled out is any further work necessary before submitting my entry?

It is always best to go over your contest entry, *thoroughly*, before submitting it, and check for the following: *duplicates* — check the log after the contest as well as during the contest for duplicate contacts. No matter how carefully you keep a dupe sheet during the contest, it is very easy in the heat of battle, working several QSOs per minute, to forget to enter a call on the dupe sheet. Presto, instant score reduction; *be sure that your entry supplies all the information required to make the QSO a valid contest contact* — if a signal report and section name are part of the required contest exchange, then a valid entry will show the signal report and section name for *each and every* QSO claimed; *be sure that your entry is quite legible* — a log checker cannot give credit for a QSO if he cannot read it in the log; *be sure that your entry is sent in plenty of time to meet*

WD6BAY operated the UCLA ARC station, W6YRA, in the NR. Leslie is secretary-treasurer for the club.



*Communications Assistant, ARRL



WD9AKM. Bill, staved off "Murphy's" last-minute appearance and finished the contest with a score of 10k points from Indiana.



Ann, WA4ZCS, took time out from her Army MARS and YLRL activities to turn in the number three Novice score from Alabama.



Steve, WB1BZP, 11 years old, made 151 NR contacts in 55 sections in his first Novice Roundup.

any deadline requirements set by the contest sponsor — after all, if your entry does not arrive in time to be considered a valid entry, all that time spent in operating in the contest and doing the required paperwork is for naught.

The success of an event such as the Novice Roundup is gauged by the enjoyment and good operating experience gained by the participants. Judging by the favorable comments of the participants, the 1978 Novice Roundup was a resounding success, due in no small part to the higher class licensees and our DX friends, who visited the Novice bands "just to help out." Thanks.

Feedback

Please note the following corrections to the 1977 Novice Roundup Results that appear on page 64 of the September 1977 *QST*. The call sign listed as WB7CLA in the Arizona section should really be WB7ELA. WB9YCI listed in the Illinois section is in reality WB9YJC. And finally, the score for WB9WSO in the Illinois section should be 9163 points rather than the 8428 shown.

Soapbox

I was QRV nearly every afternoon on 21 MHz when the band was open to the U.S. Sure wish all the NR participants had signed /N or /T, sure would have made things easier for those of us only able to work Novices or Techs . . . be back next year. (OE1TKW) Greenwich *Mean Time* is aptly named. (WB7RGM) One problem

in particular that I did encounter was having my CQ NR answered by stations who were not participating in the contest and wanted to ragchew when I returned their call. This is particularly time-consuming and it is a shame that nonparticipants are not at least cognizant of the contest and of the fact that most participants are trying to make as many contacts as possible and really don't have time to ragchew. (WB7OJS) My first time on the air, Quickie contacts helped me to get over my "key fright." (WB2SUW) I think that the time span of 30 hours is just too much. I am sure that it is fine for retired persons with plenty of time, and for youngsters who don't have to work for a living. However, us ole hard-working bananas just don't have that kind of time to spend to become competitive in the contest. (WB5SRB) Many thanks to the General and higher class ops who showed up, especially N6NR. How's that for a call in the Novice Roundup? (WD6CGW) . . . Keeping track of dates and times in UTC is the pits! (WB1GGR) I figured out what NR means — Numb Rist. (WB0ZGD) Just when you get in the swing of that catchy "CQ NR," it's over. (WD9DMJ) I was so surprised when HP1AC answered my CQ, that I came back with "What section?" (WD6EEQ) The General class cw test was a snap after the NR. (WD4DWJ) The Novice Roundup was great fun and as an added bonus, I can now send a slant bar, which heretofore I could not send! (WD4MDA) Had a lot of fun in the NR, but also ran into some problems. Average

temp in the shack was 26°F (lowest it got was -1°F). Had to melt my long wire antenna out of the ice, using boiling water. Then to top it all off, my finals blew half into the NR. I trudged through a blizzard in a futile attempt to buy new ones . . . but NR was the greatest time ever. (WB3HII) Thanks for giving us Novices a chance to share in a portion of amateur radio that the more experienced operators enjoy, contesting. (WD4LTH) I started the contest in the middle of the week. First time I ever missed "Charlie's Angels"!! (WB3JGD) [Now that's real dedication. — Ed.] I think that the hardest part of the contest is keeping the dupe sheet so that you don't work anyone twice. (WD8KEM) I heard many stations calling CQ VT during the contest, myself included. Never did raise a Vermont station. (WD0FPJ) Haven't people ever heard of dupe sheets? I spent half of my time working duplicate QSOs, not all of them were Novices, though. (WB3DCA) I hope that I did OK for a Novice from KL7-land. (KL7JBS) [Any effort from KL7 is greatly appreciated by us Southerners in the lower 48. — Ed.] The Novice Roundup when "mother" is a Novice with three kids and is in the contest means: frozen food dinners, the OM can't use the rig, the telephone stays off the hook, and no one gets to bed on time. (WD4HCF) Worked my first DX in the NR. (WB1DED) I enjoyed the contest very much. I think the idea of spreading the operating time out over 30 hours is excellent, as it gives everybody an equal op-

WD0BQG, top-scoring Novice in the Nebraska section, in his "wait 'til next year" mood right at the end of the 1978 NR.



WA4UYJ's 58k points earned him first place in Tennessee and fifth place, nationally, among Novice operators.



Chuck, WB9YQT, enjoyed the quick pace of the NR and is already planning more contest activity in the near future.

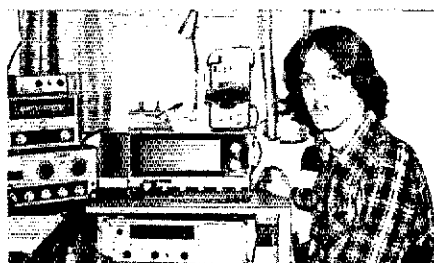




Judy, WB3GRT and "friends" enjoyed the NR from the Eastern Pennsylvania section.



Jim's 25k points put WD5CBQ at the top of the list in Mississippi.



Miles, WA2IAU, turned in the number five Novice score in Southern New Jersey.

WD40W/JN	14,608-234	62-30
WD40K/GN	15,577-204	58-21
WD40K/GN	17,199-204	57-19
WD40K/GN	3710	91-55-22
WD40K/GN	3333-81	33-6
WD40Q/HN	2176	68-32-16
WD40L/GN	1740	54-30-6
WD40L/GN	1534	58-23-12
WD40M/DN	454	20-13-3
WD40B/N	15	4-4-1

WB4AF/PN	25,788-292	84-20
WB4M/GT	10,553-173	61-24
WD4K/FN	10,050-201	10-26
WB4T/N	4059	84-41-27
WD4LBS/N	1080	45-24-13
WD4FJP/N	80	10-8

WD40U/FN	56,256-566	96-30
WD4HS/PN	22,832-432	76-24
WA4ZGB/N	32,486-428	74-30
WD40J/HN	31,755-428	73-26
WD4AHZ/N	28,706-463	62-30
WD4GFS/T	20,922-307	66-30
WD4KAA/N	6090-145	42-17
WD4MD/N	60	10-6-14

WA40Y/JN	58,420-620	92-27
WD40E/GN	33,386-449	89-24
WD4FP/N	28,710-315	87-30
WA40GV/N	21,285-312	85-27
WA4WBA/N	16,500-280	85-28
WA4PM/N	13,520-190	84-19
WA4SGE/N	12,998-184	67-19
WD4FPX/N	11,880-206	85-29
WD4NMD/N	11,136-207	48-24
WD4TH/N	12,376-217	32-20
WD4DFY/N	4158	99-42-7
WD4CIN/N	3640	91-40-11
WD4JPS/N	2656	68-32-15
WD4E/CM	560	25-16-4

WD4NFS/N	30,880-386	80-25
K4AF/N(WD4E)	10,500	80-25
WD4NHB/N	21,432-361	87-28
WD4GN/N	20,584-322	62-19
WD4FMG/N	15,226-321	46-27
WD4CG/N	12,376-222	53-16
WD4ALH/N	15,096-214	64-13
WD4FGX/N	10,883-203	57-12
WD4MVP/N	9246-201	46-29
WD4FTK/N	12,697-179	43-14
WB40X/N	7488-141	48-17
WD4FOS/N	6591-160	39-19
WD4LKN/N	4672-123	38-25
WB4HT/N	3318	19-42-13
WD4LUE/N	194	13-18-16

K4ACE/N	40,964-514	76-24
K4ERT/N	3284-119	36-16
K4EDL/N	2686	69-34-26

WB5TGP/N	24,192-378	64-30
WD5HZN/N	13,130-202	65-20
WD5HBZ/N	12,430-225	55-29
WD5FY/GN	12,430-225	55-29
WB5HR/N	11,760-210	66-19
WD5D/N	10,780-208	42-16
WB5W/GN	4117	99-43-14

WB5YL/T	17,360-265	62-27
WD5DBR/N	12,265-213	55-27
WD5HSE/N	12,564-209	56-30

WB5SBO/N	25,488-339	72-24
WB5DCK/N	17,460-271	60-20
WB5DK/N	11,818-194	47-30
WB5GDA/T	5658-138	41-19
WB5HLD/N	108	12-9-6

WB5YLD/N	10,816-208	52-30
WB5MB/T	1107	41-27-14

WB5WA/JT	320-20-16-5
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Oklahoma

WD5CJO/N	2333-101	33-18
WD5EAA/N	1197-47	21-11

Southern Texas

WB5LVL/N	48,691-667	73-29
WD5HTL/N	6000-140	40-9
WD5FJY/N	3138	95-33-18
WD5IF/GN	510	30-17-14

WB5ZKN/N	11,289-203	53-20
WB5ZZ/N	7956-133	52-25
WD5AEF/T	486	27-18-5

WB5E/CM	41,420-545	76-28
WD5D/N	23,529-313	73-25
WB5S/HA/N	16,320-240	68-30
WB5YK/N(WD5A)	13,822-204	63-18
WB5HQS/T	5265-107	45-17
WB5K/N	4851	99-49-16
WD5DT/N	2754	66-34-28

WB5H/N	28,704-401	69-20
WB5KGN/6N	560	28-21-21

Orange

WB5GCV/N	2208	69-32-9
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Santa Barbara

WB5MZR/T	27,648-422	64-30
WD5CJO/N	18,850-270	65-18
WD5CHG/N	17,621-263	67-28
WD5CGW/N	14,625-210	66-23
WD5DK/N	14,280-223	60-29
WD5EPV/N	12,430-216	55-28
WD5CKT/N	11,165-203	56-30
WB5CSB/T	416	16-8-6
WD5CJA/N	99	11-9-3

WB5MZR/T	27,648-422	64-30
WD5CJO/N	18,850-270	65-18
WD5CHG/N	17,621-263	67-28
WD5CGW/N	14,625-210	66-23
WD5DK/N	14,280-223	60-29
WD5EPV/N	12,430-216	55-28
WD5CKT/N	11,165-203	56-30
WB5CSB/T	416	16-8-6
WD5CJA/N	99	11-9-3

San Diego

WB5DHR/N	16,962-242	66-28
WB5CZR/T	3306	87-38-11

WB5EEQ/N	13,662-207	66-14
WB5CKD/N	7376-112	48-20

San Joaquin Valley

WB5CJF/T	1820	92-35-14
WB5BJK/N	224	16-14-8

WB5LIX/N	21,240-280	72-25
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Pacific

KH5JTW/N	13,200-210	60-27
KM5FD/N	5658-123	46-13

WB5TAH/N	33,540-430	78-28
WB5SY/N	17,615-261	65-30
WB5W/O/N	16,704-273	58-30
WB5FHC/N	14,019-247	57-30
WB5OJS/N	7826-167	44-29
WB5RGA/N	6219	68-62-16
WB5FGE/N	5211-111	47-16
WB5TUM/T	5000-125	40-30
WB5TJK/N	792	36-22-30
WB5FJ/N	637	33-19-13
WB5OW/N(WB5PLX)	1A	1A
WB5N/PS/N	864	36-24

WB5OGV/N	27,200-400	68-25
WB5RBR/N	14,101-239	59-22
WB5BUT/T	8632-156	52-24

Idaho

WB5HHE/N	33,954-539	63-29
WB5PJD/N	26,566-398	67-30
WB5TQO/N	1848	56-33-8

WB5FMG/N	31,382-427	71-30
WB5OY/T	14,884-244	61-19
WB5DPR/N	12,127-209	58-28
WB5RYS/N	9720-180	84-23
WB5RXX/N	2000	70-40-11

WB5DUV/N	13,456-217	58-13
WB5GEE/N	11,985-225	51-23

WB5SWO/N	9516-184	52-12
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Washington

WB5FE/JN	26,996-397	68-30
WB5RWH/N	24,254-342	67-30
WB5RY/N	15,015-216	69-24
WB5ZLV/N	14,755-227	65-30
WB5BQ/T	13,980-225	62-27
WB5RGM/N	12,960-206	60-26
WB5EJ/N	12,960-206	60-26
WB5TEN/N	12,198-204	57-25

Wyoming

WB5UW/N	4325-103	42-30
WB5SNA/N	1769	51-29-11

KL5N/N	24,180-372	65-27
KL5JES/N	18,081-287	63-23

WB5RHO/N	35,770-511	70-25
WB5BAE/N	30,114-433	63-27
WB5DUG/N	28,275-435	65-25
WB5NHA/N	22,320-382	60-26
WB5K/N	20,450-295	65-30
WB5N/N	19,425-259	64-28
WB5DUP/N	17,820-315	64-30
WB5DJB/T	15,486-267	58-29
WB5L/N	13,908-278	60-30
WB5RAN/N	12,528-246	48-22
WB5NJJ/N	12,265-208	65-30
WB5D/N	11,078-176	48-28
WB5OGC/N	10,800-216	60-27
WB5N/N	10,528-214	47-20
WB5IEK/N	9880-190	57-14
WB5L/N	9445-205	37-25
KR5J/L	7740-180	43-30
WB5LIM/N	6674-142	47-26
WB5RXX/N	6480-135	48-14
WB5K/N	6144-128	48-15
WB5NVP/N	5586-147	38-28
WB5MOM/N	2310	77-30-22
WB5RQ/N	1769	41-29-8
WB5R/W/N	1596	37-38-17
WB5R/V/N	1375	55-25-7
WB5P/T	1184	74-16-4
WB5R/N	705	45-17-4
WB5R/V/N	518	37-14-5
WB5L/N	240	24-10-9
WB5P/N	72	12-6-4
WB5P/V/N	6	4-2-4

WB5RYN/N	39,760-480	62-29
WB5E/N	19,964-322	62-30
WB5NT/N	13,029-244	51-24
WB5P/N	13,000-249	50-29
WB5N/N	12,822-326	62-30
WB5NHN/N	12,483-204	57-27
WB5R/T	12,173-259	47-13
WB5RHH/N	12,150-225	54-20
WB5R/N	11,016-116	57-24
WB5J/T	10,224-213	48-15
WB5OK/N	9555-180	49-30
WB5Q/N	8820-210	42-27
WB5E/N	7980-138	50-21
WB5KRE/N	6237-189	33-19
WB5C/N	4968-138	36-24
WB5KQV/N	3182	76-37-19
WB5N/N	1969	67-37-28
WB5BGV/N	2350	94-26-8
WB5J/N	1363	47-29-19
WB5JRM/N	731	28-17-14
WB5G/N	1748	68-24-18
WB5B/W/N	270	30-9-6

WB5TQO/N	13,110-230	57-22
WB5MZZ/N	7020-135	52-18
WB5KAC/N	7004-206	44-21
WB5KSL/N	2380	70-28-25
WB5G/N	1748	68-24-18
WB5W/L/N	140	14-10-2

WB5RYN/N	39,760-480	62-29
WB5E/N	19,964-322	62-30
WB5NT/N	13,029-244	51-24
WB5P/N	13,000-249	50-29
WB5N/N	12,822-326	62-30
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WB5NT/N	13,029-244	51-24
WB5P/N	13,000-249	50-29
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WB5TQO/N	13,110-230	57-22
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WB5KSL/N	2380	70-28-25
WB5G/N	1748	68-24-18
WB5W/L/N	140	14-10-2

WB5RYN/N	39,760-480	62-29
WB5E/N	19,964-322	62-30
WB5NT/N	13,029-244	51-24
WB5		

Helping the Beginner

One of the nicest amateur radio traditions has always been the helping hand of old-timers extended to the beginners. We were all beginners, once. With some of us, it was just yesterday, with others decades ago, but we all remember our initial struggle to get established in the mainstream of the hobby, the better to enjoy it and to perform a useful function. And most of us remember with fondness those who helped us get that much-needed start.

Amateur radio is a lot different from what it was 50 years ago. For one thing, it's a lot bigger — 20 times as big. For another, it's a lot more diversified. The techniques are totally different. The average age is different (higher). The attitude of one amateur toward another is different (more impersonal). Even individual operating preferences are vastly different.

With all these changes, not to mention the great expansion, it becomes more and more difficult to maintain some of the oldest and dearest traditions of amateur radio, the most important of which is that old helping hand, that "Elmer" tradition of one amateur to another, and especially to the beginner or newcomer.

Assuming you are interested in helping beginners (aren't we all?), how do you go about it? Oh sure, conducting code classes, technical help, antenna help, advice on what to

buy and what not to buy, etc. But this is an operating column, so we are talking about operating help, on the air. You are going about your regular operating, with your regular contacts. How can you help beginners in this?

Well, it depends largely on what you are up to, but there are beginners in every mode and every phase of amateur operating. You will know them by how they operate, their unfamiliarity with established procedures, their halting, tentative approach to things. Some of them will be shy, reluctant, apologetic; these are relatively easy to bring out, to let them know they have nothing to fear, that they are among friends. At the other extreme are the forward, pushy, outgoing types who are inclined to talk more than listen and to assume they know everything already. These are the ones that are hard to deal with, that require the greatest tact, forbearance, patience. If you feel that uncontrollable urge to tell them off, this is quite understandable but it must be resisted. At this point, it is not progressive. They will soon enough discover that you can't learn to swim by jumping into deep water, and then they will become at least manageable.

In between, of course, are the average beginners who are not shy or apologetic and are willing to take advice and counsel from the older and more experienced. With them, your principal concern should be to make sure you give them *proper* advice and counsel. This includes

the old saw, "do as I say, not as I do" in many cases. That is, all of us have some bad habits; some of us are even proud of them — that old "Lake Erie Swing," for example. Setting the example is fine, but make it a *good* example, not a bad one. Beginners are prone to imitate what they hear. If what they hear is bad, then they will start learning things inimical to amateur radio. If they get that from you, even though you don't try to set yourself up as an example, you are doing them and amateur radio a disservice.

So one way to help the beginner on the air is to exhibit impeccable procedures in your own operating at all times, not just when you are contacting him — because he may be listening. Speak clearly, modulate cleanly (so many of us blow and spit into microphones!), form your cw characters carefully, with proper spacing. Handle your messages in standard form, not "any old way." And so on. It's all in the various ARRL operating guides and manuals. Without being a teacher, mentor or "Elmer," you can teach beginners good operating practices by observing them yourself.

Is this what you expected to read under the above title? No rote rules, no detailed examples, no specific dos and don'ts — just treat beginners with patience, kindness, consideration, and set them a good example. If we all do this, our new crop of amateurs will be a bumper one.

*Communications Manager, ARRL

W1AW Operating Schedule (April 30, 1978-October 29, 1978)

PDST	CDST	EDST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6 A.M.	8 A.M.	9 A.M.	1300 *	Slow ¹	Fast ¹	Slow ¹	Fast ²	Slow ¹		
7	9	10	1400 *	←	←	Cw Bulletins ³	←	←	←	←
8	10	11	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	4	5	2100	←	←	Cw Bulletins ³	←	←	←	←
3	5	6	2200	←	←	RTTY Bulletins ⁴	←	←	←	←
4	6	7	2300	Slow ¹	Fast ²	Slow ¹	Fast ²	Slow ¹	Fast ²	Fast ²
5	7	8	0000	←	←	Cw Bulletins ³	←	←	←	←
6	8	9	0100	←	←	RTTY Bulletins ⁴	←	←	←	←
6:30	8:30	9:30	0130	←	←	Phone Bulletins ⁵	←	←	←	←
7	9	10	0200	Fast ²	Slow ¹	Fast ²	Slow ¹	Fast ²	Slow ¹	Slow ¹
8	10	11	0300	←	←	Cw Bulletins ³	←	←	←	←
9	11	12	0400	←	←	RTTY Bulletins ⁴	←	←	←	←
9:30 P.M.	11:30 P.M.	12:30 A.M.	0430	←	←	Phone Bulletins ⁵	←	←	←	←

¹Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 5, 7-1/2, 7-1/2, 10, 13, 15 wpm.

²Fast code practice on cw bulletin frequencies, 8 minutes each session; 35, 30, 25, 20, 15, 13, 10 wpm.

³Cw bulletins, 18 wpm, on: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz.

⁴RTTY bulletins 60 wpm/170-Hz shift on 3.625, 7.095, 14.095, 21.095, 28.095 147.555 MHz.

⁵Phone bulletins on 1.835, 3.99, 7.29, 14.29, 21.29, 28.59, 50.19, 147.555 MHz.

*W1AW will beam 45° for these transmissions on Mondays, Wednesdays and Fridays during August on 20, 15 and 10 meters. European listeners are encouraged to report use of these transmissions during this trial period.

Normal W1AW visiting hours are 3:30 P.M. to 1 A.M. seven days a week (local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Note: ARRL office-visiting hours are 8 A.M. to 5 P.M. Monday through Friday. Maps with local street detail are available upon request. Please note that all footnoted frequencies are approximate. If you wish to operate when visiting, you must have your original operator's license with you. The best time for visitors to operate is on weekdays between 1 and 4 P.M. local time. (Schedules can also be arranged to work W1AW.) The station will be closed September 4. Staff: Chief Operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Stan Gibilisco, W1GV.

In a communications emergency monitor W1AW for special bulletins as follows: *phone* on the hour, *RTTY* at 15 minutes past the hour, *cw* on the half hour.

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy on certain tapes, note the UTC dates and QST text to be sent in the 0200 practice from the issue of QST two calendar months past: August 2, It Seems to Us; August 8, World Above; August 14, League Lines; August 17, Public Service; August 25, Happenings; August 28, Operating News.

Satellite Communicating

One of the ways in which amateur radio can improve its operating image is through support of the amateur satellite program. Starting in 1961 with the launch of the first OSCAR, a total of eight amateur satellites have been sent aloft. Two are presently active. An excellent field for amateur operating today is exploring space-age communications.

New geostationary and elliptical satellites are inevitable and will present a whole new concept in amateur communicating. There will be challenges galore to all participating. But all space programs demand advanced planning years ahead, and we must plan now on how best to utilize these new satellites. Can our present services use them, and if so to what extent, and how? Any of the small problems we can perceive now will be magnified manyfold in just a few years. What type of service best applies to a particular type of orbit? How about domestic traffic nets in geostationary orbits, with worldwide nets on elliptical orbits? DXing and contesting will take on completely new looks. New operating awards will have to be set up. OVS experimenters will have a completely new field to work with.

These things are not in the realm of visionary dreaming. They are figuratively but will soon be literally on the horizon. Will we be ready for them? — WINJM and W9KDP

SCM ELECTION NOTICE

To all ARRL members in the Missouri, Southern New Jersey, Quebec, South Carolina, Western Pennsylvania, Eastern Massachusetts, Saskatchewan, Nebraska and New York City and Long Island sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures on that petition. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL
225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office. (Signature . . . Call . . . City . . . ZIP . . .)

SCM candidates must have been a member of the League for a continuous term of at least two years and a licensed amateur of General class or higher (Canadian Advanced Amateur Certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, September 8, 1978.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on October 2, 1978, returns counted November 21, 1978, and SCMs elected as a result of the above procedures will take office January 1, 1979.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition, for a two-year term beginning January 1, 1979.

If no petitions are received for a section by the specified closing date, such section will be resolicited in January 1979 QST, and an SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.

George Hart, WINJM
Communications Manager

OSCAR 7

Ref. Orbit	Date	Time (UTC)	Long. W.
16967A	1 Aug.	0053	71.7
16980B	2 Aug.	0147	85.3
16992B	3 Aug.	0047	70.2
17005A	4 Aug.	0141	83.8
17017B	5 Aug.	0040	68.6
17030B	6 Aug.	0134	82.2
17042A	7 Aug.	0034	67.0
17055B	8 Aug.	0128	80.6
17067B	9 Aug.	0027	65.5
17080A	10 Aug.	0122	79.1
17092B	11 Aug.	0021	63.9
17105B	12 Aug.	0115	77.5
17117A	13 Aug.	0015	62.4
17130B	14 Aug.	0109	75.9
17142B	15 Aug.	0008	60.8
17155A	16 Aug.	0103	74.4
17167B	17 Aug.	0002	59.2
17180B	18 Aug.	0056	72.8
17193A	19 Aug.	0151	88.4
17205B	20 Aug.	0050	71.3
17218B	21 Aug.	0144	84.8
17230A	22 Aug.	0044	69.7
17243B	23 Aug.	0138	83.3
17255B	24 Aug.	0037	68.1
17268A	25 Aug.	0131	81.7
17280B	26 Aug.	0031	66.6
17293B	27 Aug.	0125	80.2
17305A	28 Aug.	0024	65.0
17318B	29 Aug.	0119	78.6
17330B	30 Aug.	0018	63.4
17343A	31 Aug.	0112	77.0
17355B	1 Sept.	0012	61.9
17368B	2 Sept.	0106	75.5
17380A	3 Sept.	0005	60.3
17393B	4 Sept.	0100	73.9
17406B	5 Sept.	0154	87.5
17418A	6 Sept.	0053	72.3
17431B	7 Sept.	0148	85.9

OSCAR 8

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
2069A	1 Aug.	0101	54.5
2083X	2 Aug.	0106	55.8
2097A	3 Aug.	0111	57.2
2111A	4 Aug.	0117	58.5
2125J	5 Aug.	0122	59.8
2139J	6 Aug.	0127	61.1
2153A	7 Aug.	0132	62.4
2167A	8 Aug.	0134	63.7
2181X	9 Aug.	0139	65.0
2194A	10 Aug.	0002	40.5
2208A	11 Aug.	0007	41.8
2222J	12 Aug.	0012	43.1
2236J	13 Aug.	0017	44.4
2250A	14 Aug.	0022	45.7
2264A	15 Aug.	0027	47.0
2278X	16 Aug.	0033	48.3
2292A	17 Aug.	0038	49.6
2306A	18 Aug.	0043	50.9
2320J	19 Aug.	0048	52.2
2334J	20 Aug.	0054	53.5
2348A	21 Aug.	0059	54.8
2362A	22 Aug.	0104	56.1
2376X	23 Aug.	0109	57.4
2390A	24 Aug.	0115	58.7
2404A	25 Aug.	0120	60.0
2418J	26 Aug.	0125	61.3
2432J	27 Aug.	0130	62.6
2446A	28 Aug.	0135	63.9
2460A	29 Aug.	0140	65.2
2473X	30 Aug.	0003	40.7
2487A	31 Aug.	0008	42.0
2501A	1 Sept.	0013	43.3
2515J	2 Sept.	0018	44.6
2529J	3 Sept.	0023	45.9
2543A	4 Sept.	0028	47.2
2557A	5 Sept.	0033	48.5
2571X	6 Sept.	0038	49.8
2585A	7 Sept.	0043	51.1

Have you listened to OSCAR 8 yet? This newest of amateur satellites is available to anyone with a good-quality, 10-meter or 70-cm receiver. To track it, you'll need an OSCARLOCATOR and reference-orbit information (available on W1AW bulletins). It orbits the earth every 103 minutes; the morning and evening passes occur at approximately the same times each day. Decoding the telemetry from the beacon is a simple matter using the ARRL OSCAR telemetry forms, available from Hq. for an s.a.s.e. When you return it, we'll send you a colorful OSCAR 8 QSL card.

To keep abreast of the latest developments, tune in to the regular phone and cw bulletins over W1AW, AMSAT bulletins transmitted around 29.440 MHz on Mode A, 145.960 MHz on Mode B, during 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).

Notes

- 1) All time and date references are in UTC.
- 2) The times and longitudes are for OSCAR's first equator crossing each day, which is called the reference orbit.
- 3) O 7 will operate Mode A only on days of the year fully divisible by three (August 4 is day number 216, for example), and the other two days in between will be Mode B.
- 4) All Monday orbits are reserved for QRP use only. Use a maximum of 10 watts ERP. Wednesdays are reserved for special experiments. Schedule O 7 experiments through AMSAT, O 8 through ARRL.
- 5) The OSCAR 7 Mode B and OSCAR 8 Mode J transponders invert signals. Upper sideband into the uplink becomes lower sideband on the downlink.
- 6) O 7 progresses an average of 28.737517 degrees west per orbit in a period of 114.945218 minutes. O 8 progresses 25.808386 west in a period of 103.230319 minutes.
- 7) O 8 modes of operations are Monday, Tuesday, Thursday and Friday — Mode A. Saturday and Sunday — Mode J. Wednesdays are for experimental use only.

Spacecraft Frequencies

Spacecraft	Uplink	Downlink	Beacon
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
O 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.100-435.200 MHz	435.095 MHz

This schedule of orbits for OSCAR 7 and OSCAR 8 is a regular feature of QST. Tune in W1AW bulletins for updated reference orbit data. Further information on the radio amateur satellite program can be obtained free of charge from ARRL Hq. Also, the popular and informative series of QST articles for the beginner has been reprinted in book form. *Getting to Know OSCAR — from the Ground Up* covers OSCAR 6, OSCAR 7, the newest satellite, OSCAR 8, launched in early March, and the exciting Phase III program scheduled for late 1979. It includes the OSCARLOCATOR, a tracking device that lets you know which passes you can access and where the satellite is in the Northern Hemisphere at any given moment. The book is available for \$3 postpaid (\$3.50 outside the U.S.), from the ARRL.

Operating Events

AUGUST

3: West Coast Qualifying Run (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0400Z (Universal Coordinated Time, abbreviated UTC, with Z used as a time designator), on approximately 3590/7090 kHz. This is 2100 PDST the night of August 2 (9 P.M. PDST). Please note that dates are always shown at least two months in advance and times are always the same local "clock time."

5: Wonderful Wisconsin Rapids Area Week, W9DQA. From 1500-1800Z check 3900-3925, 1800-2200Z 14300-14325. If you work W9DQA send a QSL and an s.a.s.e. to Gene Santoski, K9UTQ, 1220 18th St. So., Wisconsin Rapids, WI 54494.

5-6: UHF Contest, page 74, July *QST*. **YO DX Contest**, sponsored by the Romanian Amateur Radio Federation, 24 hours starting 1800Z August 5; 80-10 (no crossband); cw, phone (no crossmode). Entries single op single band, single op multiband, multiop single band, multiop multiband. The object is to contact as many YO stations in as many YO "counties" as possible. EU stations may also be worked by the W/VE contingent. One may contact the same stations on other bands/modes but only after at least a one-hour lapse. Exchange RS(T) and QSO no. starting with 001, regardless of band or mode. Non-EU stations earn 2 points for each EU QSO, 10 points for each YO station. Each YO county and each country is a multiplier. Abbreviations of counties in each YO call area as follows: YO2 AR CS HD TM, YO3 BU, YO4 BR CT GL TL VN, YO5 AB BH BN CJ MM SJ SM, YO6 BV CV HR SB MS, YO7 AG DJ GJ MH OT VL, YO8 BC BT IS NT SV VS, YO9 BZ DB IF IL TR PH. Score equals QSO points times multiplier. Logs must include band/mode, time(Z), stations, serials, multiplier column (filled in if new multiplier), QSO points. Include a summary with computations, name, address, equipment description plus usual declaration. Awards. Logs must be postmarked no later than Sept. 1 and addressed to Romanian Amateur Radio Federation, Box 1395, R-76100 Bucharest 5, Romania. Decisions of the contest commission are final. **Illinois QSO Party**, 16th annual, sponsored by the Radio Amateur Megacycle Society (RAMS), from 1800Z August 5 to 2300Z August 6, with a rest period from 0500-1200Z August 6. All bands, cw and phone. The same station may be worked on each band and each mode. No repeater contacts. Suggested frequencies: about 60 kHz from the low end on cw; about 3975, 7275, 14725, 21375 and 28675 phone; approximately 25 kHz from the low end of each Novice band, particularly look on the half hour. IL stations send serial, RS(T) and county. Others send state, province or country in lieu of county. One point per QSO (Novice contacts count 2 points, ditto Tech contacts in a Novice band). IL stations multiply QSO points by the total number of states (max. 50), VE/VO call areas (max. 10) and no more than one non-W/K/VE/VO DX country worked. Additional DX contacts/work for QSO points but only one DX multiplier overall allowed. IL mobiles/portables away from normal QTH may add 200 to their final score for each county of operation from which 10 or more contacts were made. Non-IL stations multiply QSO points by the no. of IL counties worked. They may also take extra bonus multipliers for each group if eight QSOs with the same county. Awards. Legible logs, with summary listing claimed multipliers and score, plus operator(s) name, address, call and category of operation should be postmarked by Sept. 15. Send to RAMS, K9CJU, 3620 N. Oleander Ave., Chicago, IL 60634. Send a large business-size s.a.s.e. along for a copy of results/critique to be returned.

12-13: European DX Contest cw (WAEDC), sponsored by the Deutscher Amateur Radio Club, full UTC period, 80-10 meters. (Note: Phone Sept. 9-10, RTTY Nov. 11-12.) Single op all band; multiop single transmitter. Only 36 hours of operation out of the 48 are permitted for single ops. The 12 hours of nonoperation may be taken in one, but not more than three periods any time during the contest. Non-EUs work EU stations only. Exchange RS(T) plus serial number starting with 001. Each QSO worth 1 point. Stations may be worked only once per band. Each confirmed QTC (given or received) counts 1 point. The mult. for non-EUs is determined by the no. of EU countries worked on each band. The multiplier on 80

may be multiplied by 4, the mult. on 40 by 3, the mult. on 20-15-10 by 2. Score is the total QSO points plus QTC points multiplied by the sum total of multipliers from all bands. A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to an EU station. It can only be sent by a non-EU to an EU. A QTC contains the time, call and QSO no. of the station being reported. A QSO can be reported only once and not back to the originating station. A maximum of 10 QTCs to the same station on all bands is permitted. You may work the same station several times to complete this quota. Only the original contact, however, has QSO point value. Keep a uniform list of QTCs sent. QTC 3/7 indicates that this is the 3rd series of QTCs sent and that 7 QSOs are reported. Certificates. Usual disqualification criteria. Contest Committee decisions final. Log 40 QTCs or QSOs per sheet (sheets are available from the DARC). Separate logs per band. Deadline for cw logs Sept. 15; for phone entries Oct. 15, RTTY Dec. 1. WAEDC committee address is Box 262, D-895 Kaufbeuren, Germany.

18: WIAW Qualifying Run at 0200Z, 10-35 wpm, transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 and 147.555 MHz. This is 2200 EDST (10 P.M. local Eastern Time) the night of August 17. Other instructions under the August 3 listing.

19-20: Seant World Wide DX Contest phone, rules July "Operating Events." **SARTG Worldwide RTTY Contest**, sponsored by the Scandinavian Amateur Radio Teletype Group. Periods: 0000-0800Z and 1600-2400Z Aug. 19, and 0800-1600Z Aug. 20. Use all band, 3.5-7.14-21-28 MHz, open to all. Classes: Single op, multiplier single transmitter, SWL. Exchange RST and QSO no. Points: QSOs with own country 5 points, other country but same continent 10 points, other continent 15 points. In USA, Canada and Australia, each call district will be considered as a separate country. The same station may be worked once on each band for both QSO and multiplier credit. Only two-way RTTY QSOs will count. Use DXCC list and each W/K/VE/VO and VK district for multipliers. Points = the sum of QSO points x the sum of multipliers. Logs must be received by October 10, 1978. Usual log info, separate sheet for each band. Include your comments with your logs, please. Awards. Logs go to SARTG Contest and Awards Mgr. C. J. Jensen, OZ2CJ, Meisnersgade 5, 8900 Randers, Denmark. **CAN-AM Championship**, to increase VE/W friendship; phone Aug. 19 0000-2400Z, cw 0000-2400Z Aug. 20. Categories: single operator, stations operated by the station licensee; multioperator, single transmitter (stations operated by more than one operator, or single operator other than the licensee, or club stations); club competition. 160-10 meters with the U.S. general portion of the bands recommended. Exchange RS(T) plus sequential QSO number starting with 001, plus multiplier area abbreviation (the usual two-letter state abbreviation for the 50 states), CN for Caribbean (KC4, KG4, KP4, KS4, KV4, KZ5), PC for Pacific (and rest of U.S. possessions), VEs will use NF (VO1, VO2), NB (VE1, New Brunswick), NS (Nova Scotia), PE (Prince Edward Island), SI (Sable and St. Paul), PQ (VE2), ON (VE3), MB (VE4), SK (VE5), AT (VE6), BC (VE7), NW (VE8, NWT), YU (Yukon). The multipliers are 50 U.S. states, 2 U.S. possessions (Caribbean, Pacific), 10 Canadian provinces, two territories (NWT, Yukon), 1 island (Sable/St. Paul); for a total possible multiplier of 65, per band. Maximum possible on all bands is 390. American to American QSOs and VE to VE contacts count two points. W to VE and vice versa count 3 points. The same station may be worked once on each band and mode. Stations operating from outside their own call area must sign portable. Multioperators must stay on the band at least 10 minutes before they can make contact on another band. Score is the result of QSO points from all bands multiplied by the sum of multipliers from all bands. Phone and cw are separate contests but combined scores will be used for overall competition and will be calculated by the committee. A large variety of certificates, trophies and plaques. Club officers must submit a summary showing the 5 best scores on each mode. Log in UTC. Indicate multipliers the first time only on each band. Note category of competition, name and call of operator, address of station and signed declaration. Entries with over 200 QSOs re-

quire check sheets. Official forms are available for a large s.a.s.e. (Canadian stamps). All entries must be postmarked no later than September 30 and mailed to the Canadian DX Assn., CC, Box 292, Don Mills, Ontario, Canada M3C 2S2. **Norwegian Radio Relay League 50th Anniversary Contest**, open to all, cw the 24-hour period Aug. 19, phone the similar period Aug. 20. Frequencies: 3505-3575 3600-3650 3700-3790, 7005-7040 7050-7100, 14010-14075 14150-14300, 21010-21125 21200-21350, 28010-28125 28400-28700 kHz. Call CQ LA. Work as many LA stations as possible. Contacts with LA/LB/JW/JX/3Y will be accepted (LB on 15 cw is an LA Novice). Each station may be worked once on phone and cw on each band. Categories: single op less than 15 watts; single op more than 15 watts; multiops (club stations); SWL. Exchange RS(T) and serial starting with 001. Norwegian stations will transmit an additional single letter to indicate their country. The letters W, X, Y and JX/JW are for areas north of the Arctic Circle. Count 3 points per valid QSO, multiply by the total number of countries on all bands. Log cw and phone separately; total together for final score. Usual logging and summary plus signed declaration. Multipliers: Oslo "A", Ostfold "B", Akershus "C", Hadmark "D", Oppland "E", Buskerud "F", Vestfold "Z", Telemark "H", Aust-Agder "I", Vest-Agder "K", Rogaland "L", Bergen "O", Hordaland "R", Sogn og Fjordane "S", More og Romsdal "T", Sor-Trondelag "U", Nord-Trondelag "V", Nordland "W", Troms "X", Finnmark "Y", Jan Mayen "JX", Svalbard/Bear Island "JW", Antarctica/Bouvet Island "3Y". Contacts made during the contest may count for the WALA Award (within a year of the contest); use QSOs with LA/LB on or after Jan. 1, 1950. Produce QSLs showing 20 different LA/LB contacts on any band (at least 6 of the stations must be located north of the Arctic Circle). No crossband, minimum reports of 33R or 33I. Info with 10 IRCs goes to the NRRL Award Mgr., Hans E. Kinck, LA4YF, N-3800 or BO I Telemark, Norway.

24: WIAW Qualifying Run, 2000Z, other details under the August 18 listing.

26-27: All-Asian Contest cw, rules page 80, June *QST*. **Kentucky QSO Party**, sponsored by the Bluegrass Amateur Radio Club, from 0001Z August 26 through 2359Z August 27. KY stations send RS(T), county and consecutive QSO no., other stations substitute state, country or province for county. Score 1 point per QSO. Multipliers for KY stations are states, countries, provinces worked. Non-KY stations use KY counties for multiplier. A final multiplier of 1.5 for inputs of 250 watts or less. You may work a station once on cw and once on another mode; 6- and 2-meter operation on simplex only. Suggested frequencies are the lower edges of the General class hf cw and phone bands, also Novice frequencies. Send logs by Oct. 1 to Tom Fitzpatrick, WB4FOT, 3709 Niagara Dr., Lexington, KY 40502. Awards. **Ohio Interstate QSO Party**, sponsored by the Ohio Council of Amateur Radio Clubs and the Far Out ARC. Noon to 10 P.M. EDST each day (1600-0200Z). Out-of-state stations work Ohio only, Ohio amateurs work any station. A station may be worked once per band and mode. Exchange serial number, RS(T), state, province or country (out-of-state); or Ohio county for Ohio stations. To score: Ohio stations multiply QSOs times sum of states plus counties. Others use Ohio counties as a multiplier. Multi-multis permitted but ineligible for awards. Certificates and trophies. Logs (time, band, mode, exchanges) plus summary with claimed score and mail address constitute an entry. Send an s.a.s.e. for complete results. Logs must be postmarked by Sept. 15 and sent to Frank Stilwell, WB0FR, c/o 5326 Brainard Dr., Kettering, OH 45440. All entries become property of the FARC.

SEPTEMBER

1-10: Miss America Pageant (K2BR operation) sponsored by the Southern Counties Amateur Radio Association. Approximate frequencies: cw, 3555 7055 14055 21055; phone, 3935 7235 14280 21380; Novice, 3730 7130 21130. Operation will be from the Atlantic City Convention Hall and traffic to and from the contestants will be welcome. QSL to K2BR, SCARA, 591 White Horse Pk., Egg Harbor City, NJ 08215.

1-30: Grand Prix Award, issued by the Radio Club of

Monza (a branch of the Italian Society, the ARI), issued to hams and SWLs for contacts with members of the Monza Radio Club during the month of September in celebration of the Formula 1 Italian Grand Prix. Any mode or band, no crossband, crossmode or repeater contacts. However, satellite contacts are acceptable. Contest QSOs are acceptable for award but not for prizes. You may work a Monza RC member only once. Each contact counts one point, the special station counts 2 points. W/VEs need 7 points. Applications go to Box 1, 20052 Monza, Italy; postmarked not later than Nov. 15 of the year during which the contacts have been made. Enclose log or QSL, 10 IRCs and \$4 U.S.

2-4: Four-Land QSO Party, 9th annual sponsored by the Fourth Call District AR Assn., begins 1800Z Sept. 2 and ends 0200Z Sept. 4. The same station may be worked on each band and/or mode fixed, and repeated again if operated portable or mobile, and from each different county. Stations within the 4th call area may work each other, 4s count 1 point for W/VE QSOs, 3 points for DX (including KH6/KL7). Final score computed by multiplying total points times states and provinces (multipliers count once only). All others score 2 points for each QSO times the total of 4th district states, plus 4th district counties. Count each state and county once only. Suggested frequencies plus/minus 10 kHz are phone, 3940 7260 14340 21360 28600; cw, 3575 7060 14060 21090 28090; Novice, 3710 7110 21110 28110. Awards. Mail logs within 30 days to Bob Knapp, W4OMW, 105 Dupont Circle, Greenville, NC 27834 (an s.a.s.e. will bring copy of the results).

3: LZ DX Contest, the full 24-hour period, UTC. Look for LZ 3520-3750, 7010-7090, 14020-14300, 21020-21300, 28020-28500 kHz. Call CQ LZ, cw and ssh. Send report plus serial starting with 001. LZs will send a report plus a two-digit number signifying their administrative district. Phone and cw are separate categories: single op, multioop (both individual and club stations), SWLs. Each contact with one's own continent earns one point, with another continent 3 points. Contacts with LZs earn 6 points for non EUs. Contact a station only once per band, no crossband or crossmode contacts. Multipliers are 1 plus the no. of LZ administrative districts worked on all bands. Maximum multiplier: 28 districts x 5 bands = 140 plus 1 = 141. Awards. Logs by mid-October to BFRA (Bulgarian Federal of Radio Amateurs), Box 830, Sofia, Bulgaria.

6: West Coast Qualifying Run (+40 wpm), at 0400Z. (This is 2100 PDST the night of Sept. 5.) Check under the August 3 listing for further details.

9-10: VHF QSO Party, rules this issue. WAE phone, see Aug. 12-13 listing. **Pennsylvania QSO Party**, sponsored by the Nittany Amateur Radio Club from 1700Z Sept. 9 through 2359Z Sept. 10. Look for the "super-activity" periods at 1800Z Saturday and 1700Z Sunday. Transmit usual QSO no., and RS(T) plus county (for PA) or ARRL section. Suggested freqs: Phone 1815 3980 7280 14315 21380 28560, cw 1810 3550 7050 14050 21050 28050, Novice 3715 7160 21115 28115. PA stations score 3 points per out-of-state QSO, 1 point for PA. Multiply by no. of ARRL sections (including E. PA and W. PA). One mult. may be counted for DX QSOs, only 1 regardless of the no. of different stations/countries worked. Non-PA stations score 1 point per PA QSO times the no. of PA counties worked. Stations may be worked once on each cw and once on each phone band. Usual logs, info, soapbox, county checklist, summary, etc. Mail by Oct. 15 and send to Douglas R. Maddox, W3HDH, 1187 S. Garner St., State College, PA 16801. S.a.s.e. appreciated.

10: North American CW Sprint (part 2). Check "Operating Events," July, for rules under the July 2 heading.

12: WIAW Qualifying Run, 0200Z. Other details under the August 18 heading.

13-15: YLRL "Howdy Days", starts 1800Z Sept. 13 and ends 1800Z Sept. 15, only contacts between women operators permitted. No crossband. Net contacts do not count. Only one contact with each station. Score 2 points for each YLRL member worked and one point for each non-YLRL operator worked. No multipliers. Logs must be received by October 16. Send to Phyllis Shanks, W2GLB, 3 Honey Lane West, Miller Place, NY 11764.

16-17: Scandinavian Activity Contest (SAC), cw, 18th annual, from 1500Z Saturday to 1800Z Sunday (phone Sept. 23-24). 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/OH/OI Finland, OH0 Aland Island, OJ0 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, multioperator/single transmitter, multioperator/multi-transmitter. Only all-band entry. Club stations, even if operated by one operator, are considered multioperator. 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 OZ0 and G4XYZ/LA counts for LA0s. SJ9 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 Danish Society, the EDR, Box 79, DK-1003, Copenhagen K, Denmark. **Washington State QSO Party**, sponsored by the Boeing Employees Amateur Radio Society, 13th annual, open to all. Operating periods: 0100Z-0700Z Sept. 16, 1300Z Sept. 16 — 0700Z Sept. 17, 1300Z Sept. 17 — 0100Z Sept. 18. All bands and modes may be used, stations may be worked once each band and mode for contact points and more than once if they are additional multipliers. WA stations score 2 points per QSO (including other WA stations). All others score 2 points for each contact with a WA station. WA stations multiply contact points by the total of different states. VE provinces and other countries worked. All others use total of different WA counties worked (maximum of 39). There will be an extra multiplier of one for each group of 8 contacts with the same WA county for all non-WA stations. Send RST, QSO no., and county (for WA); others send state, province or country. Suggested freqs.: cw 1805 3560 7060 14060 21060 28160, phone 1815 3925 7260 14305 21380 28580, Novice 3725 7125 21150 28160. Usual complete logs with declarations. S.a.s.e. not required. Postmark entries by Oct. 10, and send to Boeing Employees' Amateur Radio Society, c/o Contest Committee, Willis D. Propst, K7RS, 18415 38th Ave. South, Seattle, WA 98188. **Maryland-District of Columbia QSO Party**, starts 2300Z Sept. 16 and ends 0100Z Sept. 18th, 13th annual, sponsored by the Maydale ARS. The same station may be worked on each band and mode for QSO points as well as band multipliers. 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. Multiplier: MDC uses ARRL sections/countries worked on each band. All others use MD counties and Independent Cities (total 26). 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. All bands, no repeater contacts but OSCAR OK. Awards. Log separately for each band/mode. Use a summary showing totals for all bands/modes, name, address, call (in block letters) and usual signed declaration. Mailing deadline is Oct. 15. Send to Maydale ARS, c/o C. E. Andersen, W3XE, 14601 Claude Lane, Silver Spring, MD 20904.

17: Frequency Measuring Test, open to all, begins with a callup at 0200 and 0500 UTC Sept. 17. Remember, this is the evening before, Sept. 16, by local time. The periods of 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 14137, 7047 and 3512 kHz; late-run frequencies are 14064, 7090 and 3530 kHz. Your report must be received by Sept. 28 to qualify for the December QST report of the competition. WIAW will start transmitting the official results in a special bulletin Sept. 29.

19: WIAW Qualifying Run at 1300Z. Other details under the August 18 listing.

23-24: Scandinavian Activity Contest phone. See Sept. 16-17 listing. **Delta QSO Party**, 9th annual sponsored by the Delta division of the ARRL; from 1800Z Sept. 23 to 2400Z Sept. 24. 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 reworked 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 postmarked no later than Oct. 21 to be eligible for award considerations. Logs will be returned if requested. Send entries to Malcolm P. Keown, WSRUB, 213 Moonmist, Vicksburg, MS 39180.

24-25: Fall Classic Radio Exchange, sponsored by the Southeast Amateur Radio Club (R8EMY), open to all. Object is to restore, operate and enjoy older equipment with like-minded hams. A Classic Radio is any equipment built since 1945 but at least 10 years old; an advantage, but not required in the exchange. The operating period is 1800Z Sunday, Sept. 24 to 0100Z Monday, Sept. 25. Exchange name, RST, state-province or country, receiver and transmitter type (homebrew send PA tube, i.e. 6L6), and other interesting pleasantries. The same station may be worked with different equipment combinations, and on each mode on each band. No a-m phone below 21 MHz. Cw call CQ CX, phone call CQ Exchange. Non-contestants may be worked for credit. Suggested frequencies: cw 60 kHz from low band edges; phone 3910 7280 14280 21380 28580; Novice/Tech 3720 7120 21120 28120. Scoring: add the numbers of different transmitters and receivers, states-provinces or countries contacted for each band. Multiply by the total number of QSOs. Multiply that total by the Class Multipliers: total years old of all transmitters and receivers (three QSOs minimum required per unit). For transceivers, multiply years old by two. Awards for highest scores, longest DX, most equipment combinations, oldest equipment and unusual achievements (like hearing W6 with an AR-1). Send logs, comments, pictures, anecdotes, etc., to Stu Stephens, K8SJ, 2386 Queenston Rd., Cleveland Heights, OH 44118. Enclose an s.a.s.e. for the *Classic Radio Newsletter*.

30-Oct. 2: Rocky Mountain Division QSO Party, open to all. There are two time periods: Sept. 30 2000Z to 0600Z Oct. 1 and from 2000Z Oct. 1 to 0200Z Oct. 2. Non-Rocky Mt. stations are urged to refrain from calling CQ. In-division stations (CO NM UT WY) send consecutive serial number, county and section. Outside stations send consecutive serial number and section, foreign stations transmit RS(T) and serial number. A station may be worked only once per band, regardless of mode. However, a county hopper may be worked once per band from each county of operation. Suggested frequencies: 3560 7060 14060 21060 28060 3920 7230 14280 21360 and 28560. Sab QSOs count one point, cw contacts two. Out-of-division stations multiply QSO points by the number of counties. Stations within the division multiply QSO points by the sum of division counties, sections and foreign countries worked. Awards. Logs must note county of operation. County hunters indicate separate county totals as well as a grand total. Logs must be postmarked by Oct. 30 and sent to Bill Wegeman, K5MAT, 35 San Juan, Los Alamos, NM 87544. Include an s.a.s.e. for contests results. Decision of the contest committee is final.

OCTOBER

- 5: West Coast Qualifying Run, 0400Z.
- 7-8: California QSO Party, VK/ZL/Oceania
Contest phone/RTTY, QRP QSO Party
- 11-12: YL/AP cw
- 14-15: CD Party cw, Manitoba QSO Party,
9-Land QSO Party, VK/ZL/Oceania
Contest cw
- 15: R5GB 21/28-MHz Contest phone
- 18: WIAW Qualifying Run, 0200Z
- 21-22: CD Party phone, R5GB 7-MHz Contest
phone, CARTG RTTY SS
- 22: WIAW Qualifying Run, 2300Z
- 28-29: CQWW phone, CQ-WE

NOVEMBER

- 4-5: SS cw
- 18-19: SS phone

DECEMBER

- 2-3: 160-Meter Contest
- 9-10: 10-Meter Contest

Station Activities

SCM 5 AREC 5 ORS 5 OVS 5 SEC 5 OBS 5 TCC 5 OO 5 NTS 5 WAC 5

CP 5 A-1 OPR 5 EC 5 DXCC 5 CLUBS 5 RM 5 OPS 5 RCC 5 PAM 5 WAS

CANADIAN DIVISION

ALBERTA: SCM: S. T. Jones, VE6MJ — SEC: VE6XG, PAM: VE6AFO. I regret to report the passing of Tony Walton, VE6AGG on April 22. Congratulations to VE6ABC on his election as pres. of the Northern Alberta Radio Club and also his election to membership in the A1 operators club. I wish to thank the members of the Peace Country Amateur Radio Club at Grande Prairie for the warm welcome on my visit to the club on May 27. VE6HO has a new rig consisting of SB104 and IC 211. Traffic: VE6HO 51, VE6XD 15, VE6XC 11, VE6AMM 6, VE6AFO 4, VE6VS 4, VE6AFJ 2, VE6AFW 2, VE6BCZ 2, VE6VW 2, VE6CAA 1.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — The Amateurs of British Columbia have been very active in Public events. But they don't send the SCM any reports. VE7XG organized communications for the Hyack Canoe Race down the Fraser River, ten amateurs in power boats, six mobiles on shore of the Fraser River. Yours truly in the Labatt's motorhome being used as HQ unit, mobile. Have you ever seen six men Brigade canoes fighting down a wild river for eight hours? Midway down the river we had over seventy five canoes to look after their safety by radio. Asst. Director, VE7ZK wishes to hear from the VE7s on any subject to help amateur activities, nets etc. Traffic: VE7ZK 184, VE7DFY 143, VE7COA 64, VE7FB 35, VE7HO 33, VE7BLS 12.

MANITOBA: SCM, Peter Guenther, VE4PG — Asst. SCM: VE4UL, SEC: VE4TR, RMs: VE4GJ VE4ADS, PAMs: VE4-JP VE4TE VE4VJ. The following stations handled the traffic at the car rally May 27. VE4s DV CS JP ND BV UF AD TR ADM AFO AED DD ADY HK ADS FK AGT QJ JA PG VI CR. ARES membership of climbing and ECed to responding. Ash on At. SCM is being transferred to the east and we wish him well. The severe storm on May 25 caused much damage to antennas, MEPN 31 sess., 843 QNI, QTC 25, MMPN 31 sess., 297 QNI, QTC 10, MTN 30 sess., 228 QNI, QTC 75, MSTN 10 sess., QNI 15, QTC 10, MRIN 4, QNI 47, QTC 0. Traffic: VE4PG 52, VE4IZ 20, VE4QU 19, VE4JA 12, VE4LU 9, VE4ID 8, VE4IX 8, VE4QJ 6, VE4XN 5, VE4GR 5, VE4AED 4, VE4GB 4, VE4AAD 3, VE4AAU 3, VE4ANE 3, VE4LS 2, VE4TE 2, VE4LB 1.

MARITIME-NFLD: SCM, Aaron D. Solomon, VE1OC — Asst. SCM, VO1FG, SEC: VE1DI, PAM: VO1JN, APN Mgr.: VE1WF. Silent Keys: VE1AA VE1ADG, Hosp. VE1s AF GA AKJ CG EG, HARC Group VE1s AJ AH AJP AMC MR worked 6000 contacts from St. Paul's Island as VY0CA. Congrats! VE1s ASW AYY BBO BLQ FO VYU participated mock airport disaster to test Emerg. Measures Comm. VE1RI Ed. Cape Breton Amateur lists 20 new hams. VE1s SYD CBI HAM RTI active repeaters in C.B. Island. VE1CGC club station Coast Guard College ARC VO1FG operated as G4EGZ during visit to U.K. Three new Amateurs in Lewisport, Nfld. area. VO1GW looking for new mgr. Nfld. Traffic Net. APN sess. 31, QNI 114, QTC 80/66, May NTN sess. 11, QNI 20, QTC 5, Apr. NTN sess. 24, QNI 66, QTC 9. Traffic: (May) VE1SW 77, VE1ST 54, VE1G 20, VE1E 10, VO1GJ 10, VE1BG 14, VE1AMR 13, VE1YO 10, VE1HJ 4, VE1ABG 2, (Apr.) VE1LI 27, VO1GW 21, VE1KR 4.

ONTARIO: SCM, Larry Thivierge, VE3GT — Asst. SCM, VE3GOL, CG6A will be active during the summer Commonwealth Games held in Edmonton in Aug. New League Life members are VE3s MV and FSX. OPN Section Net certificates issued to VE3s AJN ASH DUK FGU FHZ HSF and IFP. VE3HOI new EC for the York Region. VE3GLY asst. EC for Windsor. Metro Radio Club has again taken up the chore of maintaining VE3CNE at the Toronto Exhibition. VE3GYD and XYL, VE3JBL visited the "Old Country." New call from Guelph is VE3KVI and many new calls on the air from Hamilton. Congrats to VE3s JRT and DET on passing their Advanced. St. John Ambulance Certificate very impressive. The amateurs radio communications provided by Ottawa amateurs during the annual "Meters for Millions." VE3GUJ pleased with his new Triton gear. Regretfully I announce that VE3s FBL JQR OD and VE4RF, ex-VE3EJK have become Silent Keys. Ont. well represented at the 27th annual Dayton Hamvention. VE3HDJ successful in a recent transmitter hunt. VE2AW now VE3KDM. New appointment restructuring effective July 1st. ORS and OPS now combined into OTS. All stations are invited to be active in the NTS and the ARES. It's an excellent way to improve your operating skills and provide a public service at the same time. Emergency Coordinators are requested to check their membership files for stations eligible for OES appointments. Guidelines are in the new edition of "Operating an Amateur Radio Station" available from Hq. or this office. I would like to thank all the clubs and elected officials who so kindly provide me with copies of their bulletins, it is greatly appreciated. VE3AXL provided progress reports via 2-meter repeater VE3YQT for Thunder Bay's Royal Canadian Legion Branch 6's annual road race. Assisting were VE3s EFZ EUJ EUL FHS HJS HMV HXK JAB and JAH. Traffic: (May) VE3CDK 271, VE3GDL 216, VE3ISV 185, VE3GFN 170, VE3HG 162, VE3SB 147, VE3DPO 127, VE3GT 109, VE3JG 85, VE3FZ 80, VE3EVS 80, VE3EVD 74, VE3DVE 62, VE3JIR 42, VE3FGU 31, VE3JRT 24, VE3FHZ 23, VE3AWE 22, VE3ATR 20, VE3IFP 20, VE3GNW 17, VE3ILP 16, VE3DUK 13, VE3BZR 2, (Apr.) VE3FGV 17, VE3BZR 11, VE3FHQ 10.

QUEBEC: SCM, Ed Sieb, VE2BAQ — Congratulations, MARC, well done, bravo. With these words, amateurs made history once again when the first ever transmission of packet data was sent over 146.58 MHz at the May 31 meeting of the Montreal Amateur Radio Club. Another first for MARC, and ham radio. VE2FEL moved to his new QTH, a fifty acre farm. VE2VI runs 400 watts on two. VE2EC reports that VE2s EAO AJD and DHN were kept busy manning an amateur radio exhibit at a recent trade show. VE2UN made BPL twice in two months. All amateurs are reminded to send in reports early for inclusion in this column. Traffic: VE2BP 62, VE2UN 62, VE2EC 16.

SASKATCHEWAN: SCM, Percy Crosthwaite, VE5RP — VE5SO and companions are canoeing on the Churchill River running from near the Alberta border to Otter Lake. They are using my Argonaut for communications, giving us their progress each night. Unfortunately this year I was unable to make the annual canoe trip. Swift Current held a successful picnic at Saskatchewan Landing after having a three day display at the new mall in Swift Current. Traffic: (May) VE5AE 72, VE5HG 21, VE5NJ 14, VE5ABK 10, VE5RP 10, VE5QI 8, VE5OY 6, VE5LN 2, VE5NR 2, VE5OE 2, VE5ABN 1, VE5BD 1.

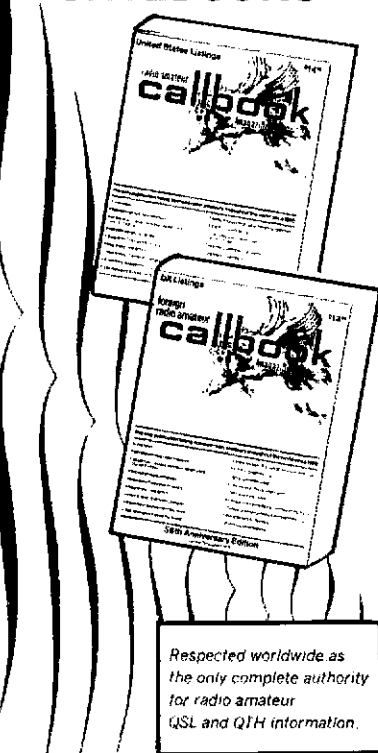
ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PQ, RM: W3QQ, PAM: W3WD, PSHR: K3JL 46, WA3WPY 44. The Delaware Ham Campout at Tuckahoe Acres near Dagsboro was the largest to date. Campers were W3WYO W3FEG W3BSS K3NVV WA3QLS W3TCI WB2GJP WB3ENF WB3FOE WB3ERC WB3ILO WB3FEF K3JLY WB3GXD WB3FUP and W3DKX. Visitors included K3JL WA3VIT WA3YTB WA3WYI WB3DUG WA3EDF WA3RTX WA3ZBI and W3YAH. Congratulations to WA3WPY on earning his 30 wpm cw ARRL endorsement. WA3WUL encourages all Del. hams to join him on 50 MHz SSB and CW where the "First State" is much in demand. He has worked 43 states and 6 countries on '6.' DTN: QNI 385, QTC 95, DEPN QNI 46, QTC 4. Traffic: (May) W3QQ 53, WA3WPY 47, WB3KPV 43, W3DKX 30, K3JL 20, W3WD 19, WA3WYI 16, WB3DUG 9, WB3FOE 3, (Apr.) W3PQ 85, W3WD 33, WA3DUM 14. (Mar.) W3PQ 208, W3WD 5.

EASTERN PENNSYLVANIA: SCM, George Van Dyke, Jr., W3HK — SEC: WA3PZO, RMs: K3KW K3NGN W3VA W3IAZ, Net rpts. EPAEP&TN QNI 391, QTC 91; PTTN QNI 329, QTC 90; PFN QNI 389, QTC 722; EPA QNI 659, QTC 307; AREC(2) QNI 13; CM6 QNI 21, QTC 5. OVS reports W3GOA W3CL WA3BJQ WA3ANDQ. OBS reports W3VA W3ID W3ID WA3RPG W3AVJ. OO reports WA3TMP W3KEK WA3RPG, BPL W3CUL W3VR WA3ZRY WA3ATQ WA3THT, PSHR K3YL WA3YDC W3DP K3NGN WA3OVZ WA3PZO WA3RPG W3GOA. Ttc. a bit cool at W3CUL, all coming from Alaska! Got first report from new SEC this month! WA3ATQ says grass cutting is good exercise, make an offer maybe she will do yours! K3YL reported big problems, hope they are only minor. Lucky guy W3FAF got his old call back on returning to this area! WB3CPZ got the big E ticket. W3PD has added phone patch to his capabilities. W3JD shifting to farming, says he can raise more! WA3TMP got 1st commercial now is working on big E. WA3YDQ says summer school will cut his activities. W3BUR reports long lead time for reciprocal licenses in Caribbean area. Many of the club papers are excellent and getting real professional, keep up the nice work. W3EU reports many years of girl watching while mobbing. When asked why he didn't know WA3ZRY still doing fine job on DEAN. Welcome WB3JGP to PTTN. Welcome W3VA as new RM for EPAEP&TN. New ham killed while he was shooting ant. wire over power line with bow & arrow, let's be careful! Hope you all had a nice summer and vacation period and are now ready for a heavy tlc. season! Traffic: (May) W3CUVL 4177, W3VR 1151, WA3ZRY 624, K3KW 419, WA3ATQ 407, WA3WQP 402, K3NGN 259, WA3THT 280, K3YL 121, W3IPX 119, W3FAF 108, W3BI 102, WA3OVZ 94, WA3YB 63, W3VA 52, WB3JGP 51, WB3BKV 49, W3DP 36, WB3CPZ 26, N3GP 25, WA3YDC 23, W3PD 22, W3ADE 20, N3CP 18, WA3ANDQ 16, WB3HPV 15, W3CL 14, K3NB 12, W3BRE 10, WA3PZO 8, WA3YCE 7, W3W 7, WB3ZG 6, WA3RPG 6, W3AVJ 5, WA3TMP 4, WA3FKH 3, W3HK 3, WA3BJQ 3, WA3BUR 1, WB3CTU 1, W3EU 1, W3GOA 1, W3KEK 1, WA3YDQ 1. (Apr.) WA3NDO 8, W3EKI 1.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Karl R. Madrow, W3FA — N3II is the MDC SEC. All ARES keep the EC posted and your SEC informed. Save postage; contact W3FA on the nets first week of the month with your reports! With the nets: Manager, Sessions/Tfc.QNI! Avg. MDCTN K3ORW 1776/15.5. Top Honors to WA3ZRY W3FA WB3CES K3ORW and W3DKX. MEPN WA3PRW 21/73/20.8. No 100% but others were W3ADQ WB3CES W3HWZ and WA3ZRY. WR PON W3DFW 18/24/15.3. MDC PON W3OYV 4/14/21. MDD W3QQ is boss. WB3CUM is still working on antennas. WB3FTM has a phone patch. W3ZNNW gets a house number after all these years. N3II is an early bird. WA3SXL completed 2nd year of EE. N3RL has a TS 520 for trips. WB3CGG sorry to report that WB3FNX was electrocuted when a guy wire hit the power line. WB3CGG made it to Dayton. Paraded Memorial Day and is planning Field Day with the MARC. WA3RSK has a new phone patch too. W3WBY sez a few little problems on the local repeaters. W3CDDQ has a new job as secy. for the Rock Creek Club. N3RC has a Century 21. K3ORW settled down on the job. W3OYV likes cold wx. N3LE opted for WA3PAA. WB3CES is doing more traffic work. WA3PRW passed the Extra. Look for a new call. AA3A was WB3EJB prior to his Extra. Congrats to you both. The Mountain ARC has a new more powerful machine on 28.8K with autopatch. W3DFW opens the Ponderosa for the season. W3FZV takes on some new MDD jobs. WA3EHK was big tlc. man in May. N3QA fills the no show spots. K3IU putting up new tower with rotatable 40-mtr. dipole and tribanders. WB3DHA to CA for summer school. WB3EYS to UK for a short trip. W3JQN moves to Bethesda and takes a new bride. W3HJH recovering nicely from surgery. W3MR concerned about WARC. WB3CLO won a wad in the local 50/50 raffle. K3USO finds the nets interesting while recovering from a broken leg. K3VC and N3JC are the ones to see for BARC membership. The MDD-MEPN-MDCTN picnic Sunday, Aug. 20, McKeldin Area No. 501 Patapsco State Park. All day, MDC QSO party, Sept 16, 17, 18. Work all counties — details elsewhere. Traffic: (May) W3FA 124, WA3EHK 54, N3QA 53, W3FZV 46, WA3PRW 30, N3IT 25, K3IU 23, WB3CES 17, W3WBY 16, WB3CGG 9, K3ORW 9, W3ZNNW

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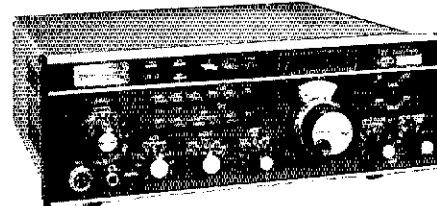
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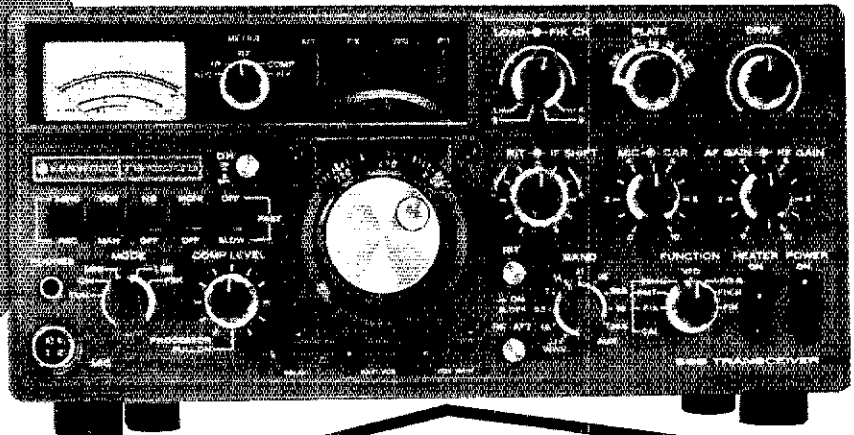
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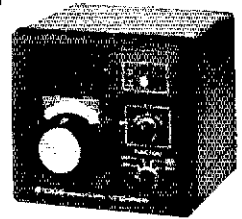
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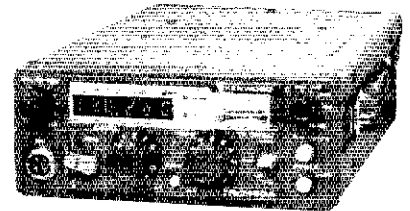


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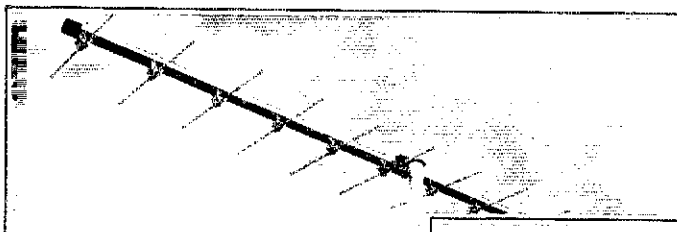


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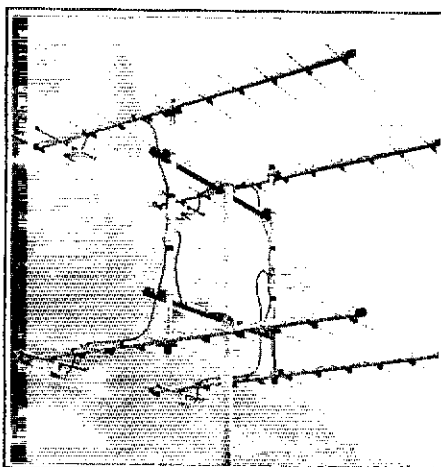
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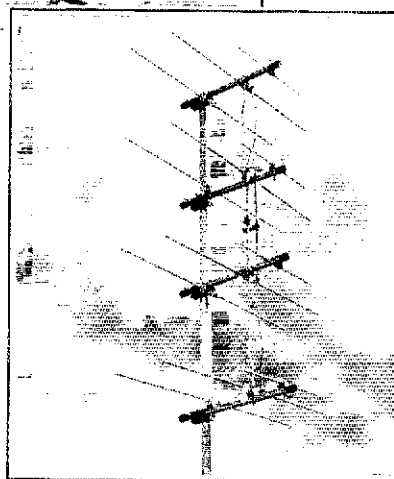


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SOUTHERN NEW JERSEY: SCM, Raymond F. Ciancio WB2GTE — SEC W2HOB reports WB2ZJF new EC 10 Salem Co. W2SDS fell off roof and broke arm. New Extras WB2OSQ WB2BVV W2SUA WA3VOY WA2VOZ Congrats. N2SI W2SUA WA2s OMY AXJ NPD enjoy Dayton Hamfest. W2OSQ Silent Key. WR2AJC repeater offers 5-20 wpm code practice Mon. plus a general theory course planned sez N2GLW WB2VCF. W2DXC 283. 8 ARES members serviced CROP walk-a-thon via Robbinsville Repeater. Del. Valley RA had family picnic July 16 near Belle Mt. Glouc. Co. ARC new VP WB2LNI is Crosstalk editor. WA2FJE sports new rig and 2GEK new ant. and 50-ft. tower. RCA-Astro Elec. RC will have 90W 2M rpt'r sig from 200-ft. tower sez WB2PKG WB2LQO skeds WB2GTE on 2M. SPARC's WB2EYH has successful hamfest at Stocton State College. 1978 Explorer Canoe Race on Maurice River thru Glouc. Salem Cumberland Counties had a thrill when WA2AX. WA2SUG chased canoe 2M equipped 'helped' an inexperienced canoeist around themselves and 2M gear floating down river. WB2RRJ sez WA2s F2B MMA YC. VOY WB2AOL manned check points. Pine Barrens RC officers, WA3YNT. pres.; W2ESB, vice-pres.; W2PKF secy. Jersey Shore ARSs W3QME listens and watches QSOs on 439.25 MHz 8W ATV rig SCARA's W2OB N2NJ are FD ready. WA2AIQ visited 10 mile offshore oil drilling rig by Helicopter and found ham there. WA2MNJ EC Mercer Co. sez MCN handled 31 msg. and looks for more. SJRA ran a hamfest at Ellisburg Circle on Rte. 70. Traffic: WA2MNJ 162, W2H 61, N2JF 34, W2UBQ 26, K2SB 22, WB2VFT 21, W2H 18, WB2UNJ 6, WB2EYF 4.

WESTERN PENNSYLVANIA: SCM, John T. Fleming W3GJQ SEC: WA3VUP. Asst. SECs: K3SMB WA3LJW PAM: K3SMB. Rms: WA1WGNEM W3KUN. Repeater Freq. Coordinator W3MIF. Section Nets:

Net	KHz	Time/Days
WPA CW Traffic	3585.0	7:00 PM Dy
WPA Phone Traffic	3983.0	6:30 PM Dy
PA Traffic & Training	3610.0	6:30 PM Dy
WPA RACES	3990.5	9:00 AM Su

I hope by the time you are reading this, I have sold my home in WPA and purchased a home in Detroit. On June 2, I received a transfer to B-Land. Otto Schuler, K3SMB 3732 Colby St., Pittsburgh, PA 15214 is the new SCM until Dec. 31, 1978. Be sure to consult the "Operating News" in July QST for the WPA Section SCM election. New appointments: WB3VRS. Upgrade: WA3YEC to Extra. New ham: K3ADE. New club — Point Radio Operating Soc. K3TP. pres.; K3WT, vice-pres.; K3VX secy.; W3YQ. treas. New ARRL affiliated clubs: Supelco Park ARC, Quad County ARC. If you hear a mobile passing through the area, welcome him! Your conversation will help him "Stay alert — stay alive." Stations with proposed repeater frequency assignment, write to W3MIF at least every 6 months with activity reports to avoid loss of frequency assignment. Blue Knob repeater picnic Aug. 26. WPA (Pgh) 2-Meter Traffic Net had 31 sessions, 507 QNI, 65 QTC. WPA Phone & Traffic Net had 31 sessions 290 QNI, 54 QTC. WPA CW Traffic had 31 sessions, 372 QNI, 143 QTC. PSNR Credits: WA3YEC 56, K3H 46, WB3DKT 28, WB3GZR 22, WB3EML 19, Traffic: WB3HGL 167, K3H 133, W3SFM 109, W3ECL 104, W3YQ 86, WB3PAV/3 50, W3SMV 42, WB3DKT 39, K3KUN 38, WA3YEQ 31, K3SMB 27, W3RUL 24, W3AS 23, WA3QNT 21, WA3UNX 18, WB3GWW 16, K3CHD 15, W3ATQ 14, K3CR 6, WB3EML 5, K3HCT 4, K3VQV 4, W3UT 2, WB3GZR 1.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES. RM: W9NJP. PAM: WA9KFK. Cook County EC: W9HPG.

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Ill Phone	3915	2245 Dy	199	28
NCPN	3915	1200/1700 M-S	136	51
INTN	3710	1300 Dy	no report	
IEN	3940	1400 Su	no report	

K9MX, a top traffic handler of the ILN and a captain in the U.S. Army now stationed in Texas, K9BVE had his Collins gear hit by lightning. WB9ACQ has been appointed chmn. of the Technical Committee of WR9AAA and the Gypsy Amateur Radio Society (Joliet). The Executive Committee has approved the application for club affiliation of the Saline County Radio Club and declared it a duly affiliated society. WA9CNG was appointed asst. EC for Knox County. WD9HQV upgraded to Tech. K9WA won the low power Class in CW for IL and also the Central Division. W9NXX is recruiting new check-ins on the D9RN at 2000Z on 3940 and 2015 on 7280. Contact him for further information. The IL participation was 90 percent and W9JLJ, W9NNG and W9HOT were the IL check-ins and the traffic count for this 9RN was 97 messages. WD9AGS has passed his General. W9UFL has gone mobile FM. W9QLA's 90-ft. antenna destroyed by the ice storm has been replaced. W9IFA is building a quad for CQAR contacts. W5KLV reports C&ND traffic is 353 in 62 sessions with the 9th region of 95%. The IL check-ins include K9DAC, WA9YZR, WB9WAX, W9AES, W9NXX, and W9HOT. The W9ZEY memorial net had a traffic count of 5. The 16th annual IL QSO Party will be sponsored by RAMS on Aug. 6th. See QST "Operating Events" for info. W9HDC is now Extra Class. WB9IFL and WD9HDA are new additions to the Advanced Class. WB9YFX and WB9NLQ are proud parents of a YL. Our sympathy to the families and many friends of W9JEV, W9FUH, K9ARC, W9JYR, WA9USV, and W9KP who have recently joined the ranks of Silent Keys. W9JLJ is the only BPL recipient for this month. Traffic: W9JLJ 516, W9NXX 159, W9HOT 152, W9OK 144, WA9KFK 122, WB9JSR 89, W9NJP 94, W9HBI 83, K9BE 82, WB9ZED 79, NGJF 89, W9KR 65, W9OBS 63, K9EEA 58, N9DR 55, K9MX 50, N9MX 48, W9OYL 43, W9LNC 31, K9SW 28, WA9AON 28, W9PE 11, W9PRN 10, WB9SGK 10, K9DAC 8, K9AXS 5, W9HPG 4, W9VY 4, K9WA 3.

INDIANA: SCM, J. M. Kell, W9LTU — Congrats to WB9YXN on making BPL three months in a row. He is now eligible for the BPL medallion. Also noticed he earned his CAN-D certification. CAN certificates (evening) were issued to W9FC W9EJ W9TG and W9LTU. WB9TZ informs me of the Ind-Mich-Ohio (IMO) 2-meter nets in the Fort Wayne area. First sessions is on the Fort Wayne



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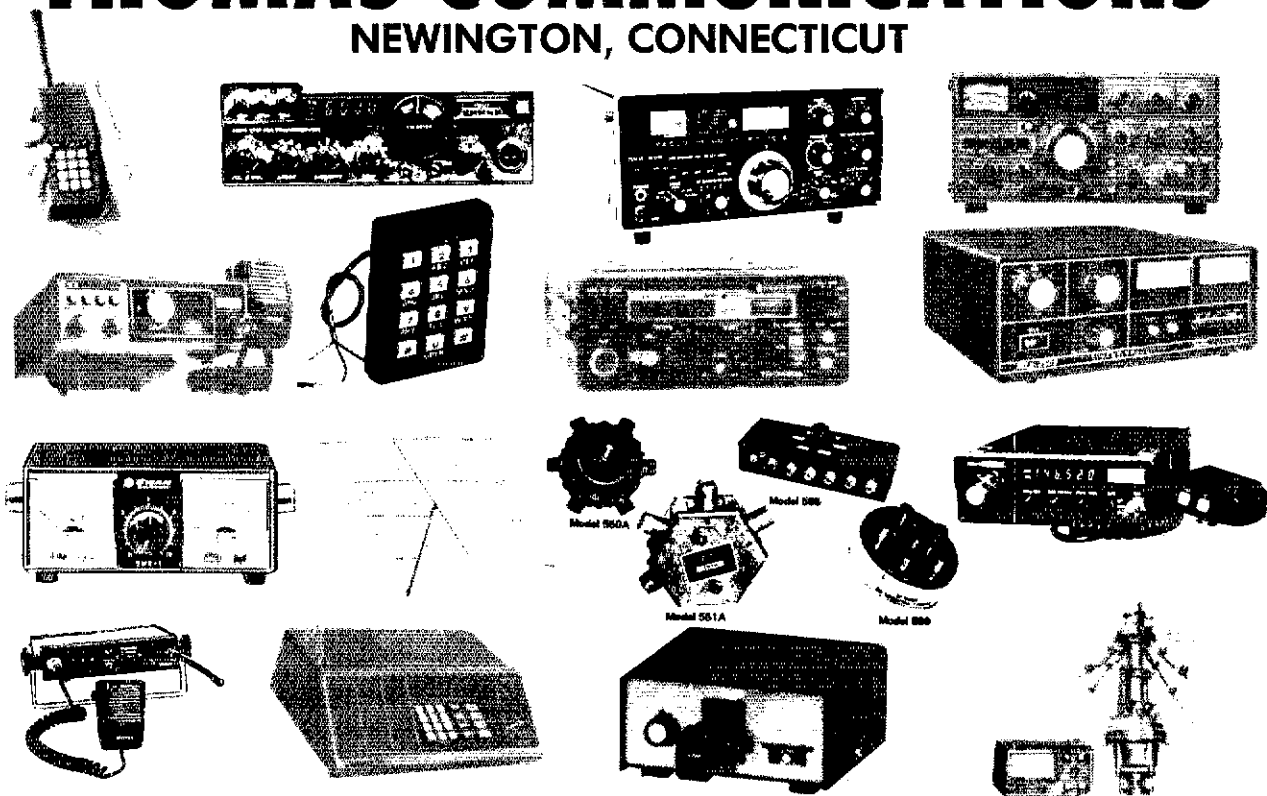
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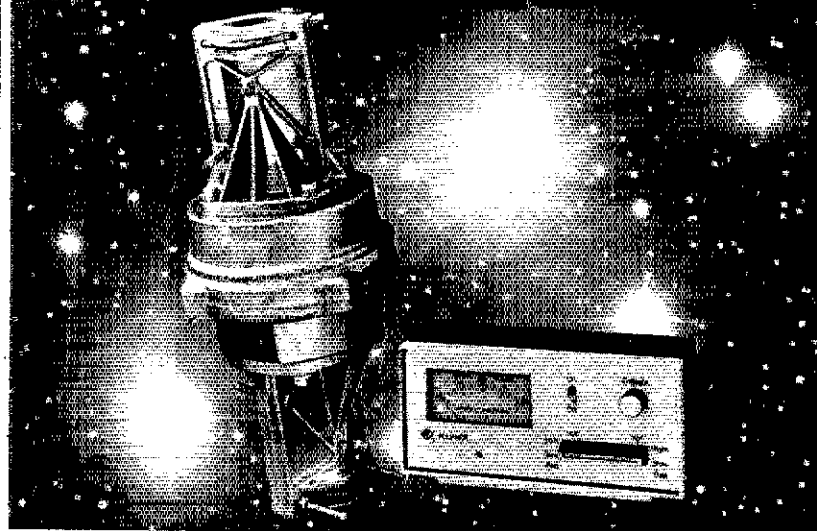
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repeater, W9RABN, 146.28-88 at 2330Z daily. Second session is on the Ligonier repeater, 147.75-15 at 0100Z every evening except Sat. Both of these nets are traffic and public service nets. Indiana needs more nets like these. Remember when 20 and 15 meters were open into Europe until after dark and 10 meters was open to Australia evenings? I do, May 1978. Old Sol has come back. Indy DXers Club were host to PJ2MI in May. I hope to meet more of you at the Lafayette Hamfest this month. Sorry no net reports this month but I'm on vacation and they didn't catch me in time. Net traffic ION 13. Traffic: (May) WB9YXN 533, W9FC 243, W9EI 225, W9LTU 132, W9GLW 118, K9FTX 108, W9ZV 74, W9SPIR 63, W9TJS 61, W9SELU 53, W9DGCX 46, W9DLF 45, W99LYU 46, W9IOH 43, W9ZKN 23, W9BVN9 18, K9HUT 14, W9ENU 12, K9DCX 11, W9CMT 8, W9SOX 8, W9BDIX 5, W9BDP 2. (Apr.) W9TG 61, W9DXW 51, W9PMT 26, K9EQT 16, K9WWJ 12.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: W9FZC. PAMS: W9AYK W9IEM K9UTQ. RMS: W99IC, K9KSA W99KPX K9LJU K9EN. Nets, Freq., Time, QNI, QTC, Mgr.: BWN, 3985, 1145Z M-Sa, 725, 835, W9AYK; BEN, 3985, 1700Z Dv, 550, 102, W9IEM; W9BN, 3985, 2230Z Dv, 848, 172, K9UTQ; W9NN, 3725, 2215Z Dv, 33, 7, W99ICH; W9SSN, 3662, 0030Z M-W-F, K9KSA; WIN-E, 3662, 0000Z Dv, 36, 97, W99KPX; WIN-L, 3662, 0300Z Dv, 225, 106, K9LJU; W9RN, 3662, 0030Z Sat., K9EN; WI EX, 3925, 1701Z M-F, 545, 49, W9ANIX. W999SD gave ham radio demonstration in Oshkosh. Moving Up to Amateur Radio, also gave actual demo. Despite rain and cold Manorad banquet was well attended. W99DLR Novice to Tech. (XYL of N9TD). Oshkosh ARC officers N9BL pres.; W99KZH, vice-pres.; W99GMF, secy.; W99SZO, treas. W9UKR now N9BM. Radio class in Maskekan has four students. ARRL state convention went well, all had a good time, guest speaker was Bruce A. Johnson from ARRL, he spoke on WARC, very interesting. W99AUD now in MA. New ECs: W99DUE Fond du Lac County, W99ZRE Green Lake County, W99BAH Vernon County. You hams in these counties give your support. W99ZG made BPL. W99CQC made Advanced. Walworth County ARES net Mar. 6. K9FHI was made an Asst. Director of traffic: (May) W99ZG 1007, W99DND 195, W99FL 167, W99CQC 143, W99IEM 114, W99DHF 104, W99KPX 89, K9FHI 80, W99AYK 77, W99AUD 76, W99FDY 64, W99YCV 64, K9LJU 61, K99AK 50, K9EF 49, W99HW 39, W99MPPF 37, W99RRU 35, N99CP 34, W99BRE 32, W99ESM 25, W99ICH 24, K99CP 22, W99EAQ 20, W99MFG 20, K99ANV 20, W99AJA 20, W99LWJ 19, K99SAO 18, W99UW 16, W99ELM 14, W99DOT 6. (Apr.) W99ESM 18.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, W99HOX — SEC: W99SA.

Net	Freq.	Time/Day	QNI	QTC	Manager
MSN 1	3685	6:30 P	209	115	N99HY
MSN 2	3689	10:15 P	101	42	K99PZ
MSPN N	3945	12:05 P	554	78	W99JYT
MSPN E	3929	5:45 P	508	171	W99DUW
PAW	3925	9-12/1-5	2838	248	W99VYT
MWX	3925	6:15 P	274	217	W99UKI

Attention please! Minnesota is lacking ECs in many of its counties. We would like to have one in each county in our great state. If you are an EC or are interested in becoming an EC in your county, please ARL7 me as soon as possible. We need a strong ARRL. Congratulations to: W99ZG, W99CQC, W99IC, W99FL, W99DND, W99HOX 164, W99DUW 121, W99JYT 113, W99VYT 97, N99HY 95, W99UKI 89, W99FTG 87, W99GIT 70, K99PZ 67, W99LUP 63, W99RQJ 58, W99PKG 53, W99CIUE 40, K99CSE 36, W99NZE 32, W99RIO 32, W99SYT 28, W99HZ 27, W99ONK 21, W99HKF 15, W99PNE 14, K99ZBI 14, N99J 12, W99ZBJ 11, W99OPX 10, K99FLT 5, W99UMX 5.

NORTH DAKOTA: SCM, Mark J. Worcester, W99WLP — Late report (Apr.) New Trustee's of Bis. Rep. — K99GRM 34/94, W99CZP 25/85. Pres. of Bis. 2-meter Club W99EWW, W99RIB back in Bis. Pres. of Goose River ARC, W99KZU. FARC participated extensively in the flood relief operations. There are 11 in the G.F. Novice Classes. New Techs.: W99HTF, W99HDD, W99BLY. Gen. W99BTR, Extra: W99CSP and W99FTG. Extra W99AT79. The first annual K99YZ memorial Com Fesd will be held Aug. 6 at Ambercombe, contact W99VGJ. W99VAI was hospitalized in Bis., doing well at last check. The Carrington Rep. giving good coverage to Devils Lake, Jamestown, Wimbledon and Bismarck and all towns in between. I will not be seeking re-election for SCM. I hope someone will be found that will do a good job.

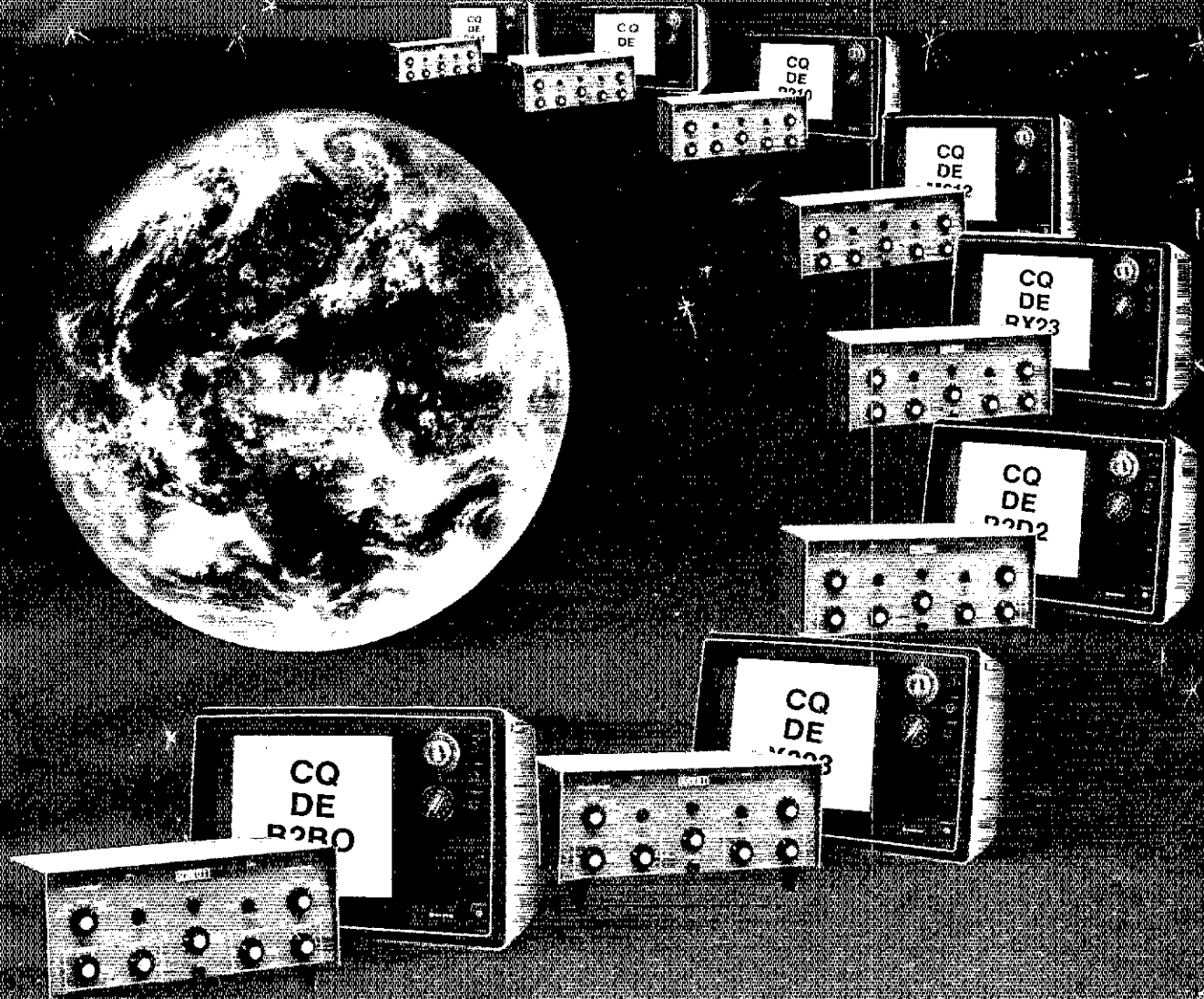
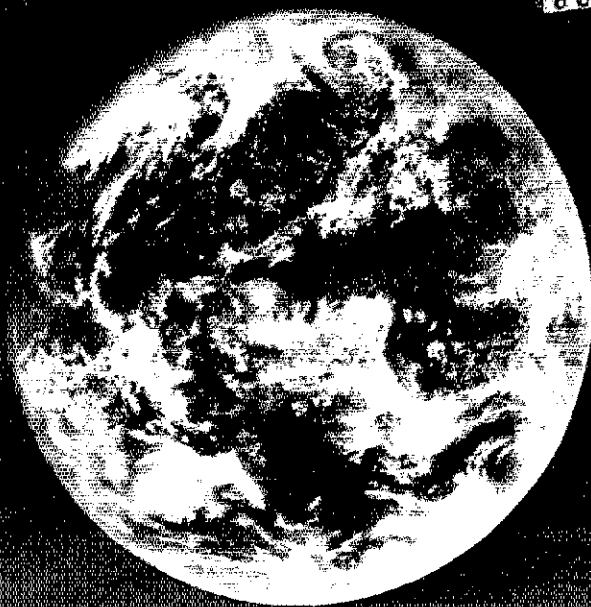
Nets	kHz	CST/Days	Sess.	QNI	QTC
DA Fa	3996.5	1800 S-S	24	178	40
W99WSQ	Goose River	1990 0900 Su	5	49	1

W99CQC Traffic: (Apr.) W99WSQ 17, W99SUF 15, W99DM 5, W99JPT 5, W99WIB 5.

SOUTH DAKOTA: SCM, Lydia S. Johnson, W99KJZ — Asst. SCM: W99DVB, SEC/RM: W99TMM. Net Mgrs.: NJQ Net W99VRE; Morning Net W99HOJ & W99MJI; Evening Net K99TVJ; PERC Net W99UEN. Late congratulations to three who made BPL in Mar. W99ZEB, W99TUK; in Apr. W99VRE, W99TUK passed his Extra Class. W99NZA appointed by 10th Regional mgr. to be TEN receiving station on CAN. W99LYO new call K99JV. W99ZWL back on the air from new location in Rapid City. W99AX retired engineer K99FRE and XYL will be summer touring in their new motorized home. W99CF leaving SD. Congrats to W99TMM on making the PSHR with 49 points. All EC appointees please note, send your monthly reports to Jim. We could use qualified operators for OQ OBS and other ARRL appointments. Net totals: SDN 25 sess., QTC 47, QNS 110, NJQ QNS 565, QTC 48, Morning Net QNS 435, QTC 46, Evening Net QNS 930, QTC 31 in 31 sess. Traffic: (May) W99VRE 356, K99FRE 96, W99TMM 84, W99DVB 68, W99NZA 52, W99HOJ 48, W99MJI 38, W99KJZ 28, W99BOH 20, W99IG 13, W99EVQ 9. (Apr.) W99ZEB 48, W99EVQ 19. (Mar.) W99ZEB 225, W99TUK 132.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5U4U — SEC: W5A5NV, PAMS: W5POH, W5AZWZ, K5MEA. RM: W5MYZ. Nets, kHz, Time/Day, QNI, QTC, Mgr.: OZK, 3760, 0000/Dy, 140, 15, W5MYZ; APN, 3937, 1100/Dy, 984, 39, W5POH; M-Bird, 3928, 2130/M-F, 705, 31, W5AZWZ; ARN, 3995, 2330/Dy, 983, 93, K5MEA. New EC Saline Co.



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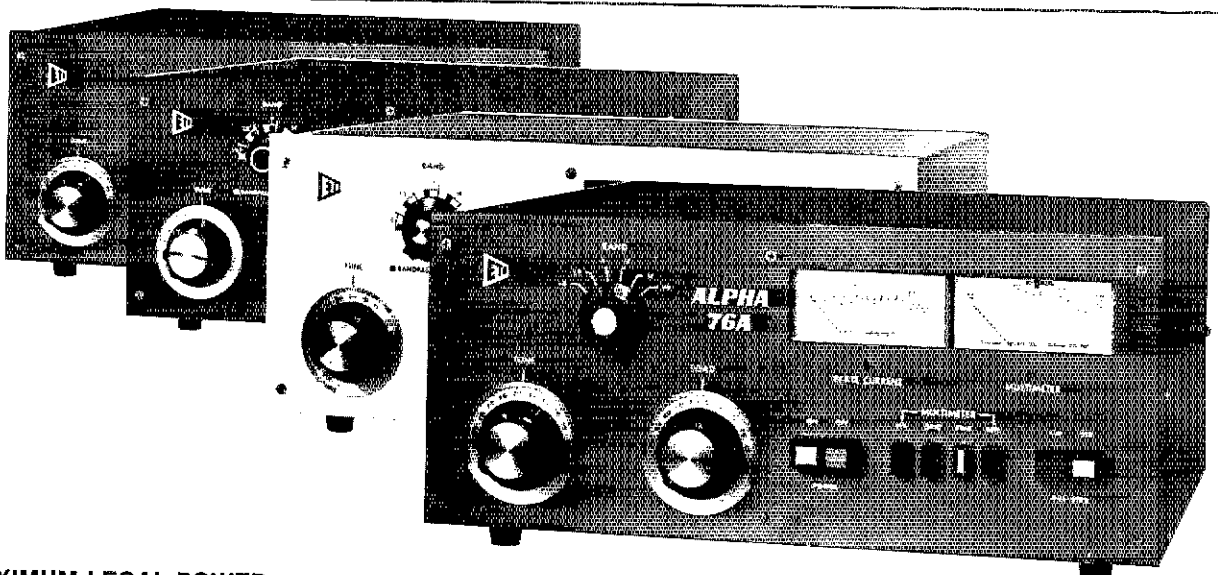


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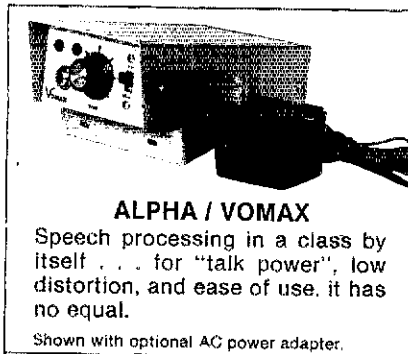
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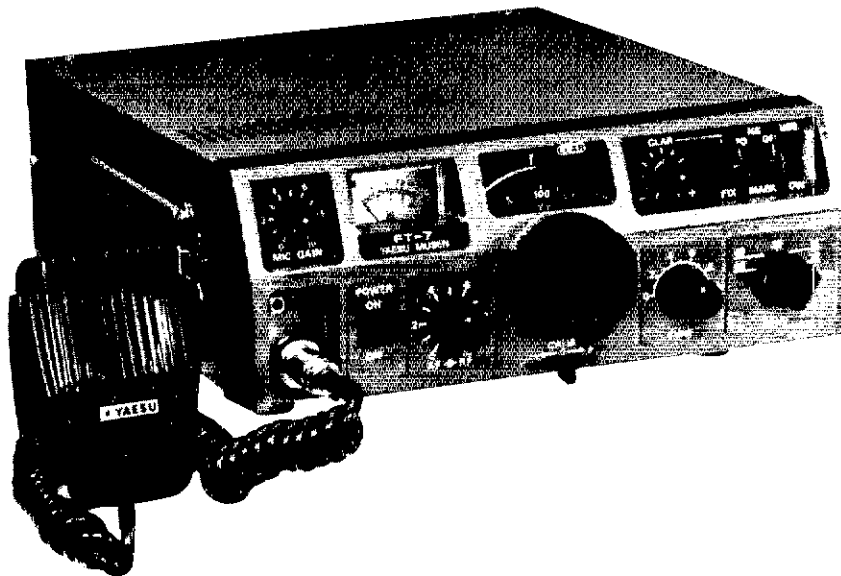
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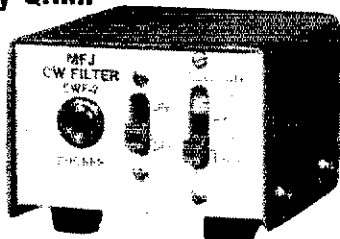


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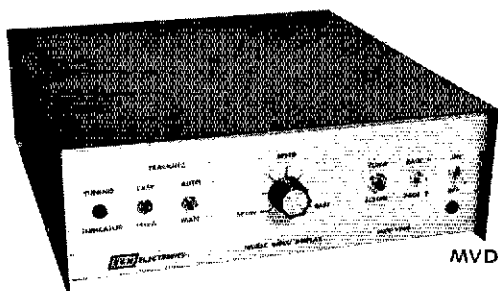
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WB4BWC/5. Officers Crowley Ridge Repeater Assn.: K5CX, pres.; WD5CTF, vice-pres.; WB5NGT, secy-treas. Crowley Ridge Repeater 145.18/76. New hams in Ark. KA5AFZ, KA5AHU, KA5AHK, KA5AL1. Aug. 23/26 independence Co. Fair will have an amateur radio set-up. W5KL spent week in hospital following eye surgery. OBS: K5MEA 12, WB5WVA 5, PSHP, WA5HNN 58, W5POH 39. Traffic: WA5HNN 172, WB5FDP 91, K5MEA 47, W5POH 22, W5UAU 21, WB5WVA 18, W5KL 16, WB5NZL 10, WB5PSD 9, WB5GQH 1.

LOUISIANA: SCM, S. T. "Tom" Losey Jr., K5TL - Asst. SCM, K5DPG. SEC: WB5IYH. RM: N5TS. PAM: N5ES. VHF PAM: W5VBX. Congrats to W5YN on 71st birthday and being in Ham Radio for 56 years. WB5IKT now has 5 BWAS. K5BLV very active on DRN5. SEC WB5IYH preparing new approach for Emergency procedures. LSN, the Slow Speed CW Net has moved to new time of 7:30 PM M-F and added Sat. session on 40 meters (7110 kHz) at 2:30 PM: WB5OQM Net. Mgr. doing fine job. WA5KNC now Extra Class. K5EGU Advanced and WD5GAX WB5NKM WB5ROB General Class. Officers for Delta DX Assn. are K5OA, pres.; K5KR, vice-pres.; K5WF, secy; W5ZPA, treas. KARC will sponsor Novice class in June. Jefferson ARC planning Novice-General class at same time. WB5GFM appointed Jefferson ARC EC. GNOARC to remain active while seeking new club location. Don't forget Traffic Handlers Picnic in Alexandria, important business to come up.

Net	Freq.	Time(PM)/Days	QNI	QTC	Mgr.
LAN	3815	7 & 10 D	448	210	K5TS
LTN	3910	6:30 D	512	95	N5ES
LSN	3703	7:30 M-F	86	17	WB5OQM

LRN 3587.5 6:30 Su&W 7 7 N5RB
Traffic: N5TS 213, N5YL 202, W5GWF 192, W5SIQU 122, N5ES 84, K5BLV 74, WB5OQM 64, W5MI 59, WB5LBR 32, K5TL 29, W5YN 12, WB5IKT 4.

MISSISSIPPI: SCM, E. Ed Robinson, III, W5XT - SEC: WB5FXA. K5QNE reports Capital Area Emergency Net serving seven counties active on 148.04/64 with emergency power and drills on Sun. 2030 local time. Congratulations to new MS. Slow Net Mgr. WA5IDF and trn to outgoing mgr. N5WE. WD5DCK (Novice) MSN NCS is OBS ad has 20 wpm Certificate! MSN Net Certificates to WD5DCK WD5DCM WD5CJV W5YRX congrats. C5FI all band mobile in VW working DX & TFC CW. Gulf Coast Area (WA5D V) puts the backs of WD5FQS WD5FAZ new General W5VCH WD5INCH WD5FQR new Tech: WD5JLU, WD5JXR, WD5JY, W5XJ, W5XJ new Novices. WA5JWD giving MS Net Mgr. job to WD5CSL, our best to both. MSBN-WB5SNB-sess. 31, QNI 187Q, QTC 51. MTN-WB5FHA-sess. 31, QNI 152, QTC 48. MN-WA5JWD-sess. 27, QNI 233, QTC 13. MSN-WA5IDF-sess. 12, QNI 60. Capital Area Emergency Net-K5QNI-sess. 4, QNI 57. Traffic: N5RN 121, WD5GNR 114, WB5FHA 108, W5EDT 72, WB5SNB 58, W5XJ 26, WA5OKI 23, W5WZ 14, WA5GIT 8, WB5VFS 4, K5MK 1.

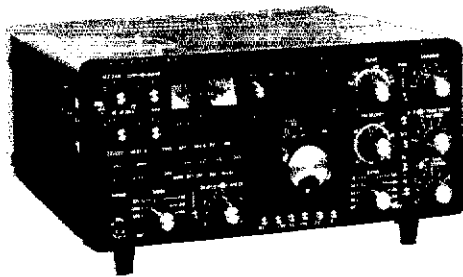
TENNESSEE: SCM, O. D. Keaton, WA4GLS - SEC: WB4DYJ. PAM: WB4PRF. RM: WB4DJU. John Brown, WB4PRF is the Asst. SCM and will continue as PAM until an STM is named. WB4YPO will remain as net mgr. of the 2330Z session. WA4EVM will continue as net mgr. of the 1145Z session. WA4EVM will remain as net mgr. of the 1040 session of the TPN. WA4CNY will remain as net mgr. of the TNN, other net managers will be named as soon as consent to serve is given. The Cedars of Lebanon Hamfest will be Aug. 27, all attend this great gathering. Certificates of Merit have been awarded to those who worked the Waverly explosion during Feb. The call sign of the Nashville member of the Repeater Frequency Advisory Committee should be W4IMX not K4IMX as was given previously. The Memphis Amateurs did a great job providing communications for the Billy Graham Crusade while in Memphis may 7-14, 1978, 309 man hours were contributed to this worthy cause. Congrats to WB4BXG on upgrading to Advanced. Look for his new call sign. WD4EIM has been named PRA for Delta Div. by Max Arnold, he wants all club presidents to report their meeting dates, time and places and other interesting info. Congrats to W4RFK on upgrading to General. The Humboldt and Knoxville Hamfests were successful. Congrats go to first prize winners WB4RHQ and W4EEE. Sec. place winners W4VJW and W4RNL. Many thanks to the amateurs who assisted in the Special Olympics in Nashville. Remember to attend the Bristol Hamfest on 18th and 20th. Phone nets report QNI 5178, QTC 745. CW nets report QNI 321, QTC 128. Traffic: AA4KB 254, WA4CNY 213, K4CNY 209, WB4ZS 102, W4ZJY 89, K4XE 81, WB4KF 60, K4YFC 57, WB4GWA 37, WB4DJU 20, W4OGG 19, WB4YPO 12, W4ACGK 11, W4TTY 11, W4VJW 11, WA4TYN 9, WB4YBL 9, WA4GLS 7, K4AMC 7, WB4BXG 6, W4RUW 6, K4WOP 6, W4EWR 3, K4FSK 3, WD4EIM 1.

GREAT LAKES DIVISION

MICHIGAN: SCM, Stanley J. Briggs, W8MPD/K8SB - Asst. SCM: WA8DHB. SEC: WA8EFK. PAMs: K8LNE, WB8OP, WA8WVY. RMs: K8KMQ, WB8NCD, K8RV, WB8YDZ.

Net	Freq.	Time/Days*	QNI	QTC	Sess.
MITN	3932	2230 Dy	601	351	31
MACS	3953	1500 Dy	801	295	31
QMN	3663	2200/0200 Dy	973	290	84
GLEN	3932	0130 Dy	809	153	31
WSSBN	3935	2300 Dy	827	75	31
UPEN	3932	2100 Dy	589	65	35
BR	3930	2130 Dy	483	62	27
MNN	3722	1300 Su	144	3	30
MEN	3930	1300 Su	144	3	30
MIGM	50.7	2300 Dy	165	5	34

VHF PAM Report: 7 Reports
*UTC Summer Schedule. The 50th Anniversary Air Show at Ann Arbor Airport was provided with amateur radio communications by Ann Arbor area amateurs. Ground movement of antique and experimental aircraft were coordinated with the FAA tower personnel. The letters "AP" can stand for "All Port Huron" as almost all the calls between KA8APA thru KA8APZ went to the new Port Huron Novices! A new traffic net is under way in S.E. Mich. on 147.59/0Z at 2200Z and 0215Z Dy. W8OAF is the manager. W8OAF will soon report the following Silent Keys: W8GOV, WD8JDT, WB8JLU, WB8JBU and K8VJK. OBS reports from N8AG, WD8APM, WD8DIB, WD8DJS, WD8DMX, WD8POK, W8SOP, W88VPM, CO reports: K8AIT, W88IKJ, K8JH. OVS reports: WD8POK, W88RNY. Welcome to our new affiliated club, Mid-Michigan Amateur Radio Club of Farwell. Field appointments: K8KMQ, WB8YDZ RMs. K8NKB, WD8DIB, OBS, WB8YRY, OBS, W8GBR EC for Luce County, WA8QEF EC for Jackson and Hillsdale Counties, W88WLX EC for St.



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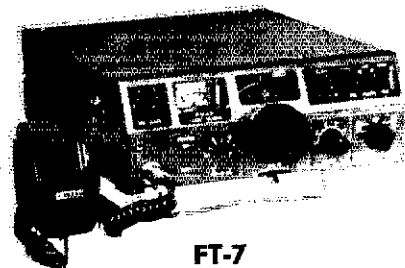
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Joseph County, WB8WNF EC for Midland County. Club election: Mich Tech ARC, WD8DWG, pres.; WDBMCC, secy.; WDBQPS, treas. K8AIT's XYL finally gave in and got license after 14 years, she is WD8RMW, Michigan's loss is Ohio's gain as K8FE has moved to Ohio. Your Repeater Council needs your support. Contact WB8JPM and offer your help. Upgrades: WBSSO to General, WD8LAA to Extra. Traffic: (May) K8LNE 348, WB8OP 34, WD8APM 251, K8RV 169, WB8MPD 166, WB8MTD 152, WB8YDZ 131, K8KMQ 129, WA8DHB 121, WD8CSA 112, WB8POL 111, K8KC 95, WB8ZNS 87, WD8NKA 83, WD8MFC 78, K8DYI 72, K8DTG 64, WD8NYN 53, WB8CW 53, WD8LY 48, WDBIEW 47, WB8NOH 48, K8CN 43, WB8IT 43, WD8LSV 43, WB8YI 43, WB8UZZ 42, K8ZJU 39, WD8DMX 38, K8DD 34, WB8DJS 34, K8UPE 33, WB8ZYC 32, WB8VY 31, WA8GAF 27, WD8DB 27, K8ED 21, WB8HYI 21, WB8HX 20, WB8YU 20, WB8YJ 19, WD8BSE 18, WD8EAO 18, WB8SE 17, WB8JX 15, WB8JUP 14, WA8WVV 14, WD8DKM 13, WB8YIG 13, WB8VZ 12, WB8VVL 11, WB8PO 9, WB8SYA 9, WB8TTA 8, K8AXL 7, WB8CUP 7, WB8WQ 7, WA8FXR 6, WB8JIX 6, WB8APN 5, WB8NQ 5, WB8LDS 5, WB8VPW 5, WB8BDF 4, WB8BP 4, K8QCB 4, N8AG 3, WB8HL 3, WB8HYD 3, WB8KJ 3, WB8LOJ 3, WN8NII 3, K8GXV 2, WB8GZF 2. (Apr.) K8KMQ 214, WA8TBL 35.

OHIO: SCM, Hank Greeb, N8XX — Asst. SCMs: WA8MCR N4VY W8TP WB8U. SEC: KBAN. STM: WB8JGW. NMs: W8DIL N8CW WB8KKI WB8KWD WA8SSI WB8WTS. Remember OH Interstate QSO Party Aug. 26-27. Details in Operating Events column.

Net	QNT	QTC	Sess.	Time(Z)	Freq.
CNN	130	84	30	2230	3.705
OSN	205	88	31	2210	3.577
BN	545	272	58	0200/	3.577
				0245	
BNR	112	168	30	2200	3605
O6mN	451	51	31	0100	50.160
OSSBN	2485	756	93	1430/	3972.5
				2200/	
				2245	

Congratulations to WB8JGW on nomination and election as new SCM. It has been a pleasure serving you for the past four years. Send your Sept. reports to WB8JGW. Bikeathon communications were handled in Cincinnati by Hamilton Co. ARES, in Cleveland by Lake Erie ARA, in Kessington by Massillon ARC, Central OH ARES coordinating efforts of Scioto Valley ARES. Scioto Valley Repeater Club and others during the two-day bicycle tour of the Scioto River Valley. QNT certificate awarded to WD8ADJ W8ECRT W8DIL W8BDTG W8DIN W8DIZE W8DMGP W8DNSD W8VLR WB8VY WB8YYS. Multiop BPL made by N8TM. Traffic: WB8KWD 390, WB8PJ 293, WB8KKI 260, N8TM 242, W8DIL 220, WD8CGH 158, WB8HGH 152, N4VY 129, WB8WTS 128, N8CW 107, WB8VLR 121, WB8QZK 116, WB8NI 104, K8BYR 102, W8TP 99, WD8BZD 91, N8XX 88, K8IKD 76, WD8CDA 65, W8CXM 56, WB8DMO 56, WD8DIP 53, WB8JGW 53, WA8SS1 50, WA8ZNC 49, WB8VWH 46, WB8GGX 44, WB8SQ 44, WB8SEI 45, WD8DDJ 41, WB8TRK 41, WB8WEG 41, WB8YU 40, WB8BQ 35, WB8CJU 33, WB8MRL 33, WB8RT 32, W8BMG 32, N8VT 29, K8AAZ 25, KBAN 24, WB8HMI 23, W8DIT 22, K8KWO 22, WD8BBQ 19, WB8OHV 19, WB8VZX 18, WB8YU 18, WB8FN 17, WB8U 17, WA8TSX 17, K8HF 15, WB8PI 15, WA8TSX 15, WB8VD 13, WB8ARW 11, K8CYX 11, WB8YGV 11, W8BMTV 10, WB8UFB 10, K8IOW 9, W8MRC 9, WA8MIH 8, N8JR 7, WB8WG 6, K8CKY 5, W8IM 4, K8ONA 4, WD8BBN 3.

HUDSON DIVISION

EASTERN NEW YORK: SCM, Guy L. Glinger, K2AV — SEC/ASCM: WB2VUK, ASEC: K2AYQ. NMs: W2CS K2OYG W2WSS WA2SPL. Nets: NYFON 5 PM 3913 ESS (slow) 6 PM 3590, NYSPTEN 6 PM 3925, NYS 7/10 PM 3677. Very light month in the mail. Gives me an opportunity for the soapbox. This column marks one year with the pen in ENY. Several things come to mind... all the support and patience I have received... the new friends I have made... the novelty has worn off. I hope that the next year will show some results of the learning process here. Have been buried by work, but job is changing in July. Rig breaks on 3 of bands. Tree that antenna was in died & had to be cut down. End of wire now in bush. Sound familiar??? W2CS went to England on IBM biz. Only thing he could manage to tell me about it though, was that it was "nice." Congrats to WA2MKQ reelected pres. of Polytechnic Radio Club, and appointed AEC. Joe wrote a letter for stn report this time. Claims he had no stamps for post card, but I think he broke his microscope. W2YJR nursing a dislocated right shoulder & QLH. Blames it on grand children. Apologies to WB2KDC whose report I got, which I have lost. Reporting: W2COJ, WA2PAU WB2COY. PSHR: WA2SPL N2YL. Traffic: WA2SPL 737, N2YL 187, W2YJR 148, K2AV 116, K2XV 53, N2EF 34, WA2EQW 28, WA2CJY 14, K2RRR 14, WA2MKQ 3.

NEW YORK CITY — LONG ISLAND: SCM, John H. Smale, K2IZ — SEC: K2HTX, PAM: WA2YEI, RM: WB2EUF. The following are traffic nets in and around the section:

Net	kHz	Time/Day	Mgr.
NLI*	3630	1900/	WB2EUF
		2200 Dy	
NLI Phone*	3928	1730 Dy	WA2YEI
NLS*	3725	1745 Dy	WB2JAY
ESS	3590	1800 Dy	W2WSS
NYSPTEN	3925	1800 Dy	WA2RSP
Clear House	3925	1100 Dy	WB2AEK
Mic Farad	3925	1300 M-S	W1DFT

*Denotes Section Net, all times are local. Please try to help out by checking in, all parts of the section need check-ins. Here it is, Aug. Have you sent in your reservations for the Hudson Division Convention yet? The dates to remember are Nov. 10-12, at the Playboy Resort and Country Club at Great Gorge, NJ. Officers for farcom for 1978-1979 are: WA2ACV, pres.; W2DJJ, vice-pres.; W2PPF, treas.; N2JE, secy.; WA2EXI, editor. Congrats to K2SX (ex-W2FVS) on his new Extra Class, his new son (number 1), new job, Exec. V.P. Booke & Co. and 5BWAS No. 378. LIMARC and The Hall of Science ARCs held very successful flea markets. That was the first LIMARC Flea Market that I've been to where the weather was nice. Staten Island ARA announces "The Staten Island Award" to any ham sending QSLs from 10 Staten Island hams, contact SIARA c/o Terry River, WA2ZFG. The Suffolk County Radio Club again sponsored an FCC exam program at SUNY Stony Brook. It was held on May 20th and over 400 people participated in taking the exams. Many thanks to WA2TAP WB2QIY and the many other people who made it possible. Congrats to the

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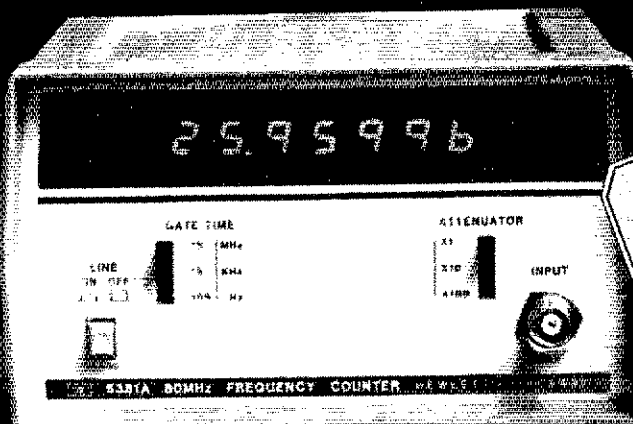
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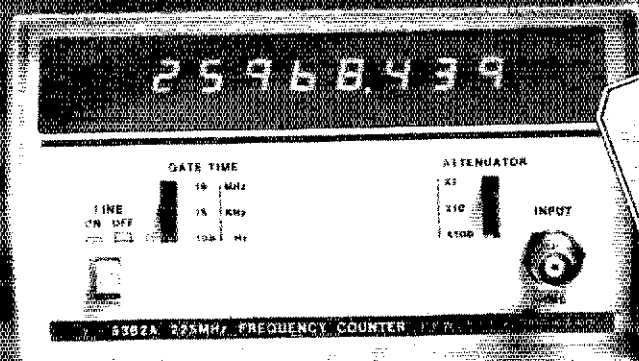
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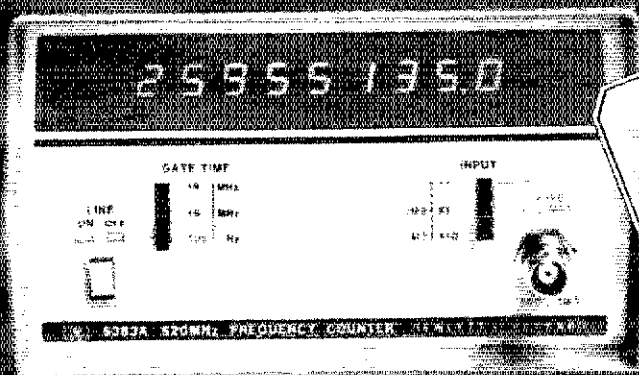
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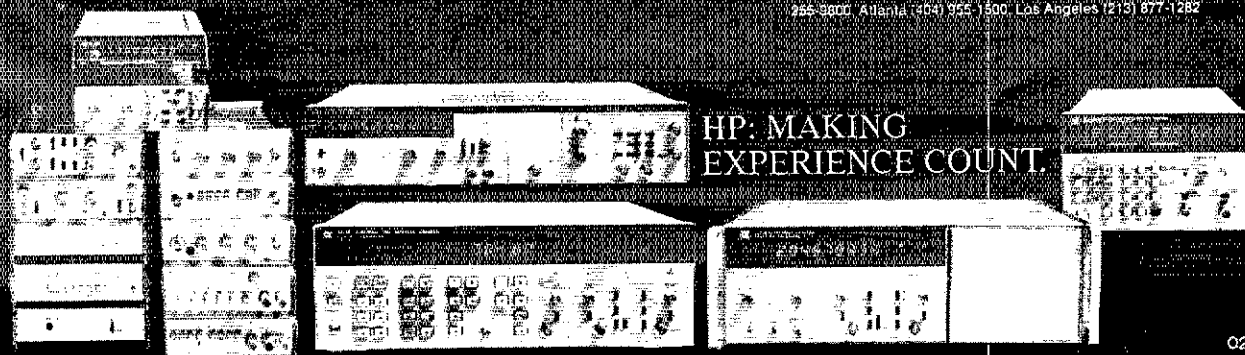
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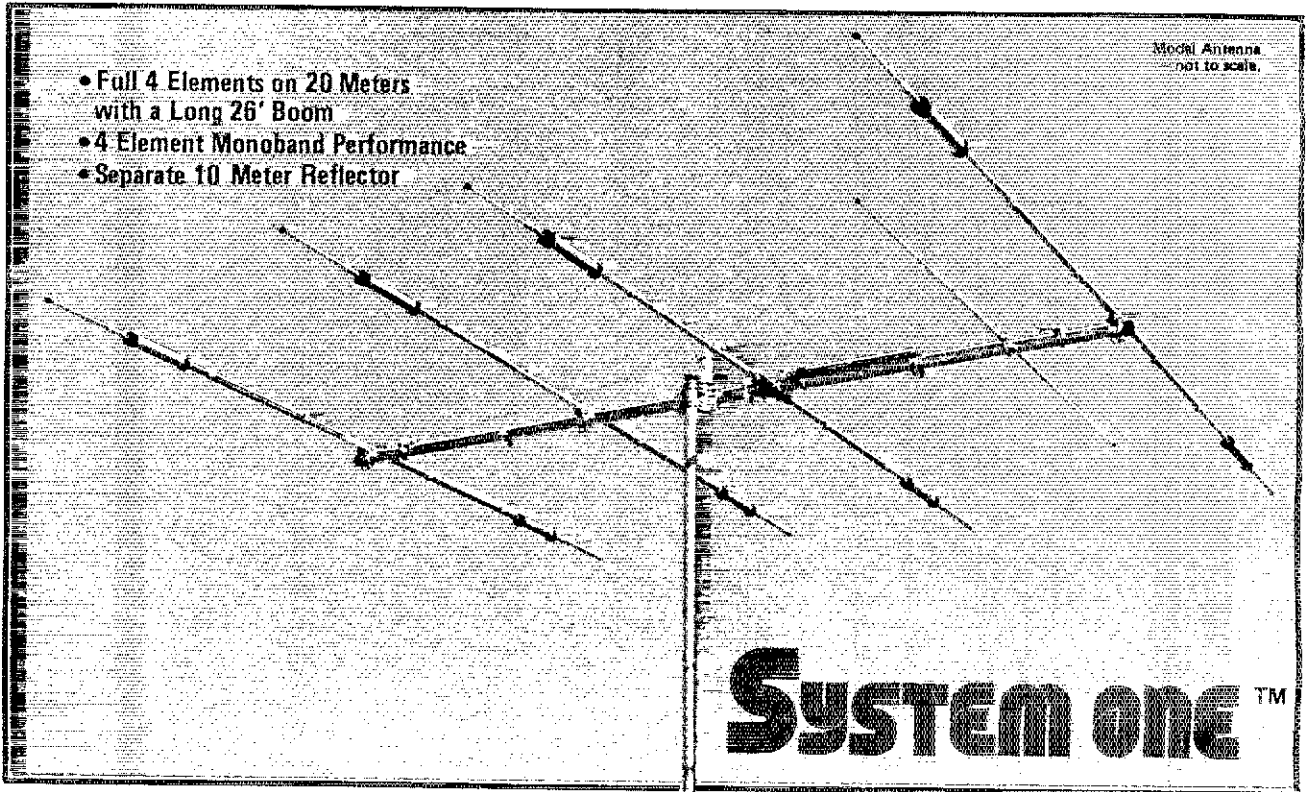
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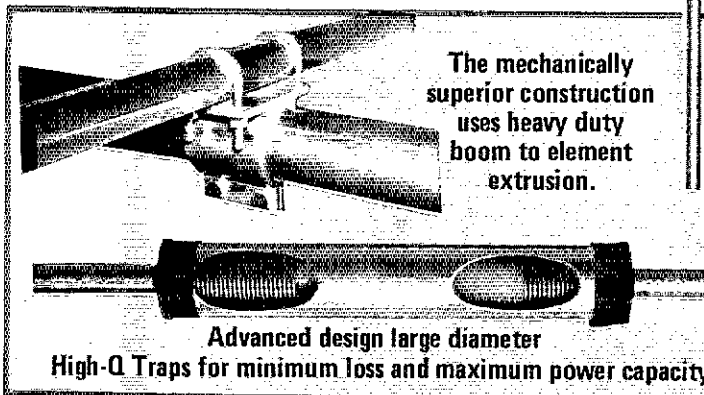
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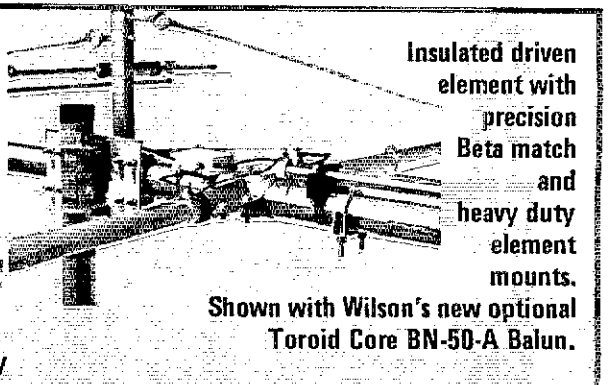
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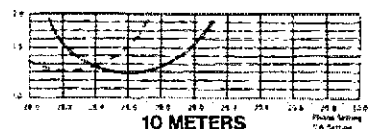
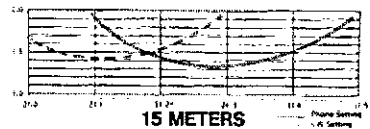
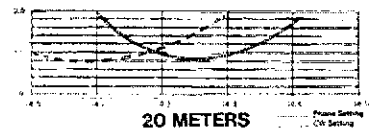
Shown with Wilson's new optional Toroid Core BN-50-A Balun.

SPECIFICATIONS: SY-1

Matching Method Beta
Band MHz 14-21-28
Maximum Power Input Legal Limit
VSWR (at Resonance) 1.5 to 1
Impedance 50 ohms

Boom Length 26'
Boom Diameter 2" O.D.
No. of Elements 5
Longest Element 26' 7"
Turning Radius 18' 6"

Required
Mast Diameter 2" O.D.
Surface Area 8.6 sq. ft.
Windload at 78 mph 215 lbs.
Shipping Weight 65 lbs.
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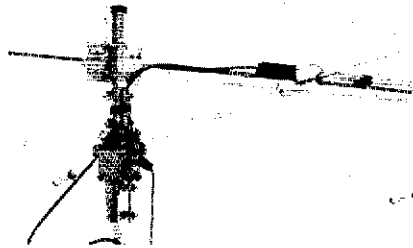
SY-2 SPECIFICATIONS

Band MHz	14-21-28	Boom Diameter	2" O.D.
Maximum Power Input	4 Kw	Surface Area (Sq. Ft.)	6.15
VSWR (at Resonance)	1.5:1	Wind Loading at 80 mph	15.3
Impedance	50 Ohms	Assembled Weight (Lbs - Approx.)	47
Boom (O.D. x Length)	2" x 18'6"	Shipping Weight (Lbs - Approx.)	50
No. Elements	4	Matching Method	Beta
Longest Element (Ft.)	27' 2"		
Turning Radius (Ft.)	16' 5"		
Req'd. Mast Diameter	2" O.D.		

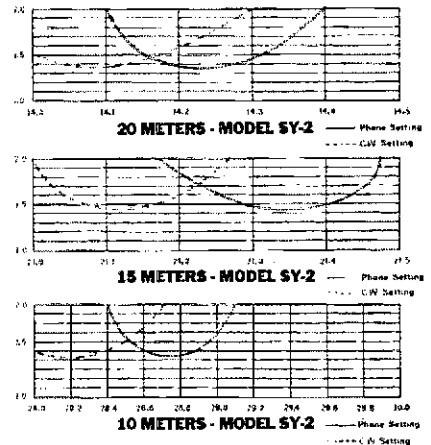
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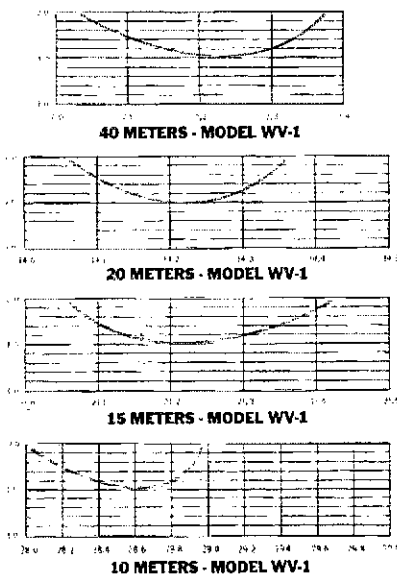
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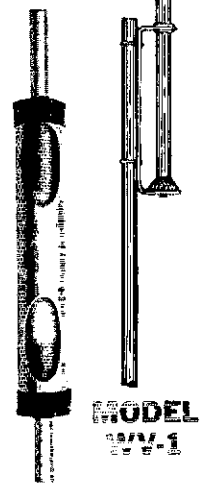


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SPECIFICATIONS

Input Impedance: 50 Ohms • Powerhandling capability: Legal Limit • Two High-Q Traps with large diameter coils • Low Angle Radiation Omnidirectional performance • Taper Swaged Aluminum Tubing • Automatic Bandswitching • Mast Bracket furnished • SWR: 1.5:1 on all Bands • 1½" O.D. Heavy wall aluminum tubing • Does not require guying • Overall length: 19' 3".



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Protect your QSL cards while you display them proudly on your shack walls. Furnished in strips of 100 long by two pockets wide; you cut to desired length. Satisfaction or full refund. 100 x 2, \$4.25, two for \$7.25, postpaid in North America.

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Choosy People LOVE Standard!



Standard Communications offers you a choice of 2 meter handheld radios in either the pocket sized C-118 or the professional sized 146A.

Why Buy The C-118?

- Compact — can be slipped in pocket or purse
- 6 channels but affords 18 channels transmit with unique offset switch which produces transmit offset of ± 600 kHz
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- Rubber flex antenna at no additional charge
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- 1+ Watts output

Why Buy The 146A?

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- Larger case affords greater audio fidelity
- Room for PL and other tone options
- Provisions for remote speaker mic
- Full size telescoping antenna is standard feature
- 5 channels
- Meter for RF and signal strength
- 2+ Watts output

Both the C-118 and 146A...

- ... Are ready to operate on 146.94 simplex and 34/94 repeat
- ... Have excellent sensitivity and selectivity characteristics

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Standard Communications Corp.
P.O. Box 92151
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Gentlemen:

Please send me additional information on

- C-118 2 meter 1 Watt FM Handheld Radio
 146-A 2 Watt VHF Handheld Radio

Name _____

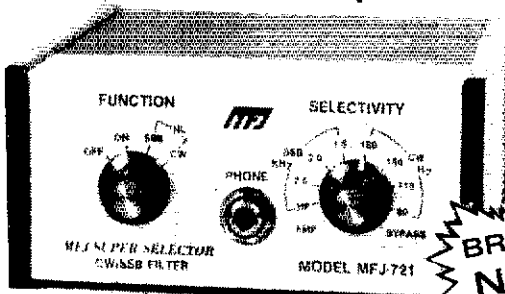
Address _____

City _____ State _____ Zip _____

B

MFJ INTRODUCES NEW SUPER CW/SSB FILTERS

This new MFJ-721 Super Selector CW/SSB Filter gives you 80 Hz BW, steep SSB skirts, noise limiting, 2 watts for speaker plus more.



BRAND NEW \$59⁹⁵

This New MFJ-721 Super Selector CW/SSB Filter gives you a combination of performance and features available only from MFJ:

- Razor sharp 80 Hz non-ringing CW filter
- Steep skirt SSB filter
- Selectable peak and trough noise limiting
- Plugs in phone jack
- Two watts for speaker
- Simulated stereo reception
- Inputs for 2 rigs
- Speaker and phone jacks
- Auxiliary 2 watt amplifier, 20 dB gain.

The CW filter gives you 80 Hz bandwidth and extremely steep skirts with no ringing for razor sharp selectivity. Lets you hear just one CW signal on the crowded Novice bands.

Bandwidth is selectable: bypass, 80, 110, 150, 180 Hz. Response is 60 dB down one octave from center freq. for 80 Hz BW. Center freq. is 750 Hz. Up to 15 dB noise reduction.

8 pole active IC filter. Low Q cascaded stages eliminates ringing. Hand matched components.

The SSB filter dramatically improves readability by optimizing audio bandwidth to reduce

sideband splatter, remove low and high pitched QRM, hiss, static crashes, background noise, and hum.

Makes listening for long periods pleasurable and less fatiguing. Ideal for contest and DX.

IC active filter includes 375 Hz highpass cutoff plus selectable lowpass cutoffs at 2.5, 2.0, 1.5 KHz (36 dB per octave rolloff).

Switchable automatic noise limiter for impulse noise; trough clipper removes background noise.

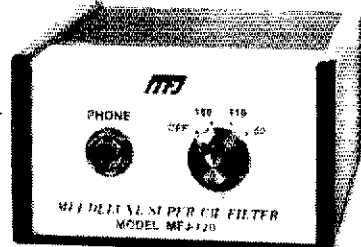
For Simulated Stereo, the raw signal goes to one ear and the filtered signal to the other. The signal appears in both ears and the QRM in only one. The ears and brain reject QRM yet off-frequency calls can be heard. Requires stereo phones.

Switch selects one of two rigs. OFF position connects speaker to rig. Speaker disables when phones are used. Requires 9 to 18 VDC, 300 ma. 5x2x6 inches. Optional AC adapter is \$7.95. Order yours now.

This New MFJ-720 Deluxe Super CW Filter gives you 80 Hz BW, no ringing, 2 watts out.

Same 8 pole Super CW Filter as in MFJ-721. 80 Hz BW, extremely steep skirts with no ringing for razor sharp selectivity. Selectable BW: 80, 110, 180 Hz. Center freq. 750 Hz. Automatic noise limiter. Plugs in phone jack to drive speaker to 2 watts. 2x4x6 inches. Requires 9-18 VDC, 300 ma.

BRAND NEW \$44⁹⁵



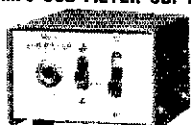
These MFJ active filters are the most copied in Industry.

MFJ SUPER CW FILTER CWF-2BX

MFJ SSB FILTER SBF-2BX



\$29⁹⁵



\$29⁹⁵

But performance is not copied. Only MFJ hand selects components so the center frequency of each CW stage is within one Hz of each other. CWF-2BX and the SBF-2BX are the same CW and SSB filter as in the MFJ-721 but less speaker amplifier and noise limiter. Plugs in to drive phones or connect between audio stage for full speaker operation. Uses 9 V battery. 2x3x4 inches.

For Orders, Call Toll Free

800-647-8660

ORDER TODAY BY MAIL OR CALL TOLL FREE 800-647-8660 AND CHARGE IT ON VISA OR MASTER CHARGE. Order any product from MFJ and try it. If not delighted, return it within 30 days for a prompt refund (less shipping). One year unconditional guarantee. Add \$2.00 shipping/handling. For order/repair status, in Mississippi and outside continental USA, call 601-323-5869.

MFJ ENTERPRISES

P. O. BOX 494 MISSISSIPPI STATE, MISSISSIPPI 39762

Following stations on upgrading: WB2PTT to Extra, K2ENG and K2AAN to Adv, WB2CDJ to Adv, WA2CDB and WB2YCD to Gen., K2HVN to Extra. K2TV just completed cw and ssb DXCC and now has a mixed DXCC total of over 160 countries. WB2FHN is building the 20 mtr. rcvr from Apr.-May. QST. WA2YEI welcomes his neighbor KA2AEV to the ham ranks. WR2AHU transmitted code practice on 147.36 at 2030 local on June 21. Traffic: WA2JGK 119, WB2HIQ 87, WB2EUF 36, WB2JAY 24, WB2FHN 14, WA2YUS 13, WA2YEI 11, W2DBQ 10, K2IZ 4.

NORTHERN NEW JERSEY: SCM, Bob Neukomm, WA2MVG - SEC, WB2YUF, RM: W2XD, PAMS: WB2LCC, WA2OPY (VHF), RM RTTY: W2PSU, RM NJUN: N2MW, RM NJUNY: WA2LHV.

Net	Mgr.	Freq.	Time/Days	Sess.	QNI	QSF
NJN	W2XD	3695	7:00 P Dy	31	406	183
NJN	W2XD	3695	10:00 P Dy	31	211	95
NJSN	N2MW	3730	8:15 P Dy			
NJPN	WB2LCC	3950	6:00 P Dy	31		
NJPN	WB2LCC	3950	9:00 A Su	4		
RTTY	W2PSU	147.51	7:00 P Dy			
NJ2Mtr	TfcWA2OPY	145.5	8:30 P Dy			
NJNYN	WA2LHV	3735	4:00 P Dy	28	53	

All above times Eastern Daylight Savings Time. Novices and Techs please note the new net - New Jersey - New York Net at 3.735 daily at 4:00 P. A nice place to get your code speed up. Please check in. WB2ZX now a new Tech with new call N2AAZ. WB2FKN to Tech. WB2JUP to Tech. WA2WFF to General. To advanced WB2JUN WA2OAC WB2TLZ and WB2KQA. WB2KPS to Tech. WA2JUN has a new three-element Yagi at 70 ft. but WA2JUC's quad still beats him out. You DXers note the new East-West DX Net meets Thur. on 14.248 at 0500 with K2GX and W2JGQ as Ncs. WB2PKX now Advanced with a new TA-33 at 60 ft. WA2UDT moved to New Brunswick is chasing DX on 10 meters and finally got DXCC certificate. The 550 Club is holding its annual picnic at Lake Todd. OO reports from W2TP and WA2MVC: Chirpy signals and out of band. WD2AEV is new Tech in Clifton. N2GJ received 1st place certificate for NJJ in 1977 10-meter contest. Code practice 8 PM Mon. on WR2AJC Princeton 147.46/146.46. WA2LHV upgraded to General and has been doing FB job as net control and RM for the "new" New Jersey-New York Slow Net meeting daily at 4:00 PM EDT. Another new General very active on NJPN is WA2KLS. Traffic: (May) W2RQ 237, WB2MSO 189, W2CQB 152, K2VC 134, WB2RM 107, WB2MSV 85, W2LD 78, WA2MVO 57, WA2LHV 53, WA2EPK 39, W2LTP 39, W2QNL 35, K2OP 32, WB2BMD 26, WB2KLL 25, W2GJ 20, K2SE 19, W2ZEP 18, W2ZEP 15, W2UP 15, K2ZF 13, N2NS 12, NZTM 10, N2SU 9, WA2KLF 7, W2GJ 4. (Apr.) W2RQ 133, W2LTP 34, W2GD 2. (Mar.) W2GD 2.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF - The Sooland Repeater Assn., Siouxland ARC and 3900 Club can be proud of their Hamboree. WB0RNM has a 7-year old in his Novice class. WB0YB again active after a 20-year layoff. Buckingham Repeater near Traer now on 147.72 147.12 and 147.80. W0LFF and W0LFF are doing good coverage. WB0X home from hospital. WB0RWN earned WAC. ISU received assist from WA0KIF during VE1SHA week. WA0CZA now at USN Bethesda Medical Center. 12-year old WB0ZGS upgraded to Tech. Her mother WD0GSS also a new Tech. Dad a General is WB0VRN. They have a hamfest every day. Iowa had 93.5% on DTRN thanks to WB0PYD W0TGO WB0NSS and WA0ALX. Congrats on upgrades to: W0GGO K0VM WB0TJC WB0USD W0DCKY W0ROI W0RANW for Extra. K0CFK WB0PDP for Advanced. W0BAPD W0DGT F WB0YH W0DQYF for General, and W0DQCS for Tech. WB0YH elected to Chairman of Board of Iowa 75 M. Net. New equipment for W0LUP and W0LJY FT-277R, K0CF SB-220 and W0LFF TR7400A. Operation "Sunshine-2" by W0GQ was great success. Cedar Valley Fox hunt won by WA0AJF and Iowa City hunt by W0ENLW0LFF team. Yours truly had fine eyeball with FT. Dodge Club. Humbolt Club will need help with statewide bike rides. Nets: Ia. 75M, 3970, 1730Z M-S, QNI 1136, QTC 89, sess. 27, Mgr. WA0VZH, 2330Z M-S, QNI 897, QTC 81, sess. 27, Mgr. W0YLS, TLGN, 3560, 2330/0300 Dy, QNI 422, QTC 127, sess. 62, Mgr. W0YLS, Iowa Code Net (ICN), 3713, 2345Z MWV QNI 36, QTC 8, sess. 10, Mgr. W0YRH. (Apr.) QNI 22, QTC 6, sess. 6 (Mar.) QNI 48, QTC 6, sess. 10. Traffic: WA0ALX 69, W0SS 229, W0YLS 130, NSYX/9 114, N0SM 80, WA0CZA 36, W0BKH 36, W0LFF 27, W0DGL 20, W0DFCI 18, W0BNS 15, W0AVV 7, W0BW 6, W0BRWN 6.

KANSAS: SCM, Robert M. Summers, K0BXF - SEC: W0KL, PAMS: W0YH W0BSZS, RM: W0FT, PAM W0BCZS, Portable 5 in Tulsa for 10 days in May, was W0PB. EC Net meets Tue. evenings after the SSB Net. KWN, QNI 629, QTC 336 in 31 sess. K5BN, QNI 1047, QTC 107 in 31 sess. KPN, QNI 278, QTC 10 in 22 sess. QKS QNI 437, QTC 158 in 57 sess. Don't forget to get registered for Midwest Division Convention this Oct. The Mid-States Mobile Monitoring Service, QNI 159, QTC 2, mobiles 3. In 1976 Dave Sieger, age 14 got his ham ticket, after attending John Bandy's Novice class. In Aug. of 1977 he went to C.C. for his General ticket. During FCC's visit this past March, Dave conquered the advance exam. For a "Grand Finale" another trio to K.C. to become an Extra Class operator. FR11 Traffic: (May) W0BOBH 180, W0OYH 118, W0AM 117, W0FIR 101, K0EZ 98, W0HI 87, W0CHJ 70, W0FT 63, K0BXF 37, W0FDJ 27, W0DFP 22, K0KD 19, N0SN 19, N0IN 18, W0BSZS 17, W0PB 16, K0PCC 11, W0KL 9, W0RBO 9, W0SEV 8, W0RT 7, K0LL 5, W0ERQ 3. (Apr.) W0KL 4.

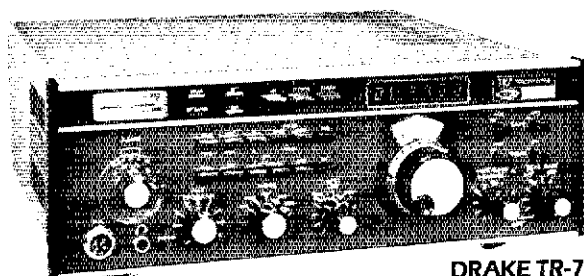
MISSOURI: SCM, L. G. Wilson, K0RWL - Asst. SCM: Joe Flowers, W0TF. SEC: W0BFKY. New officers for the West Central Missouri FM Assn. are W0BUKF, pres.; K0UCV, vice-pres.; K0RDD, sec.; WA0BK, treas. W0GNX and W0BMB are to be commended for outstanding achievement during the recent WPX contest. The new net manager for the M0SSN for the coming year is W0BCKI with K0AFY as secy/treas.

Net	QNI	QTC	Net	QNI	QTC
PHD	31	7	HBN	371	54
NEMOE	95	1	MOSSBN	815	95

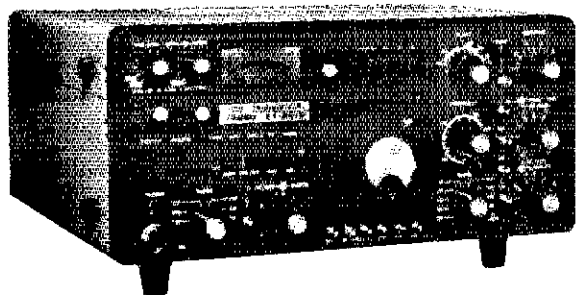
Congrats to the following licensees - Novice, W0DS GYB GYD GYW GZF GZH GZU HAI HAS HAW thru HAY HBD HBE HBG HBI HBN HBX HBZ HCF HDJ HDG HDK HDL HDT HDU HFF HHE HHJ HHU HJD HJL HJO HKP HKZ HLI HLJ HLN HLT HLU thru HLX HLY HMG HMM HKN HKB HCF HOF HOR HOZ HPE HPO HPR HQB HQM HUI HVB HRE HRF HRS HSN thru HSP HSR HST HSI HTO HUA thru HUB HUK HUM HVB thru HVD HVS HVU HWH thru HWK HWO HWQ HWV HWW HXD HXM HXX

Clegg is Transceiver Headquarters!

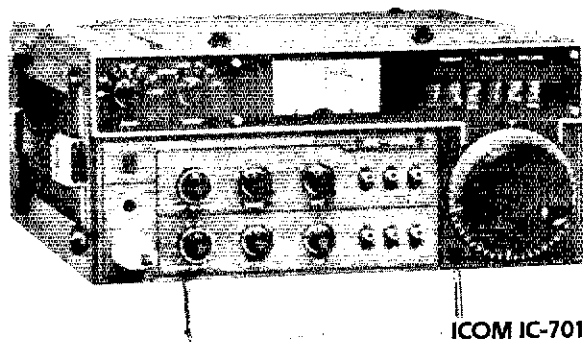
Who was it that said "There's nothing new under the sun?" He was wrong! There now is a generation of truly new concepts in Ham Transceivers. Any one of the rigs shown here has features and performance that never before were available. Regardless of what transceiver you currently own, we contend that replacement with any one of these three will increase your station performance. Each of the three has unique features. The only question is "which best suits your personal operating requirements?" Let us help you decide!



DRAKE TR-7



YAESU FT-901



ICOM IC-701

Drake's "7 SYSTEM" incorporates more innovative technical advances than any product we have seen in many years. Receiver dynamic range exceeds that of all others. If your QTH is in KW alley you'll experience a substantial relief from overload. If you've worried about changes in our bands after the WARC assemblage—the TR-7 can dispell your fears because it accommodates any future possible band relocations and new allocations. The frequency stability of Drake's "full-synthesis" and the large brilliant digital display add to the delight of any TR-7 owner. Space here is inadequate to define the numerous design and operational features of this superb transceiver. Call us for descriptive literature; better yet, drop by and try one in our demonstration room.

You'll discover—as we have—that Drake has created a real winner. One that the others will be hard pressed to equal for years to come. And if you prefer to operate with "separates" the forthcoming R7 Receiver gives you the performance of "twins" plus the convenience of a full performance transceiver for traveling or in the mobile.

YAESU'S FT901 system, if you're looking for a transceiver that not only outperforms others on any band from 160 through 10 meters but also has a single matching accessory to conveniently and efficiently cover 6, 2 and 3/4 meter bands, the 901 is it! Even if the VHF and UHF transverter doesn't interest you now, it surely will as OSCAR satellites become the way of life in the next few years. Of all the transceivers we've tested (both on the air and in the lab) none offers the superb control of receiver selectivity offered by YAESU'S Variable Selectivity and Notch Filter. And if you work CW, the Tuneable Audio filter will delight you. Nor have we found another Speech Processor system that sounds as good while doing so much for signal punch as that on the 901. Add to this such features as a built in keyer plus both FM and AM detectors. Watch for a gigantic increase in membership in the Fox Tango Club when the gang discovers this great new transceiver.

Watch for YAESU'S new matching SCOPE with "panoramic" display and the new synthesized external VFO accessories.

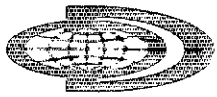
ICOM'S IC-701 has to rank very high on our list of best available transceivers. Most of its great features aren't immediately apparent when you first take it out of the box. In fact, after you operate it for a week you'll still be finding new things to like about this all solid state, sophisticated unit. The operating flexibility provided by the dual VFO feature appeals to everyone here at Clegg. It's the first unit that makes no compromise as a fixed station and yet so conveniently mounts in virtually any compact mobile. If you hop from band to band—or chase DX around any single band you'll love its frequency agility and large bright frequency display.

Also available is the matching IC-211 with all mode coverage of 2 meters.

Whatever your needs in Transceivers, Amplifiers, Antennas, Keyers, Station Accessories, etc., call Clegg Toll Free 1-(800)-233-0250; in Pennsylvania call collect—717-299-7221 or write today for our latest catalog!

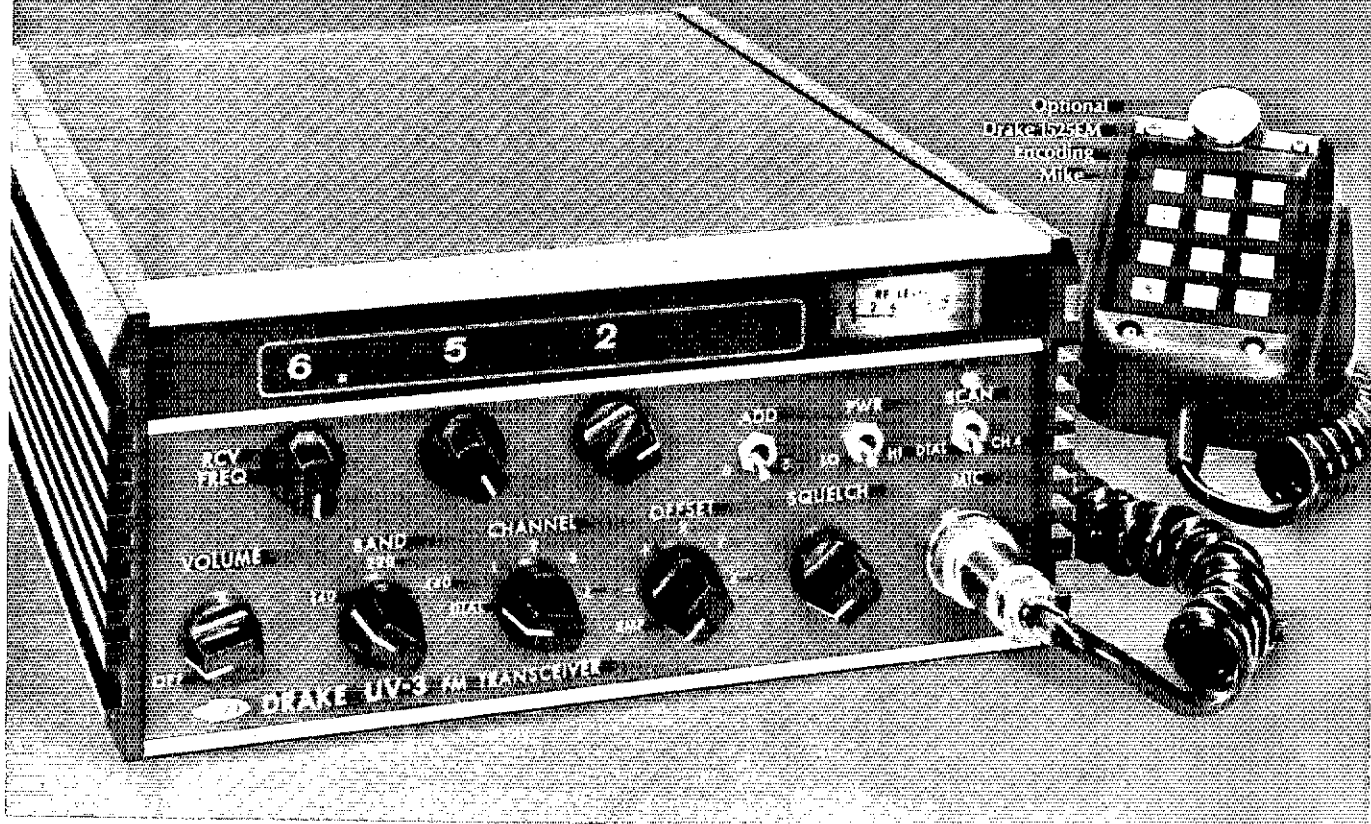
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Communications Corp.
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Greenfield Industrial Park East
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DRAKE UV-3 multi-band

144-220-440 MHz



Designed and manufactured in the U.S.A.

- Model 1346** Drake UV-3 (144-220-440) \$795.00
- Model 1344** Drake UV-3 (144-440) \$695.00
- Model 1343** Drake UV-3 (144-220) \$695.00
- Model 1345** Drake UV-3 (220-440) \$695.00
- Model 1340** Drake UV-3 (144) \$595.00
- Model 1359** Drake UV-3E (144-430)*

(Models above include factory installed modules for bands as listed, standard dynamic mike, and mobile mounting bracket.)

* This model tuned for European fm bands.
See your dealer for price details.

Add-on modules expand band coverage of models which may have been purchased in a single band or two band configuration. Prices include factory installation which is necessary to meet FCC receiver certification requirements.

- Model 1504** Drake PS-3 AC Power Supply. . . . \$ 89.95
- Model 1525** Drake 1525EM Encoding Mike. . . \$ 49.95
- Model 1330** UMK-3 Remote Trunk-Mount Kit . . \$ 69.95

NOTE: Certain of the above models will be available before others. Check with your dealer for specific availability.

synthesized fm system

For the serious amateur who...

- considers fm a vital part of a total communication system
- needs multi-band coverage in a single transceiver
- needs to continuously scan-monitor a priority amateur repeater dedicated to public service, weather, or DX alerts
- needs extra programmed channels for quick selection, in addition to the synthesizer...

The Drake UV-3 provides it all!

- Continuous priority channel scan
- Remote trunk operation (optional)
- Four extra diode-programmed channels on each band
- All three bands in a single bandswitched unit, or start with basic models and add extra band-modules later
- Non-standard offsets available for each band

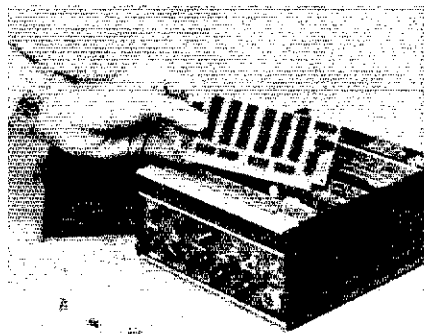
The Priority Channel Scan

You can diode-program your priority channel in one of the fixed channel positions. It can be con-



tinuously monitored from any other synthesized or fixed channel. If you're operating on the priority channel, or another programmed fixed channel, you can scan-monitor any synthesizer frequency you choose.

The Extra Diode-Programmed Channels

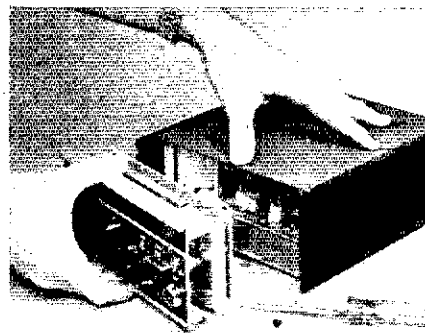


You can diode-program up to four fixed channels, with their offsets, for each band. This feature allows super-quick selection of favorite channels. The five-kHz synthe-

sizer operates independently of these programmed channels. And best of all, soldering is not necessary for programming. The program board has special sockets mounted on it for direct insertion of diodes. We even provide the diodes.

Remote Trunk Mount Kit

The control panel of every UV-3 removes for installation in the UMK-3 Remote Kit. This provides for safety, as well as easy installation in small cars where under-dash space is limited.



Write for a fully illustrated brochure on the Drake UV-3 System.

R. L. DRAKE COMPANY

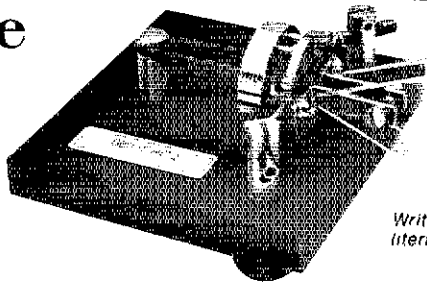


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a classic case...

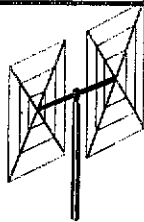
of simplicity in design providing reliability and contest winning performance, at rock bottom prices.

30 years of use test in all kinds of field conditions prove the quality of a Gotham antenna. The prices below prove the economy.

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Two element quads with full wavelength driven element and a reflector. Gain is equal to that of a three-element beam and directivity is exceptional. ALL METAL construction (except the insulators). Totally complete with boom, aluminium alloy spreaders, sturdy universal type boom mount, wire and all hardware; uses 52 ohm coaxial feed; no stubs needed; full instructions for simple assembly and installation included; assembled weight 25 lbs; a fool-proof quad that always works with great results. This cubical quad is the antenna used by the DX champs and it will do a wonderful job for you.

Now check this super price: 10/15/20 quad, complete, ready for simple assembly... JUST \$59.95.



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In an age of compromise, Gotham beams stand out offering championship performance at modest prices. Adjustable to any frequency within band, at lowest SWR, these beams are built strong to resist adverse weather conditions. Each beam is full size for full size performance, not mini beams, or trapped beams; including boom, all hardware, and gamma match; requires 52 or 72 ohm coaxial feedline; 7/8" and 1" aluminium alloy elements for maximum strength and low wind loading.

12 EL 2M Beam \$56.95 4 EL 10M Beam \$49.95
6 EL 6M Beam \$54.95 4 EL 15M Beam \$59.95
5 EL 10M Beam \$59.95 (Truck shipped, not UPS)

FREIGHT PREPAID ON 2, 6, and 10M beams shipped to the 48!

ALL BAND VERTICAL ANTENNAS

Effective low angle, omnidirectional radiation, easy assembly and operation, no guy wires needed, occupies little space, can be installed at ground level, exceptionally rugged, broad banded, low initial cost, no maintenance, proven and tested design. Guaranteed Gotham quality at low Gotham prices. One of the best antennas for the price. LOADING COIL INCLUDED. Absolutely complete.

V40 vertical antenna for 40, 20, 15, 10 and 6 meter bands. Especially suited for the novice who operates 40 and 15. JUST \$25.95

V80 vertical antenna for 80, 40, 20, 15, 10 and 6 meter bands. Our most popular vertical. Used by thousands of novices, technicians and general license hams. JUST \$27.95

V160 vertical antenna for 160, 80, 40, 20, 15, 10 and 6 meter bands. Same as the other vertical antennas, except that a large loading coil permits operation on the 160 meter band. JUST \$29.95

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2051 N.W. 2nd Ave., Miami, FL 33127

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Please send the following:

Quantity	Description	Amount

(Florida residents add 4% sales tax)

Send self addressed, stamped envelope for literature.

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IN THE WORLD!

HVX. General: WDOs AHO ALE EXX GXM GYR HEI HGR HGS HGU HGV HID HIE HTC. Tech: WB0UHD WB0s BWZ CFL GYM HGF HGT HGW HSR. Advance: W0SVA W0WVW. Extra: WA0YEF. Traffic: K0ONK 187, W0BMA 116, W0BHH 67, K0SSN 77, W0DTF 57, K3IGA/0 47, W00JD 44, W00OK 39, W0BVL 32, W0DFT 27, K0SI 23, W00AU 19, W0AFKD 3, W0M0F 7, W0RNG 6, W0AYEF 2.

NEBRASKA: SCM, Ed O'Donnell, WB0GWR — The Sandhills Radio Club, along with the Lincoln, Grand Island, Kearney, and Hastings RCs have been planning for a large group at the annual hamfest at Victoria Springs July 29th and 30th. The NE Section is being solicited in July and August for nominations for SCM. The closing date of receipt of petitions at ARRL Hq. is Sept. 8, 1978. The PM Net will be secured until after Labor Day. Net reports: Cornhusker Net, QNI 930, QTC 50; Mid-Nebr. ARES 2Mtr. Net, QNI 208, QTC 8; Morning Phone Net, QNI 1270, QTC 37; Nebr. ARES 75 Mtr Net, QNI 163, QTC 1; Nebr. Storm Net, QNI 1005, QTC 89; Pioneer ARC 2Mtr. Net, QNI 138, QTC 1; Platte Valley 2Mtr Net, QNI 160, QTC 1; Q0CWA Net, QNI 51, QTC 0; Western Nebr. Net, QNI 350, QTC 8; Traffic: (May) W0FOB 189, W0VEA 84, W0ACBJ 33, W0EUT 30, W0HOP 30, W0APCC 24, W0VYX 17, W0ZNI 14, W0BNEG 13, W0HTA 12, W0B0GWR 9, W0AQEX 8, K0BHS 7, W0NIK 7, W0BROG 7, W0CAHV 5, K0FJT 2, W0B0GMO 2, W0A0LO 2, W0A0EE 1, W0AGHZ 1, W0B0MKD 1. (Apr.) W0FQB 297.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, John McNassor, W1GVT — SEC: W1XX. RM: K1E1R. PAM: K1E1C. VHF WA1E1A.

Net	Freq.	Time/days	Sess.	QNI	QTC
CN	3640	1900/2200 Dy	62	283	188
CPN	3965	1800 M-S	31	445	167

VHF-2	28/88	1000 Su	30	298	67
CORN	147.75/15	2130 Dy	24 Hrs.	23	424
WESCON	78/18	2030 M-S	23	1030 Su	81

High QNI: CN — W1KY W1GF K1E1R. CPN — W1NOO K1BCB W1HMJ WA1TYP. VHF-2 HI QTC: WA1HRC. SEC W1XX and helpers had busy time during Red Cross Convention in Hartford — tnx to all who helped. Director W1FHR appreciates club help to Novice operators — hope they will be induced to master the Art of Traffic Handling. Conn. Wireless Assn. held 30th Anniversary Dinner Meeting. Shoreline ARC getting new equipment for Repeater. NYC has W1YL W1CW & W1HR as Guest Speakers at Annual Dinner Meeting. Stamford ARA held Fox Hunt — their "Squeech Burst" notes unwelcome use of profanity on Ham Band which provides a poor image for all of us. ICRC 28/88 Time Out has info on new QTH, new equipment, and improved facilities: Manchester RC donated a full set of League publications to local library, what has your club done lately? Congratulations to: K1PZU Extra Class; WA1KVI & WA1LOU Advanced; WB1GWU Tech!!! Please support your favorite Repeater Club — repeaters cost money, please pay your dues!!! Traffic: K1GF 166, WB1AIU 113, W0EPU 101, W0S1CPE 99, WA1HYN 81, K1XA 57, K1DFS 56, WA1DU 33, W1V1 48, W1GVT 38, WA1RLV 34, K1PZU 25, K1QQG 17, W1JTD 16, W1BDN 10, W1BDI 8, K1AQE 6, W1CUD 4, W1QV W1V 4.

EASTERN MASSACHUSETTS: SCM, Frank Baker, W1ALP — Asst. SCM: WA1OWQ. SEC: W1OQG. NAKR W1HBG, ex-W1HES are Silent Keys. EM2MN had 51 QTC, 48 QNI. EMRIN had 394 QNI, 245 QTC. NEEPN had 74 QTC, 13 QNI. N1CW in Marlboro. W1BFJ now W1BZ. WB1FWS has General. W1AN moving to NH. K1QAO now W5VNP. W1ATO says the L. F. Liaison Net is on 7230 at 1100. T-9 Club met at W1KGH's QTH. Cape Cod & Islands ARA held their annual family picnic. W1HGY's son has his call KA1AA1. W1ADG received reports from W1K1s and W1VUJAC MFD; W1B3 BHVD XA ZMO BK; WA1E BLG HPS. For more info, provided communications for road race in N. Attleboro. W1XA CSL mgr. for JY9OZ. W1GXT worked lots of DX on 2.50 watts cw during Aurora. North Shore RA have a new spectrum 1000 repeater. WB1DXR made BPL. Billerica ARES active in Memorial Day Parade. W1JK has been quite ill. WA1ZXB's Dad is WB1HAH. K1LWI mobile in CA. Minuteman Chapter of 10-10 had luncheon at Valle's in Saugus. W1EMG in Hawaii for 2 weeks. WA1YMD has new tri-bander from Swan. W1ATXQZB a Yasu for 2. W1AFNM new antenna for 10-15. W1MZMM in Hamburg, Germany for a month. Wellesley Clubs Auction a great success. Officers of T-9 Club: W1KGH, pres.; WA1IZF, vice-pres.; W1ISX, treas.; W1WVK, secy. K1YWW has TA-33. W1NF new antenna for 80. WA1IFE HW-2036. Officers of Whitman ARC: W1HA, pres.; WA1DUZ, vice-pres.; W1TC, treas.; WB1BRY, secy. Officers of Charles River W. Soc: WA1EOT, pres.; DK6CX, vice-pres.; K1HRV, secy.; WA1URY, treas. WB1FQW is the Son of OA4OK & OA4BI in Needham. WA1CDD who is sightless, gave a very interesting demonstration, how to operate ham radio, at the Massachusetts ARA. K1PJ and K1OC put up an antenna for WB1HLR, nice work. W1DTB in the hospital, also W1MV. KNIFFQ was WA1IEB has 105 countries. K1CG has a NYE 3KW NYE 3KW matchbox. WA1URV has 98 on his DXCC. K1BT home from a trip on an island in the Pacific. Cadaway RC met at K1GUG's QTH. HHTN had 335 QNI, 66 QTC. K1PZU is ex-WA1DJC in E. Bridgewater. W1BHD is secy of the Eastern New England Repeater Advisory Comm, covers ME NH RI EM to a point 10 miles West of Worcester. Officers of Wellesley ARA: WA1HVS, pres.; WB1BUP, vice-pres.; WA1YAU, rec. secy.; WA1YOJ, corr. secy.; WA1TBY, treas.; WA1YHV, fund raiser; WA1PQY, co. act. WA1YH now Extra. WA1WDF Advance. WB1BUP WB1AJA WB1ELQ WA1YHT General. WA1YMN now has his Extra. W1SR working for Cramer. WA1YMN new net mgr. of EMRI-SS. Officers of Quannawitt RA: WA1AER, pres.; W1HL, vice-pres.; K1NKA, treas.; WA1WPO, secy.; WB1DBW WA1HTF, Wis PL HFR ZMJ JKF, dir. Traffic: (May) WA1UWF 288, WA1ZAZ 234, WA1YMN 233, WA1VAB 231, K1BA 220, W1PEX 213, WB1DXR 200, WA1UNC 139, K1PAD 117, W1DMS 114, W1FJ 113, WA1TBY 102, K1GN 99, WA1EYV 62, K1BSS 56, W1EMG 47, WA1ZXB 46, W1DMH 41, K1ES 40, WA1AD 39, K1BZD 34, W1AOG 25, W1DGD 20, WAGNE 12, W1BZD 14, W1NSZ 13, WA1IFE 13, WA1YMD 12, WA1ZGX 12, W1NSD 11, W1WFC 10, WA1YJ 8, WA1FNM 6, WA1TY 4, W1NF 1 (Apr.) WA1ZXB 34, W1EMG 14, WB1GEX 14, WB1FDG 9, K1TK 4, W1TKZ 1.

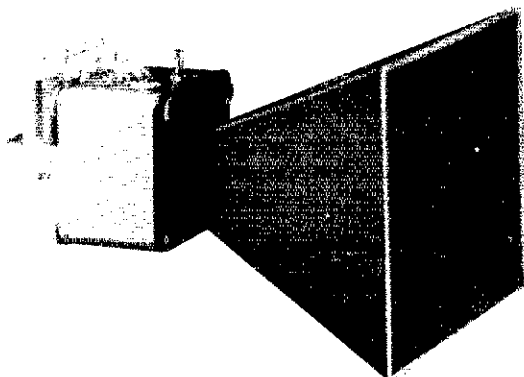
MAINE: SCM, Bill Mann, W1KX — SEC: WA1YUW. New EC (Hancock Co.) W8BUHU/T. New: OVS, WA20NH1/OTS WA4UJ/J1. June 10-11 busy public-service weekend. Hams helped at Brunswick NAS Air Show, Jr. Olympics in Waterville and Bike Hike in Farmington.

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"FRONT END" BY MICROWAVE ASSOCIATES

Features

- Low Cost
- High Sensitivity
- Integrated Assembly
- Electronically Tunable
- High Reliability
- Low Operating Voltage



PRACTICAL RANGE CONSIDERATIONS

The actual usable range is a function of characteristics such as output power, frequency stability and noise figure. Generally, it's desirable to deviate the FM signal so that the available IF bandwidth is completely filled.

The graph in Figure 1 below indicates the maximum achievable range vs. IF bandwidth at threshold with threshold defined as the beginning of intelligible speech. Higher gain antennas will obviously greatly increase range.

THE GUNNPLEXER SYSTEM

The fascination of amateur microwave application is unique. First of all, microwave systems have an 'exotic' ring to them. Until the appearance of the Gunnplexer, getting into microwaves required either a six foot rack of surplus gear or a friend on the inside of a microwave hardware supply company. The Gunnplexer has changed all of that; you can hold the whole thing in the palm of your hand and you don't need any friends in the microwave business (in fact it may be better if you don't have any prior microwave knowledge because the Gunnplexer pretty much throws away the book on standard microwave design practices!)

An equal fascination is the wide band capability of the microwave region. The 10 GHz assignment, for example, has spectrum-space for 111 simultaneous video (4.5 MHz wide) channels. Try that even using SSTV in the 20 meter assignment. The bottom line on microwaves is simply that it will do much more communicating than you might first suspect.

DESCRIPTION

The MA-87127 series of frequency modulated transceiver "front ends" using Gunn oscillators and Schottky mixer diodes has been specially designed to operate in the amateur 10.0 to 10.5 GHz band.

The rear portion of the unit consists of a Gunn oscillator which directly converts DC to RF energy. The oscillator is delivered pre-set at 10.250 GHz (oscillators pre-set to other frequencies are available on special order 10.0 - 10.4 GHz). Mechanical tuning is available to shift the center frequency ± 100 MHz. A tuning varactor is mounted close to the Gunn diode which will deviate the fundamental frequency typically 60 MHz when the proper tuning voltage is applied. FM, including both audio and video, can be applied to the tuning varactor input. The receiver noise figure is approximately 12 dB depending on auxiliary equipment used. A ferrite circulator has been integrated into the waveguide mount to isolate the transmitter and receiver functions.

TWO-WAY COMMUNICATIONS

The primary application of the Gunnplexer "front end" is for 2-way communications. Two units, one a transmitter and the other a receiver down converter, are used with their carrier frequencies off-set to provide a reasonable IF (30 MHz or higher). Applications range from linking remote receivers to VHF repeaters; transmitting color video, linking homemade computers, full duplex mountain top DXing or over water duct DXing. A separate power supply and simple FM modulator must be provided; the MA-86551 horn antenna (shown here) is suggested.

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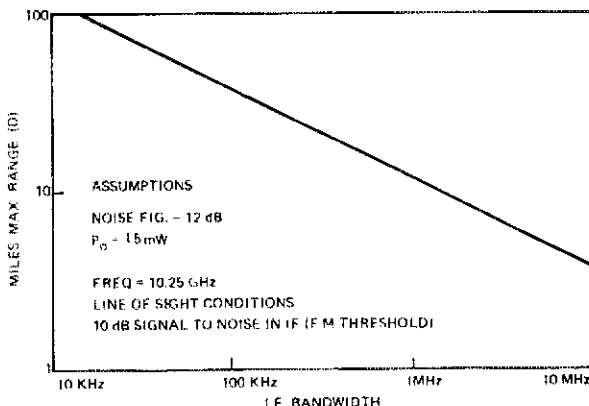


FIGURE 1

MA-87141-1 2 Complete Gunnplexer transceivers (MA-87127-1, 15mW typical and 2 horn antennas MA-86551,) just \$199.95 plus \$2.00 shipping and handling.

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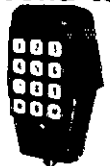
All Solid State-CMOS PL digital synthesized - No Crystals to Buy! 5KHz steps - 144-149 MHz-LED digital readout PLUS MARS-CAP and MULTIPLE OFFSET.*

● 5 MHz Band Coverage - 1000 Channels (instead of the usual 2MHz to 4MHz-400 to 800 Channels) ● 4 CHANNEL RAM IC MEMORY WITH SCANNING ● MULTIPLE FREQUENCY OFFSETS ● ELECTRONIC AUTO TUNING - TRANSMIT AND RECEIVE ● INTERNAL MULTIPURPOSE TONE OSCILLATOR ● RIT ● DISCRIMINATOR METER - 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.

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- **FREQUENCY RANGE:** Receive and Transmit: 144.00 to 148.995 MHz, 5KHz steps (1000 channels) INCLUDING NEW BAND 144.5-145.5MHz + MARS-CAP and MULTIPLE OFFSET.*
- **LED DIGITAL READOUT.**
- **4 CHANNEL RAM SCANNER WITH IC MEMORY:** Program any 4 frequencies and reprogram at any time using the front panel controls—search for occupied (closed) channel or vacant (open) channels. Internal Ni-Cad included to retain memory (no diode matrix to wire or change).
- **MULTIPLE FREQUENCY OFFSETS:** Three positions A,B,C, provided for installation of optional crystals: EXAMPLE - 1 MHz offset. Duplex Frequency Offset Built in - 600 KHz PLUS or MINUS 5 KHz steps, plus simplex, any frequency.
- **INTERNAL MULTIPURPOSE TONE OSCILLATOR BUILT IN:** 1750Hz tone burst for "whistle on operation" and sub-audible tone operation possible by simply adding a capacitor across the terminals provided. Internal 2 position switch for automatic and manual operation, tone burst or sub audible tone PL - adjustable 60-203Hz (100 Hz provided).
- **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 Frequency Selection as standard equipment.
- **FULL AUTOMATIC TUNING OF RECEIVER FRONT END AND TRANSMITTER CIRCUITS:** DC output of PLL fed to varactor diodes in all front end RF tuned circuits provides full sensitivity and optimum intermodulation rejection over the entire band. APC(AUTO POWER CONTROL) - Keeps RF output constant from band edge to band edge. NO OTHER AMATEUR UNIT AT ANY PRICE has these

features which are 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.
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- **MONITOR LAMPS:** 2 LED's on front panel indicate (1) incoming signal-channel busy, and (2) Transmit.
- **FULLY REGULATED INTEGRAL POWER SUPPLY:** Operating voltage for all 9v circuits independently regulated. Massive Commercial Hash Filter.
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- **MULTI-PURPOSE METER:** Triple Function Meter Provides Discriminator Meter, "S" Reading on receive and Power Out on Transmit.
- **RECEIVE:** Better than .25uv sensitivity, 15 POLE FILTER as well as monolithic crystal filter and AUTOMATIC TUNED LC circuits provide superior skirt selectivity - COMPARE!
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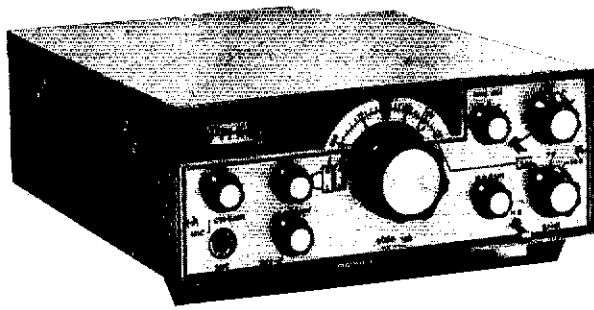
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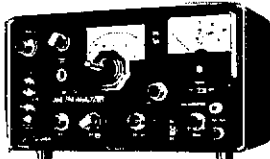
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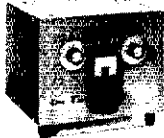
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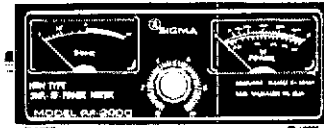


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Several clubs represented. ARRL Affiliation of Waido Co. ARA brings Maine affiliated total to nine. Portland AWA Flea Market - Banquet well recd. June 10. Pine State ARC mbrship stands at 79. Barnyard Net gang met at Scarborough June 3 for lunch/chat. Arrostook ARA Mini-Newsletter cautions members in use of autopatch. Don't abuse privilege! Latest ham news each Wed. on Litchfield 14/1070 rpt from W1GCM. Sorry to lose EC and MSN Mgr. 27/1070 rpt from W1GCM. Ham Band at W10LQ Aug. 27. May mbrs: Seas/GTC/ONI. P7N 31/145/265. SGN 26/123/1084. MSN 12/719. MPXN 4/13/58. CMEN 14/14/186. BYN 27/36/890. Traffic: W1DX 216. WA2ERT/1105. W1RWG 93. WA1QFX 61. W1HDC 54. K1GUP 25. W1WSD 25. W1AHM 20. W1WGU 16. W1JTH 15. K1TZH 14. WA1FCM 13. N1RP 10. WA1SMY 10. K1TVT 9. WA1JCN 2. WA2MEQ/1 2. WB3HYD/1 1.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1SWX/W1NH - SEC: K1RSC. RM: N1NH. PAM: W1TN. Hope everyone is having a nice summer. VO2GD checked into the repeater during his visit. W1CNK visiting in CA. W1BYS listed in "Who's Who" in the East. Seen on the NH highways. K1YLA WA1AYH W1MHD and K1CAU. W1DC operated from Miller State park on FD. W1AM moving to Lees. The Nashua Area RC very active in the SET with publicity on station W5NH. K1K1 building an audio filter for cw contests. The Port City ARC (W1WOM) provided communications for the March of Dimes Walkathon. The Keene Machine group provided communications for the NH State Fire School in Fitzwilliam. WA1SLV awaiting new call after passing his Extra. WA1RGP has a new Yaesu 301S. K1ACL worked rare Clipperton Island on 5 bands. WB1EXY now N1EX. New Extra is W1FBG. also W1HXR. The Century Kids W1MPP and K4RO are back in NH. SM0CCM visited with K1BCS and W1CCM. Traffic: W1TN 255. W1GUX 66. WB1ELP 53. W1HBR 26. W1AFC 17. WA1PEL 5. W1SWX 4.

RHODE ISLAND: SCM, J. Titterington, W1E0F - RIEM 2-mtr. Tlc Net. WA1GSD, Mgr., QNI 186. Tlc 40. Ham Radio lost a great friend with the passing of WA1RXL. He will be missed by all. WA1NWX now N1WJH. Congratulations! Novice population continues to grow in RI. Hope each Novice will upgrade as soon as possible so they can participate more fully. WB1HJK now Tech. and keeping the repeaters warm. The 16-76 Auction and Flea Market was a big success once again. All hams, members or not, are invited to send a monthly report to this office on before the 7th of each month. I am your HAM. Keep me informed! Traffic: K1UZ 112. N1RI 102. W1E0F 19.

VERMONT: SCM, Bob Scott, W1RNA - BARC International Field Day annual hamfest at Old Lantern Aug. 12-13. W1AM worked VY9CA 5/21 on 6 mtr. K1LPS K1BKK WA1JXN & W1AIM attended the VHF-UHF conference at Durham, NH. There are several VHF 2-mtr hams hoping stns to South & West would look this way. Unofficial rumor of contest for high scorer FD between BANC & CVARC. CVARC had speaker on witchcraft may meeting! Hmmm! May 7, bike-a-thon Burlington area benefit American Diabetes Assn. 180 riders raised \$13,000. BARC furnished 2-mtr communications along 30 mi course. NC was WB1FQE with WA1s TER UVW K4RCCY QZE SZL; W1s BKZ DOQ K1YCC; WB1s BZR AGH & WB2ZJ joping check points. WA1SVR furnished contact between NC and head of the Diabetes Assn.

WESTERN MASSACHUSETTS: SCM, Bill Lowe, W1TM - SEC: WA1DNB. PAM: WA1MJE. SCM attended meeting at ARRL on NTS, Public Service and Public Relations. This section in need of more activity in these matters. Also in need of Official Observers. Congrats to W1OAA on WAS (2 ltr. suffixes, 75 SSB extra only) Welcome new stns WB1s: GUY GVR GVS GWA GWC GWK GWT GWV GWZ GXE GXG GXV GZD GZE GZS HAZ HBG HCC HCR HCS HCX HDF HDT HEC HED HEE HFZ HGM HGP HGR HGT HHA HHO HHT HHU HHX HHY HIB HIC HID HIE HIG HII HIN HIP HIT HIU HIZ HJA HJE HJG HJQ. Lots of dits there! The Novice classes are showing good results. Traffic: W1TM 203. WA1MJE 200. K1SSH 142. W1TDV 26. W1ZFB 26. W1BVR 22. K1JUV 22. WA1OPN 13. WR1CWH 10. WR1EHS 4.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davie, KL7CUK - The SPARK of Kodiak which is the Kodiak Club provided communications for a boat race and long distance foot race during the King Crab Festival. They also had a booth to handle QTC and inform the public on amateur radio. The Anchorage Club had a booth in one of the shopping malls to handle QTC over Mother's Day weekend. They handled 1378 msgs. with OSCAR display and other educational information. The following stations participated in the lower 48: WB7DDK W7DZX WD6EAQ WB6EIG W7GIP N6GW WD6KAD WB6QJI WB7SVM W7VSE K5WAB and KY2DO. Space does not permit listing all KL7 stations. The AKS-1 (etc. 58) still growing meeting nightly at 0300 GMT on 3920 kHz. KL7AF reports receiving WPX, USCA No. 2 AK. CQ 100 CW & SSB. Traffic: KL7JDI 708. KL7AA 689. KL7JDH 407. KL7YH 109. WA1QXD/KL7 106. KL7JKC 43. KL7IYK 32. KL7IGE 28. KL7JJO 20. KL7HDS 8. KL7AF 6.

IDAHO: SCM, Ed Hamlin, W7KDB - W7LKH active in the Evergreen chapter of the QCWA (Bonners Ferry). W7GBO ordered a new SB-104. WB7TQH active on IMN net. WA7JN is 183rd ham in the world to work all counties. W7VSE is RN7 mgr. WB7TYK on the air, wants contacts. WA7ZPO busy at his EC post. WA7NRP added a 6-meter rig. W7KDB new 2 meter rig on order. The Nampa ARC changed its weekly luncheon to Thurs., will soon have a 2-meter repeater on the air. K7IRY and W7DSU are proud owners of new HF and VHF rigs. K7JBC vacationing on her boat in the northwest and in VE7-Land. W7GHT collected enough points for PSNR. W7FIS busy with summer yard work. WB7TFE has old call W7ETU back. K7QD has gone QRP with an HW-8. A new ham in Meridian is KA7ANM. WA7YXZ married in June.

Net	Sess.	QNI	QTC	Freq.	Mgr.
FARM	31	910	33	393	W7CJC
RACES	28	457	22	3990	WA7WXI
IMN	23	196	83	3635	W7GHT

Traffic: W7GHT 277. W7KDB 14. W7GBO 12. W7ASA 10. WA7PFL 6. W7FIS 2.

MONTANA: SCM, Robert Leo, W7LR - W7TGU is the new PAM for MT. At Helena VHF meeting 20 kHz plan rejected; new officers W7YH, chmn.; W7LR, vice-chmn.; K7MB, secy-treas. W7IXD K7MB ran emergency drill in Deer Lodge for prison & hospital. New K7A calls issued to MT hams. Son & daughter-in-law of W7JMX surprised him with new calls WB7WBA & KA7ADM. About 40 attended Gallatin Ham Radio Club. MTN QNI 890. QTC 120. W7TGU & W7LBK revamping stations. WA7JN wants to run 2-meter ssb mountain tests. IMN QTC 83.

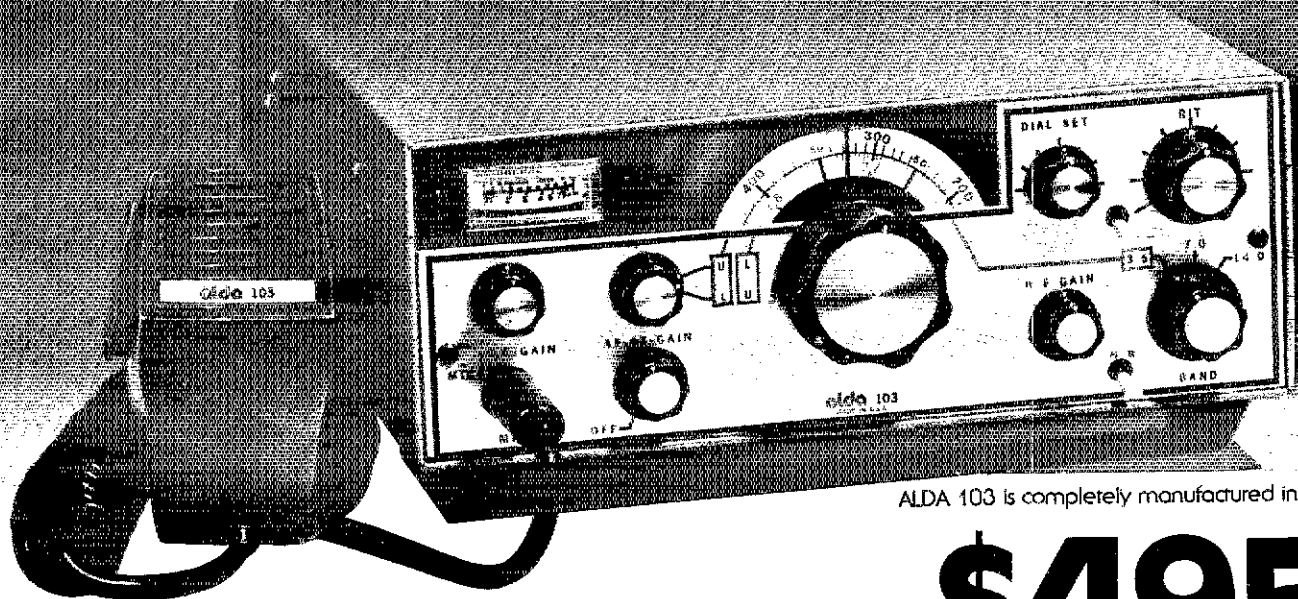
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CW — 250 watts DC maximum (adjustable)

Transmitter:

Antenna Impedance: 50 ohm, unbalanced

Carrier Suppression: Better than -45 dB

Side-Band Suppression: Better than -55 dB at 1000 Hz

Distortion Products: Better than -26 dB

AF Response: 500 to 2500 Hz

Spurious Radiation: Harmonics better than -45 dB below 30 MHz; better than -60 dB above 30 MHz

Frequency Stability: Less than 100 Hz drift per hour (from a cold start at room temperature)

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Receiver:

Sensitivity: Better than 0.5 watts audio output for 0.5 μ V input

Signal-to-Noise Ratio: Better than 10 dB S+N/N for 0.5 μ V input

Image Ratio: Better than -60 dB (typical with respect to 0.5 μ V input: 80 meters — -130 dB; 40 meters — -100 dB; 20 meters — -75 dB).

IF Rejection: Better than -70 dB (typical with respect to 0.5 μ V input: 80 meters — 110 dB; 40 meters — 80 dB; 20 meters — 75 dB).

Intermodulation Intercept Point: Better than 10 dBm

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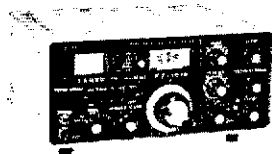
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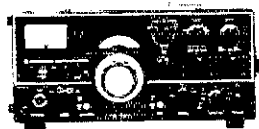
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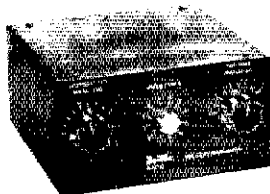
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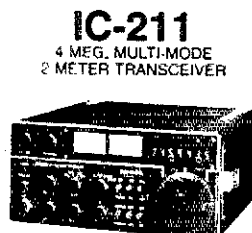
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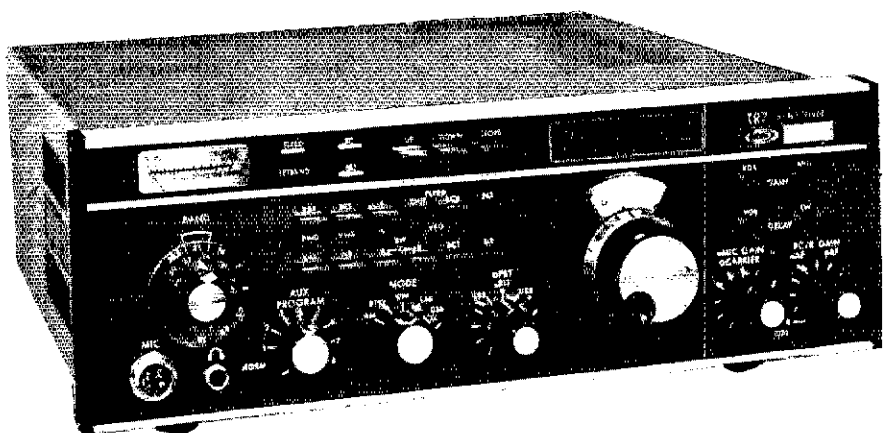
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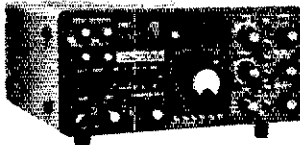


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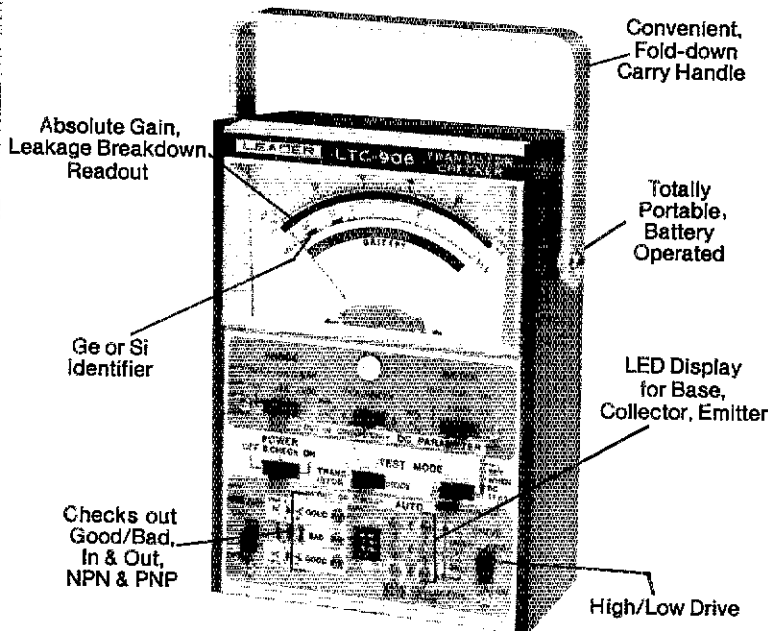
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QNI 196 W7DB sends OBS bulletins. W7IDK preparing for Malta hamfest. W7LYR back from vacation and prepares FD & EC efforts. Traffic: W7XD 548, W7TGU 21, W7NEG 11, WA7OBH 6, W7LBK 5, W7JMX 4, W7LRA 3, W7HAH 1.

OREGON: SCM, Dwight J. Albright, W7HLF — SEC: W7LBH, ARES, 147.05, QNI 198, QTC 10, 9 sess., N7SC, ARES, 3993.5, QNI 321, QTC 81, 31 sess., WA7RWM, OSN, 3585, QNI 161, QTC 152, 31 sess., N7NO WCN, 3702, QNI 335, QTC 118, 31 sess., WA7YPJ BSN, 3508, QNI 540, QTC 39, 31 sess., WA7GFE, ARES PDX, QNI 956, QTC 48, 28 sess., K7WW, 16-76 Net 7 PM Dy, QNI 527, QTC 17, K7KVV. The Rogue Valley Radio Club joined in demonstrating amateur radio to CBers at the Medford Armory Aug. 9, 18 QNI, N7OSB reporting. SCM W7HLF and SEC W7LBH met at Coosbay, OR on June 8th with the Western Wireless Assn. With the help of club members retired W7TZO as EC and appointed W7OZLN as the new EC for Coos County. Seems the repeater group were having moving problems with some repeaters. Perhaps W7JAW will get things fixed up. I had reported last time that the 16/76 Net was folding but they came back stronger than ever. More power to K7KVV net mgr. 73 and good luck to all. K7WWR takes over July 1 as your new SCM. Traffic: (May) W7YSE 847, WA7HS, 173, K7OJF, 110, W7HLF, 91, WB7OJL 77, WB7AAK 58, WB7DIP, 47, W7HJZ 47, W7NZ 44, WA7HRG/7 30, K7WW 28, WA7ZAP 28, W7LT 15, WB7AFD 12, W7LBH 8. (Apr.) K7KPT 39.

WASHINGTON: SCM, Bob Klepper, W7UEU — NTN 3970 kHz, 11:30 AM, QNI 1443, QTC 67; ESN 3920 kHz, 5 PM; WARTS 3970 kHz 6 PM; NWSSBN 3945 kHz, 6:30 PM; QNI 667, QTC 51; WSN 3590 kHz, 6:45 PM, QNI 357, QTC 125; CBN 3960 kHz, 7 PM, Clark City ARES QNI 34, QTC 0, WB7RPP, WB7FFB, WB7QVL, WB7SKA, WB7ZNB, WB7PDV and WB7VRZ have upgraded. W7JXP off air for 15 years back chasing DX. Island County ARC and Olympia Amateur Radio Society (OARS) are newly affiliated clubs. New MINCV officers: WA7RBR, pres.; WA7RVA, vice-pres.; WA7TLL, secy-treas. Hope to see many of you at the Spokane Hamfest Aug. 12 & 13, and the Tacoma Hamfair on Aug. 19 & 20. New EAs are: W7JZR, Clallam/Jefferson; W7GB, Grant; WB7USA, Klickitat; K7SB, Cowlitz/Wahkiakum. Washington Shriners met meets 9 AM Sun, 3925 kHz, contact WA7ILO for info. Northwest Novice Net (NNN) 3720 kHz, Tue, 4:30-5 PM, WB7QWC working on code speed. WB7FGC now Communications Coordinator for Spokane DES. K7VSZ working on antennas to improve 40 and 80 meter operation. Clark City Information net now ARES net. Is KA7AEM the youngest amateur in the Section at 6 years of age? WB7APV back in states after TDY to S. Africa. WA7VSM and W7RY have become Silent Keys. W7ERH using new 75-meter vertical. WA7IB spends limited time on WSN and RN7. K7UWY has compiled a fine scrap book on W7DA, the North Seattle ARC station. W7JIE worked 2L1BD using 700 mW on 10 meters. Enjoyed the visit to the Mount Baker ARC banquet and the Lower Columbia ARC's dedication of their new club house, thanks to both for their hospitality. Local Novices are getting those new KA7 calls. N7XX attending night classes. WB7FDE took first place honors for 7-Land in the 1978 YL-OM contest. Radio Amateurs of Skagit County (RASC) club working on an information book for club members. Radio Club of Tacoma has compiled a computer list of ARES members and match the person to the situation. 31 members of the Radio Club of Tacoma provided communications for the Daffodil parade. LCARC participated in Madex '78 exercise sponsored by Cowlitz City DES, as usual amateur communications were above par. OARS have 16 Novice and 10 Generals in radio class. WA7RVA acting secy for West Seattle ARC. WA7KKY reports good results with training classes for North Seattle ARC, some students going from no license to General in less than a year. N7AM adding more radials to his phased arrays. Traffic: (May) W7DZ 1061, W7GJP 345, K7GXZ 137, N7AM 92, WA7BOD 91, N7AJ 84, W7YCM 41, W7UEU 34, W7EBU 33, WA7LQV 33, W7AFS 31, WB7EBP 19, WA7OJI 14, W7LUP 12, W7ZE 12, WA7TWB 8, WB7FDE 5, K7VSZ 3. (Apr.) N7CT 10, WB7EOK 3.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W6RGG — SEC: K6UWR, I am saddened to report the passing of an old friend, K6HW ex-W6IPW. New appointees in the section are: WD6BMX as OHS and W6LKE & WA6TPE as ECs. Welcome aboard. May 14, 2015 PDST, found WR6ADM, Northern Cal Contest Club and Alameda County RACES on 147.84/24 using a repeater donated by WA6BOB and completely operated by WA6EJZ. Previous pair occupant WR6ADC was moved to 144.8 MHz. Forcas Day communications test which was ably coordinated once again by W6ZF. New officers for SBARA: WA6SVJ, pres.; W6TMU, vice-pres.; WA6HWG, secy.; WA6YCD, treas. WA6JVZ discovered 50 & 220. WA6VEF new NCCC VPIC and going to VE7WJ for IAHU Radiosport test. N6CY leaving EB for MDC and Annapolia — congrats. WD6BMX has licked his home TVI and has gone mobile with his Century 21. N6NE on 450 with a Prog line. CCCC moving forward with their 220 repeater and WR6ALJ's autopatch. EBRC's Novice class recently concluded and WD6ETU got his Tech. SF. WA6JH new Asst. Mgr. N6N VHF. MDARC growing in size and planning big FD effort. Traffic: (May) K6OE 442, W6OA 221, N6CY 193, W6JXK 144, WB6UZX 45, WD6BMX 17, N6IG 9, N6NE 7, WB6VEW 7. (Apr.) K6COE 254, WB6UZX 48, WD7BMX 8, N6NE 7.

NEVADA: SCM, Leonard M. Norman, W7PBV — SEC: K7ZAU. The West Coast VHF conference was a success with Chairman K7ICW having the "Alligator" award bestowed on him. WB7SKM is conducting a code and theory class in Winnemucca. W7CKE and WA7ESM are growing tomatoes larger than K7ZOK's orchids, and they are big. WR7ABI on Mt. Ophir near Reno is now W7TA-R with a new tower and antenna. W7JUC has 272 DX contacts. W7ILX has added a counter and pre-scaler to his station. Traffic: W7ILX 272.

PACIFIC: SCM, George Morton, N7HR/KH8 — Asst. SCMs: KH6BZF KH6DD, SEC: KH6JMK, KH6BZF is the section PR man, he has all the filing materials for clubs, contact him for details. Thanks to KH6D, Hawaii Governor Ariyoshi will proclaim the week of June 18 "Amateur Radio Week." KH6IPQ has arranged media coverage of the signing ceremony, pix to GST after FD. PACSEC Club Council moving along, clubs are requested to exchange bulletins to make our far-flung oceanic radio community more close knit. Kokua from all clubs is needed, KH6JPL now has complete Yaesu "gold line." KH6JIB relocating on Kauai. KH6JHR coordinates

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417 AC supply/mod 39	GONSET GC-105 2m AM Xcvt \$ 69	DD-1K Digital disp 119
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Interceptor VHF Rcvr 129	910A 6m SSB Xcvt 179	SWAN SW-240 Xcvt \$159
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SS Booster 39	HALLICRAFTERS SX-111 Rcvr \$139	400 Xcvt/410 VFO 199
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FM-27B 2m FM Xcvt 179	PS-150-12 DC ps 49	412 DC supply 39
031 AC supply 49	HR-150 Rack mt 15	P-1215 AC supply 49
COLLINS 75S-1 Ham Rcvr \$299	SR-400 Xcvt 395	SS-200 Xcvt 399
75S-3 Ham Rcvr 485	SR-400 Cyclone II 475	PS-20 AC supply 95
75S-3B Ham Rcvr 795	SR-400 Cyclone III 649	14A DC converter 39
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32S-3 Transmitter 785	SR-46 6m AM Xcvt 49	700CX Xcvt 459
32S-3 Xmt (round) 995	HA-1 Keyer 59	512 DC supply 59
30L-1 Linear 495	HAMMARLUND HQ-110 Ham Rcvr \$109	117XC AC supply/spkr 95
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PM-2 Port AC PS 95	HWA-7-1 AC supply 9	FM-2XA 2m FM Xcvt 99
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COMTECH Magnum 6 For Heath \$ 69	SB-102 Xcvt 369	TPL 502B 2m FM amp \$ 99
DRAKE 2NT Transmitter \$ 99	SB-110A 6m Xcvt 295	1202C 2m FM amp 139
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TR-6/NB 6m Xcvt 589	IC-245 2m synth Xcvt 349	KR-50 Keyer 89
T-4X Transmitter 339	IC-215 2m FM Xcvt 159	206 Calibrator 19
T-4XC Transmitter 475	IC-502 6m SSB Xcvt 169	S 3W filter 19
AC-3 AC supply 65	KLM Multi-11 2m FM Xcvt \$189	030 Signalizer 29
AC-4 AC supply 85	Echo II 2m SSB Xcvt 199	VARITRONICS FM-20BM 2m amp \$ 39
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DC-4 DC supply 85	KENWOOD R-599D Ham Rcvr \$375	YAESU FTDX-400 Xcvt \$369
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DYCOMM 500D 2m FM amp \$ 49	NATIONAL NC-270 Rcvr \$119	
GLB 400B Channelizer \$ 89		

(1) This list was prepared from an inventory taken on the date shown above. The quantities vary in some cases there are several of one item, others, maybe only one. Due to the lead and distribution time of this publication some of the items may have already been sold by the time you see this ad. On the other hand, due to the number of trades we are involved in each day, some items are in stock that are not listed. When ordering state more than one choice, if possible. (2) AES reserves the right to sell power supplies and accessories only with matching transmitters or transceivers, depending on our stock situation. (3) To insure quality, our used gear is serviced and made ready for shipment after we receive your order. Please allow 5 to 10 working days delay in shipping your order. (4) No trades on used gear.

The following are NEW Close-outs, Overstock merchandise, New displays, Demos, etc. Most are factory-sealed, all carry New warranties. Limited quantity. First come, first served. Most Close-outs available at Milwaukee only. Terms of sale: Payment in full with order, Mastercharge, or BankAmericard (Visa); no trades.

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206 Remote VFO 299 269	PA2-70BC 220 2/70w FM 169 149
LOX Xtal oscillator 55 50	PA10-35C 450 10/35w FM 119 109
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DD-6B Digital dial 229 169	TS-820 Xcvt \$919 799
BIRD reg. NOW	1S-520S Xcvt 739 659
4350 2kw Ham-Mate \$ 94 59	TS-700S 2m Xcvt 729 649
4351 1kw Ham-Mate 94 59	TR-7200A 2m FM Xcvt 249 199
4352 VHF Ham-Mate 94 59	TR-7500 2m synth Xcvt 299 249
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2CQ Speaker/Q-mult 49 45	SS-200 Xcvt 779 429
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7072 Hand microphone 19 17	P-1215A AC ps for monoband 75 39
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AC-10 12vdc supply 49 45	702 2m 1/70w amp 169 149
AN-5 Shortwave ant 8 5	802B 2m 1.4/50-80w amp 259 219
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GALAXY reg. NOW	350 450 5-15/20-40w amp 189 149
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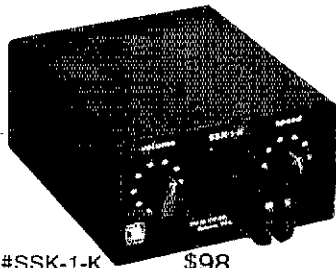
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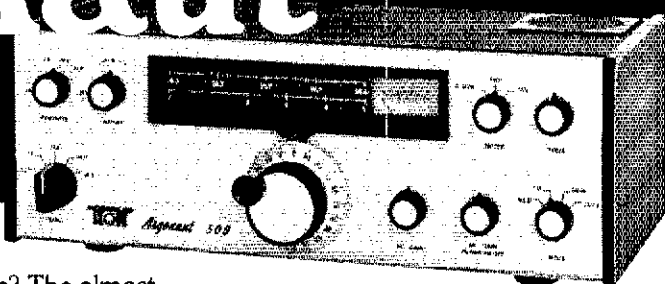
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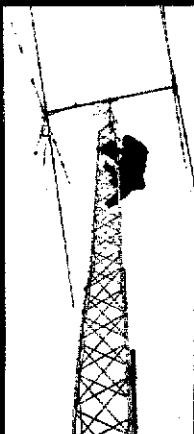
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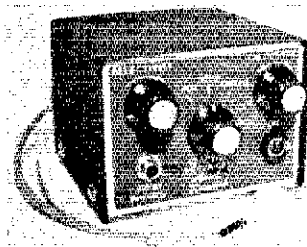
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troop openings, QX 7180 and 145.1 as many (see SSBBers listening. Other reports invited. Aloha! Traffic: KH6HJ 31, KH6BZF 18, KH6JIB 14, KH6JJP 14.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — W7NJU is now the Asst. SCM. WA8LWP has relieved K6QIF as EC for Sacramento Co. WB6DTI is now an OBS. New officers for the River City ARCS are: WB6NPC, act. mgr.; WB6YRL, pres.; WA6JKG, vice-pres.; WA6YRC, treas.; K6CII, WA6RPP, WA6YUK, WB6YML and WD6BWK, board of dir. WB6JKZ is the new treas. of the GEARS. Over 300 attended the 6th annual NHRC Hamswap. Even the hot dogs were FB. WB6NYM and WD6DPO made their Advanced while WA6AUS and WB6PMT made General Class. WA6PAY passed his 1st Radiotelephone exam. WB6GFJ gave a presentation on the OSCAR program, before the Sierra Foothills ARC in Auburn. The Foothill ARC of Yuba City/Marysville could only manage to get N6JV and his ARRL program. Remember, Calif. QSO Party the 1st week end in Oct. Traffic: W6RSP 119, W6DEF 15.

SAN FRANCISCO: SCM, Mark L. Nelson, AA6DX — SEC: N6KM. New ECs include W6CYM, Sonoma; WA6QXV, Mendocino; Congrats and a hearty thank! A word of appreciation is due for WA6LX retiring from his past work as OBS and editor of "The Echo." WR6ADC will use a supplementary covr near Sausalito. Welcome to KA6AAZ and N6AAH, new hams in Eureka. Field Day results between HARC and "F Troop" (RCCC) should be interesting! WA6KWN aka "Sugar" of the FWBA has maintenance chief's WB6MYF, WD6EOG, WB6VNF. When entering the Redwoods from the South, use 3494-east, 2888-North, 22/82 or 18/76 — you'll be welcome! NCCC now on 84/24. Your SCM supports the listing of your call in the telephone book—Ma Bell charges 40 cents/mo. for it. Traffic: (May) W6IPL 156, K6PB 152, W6RNL 152, K6TP 152, W6GGR 4, (Apr.) W6RNL 273, K6TP 169, W6IPL 200, K6PB 109, W6NL 90, W6GGR 10, WB6RTE 7, (Mar.) K6TP 212, W1ARR/6 32.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, WR6DPD — Asst. SCM: WA6YAK, WB6TRP, WA6HIN, SEC: WA6YAB. New officers of the CCAE are WA6VJU, pres.; WB6CYM, vice-pres.; WB6JII, secy.; WB6JII, treas. The club operates WR6AF's in Fresno. Congrats to the Turlock ARC on its very successful 5th Anniversary Hamfest. WB6MRL and WB6JPU won prizes. The Kings Valley 10-X Chapter meets on Wed. at 8 PM on 28.702 MHz. The Chapter sponsors the King Kong award. Check in to the net for details. ECs are needed for San Joaquin, Amador and Mariposa counties. Appt. req'd: K6PSJ, OBS. WB6MRL and K6QOK have 25-227hs. WB6YAR and WB6VUJ have ARComms S2-F5. WB6TIA a Wilson MK II. WA6FJS and WA6SZC are now Advanced. WB6NTK has an IC 211. WB6VAF an IC 215. WA6YAB a CushCraft ATB 34. WD6GVS a HW-8 and 15-meter beam. WA6RPP has returned to 20-meter RTTY. K6YK worked 3 KL7 stations in May of 62. New licensees was heard on 2m ssb. Appointees are scheduled to send in their monthly reports by the third of the month. I hope to see many of you in Reno at the convention this month. Traffic: (May) W6DPD 38, WB6VJW 30, WA6YAB 8, WA6GJV 2, (Apr.) WB6VJW 36.

SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: WB6IZF, RM: W6RFF. This is my first month as SCM and hope you will bear with me until I get into the swing of it. Check page 8 of QST for my correct address. How about sending W6CF a message thanking him for the FB job as SCM for the past four years! WA6HAD reports receiving a case of various vacuum tubes from a neighbor, as a list of them. WB6KZJ active as usual on NCN. WB6SHD has given me a keyer to try a bug, he also made BPL and PSRR. The SCV ARCS EC net meets Wed. at 1900 on WR6A20 reports SEC WB6IZF. WB6PRU/6 is new EC for Cupertino area. NCN Honor Roll includes SCV's WB6AYJ, WB6GJZ, W6IQU, WA6JWK, W6KZJ, WA6NMV, W6RFF, WB6SHD, W6YBV and K6YKG. CENTCARS net meets on WR6AWM Tue. 7 PM. WR6AWM of Marble Cone fire fame has permanent approval from the Army to use the Williams Hill site. Check with EMARC or WB6ASH for an emergency preparedness list. PAARA went all out for Field Day as usual. CCRG Circle reports in May of 62, new licensed stations. Contact me if you need info, help, or W6RFF visited W6CF's hill-top QTH to pick up SCM files. A very impressive DX OTH. W6QIE continues to put out code practice daily except Mon. on 3590 kHz. Many a beginner has been helped by QIE on theory and code. W6PDD, WR6ACI trustee, reports continued updating of the repeaters electronics. Remember the Pacific Division Convention at Reno in Aug. See you there. NCN's VHF session is very active on WR6ADC, and covers most of Northern Calif., populated areas. Traffic: WB6SHD 325, W6YBV 147, W6RFF 93, W6KZJ 15, WA6HAD 4.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, K4GHR — SEC: W4EHF, PAM: W4QFO, RM: K4MC. Congratulations to the New Bern ARC and the Azalea Coast ARC (Wilmington) now affiliated with ARRL. WA4SRD won 1st place in the 4th Call Area during the YL/OJ Contest. Super program put together by the Morehead HS ARC (Eden) WB4TLD demonstrating Amateur Radio to students & faculty. WB4DBJ gave valuable assistance to the program which included 10 operators. WA4ACP reports OBS activity expanded to 15 repeaters now... keep up the good work Kerry. Governor Jim Hunt declared June 19-25 as Amateur Radio Week in North Carolina. This again was accomplished through the efforts of the Raleigh ARS. W4OCZ reports plans being made to run a multi-county Radiologic Monitoring Exercise in conjunction with State CD on June 21. New appointments this month include WA4AFC, EC, Hamfest, WB4DZO, EC Richmond, WB4GVG, OBS. W4EHF reminds all ECs to check in to the NC EC Net which meets on the 1st & 3rd Sat. at 0830 local on 3920. This is a new time, so be sure to note it. Remember the Cape Fear ARS Hamfest in Dunn on Aug. 19-20. See you there. Traffic: (May) W4QFO 136, W4EAT 119, W4FMM 87, K4MC 85, AA4NC 83, NA4E 82, WD4FJM 67, WA4SRD 60, K4VHT 58, K4FTB 56, NA4Z 48, WA4WOR 47, WA4SRD 38, NA4A 27, K4GHR 24, W4OCZ 21, WD4OCO 20, W4ACY 18, WB4CXT 14, WB4WII 12, WA4UTC 9, WB4TJZ 8, K4AI 4, WB4WV 4, (Apr.) W4QFO 52, WB4ZTJ 43, WB4TTJ 18, W4AQR 125, W4UTC 11.

SOUTH CAROLINA: SCM, Tom Wufkin, WA4DAX — Asst. SCM: WA4MDP, RM: W4CJ, Chief PAM: W4MTK, PAM: WA4DZG, RM: WA4ACI. Congratulations are in order for the Chesterfield County Amateur Radio Society on their affiliation with the ARRL. WD4HEH is pres. of the Cheraw Club. WB4PNY has relieved K4ZN as ARND Net Mgr. Chuck is still very active with two columns in

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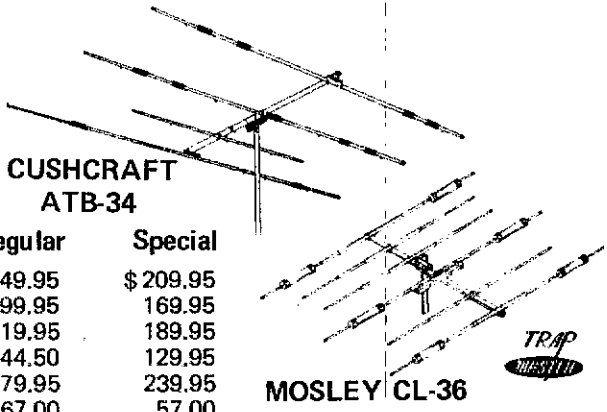
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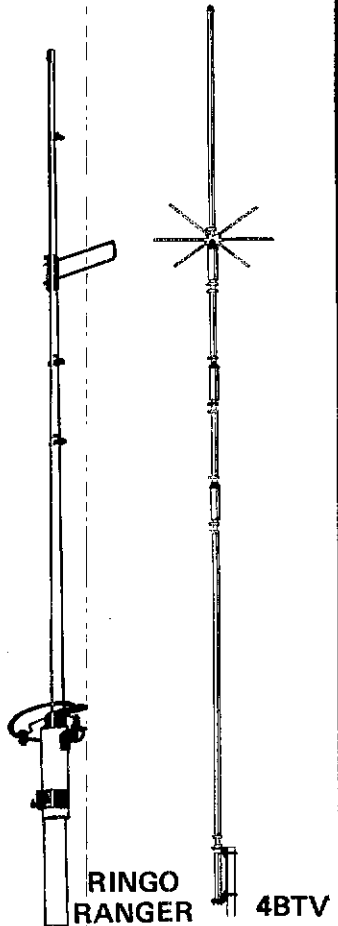
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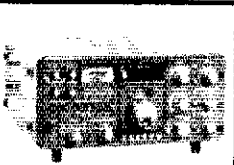
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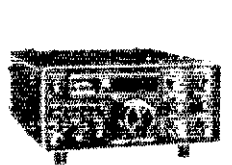
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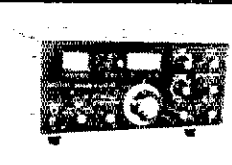
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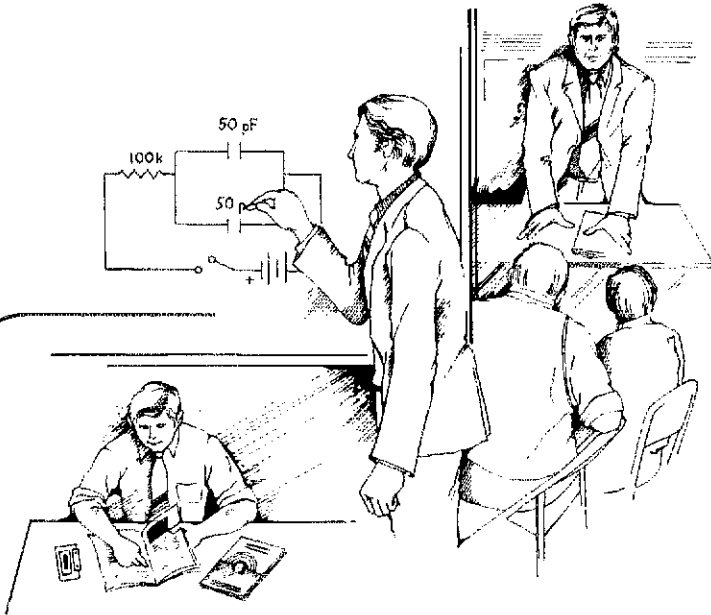
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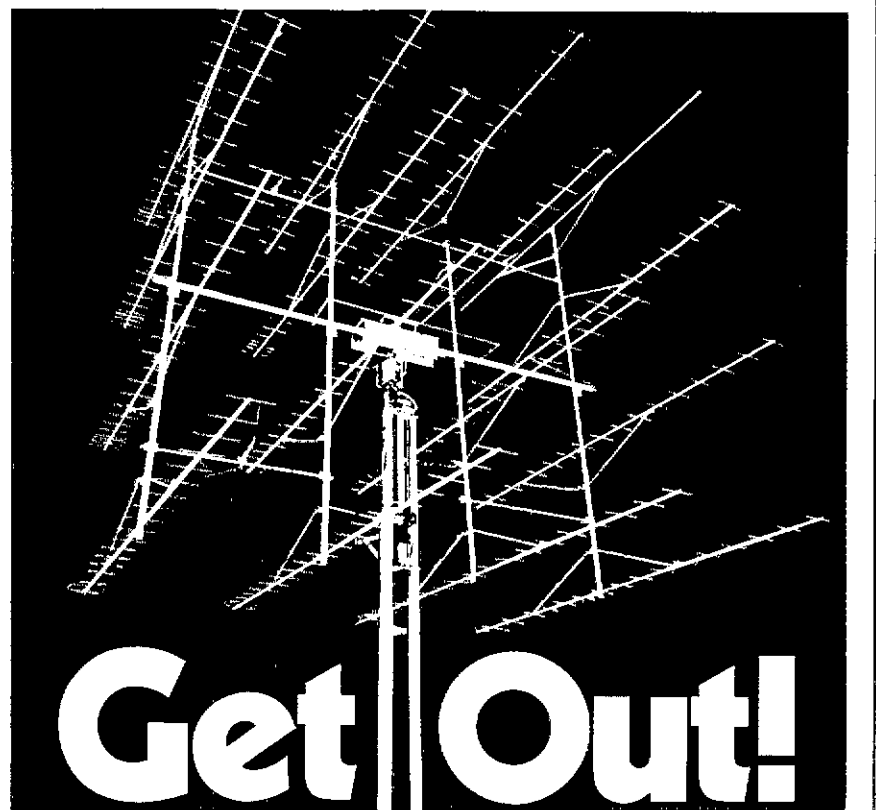
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World Radio, K4QQG and K4TTG were on a local half-hour show talking about amateur radio. A real fine job, and they say it was great fun. N4PC must be the top traffic man of the year with over 600 msgs. again this month. I don't see how he does it! Nets: SCSSB QNI 1426, QTC 131; PX QNI 209, QTC 28; Anderson 2Mtr QNI 690, QTC 33; CNL QNI 219, QTC 126. Traffic: N4PC 642, K4ZN 234, WA4KXZ 111, W4NTO 108, W4FV 52, W4ANK 49, WB4UDK 42, K4FRX 35, W4MTK 30, W4OCX 26, WA4MDP 12, WB4CAK 9, WB4NBK 6, WA4ANW 4, N4EE 2.

VIRGINIA: SCM, Richard L. Genter, K4BKX — Asst. SCM: W4YE. SEC: WB4ZNB. New appointees: N4OTIORS WA4NTP/OPS. On June 1, WB4PNY became the D-4RN mgr., congrats! K4BKX WB4ZNB N4NK met with the Office of Emergency Services, Richmond. Our state emergency plan was approved by state officials and a test of that plan to take place July 22. If all goes well, RACES certifications to follow. The VA State ARRL Convention was a big success. Our thanks to the Roanoke hams for their efforts. Guest banquet speaker was W4KFC, 1st V.P. Also there were Dir. W4ACY and V.Dir. W4UG. Certificates of Merit were bestowed on AA4CK WB4DBK K4BKX by W4ACY. K4DHB helped provide communications for the Potomac River crew races and participated in emergency exercise, "The Great Train Wreck." WB4ZNB K4BKX met with Tidewater ECs to discuss coordination of efforts in their area. WB4DQZ enjoying new HW-2021. WD4IQF has new keyer. WA4STO now set up to receive RTTY — the transmit aspect will come later. WA4QCJ has complete new Kenwood station. K4BKX has new W4KCI. Plans to go over the 20 when time permits. W4YE hosted EP2A & EP2VW in June. W4NWM reports increased DX activity on 10 & 15. WA4FTJ completed WAS with less than 1 watt and has 46 countries with 1 watt or less. K4LEF taking leave of absence from NTS while he goes to school in Chicago, then in San Francisco. WB4UPA's Ma (Ma Bell, that is) is sending him to school in Columbus, OH. W4JUJ will tour Austria and Germany this summer. K4KA moving to North Carolina in Sept. Sure hate to lose a good man like Frank. Manassas held their hamfest again in June. The second annual Bristol hamfest will be held Aug. 19-20. The third annual Tidewater hamfest is planned for Sept. 23-24. QO reports received from WB4U and WB4CI. W4KCI reports received from K4MSG and W4WVQ. BPL: K4KD. Traffic: (May) WA4CCK 368, K4KDJ 381, N4NK 304, K4BKX 259, K4KNP 254, K4GR 212, WB4PNY 195, W4SQO 177, W4JK 151, WD4IQF 140, WB4FLT 125, N4RF 120, W4UJ 111, WB4DQZ 100, K8LGA/4 90, WA4FTJ 88, WB4ZNB 81, WA4FDV 76, WA4YU 75, WA4UYD 74, K4EJ 63, W4OKN 60, W4SUS 58, WA4LJ 56, K4JM 55, W4AQWQ 54, WB4KIT 51, N4LE 51, WB4FNW 40, K4DHB 39, WASHJ 35, WA4STO 35, W4YE 34, N4FP 31, K4KA 30, W4NWM 21, W4DM 20, K4ISW 18, WA4QCJ 18, WA4PBG 16, W4NWT 13, WA4YJF 11, WD4CYX 10, K4LEF 10, W4WQCG 8, W4OJL 7, K4AVK 7, K4AVK 7, W4AANN 6, AA4IT 5, W4KX 5, N4OT 5, W4KXE 4, W4WVQ 3, NADR 1. (Apr.) WA4FTJ 21, N5BA/4 4, N4DW 4.

WEST VIRGINIA: SCM, Donald B. Morris, W8JM — Asst. SCM: K8KT. SEC: WA8NDY. It is with deep regret I report the passing of WB8RFL of Chapman's Mines. McDowell ARC now ARRL affiliated, officers are WB8SXZ, pres.; W8DKSL, vice-pres.; W8BMSO, secy.; W8DQVN, treas. Weekly meetings on Thur. at Thorpe, WV. New club at Masontown, Preston ARC with WA8YCG, pres.; W8LFLS, vice-pres.; W8LGLK, secy-treas. W8BMLK, PR. WA8HGA now N8CG.

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Hamfest in Ripley in Aug. and Morgantown in Sept. Traffic: WB8TJN 86, W8HZA 45, W8BTD 42, W8BIII 40, W8BEGW 36, K8KT 32, N8JC 30, K8BT 20, W8JWX 19, W8WVPW 17, W8JYM 11, K8ZDY 11, W8BJYN 6, K8JQ 6, W8CCK 5, K8MS 5, W8LJVM 5, W8BVAZ 5, W8BLA 4, K8YL 4, K8QEW 4, W8BCNM 4, W8BSAW 3, K8DFS 3, W8BRU 3, W8BCDQ 3, W8LYV 3, K8MZM 2, W8BYSM 2, W8CUL 2.

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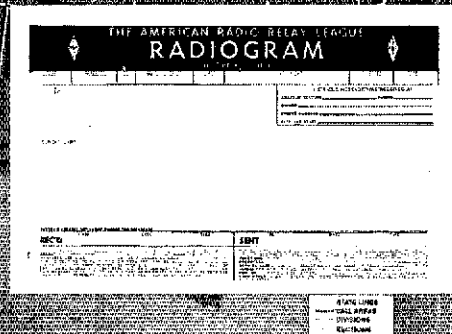
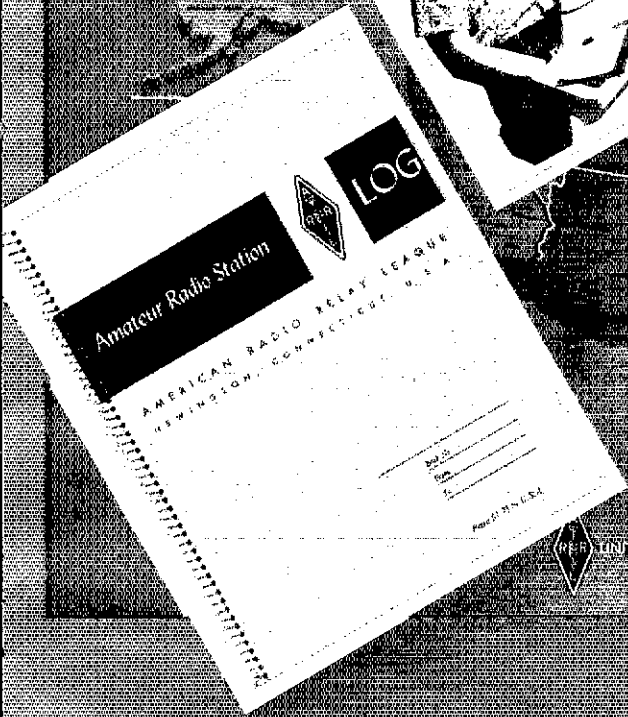
COLORADO: SCM, Clyde O. Penney, WA0HLO — SEC: K0FLP. RM: K0TER. PAMS: K0CNV WB0ZQG. K0DJ reports excellent results from new homebrew four-element, 2-meter beam. WB0MTA now serving as NCS on Columbine Net & DPAN. Congratulations to WD0BNL on the General Class ticket. Ex-N5Z2 has new call, N0ZA. Congratulations to WD0HJ on Novice ticket. WD0DNM now holds 3rd Class Radiotelephone license, and is also putting up inverted Yee for 80-meters, & beam for 10-15 meters. WA0KHM is enjoying a new Y-33 beam! Congratulations to the newly organized Grand County Amateur Radio Club, pres. WA0PRL, vice-pres. WA0KHN & secy. WD0BYU. Net Tfc. for May: Columbine QNI 1175, QTC 152, informals 300, QNF 1399 (April QNI: 1151, QTC 103, informals 271, QNF 1153); SSN QNI 83, QTC 50, informals 29, QNF 704; Hi-Noon QNI 1002, QTC 34, informals 89, sessions 29, QNF 1116. Traffic: (May) K0YFK 748, K0JAN 728, W0WYX 680, K0DJ 528, WB0MTA 366, K0CI 252, WB0ZQG 139, W5HRSW 138, WA0YNP 81, W0BQ 75, W0BLFQ 64, W0PAIT 62, W0DCHX 50, W0HXB 37, N8TU 35, W0NFW 33, W0LAE 28, W0BYK 25, W0DNN 14, W0GO 7. (Apr.) K0YFK 552, W0BLN 68, W0ANN 12, W0PAIT 83, W0ECT 70, W0HXB 62, W0DNN 13, W0GCF 1.

NEW MEXICO: SCM, Joe T. Knight, W5PDY — SEC: W5ALR. PAM: W5JOV. RM: 5RPS. Southwest Net (SWN) meets daily on 3585 kHz, 20:00 local time and handled 279 msgs with 207 stations reporting in. New Mexico Roadrunner Net (NMRRN) meets daily on 3940 kHz at 1800 local and handled 153 msgs with 1017 stations reporting in. New Mexico Breakfast Club meets daily on 3940 kHz at 0700 local, handled 89 msgs with 603 check-ins. W5BYD and W5SFB of Belen NM were of great assistance in the rescue of an injured boy in the Manzano mountains. Congrats to W5IXS who is now a full RN. Sante Fe had a good picnic and swap test at Hyde State Park. Traffic: W5JOV 376, W5DAD 302, W5HJ 274, K5MAT 260, N5NG 224, K5KPS 205, W5D5AH 133, W5MII 20.

UTAH: SCM, Carl R. Ruthstrom, W7GPN — SEC: WA7ZBO. Ex-WA7OAI now K7JG. WA7GKM demonstrated fast scan ATV at the UARC meeting. The ATV repeater will be located at the Point of the Mountain site. An ATV translocator also in planning stage. WR7AIC now active in Logan on 146.04/84, WR7AIC at Riverdale shifted to 146.13/73 from the pair now used by Logan. A

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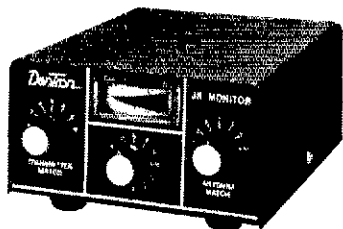
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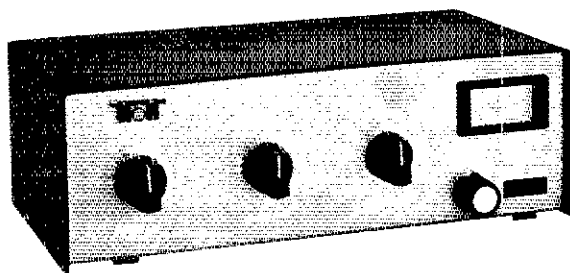
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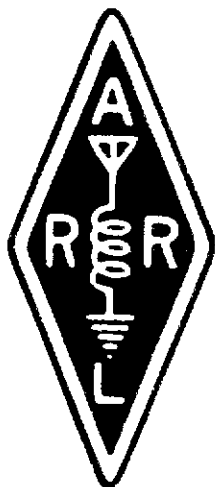
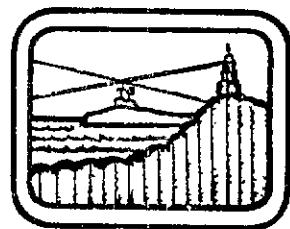
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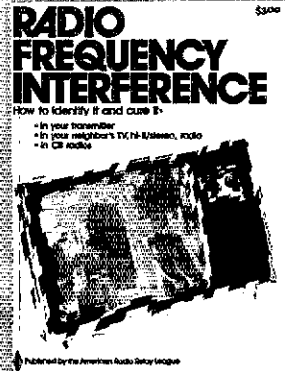
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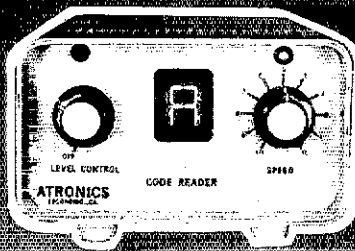
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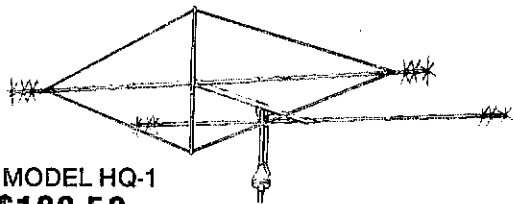
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new vertical antenna is producing a much improved signal for W7OCC. On May 26 he, W7KEB and WB7BHV participated in the Montana flood emergency. W7LLH resigned his OBS appointment due to ill health. We all wish him a speedy recovery. The new OBS is K7HLR, copying bulletins from W1AW on 20 RTTY WA7ADK continues to work 2-meter openings on CW and SSB. WA7MEL needs more support on UCN, active daily on 3710 kHz at 0115Z. Ex-K7SAD now W7RZ, active daily on a well earned vacation from duty in Kwajalein. His next assignment is China in early June. He will be on 20 SSB signing VR3AR. Traffic: K7LR 281, WA7JRC 70, WA7MEL 69, W7OCC 13, W7UTM 10, K7OA 3, WB7DMI 2.

WYOMING: SCM, Chester C. Stanway, W7SDA — K7KSA and WA7SGG set up and operated a portable station in Lodge Grass, Montana to provide emergency communications May 25 and 26 until telephone service was restored. Traffic was handled on seventy-five and two meters. KA7AJB son of WB7RYO new Novice in Gillette. KA7ACA and KA7ANQ new Novices in Cody. N7ABC new General in Rock Springs. W7HNI has a new FT901. The Torrington amateurs have organized the High Plains Amateur Radio Club. Regret to report two Silent Keys: W7GSO of Torrington and WA7TXR of Hanna. W7JL has recently undergone heart surgery. WB7NHR reports the Wyoming cowboy net held 23 sess. 647 QNI, 27 QTC. Traffic: W5SQ 408, K7VWA 390, W7TZK 346, WA7SGG 14.

SOUTHEASTERN DIVISION

ALABAMA: SCM, Frank S. Brown, W4LNN — SEC: K4WYT. PAM: K4JIE. RM: N4MD. New appointments: K4ZM OBS, WB4ZN OBS. Net reports: AENB QNI 284, QTC 183, 31 sess. AENB (Novice) 258, QTC 133, 31 sess. Election results: Huntsville AIG, K4IKR, WA4OOM, vice-pres.; WB4EKJ, secy-treas.; WD4GPF, asst. treas. Muscle Shoals ARC to install a new repeater operated through a link. Congrats to WA4WYC for earning a citizenship award. WD4LUG earned AEND certificate. WN4KKN earned both AEND and AENB certificates. Enterprise ARS has charter party. Reports a growth of 35 members in just 7 months. The team of WB4JSO WB4NZF WB4TCH WD4KVM were the AL winners in the ARRL Sweepstakes contest. They worked all 75 ARRL Sections. K4UMD wins second place in ugly contest at Mt. Cheaha picnic. WD4NYL says some of the new calls are confusing. They turn out to be local instead of DX. With the FCC exams being given at hamfest's now there is lots of upgrading. Novices: WD4RME WD4RXG WD4SGK WD4RBB KA4AAPS KA4AFI KA4AFJ. Tech: WD4AXD WD4PZV WD4FXC WD4BXE WD4BBR WD4OSE WB4AFN WB4YSJ. General: WA4KSN WB4VHH WD4IYC WD4OKY WD4JDV WD4LOI WD4HYF WD4MAO WD4HBG WD4NXP WD4REK WD4KVM WA4KSN WB4VHH. Advanced: W4AZE K4YNZ WB4VSH WB4VPG WB4SAD WB4YXH WD4DHI WD4IAO WD4GZK. Extra: WD4LA. Traffic: (May) WA4JDH 1282, N4MD 458, WN4KKN 218, WA4VKD 121, WA4RND 59, K4ZM 57, W4LNN 44, WB4TKU 44, WB4RFP 17, WB4EKJ 9, WA4RMP 9, K4UMD 8, W4MHO 4, K4HJM 2. (Apr.) K4UMD 9.

GEORGIA: SCM, A. H. Stakel, K4VVC. SEC: K4SWJ. PAM: K4JNL. Congrats to W4VHC WB4DHC K4EV W4HON and WB4ZOJ making FSHR. It is a pleasure to have K4SWJ as our SEC. Let's all give him the help and support he needs to continue to have Georgia as a maximum state of readiness for emergencies. GARES QNI 75, QTC 2. CVEN No. 1 QNI 55, QTC 1. CVEN No. 2 QNI 923, QTC 41. NGSN QNI 44. WGN cw QNI 9, QTC 0, fm QNI 70, QTC 5. GGVHF QNI 134, QTC 8. GSSBN QNI 2277, QTC 211. GSN QNI 350, QTC 151. April GSN QNI 334, QTC 145. March GSN QNI 373, QTC 152. Welcome back for the summer to WB4DHC who piled up the ttc. activity in just a few days. WA3NAZ going wild on RTTY. Carrotton net state with battery backup planned. WB4TEK and W4JM report getting their work in. Interfere with their hamming. Bell Amateur Radio Club now ARRL affiliated. Schwartz of NWS spoke to W4RS about tornado spotting. WB4ZOJ now Advanced. WA4OMQ now 144.85 in and 145.45 out. Traffic: (May) WA3NAZ 169, W4FOE 128, WB4DHC 78, K4EV 40, K4NM 34, W4HON 31, W4BOA 20, WB4ZOJ 18, N4UZ 11, K4WC 11, W4JM 4, WB4TEK 4. (Apr.) N4UZ 83, K4YRL 20. (Mar.) N4UZ 77.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr. W4RH — SEC: AA4FG. RM: WB4GHU. PAM: WB4PGB/75; WA4FKE/40; WA4BSZ/VHF. Three clubs affiliated with ARRL this month — Cloverleaf Farms ARC in Brooksville; St. Andrews Bay ARS in Panama City, and Tri-County ARC in Romona Park. SMCs earned by WA4CLY, WD4NYV, W4ZMC, WB4TKU, K4JLG, and WB2GT/W4 on NFPN; and by K4FM on FMTN. N4UF did fine job preparing a history of FMTN, with help of many old timers. QFN Bulletin needs a new Editor; can you help? Over 150 attended NW FL picnic near Chipley, organized by WB4GK and Panama City ARC. WD4VVP WA4FRK and WA4SJP now Silent Keys. WA4VJP now K2VP; WA4QCX now W4PTI. WD4JWK and WD4JZA upgraded to Tech.; WD4LUG to General; WA4TNY and WB4UKX to Advanced. Five Flags ARA holding transmitter hunts on 146.52 once a month. K4HYV appointed RAGS officer for Escambia County, with WA4VRY his Asst. WB4FEB piloted WB4KI to over 330K points in phone CD Party. W4JL working DX with new TS-820S. K4CAC has first Jax 450 repeater on the air. N4FARS moving FD site to FJC North Campus. WB4BIW has a new tower. Beaches AREC meets each Tue. at 8:30 PM on 29 MHz and on 25/85 repeater; net controls are WB4FAJ WA4NKA W4SME and WD4FHD. WB4DTS moving to new church job in Jax; will still be on CW nets. WB4VMP active in last FMT; all OOs must qualify twice a year to stay Class I. Volusia/Orange County hams aided in search for two lost boys. WD4LLE WA4MFG WA4ZPB and WB4ZSH searched from the air; W4MGO and LDB acted as NCs; K3FLC WB4HSX and WB6BK4 were also active. Traffic: (May) WB4QBB 425, N4PL 398, WD4LUG 212, N4WA 40, W4MGO 161, WB4TZR 158, WD4IO 125, WB4HKP 113, WA4VLT 104, W4FZX 91, W4LDM 89, W4DFU 84, WD4HIF 82, WA4OEM 74, WB4FJY 66, WD4NYY 61, N4SS 59, W4KIX 50, WB4RIS 47, W4JL 46, WB4DTS 41, W4RH 41, WA4STZ 36, AA4FG 29, WA4EYU 24, WB4VAP 24, W4MVG 22, WA4NJI 21, WA4GHU 20, K4RNS 7, WB4VMP 5. (Apr.) WB4DTS 150, K4YX 124, WA4OEM 65, W4SME 21, K4IEJ 8.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst. SCMs: WB4AID W4KGJ. SEC: AA4WJ, ex-WB4ALH. RM: W4MEE. PAM: WB4AID WA4NBE. This was a big month for Net Certificates going to

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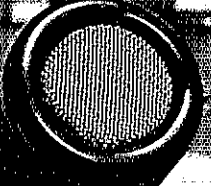
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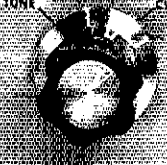
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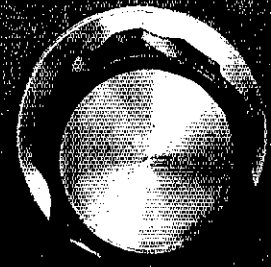
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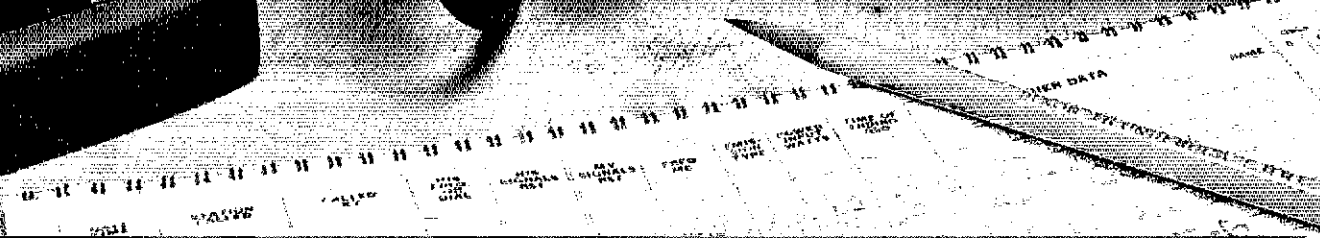
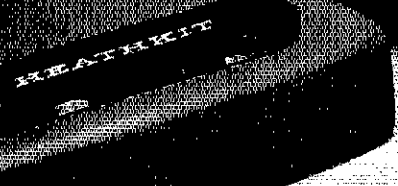
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SOUTHWEST DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DOS — PAMS: WA7KOE W7UQC, RM: W7EP, OPRC has donated \$200 to ARRL for WARC preparation work. WA7UDV is the new net manager for the Huapai ARC. The Club's new mail address is Box 3062, Kingman 86401. Awards from the Flagstar Jr. HS ARC went to WB7PLX for best DXer and to WB7MVA as most improved operator. With regret, WA7TGD and K1CW are reported as Silent Keys. Explorer Post 589 provided communications for a Scoutarama at West HS and is working on a 450-MHz repeater. WB7DQN received the Ariz. Repeater Assn. monthly achievement award in May. Net (May) Cactus 155, ATEN 111 (Apr.) SWN 214. Traffic: W7EP 158, K7UXB 145, K7NTG 74, WB7CAG 58, WB7ORT 45, WA7KOE 37, WA7YIG 29, WA7WEB 16, W7DOS 10, K7GH 8, N7EH 4. LOS ANGELES: SCM, Perry Masterson, W6RHS — May was an exciting month in the LA Section. The Lockheed Club again sponsored a great hamfest. Many people attended from all walks of life. There were more than just a few who let me know that they appreciated the effort the members put forward to make the event a success. LU1DQB assisted in a medical emergency, trying to locate 10 hospital units of Desoxyribonuclease-1. This drug was needed to save the life of a 6-year old girl. N8HE reports getting DXCC WB8BS as an Operatic Soprano. She sang in concert during the month of May and received very good reviews. K5DYB has been working DX and traffic. K6EA has gone to MN for several months. He expects to handle traffic while away from home. He will be working with the Deaf-Blind there. WB1NH has been on 20 working DX. He reports working 3B9BA. Very nice Gene is still in there with the traffic. The section reported a good traffic count for May. Lots of activity in this area. Lets keep the reports coming in even though its vacation time and the summer months are here. Now is the time to get the antenna situation well in hand. With the new sunspots going our way again there should be lots of exciting moments again. WB7RIQ is still working to improve his 20 band antennas. Don will not be left out this summer. Traffic: WB1NH 182, WB8YD 162, N6PZ 155, W6OEO 152, K5DYB 103, K6EA 88, K6CL 39, N6HE 28, W6USY 28, W6BWS 27, W6BRO 14.

SAN DIEGO: SCM, Arthur R. Smith, WB1NH — Sept. 22-24, 1978 are the dates for the ARRL National Convention to be held in San Diego at the Town & Country Convention Center. Registration forms available from K6BWT, 13031 Papago Dr., Poway, CA 92064. Contact Town & Country Hotel, 500 Hotel Circle, San Diego, CA 92108 or phone 714-291-7131 for reservations. 220 club membership has passed 100. Upgraded: WB8T, WB8B, WB8C to Technician. ARES 220 net operates each Sat. at 1900 local time on 223.5 MHz. WB8VA is net manager. So, Calif. Traffic Net has VHF session daily, at 2100, local, on WB8AKV (147.045/645 MHz). Your participation is invited. New ARES members, by districts: (Central) W6GFC W6RUL W6BSOX; (Eastern) W6BEO K6JEN N6PF; (Northern) W6BEPJ W6BGB; (Southern) K6ACY W6BEGH. Pancake breakfasts are held on second Sat. of each month at the Normal Heights United Methodist Church, 4650 Mansfield, S.D. Time: 0800-0900. All hams, families and friends are welcome. Traffic: (May) WB8FTY 235, WA6UAZ 225, N6GW 155, WB8PVH 31, WB8HUJ 58, N6AT 54, WB8SKU 47, N6RD 38, WB7SUA 31, WA6UJF 25, K6LKW 9, WA6HJL 3, WA6HGA 2. (Apr.) WB2BK 150, K6HAP 106, WB7SUA 13.

SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — Cabrillo HS ARC has a new TS820 tx to WB2SI. Canejo Valley ARC held its annual picnic at Oak Grove Park. Mike and Key Club officers are WA8QFC, pres.; WB6EDA, vice-pres.; WB6PBB, secy-treas. WB6ACU spoke at music synthesizers at Santa Barbara Club. Officers at SBARC are WB6HOZ, pres.; K6QYL, W6EMS WB6JUM, WB8TUM, K7MA, vice-pres.; N6PI, treas.; WB6CQO, secy. K6BPY spoke on antennas at Sulphur Mountain meet. WB1ET spoke on CB conversions to 10 M at Bunker Ramo ARC. Upgrades include WA6LYM

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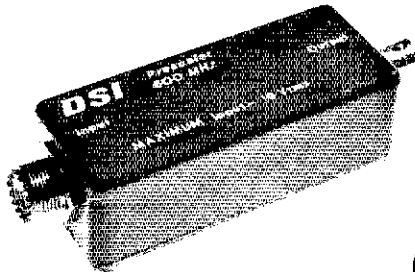
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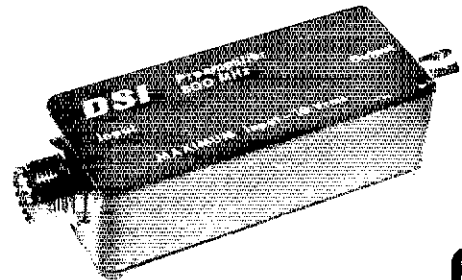


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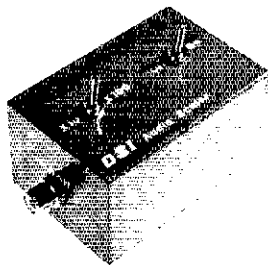


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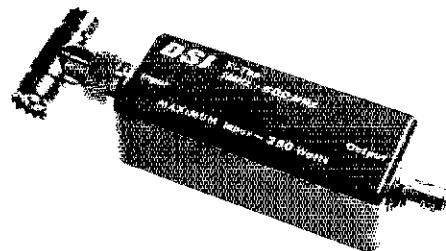


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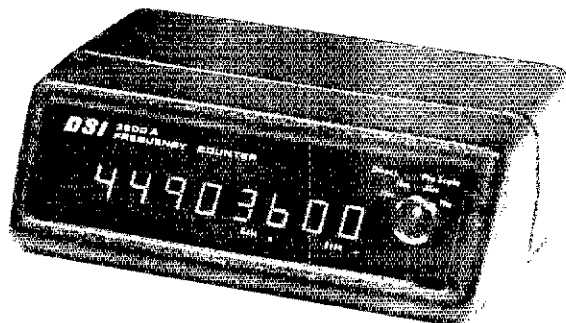
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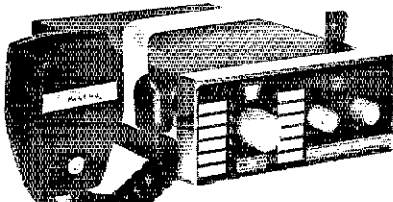
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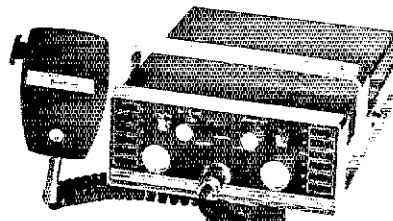
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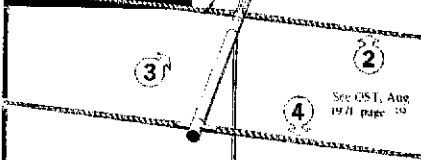
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WB8MJM WB6TUD Extra; WA6ISS WB6CBV K6DXW Advanced; WB6GDF WA6IMZ General; WD6ADG Tech.; and WD6FNW Novice. WDBBNH received WAS award. WB6QNG working DX and awaiting new 2 X 1 call. WA6PFF opened an antique radio museum. WB6IYW completing the K6TZR control system and auto patch. WA6ZMS back from trip to Hong Kong. WA6BLS recovering from 2 operations. WB6AHI building a 1TY TV display. WB6CTA working in Africa. WB6JMK sent 54 QSL's in May and 48 in Apr. WB6ZRR sent 39 and is looking for more 10/70 RTTY activity in San Luis Obispo. N6NB set up his massive array on the UTINY border for EME DXpedition and provided WAS for a couple of more stations on 2 meters. N6YH operating the Pacific Traffic Net. K6SZS continues to send bulletins despite cataract surgery. W6TAH suffered a broken wrist. N6PI K6GYL and WB6HOZ gave a fantastic amateur radio demo to the annual Calif. Stag cruise to Catalina Island. WA6HCX appointed Santa Barb Co. Coordinator of Emergency Services. Traffic: W6KON 305, N6WP 98, WA6MBZ 64, K6YD 50, N5MR 46, K6WI 44, N6YH 29, N6MA 24.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Ted Heithecker, W5EJ — Asst. SCM/SEC: K5PC, RMS: W5GN, PAM: W5GSN. FC reports from WB5WOC WB5LST WB5LAT WB5BJY WB5GZB K5HT W5TKU WB5DUJ K5ZNF W5CUI WA5KZA. OO reports: W5OPX WA5UBK. 113 out of the 145 countries in our section now have active ARES units in operation. Your participation in this vital service is deeply needed. For the name of your local Emergency Coordinator, contact K5PC; 1313 Applegate Ln., Lewisville, TX 75067; 214-221-2222. WB5HMB made WAS; building up an SB-200. All East Texas ECs involved in setting up new "Skywarn" program; to work with Shreveport NWS Office. W5SCOF sporting new gear; has caught "RTTY bug." Congrats to WD5BDC, new net mgr. of Southwest TX Net. Golden Spread Convention in Amarillo, Aug. 11-13, don't miss this one! PR dept: Lampasas/Mills ARES Unit added Bike-A-Thon in Apr. with WB5RPU W5GFR WD5JLF WD5AAT W5LKT and WD5HEZ manning the route. Assisting the U.S.C.G. Aux. at Lake Texoma for "Safe Boating Week" were WB5ROR WB5DCL WB5JLN WB5ROR WB5SBO N5EW W5RCO WB5DCL W5SIS WB5LFN K5ZNF WB5PRC using Dallas ARC mobile comm. trailer (W5FC). Public Service Honor Roll for May: K5SOR WB5LAT W5VMP and WB5SD. Hurricane season is upon us — NTS needs your QNL! Traffic: WB5DD 443, K5MC 134, WD5BDC 104, W5VMP 89, WB5LAT 72, WB5FRQ 56, K5PC 44, WB5BKM 41, W5GSN 40, WD5AAT 39, W5CTZ 34, K5SOR 29, W5SEZT 26.

OKLAHOMA: SCM, Leonard Hoilar, WA5FSN — Congratulations to all who have worked so hard and now are reaping the fruits by having upgraded your licenses. May traffic reports and participation reports are a bit lower than last month. Band conditions have not been the best for evening nets. There is a great need for our Traffic Nets at this time. We must support them as much and as often as possible. The training received is invaluable in emergency operations. It is interesting to hear the various ideas on what is the best antenna to use while "trailing" around the state. We should see some of them out on Field Day. Have several leadership changes in the making. Should have them finalized by next month along with new cards and certificates for all 200 points. Okla. Nets: OFON 1700 local M-F; 3900 kHz; STN 1730 local M-S, 3850 kHz; OTWKN, 1745 local M-S, 3900; OAN 1830 local M-F, 3705 kHz; OL 2 1900 local daily 3882.5 daily; OPEN 0800 Sat. Traffic: WB5NKC 479, W5REC 236, K5QWK 235, WB5NKC 199, W5RBR 164, W5UYH 89, W5BYC 72, WB5EAY 59, WA5CJY 52, W5SUG 36, WB5ELG 26, K5CAY 25, WB5OCZ 23, W5VOR 23, WD5ETB 20, WA5FSN 20, W5FKL 12, W5JJB 3.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR — Asst. SCM/PAM: N5TC, SEC: WB5LHK, RM: WA5RKU. OO reports this month: K5DAE K5DL OVS reports this month: WD5HJB. QTS N5FN reports upgrades: WB5HWO to Advanced; WD5JAV WD5JAW to General; WD5ZB to Technician. ORS WA5JYH building accumulator for FD-78. WB5ZRH worked W6HCO on 146.52 MHz May 12 using 13 watts and eleven-element beam; W6HCO used two eleven-element beams and 10 watts; distance is about 1300 miles. AC2 ARC, Alvin, reports upgrades: WD5IXJ to General, WD5DDI to Extra. Coastal Bend ARC Digest (Corpus Christi) reports upgrades to Extra: WB5YLI W5L0D WB5VKM. Brownsville Repeater Organization holds "fox hunts" once each month; first three winners are WB5WRB WB5URY K5DG. CHARRO (Brownsville club) reports upgrade: WD5CLF to technician. Again time to remind all Southern Texas hams that in need reports of all types of activity, not just traffic, if it interests you, it is bound to interest others. Traffic: (May) W5KLV 500, K5ZRR 352, N5TC 202, WA5RKU 153, N5FN 108, WA5JYH 99, W5BCE 83, WB5MMI 56, K5DG 37, K5ZSI 33, K5RG 22, W5KR 12, W5YDA 4, WB5LTV 2, K5RVF 2 (Apr.) K5DG 32, W5AC 10. (Mar.) K5DG 17.

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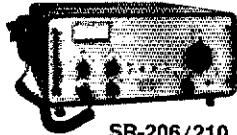
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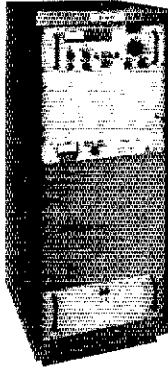


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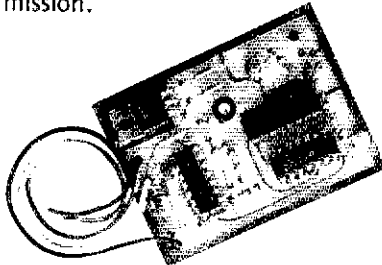
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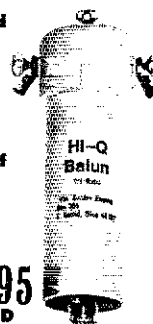
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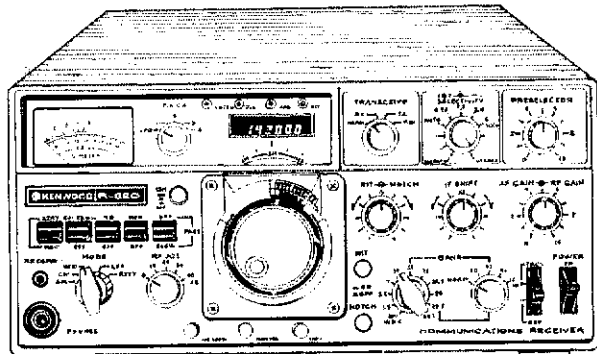
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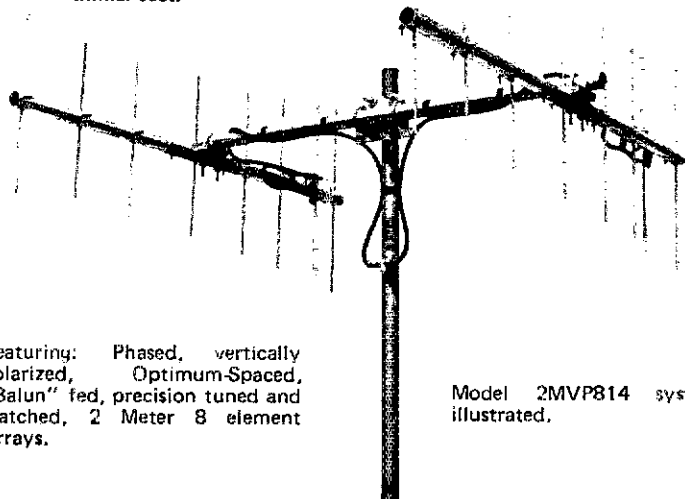
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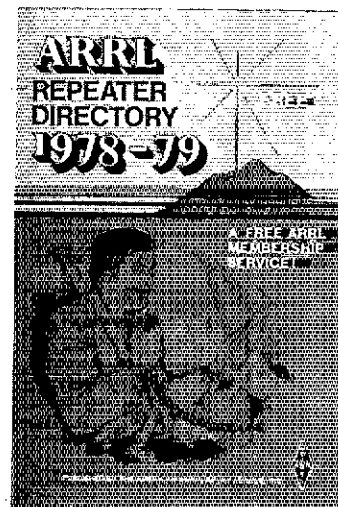
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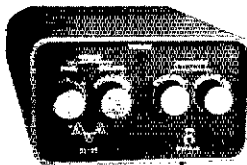
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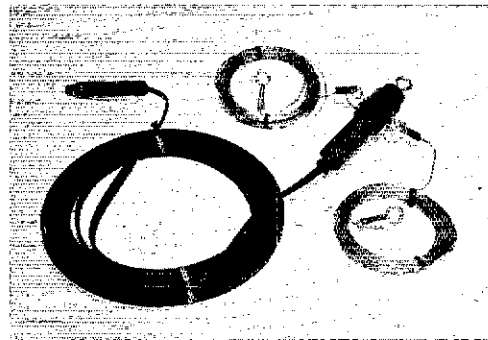
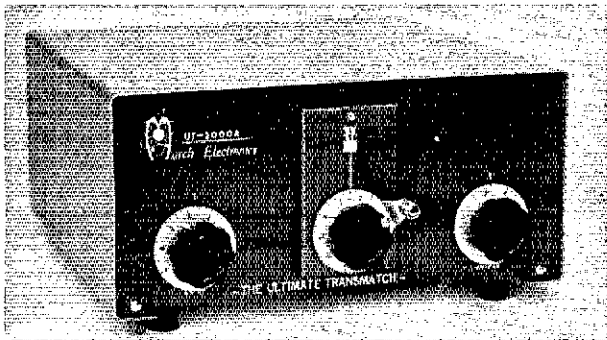
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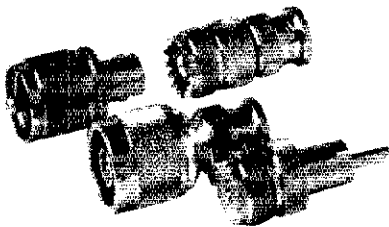
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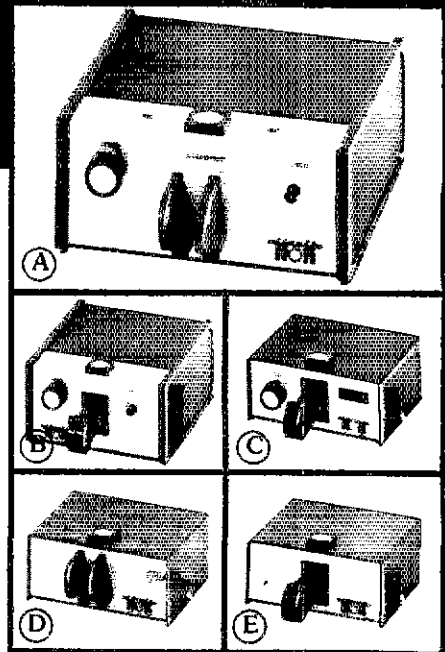
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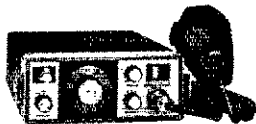
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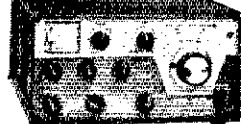
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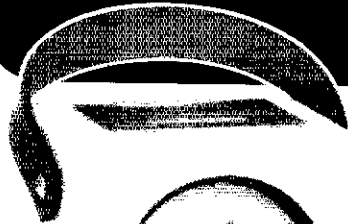
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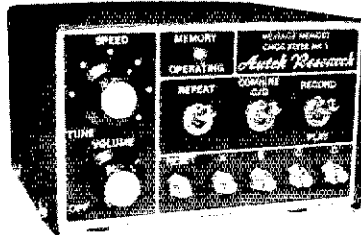
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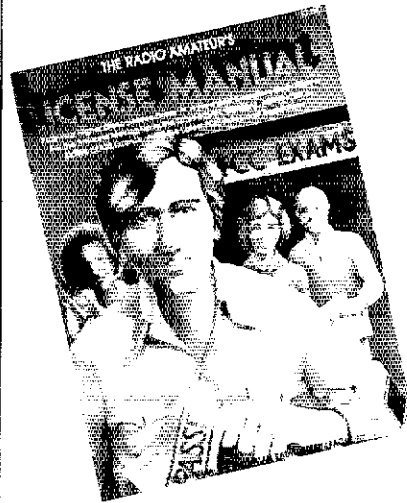
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LTRS [Shift -] FIGS [Shift .]

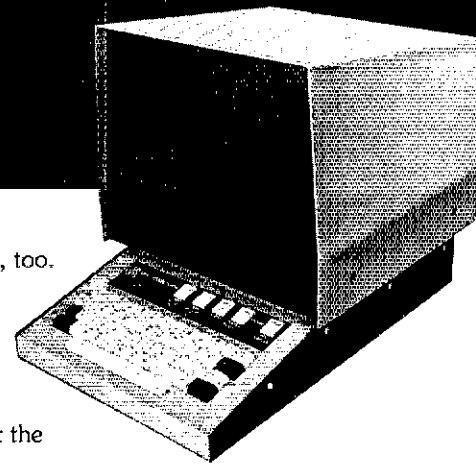
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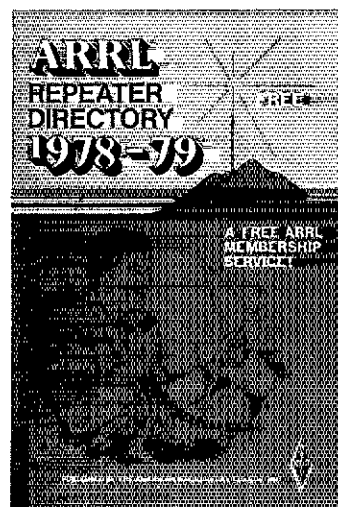
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100 watts	30A	30C	30D	30E
250 watts	50A	50C	50D	50E
500 watts	100A	100C	100D	100E
1000 watts	200A	200C	200D	200E

MODEL 43
Elements (Table 1) 2-30 MHz \$120
Elements (Table 1) 25-1000 MHz 42
Carrying case for Model 43 & 6 elements 36
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16

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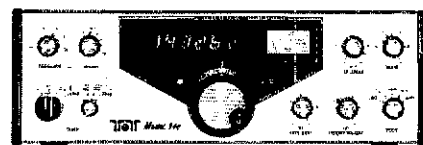
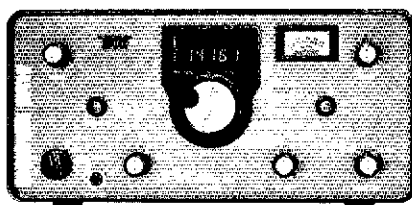
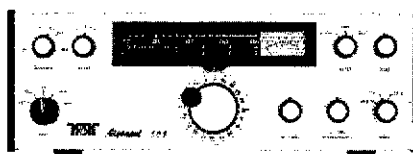
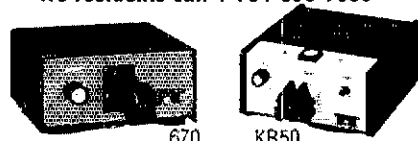
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6.73R	7.03R
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6.775R	7.12R
6.19T	7.75T
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6.82R	7.18R
6.25T	7.81T
6.85R	7.21R
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6.46T	7.36R
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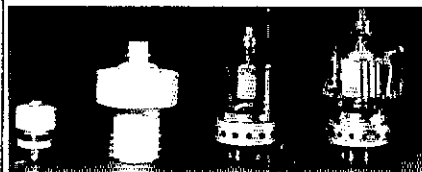
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(1) Advertising must pertain to products and services which are related to amateur radio.

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(3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied.

(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date.

(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc. 1409 Cooper Drive, Irving TX 75061.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't., police etc. invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE Sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P. O. Box 173, Huntington NY 11743.

EDITING a club paper? Need public relations help? You should belong to the Amateur Radio News Service. For information write: Doris Dennstaedt, WA3HEN, 303 N. Hammonds Ferry Rd., Linthicum Heights MD 21090.

QST AND CQ 1950-1975 issues for sale. Send s.a.s.e. if ordering 73, Ham radio, or other QST and CQ issues. One dollar minimum order and all issues cost 25c each, including USA shipping. Send chronological list and full payment to W6LS, 2814 Empire, Burbank, CA 91504. Available issues and refund sent within one month.

RADIO Museum now open. Free admission, 15,000 pieces of equipment from 1850 telegraph instruments to amateur and commercial transmitters of the 1920s. Amateur station W2AN. Write for information: Antique Wireless Assn., Main St., Holcomb, NY 14469.

WARREN, Ohio Hamfest — Sunday, August 20, 1978; Trumbull K.S.U. Campus, Route 45 at Warren, Outerbelt. 21st Big year with the famous flea market. All close-in parking; takes and parks nearby. Commercial displays, talk-in stations. \$2 door registration. Arrowsign lead from I-90; I-90, Ohio Routes 5, 11 & 45. Details? QSL: Hamfest, Box 809, Warren, OH 44482.

HAMFESTERS 44th Annual Picnic and Hamfest, Sunday, August 13, 1978 at Santa Fe Park, 91st and Wolf Road, Willow Springs, Illinois, Southwest suburb of Chicago. Exhibits for OM's and XYL's, Famous Swappers Row. Tickets at gate \$2, advance \$1.50. For Hamfest info or advance tickets (send check or money order, s.a.s.e. appreciated) to Bob Hayes W9KXW, 18931 Cedar Ave., Country Club Hills, IL 60477.

PEORIA: 21st Hamfest, September 17, same place as last year. For further details, see September Hamfest Calendar or write John Sutton WD9BJJ, 608 W. Teton Drive, Peoria, Illinois 61614. Advance tickets \$1.50; Door tickets \$2.00. All manufacturers, suppliers and forums inside — Write for table reservation forms.

FOX River Radio League Hamfest. New location: Indoors — Kane County Fairgrounds St. Charles, Illinois — Sunday, August 27th Tickets: \$2 at gate, \$1.50 advance. Contact: Don Gerridge, WB9PAC, 2303 Deerfield Way, Geneva, IL 60134.

BYTE, Drink and be merry at the Tidewater Hamfest, Flea Market and Computer show, Norfolk, Virginia. September 23-24. Over 60,000 sq. ft. of exhibit and flea market space. All indoors. All air conditioned. Write TRCI, P. O. Box 9371, Norfolk, VA 23505.

BLUEFIELD West Virginia Hamfest August 27th. Indoor and outdoor flea market space for individuals and dealers \$5. For more information, contact "Fuzz" WA8RHT, Washington St., Bluefield, WV 24701.

THE SANGAMON Valley Radio Club of Springfield, Illinois holds its Third Annual Hamfest on Sunday, September 24th. Location — Sangamon Co. Fairgrounds in New Berlin, 16 miles west of Springfield. Indoor display area and covered pavilion. Hear Hugh Vandegriff WA4WME talk on the Clipperton Atoll DX-pedition! Various exhibits, kids activities and food available. Overnite camping. Tickets: \$1.50 advance, \$2 at gate. Information — AJ K9QFR; Tickets — Carole WB9QWR, write c/o 1025 S. Sixth, Springfield, IL 62703.



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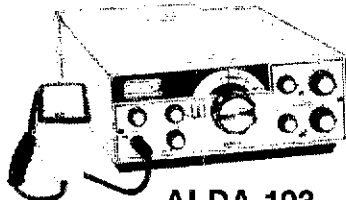
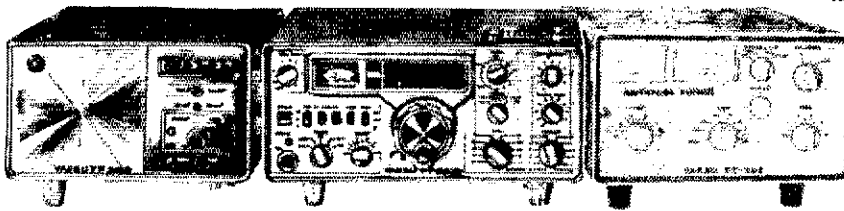
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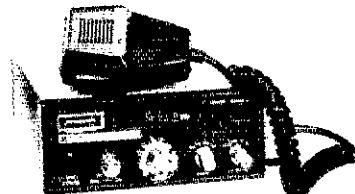


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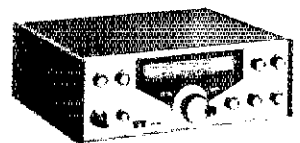
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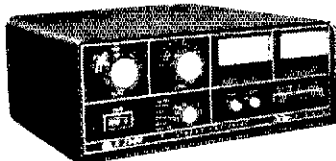
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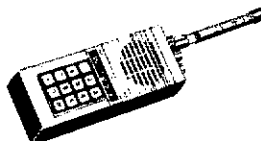
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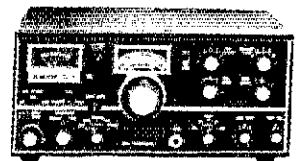
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KENTUCKY — The Lexington Bluegrass Amateur Radio Club will host its annual hamfest August 13th, starting 8:00 A.M. at the National Guard Armory. Talk in 16/76. Forums, indoor exhibit area, paved flea market area. Advance tickets \$2.50, \$3 at door; Flea market spaces \$1.00 extra. For more information, contact Paul Heflin, WA4PAB, 434 Potomac Drive, Lexington, KY 40503. Phone 606-278-0646.

GOODIES, Electronics & More. Tri Club hamfest July 16 Allentown. Information s.a.s.e. K3AI R1 Box 104 Emmaus, Pennsylvania 18049.

ELMIRA, New York Hamfest — September 30th, from 9-5, free flea market, tech talks and more! For tickets and info, contact WA2FJM, John Breese, 340 West Avenue, Horseheads, New York 14854.

CINCINNATI Hamfest: 42nd annual — Sunday September 17, 1978 at Stricker's Grove on State Route 128, one mile west of Ross (Venice) Ohio. Exhibits, good food, refreshments, flea market (radio related products only) music, good fellowship, hidden transmitter hunt and sensational air show. No increase in cost, same as last year — \$7.50 in advance. For further information: Lillian Abbott, K8CKI, 1424 Main Street, Cincinnati OH 45210.

23RD Annual York County PA Hamfest September 3rd, rain or shine. 8:00 A.M. to 4:30 P.M. Registration \$3. All male adults are expected to register, XYLs and children free. Extra charge for tailgate sales — \$1. per space. Location US 30 Dragway at Thomasville Airport 10 miles west of York on US Rte. 30. Talk-ins 146.37-97, 146.53-52, 147.93-33. Fly-ins right to the site. Saturday night self contained campers welcome. Display tables under roof by advance reservation. full service cafeteria, clean restrooms. Contact Leroy Frey, K3POR, 170 S. Albermarle St., York, PA 17403. 717-854-1203.

LANSING, MI — C.M.A.R.C. Swap-Shop Oct. 1, 1978, Grand Ledge High School, food-tables C.M.A.R.C. Box 10073 Lansing, MI 48901.

THE COCHISE Amateur Radio Association will hold its 4th annual Cochise Amateur Radio Round-Up on the 9th of September, 1978. Place and Time: The Sierra Vista Community Center, starting at 0900 hours. Talk-in on 16/76 and 52/52. For tickets and more info, write CARA, P. O. Box 1855, Sierra Vista, AZ, 85635. Tickets are \$3.

FINDLAY Hamfest — 36th Annual — Riverside Park, Findlay, Ohio. One of Ohio's finest hamfests, giant flea market, 2-meter xmitter hunt, MRS. P.O.N., Buckeye Belles, ssb, net meetings. Talk-in 75/15 and 52/52. Advance tickets \$2. at the gate \$1.50. For tickets and additional information send a s.a.s.e. to Clark Foltz, W8UN, 122 W. Hobart, Findlay, OH 45840.

QSL Cards

TRAVEL-PAK QSL Kit — Send call and 25c; receive your call sample kit in return. Samco, Box 203, Wynantskill NY 12198.

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QSL Forwarding service — 30 cards per dollar. Write: QSL Express, 30 Lockwood Lane, West Chester, PA 19380.

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QSLs — The KØAAB collection plus many new custom designs. Send No. 10, 28c, s.a.s.e. for free samples and prices. Marv WØMGI, 2095 Prosperity Ave., St. Paul, MN 55109.

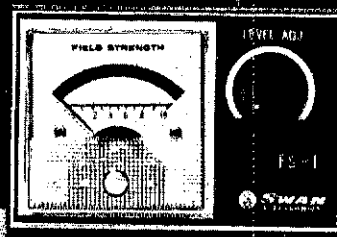
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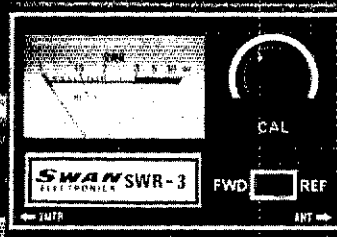
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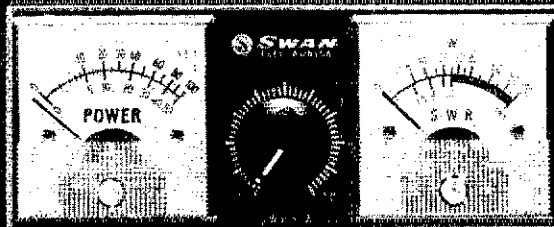
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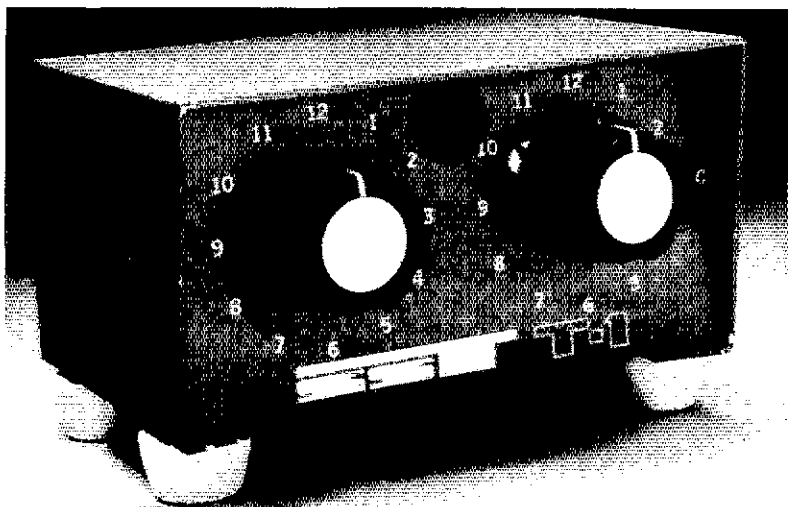


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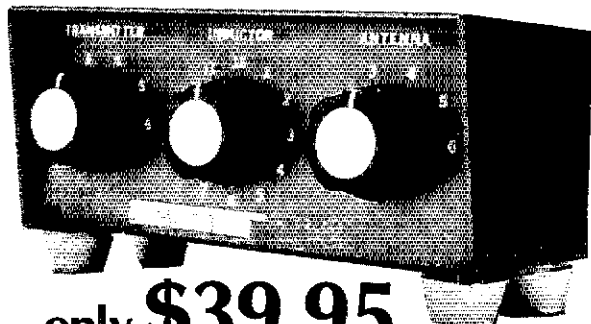
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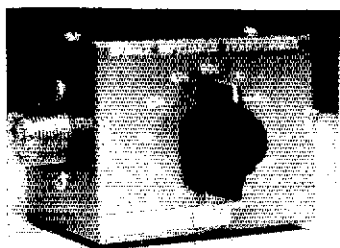
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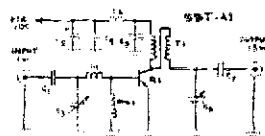
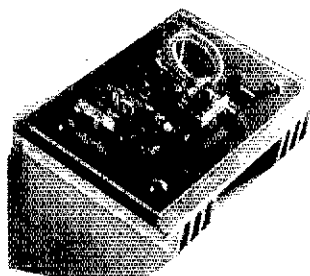
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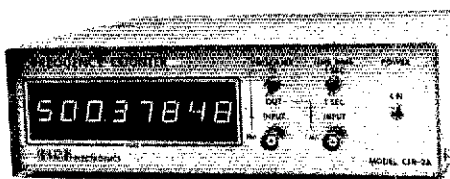
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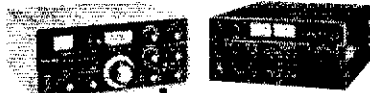


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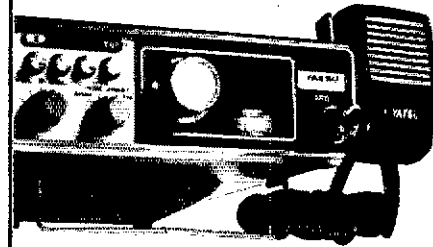
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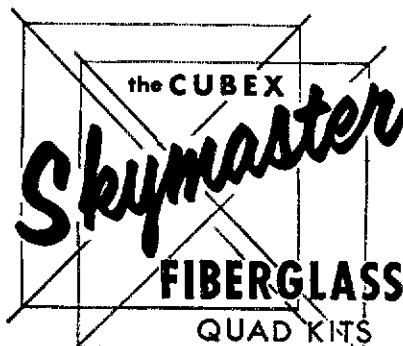
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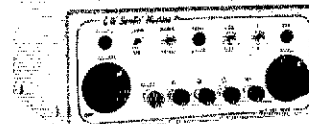
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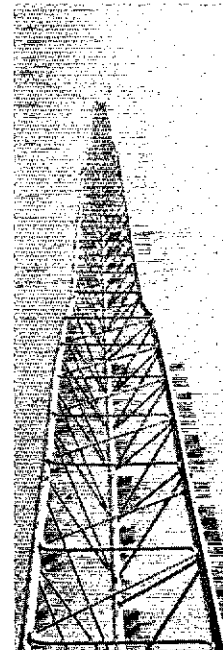
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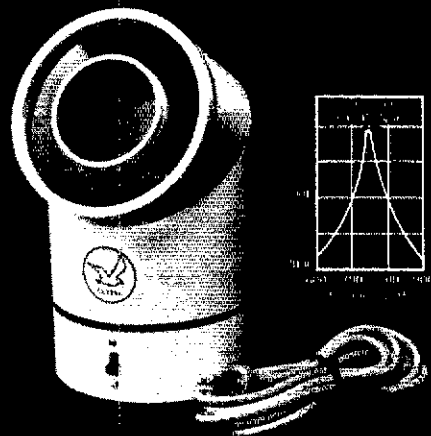
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	#N7400	\$1.29	\$2.50		#N7462	.38	.76		#N74140	.45	.90
	#N7401	.19	.38		#N7464	.19	.38		#N74141	1.79	3.58
	#N7403	.25	.50		#N7465	.19	.38		#N74145	.69	1.38
	#N7404	.19	.38		#N7470	.19	.38		#N74151	1.29	2.58
	#N7405	.19	.38		#N7471	.35	.70		#N74153	2.29	4.58
	#N7406	.19	.38		#N7472	.19	.38		#N74154	1.78	3.56
	#N7407	.39	.78		#N7473	.59	.90		#N74155	.79	1.58
	#N7409	.39	.78		#N7474	.59	.90		#N74156	.39	.78
	#N7410	.25	.50		#N7475	.79	1.58		#N74157	.79	1.58
	#N7411	.79	1.58		#N7476	.79	1.58		#N74158	.99	1.98
	#N7413	1.19	2.38		#N7478	.19	.38		#N74161	1.25	2.50
	#N7416	.35	.70		#N7479	.19	.38		#N74162	1.39	2.78
	#N7418	.35	.70		#N7481	.99	1.98		#N74163	.79	1.58
	#N7420	.32	.64		#N7482	.29	.58		#N74165	.99	1.98
	#N7421	.49	.98		#N7483	.49	.98		#N74166	.99	1.98
	#N7422	.29	.58		#N7484	.79	1.58		#N74168	1.99	3.98
	#N7423	.49	.98		#N7485	3.49	6.98		#N74173	.99	1.98
	#N7424	.49	.98		#N7486	2.29	4.58		#N74174	1.29	2.58
	#N7430	.29	.58		#N7487	1.29	2.58		#N74175	.99	1.98
	#N7432	.45	.90		#N7492	.79	1.58		#N74177	.79	1.58
	#N7437	.19	.38		#N7493	.69	1.38		#N74179	1.99	3.98
	#N7444	.29	.58		#N7494	.79	1.58		#N74180	.49	.98
	#N7440	.19	.38		#N7495	.59	1.18		#N74182	.49	.98
	#N7443	.59	1.18		#N7496	.29	.58		#N74190	1.99	3.98
	#N7448	1.25	2.50		#N7498	.79	1.58		#N74191	1.75	3.50
	#N7447	1.25	2.50		#N7499	1.29	2.58		#N74192	.49	.98
	#N7448	1.25	2.50		#N7500	1.29	2.58		#N74193	.99	1.98
	#N7451	.25	.50		#N7501	1.29	2.58		#N74194	1.25	2.50
	#N7452	.19	.38		#N7502	1.29	2.58		#N74195	1.25	2.50
	#N7453	.19	.38		#N7503	1.29	2.58		#N74196	1.25	2.50
	#N7454	.29	.58		#N7504	1.29	2.58		#N74197	1.25	2.50
	#N7455	.19	.38		#N7505	1.29	2.58		#N74198	1.25	2.50
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#LM301V	.45	.90	#LM300T-15	1.49	2.98	#LM709N	.49	.98
#LM301H	.45	.90	#LM300T-24	1.49	2.98	#LM733N	.79	1.58
#LM307V	.45	.90	#LM300T-30	1.49	2.98	#LM7310	.45	.90
#LM308V	.45	.90	#LM300T-36	1.49	2.98	#LM741H	.30	.60
#LM308H	.45	.90	#LM300T-48	1.49	2.98	#LM747H	.59	1.18
#LM309K	1.49	2.98	#LM300T-60	1.49	2.98	#LM1304	1.49	2.98
#LM311V	.25	.50	#LM300T-72	1.49	2.98	#LM1310	2.49	4.98
#LM311H	.25	.50	#LM300T-96	1.49	2.98	#LM1414V	.19	.38
#LM318V	.99	1.98	#LM300T-120	1.49	2.98	#LM1558V	.39	.78
#LM320H-5	.99	1.98	#LM300T-144	1.49	2.98	#LM1800N	.59	1.18
#LM320H-15	.99	1.98	#LM300T-180	1.49	2.98	#LM3028H	.65	1.30
#LM320H-30	.99	1.98	#LM300T-240	1.49	2.98	#LM3900N	1.25	2.50
#LM322N	1.19	2.38	#LM300T-300	1.49	2.98	#LM529V	1.49	2.98
#LM324N	1.79	3.58	#LM300T-360	1.49	2.98	#LM4250	1.20	2.40
#LM333N	1.79	3.58	#LM300T-480	1.49	2.98	#LM75451	.69	1.38
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#LM340K-12	1.49	2.98	#LM300T-720	1.49	2.98	#LM75459	.80	1.60
#LM340K-18	1.49	2.98	#LM300T-960	1.49	2.98	#LM75492	.80	1.60
#LM340K-24	1.49	2.98	#LM300T-1200	1.49	2.98	#LM75494	.60	1.20
#LM340T-6	1.49	2.98	#LM300T-1500	1.49	2.98	#P2623	1.50	3.00
#LM340T-8	1.49	2.98	#LM300T-1800	1.49	2.98	#DM556-N	1.29	2.58
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#M2380	IN4004	400	10 for \$5	20 for \$7.6	
#M2381	IN4005	600	10 for \$5	20 for \$7.6	
#M2382	IN4006	800	10 for \$5	20 for \$7.6	
#M2383	IN4007	1000	10 for \$5	20 for \$7.6	

25 AMP BRIDGE RECTIFIERS

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1/2 AMP	10 for	5 for	20 for
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#100V	10 for \$39	5 for \$20	20 for \$60
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Cat. No.	Type	1¢ Sale!	1¢ SALE!
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#10 25 P.C.	10 for 1.00	5 for 1.01	20 for 1.01
#10 25 P.C.	10 for 1.00	5 for 1.01	20 for 1.01
#10 25 P.C.	10 for 1.00	5 for 1.01	20 for 1.01

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Cat. No.	Each	2 for	1¢ SALE!
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#200	2.19	4.38	1.97
#400	4.39	8.78	3.97
#800	8.79	17.58	7.97
#1000	13.19	26.38	11.97

10 AMP - POWER TABS! #M1448 - TRIACS #M1590 - QUADRACS

PRV	Each	2 for
#50	\$.58	\$1.16
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#200	1.58	3.16

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Order by Cat. No.	1¢ SALE!
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#M2190 JUMBO RED CLEAR LEDS	

ZENERS! Order by Cat. No. #M5210A & voltage & wattage

1 Watt	5 for \$1.	10 for \$1.01
#7.5V	5 for \$1.	10 for \$1.01
#9.1V	5 for 1.01	10 for 1.01
#11V	5 for 1.01	10 for 1.01
#13V	5 for 1.01	10 for 1.01
#15V	5 for 1.01	10 for 1.01

Order by Cat. No. #M5210B

5 WATTS	1¢ SALE!
#2.3V	3 for \$1.6 for \$1.01
#3V	3 for 1.6 for 1.01
#3.3V	3 for 1.6 for 1.01
#4.7V	3 for 1.6 for 1.01
#5.1V	3 for 1.6 for 1.01
#15V	3 for 1.6 for 1.01
#18V	3 for 1.6 for 1.01
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3% DIGIT LCD WRITWATCH DISPLAY, (#M3960)	1 for \$1.19	6 for \$1.20
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#MAN-4 READOUTS, bubble, red, com. anode, 19" (#M1503)	2 for 1.00	4 for 1.01
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#1 8-DIGIT READOUT, led, com cathode, red (#M1949)	1 for 1.95	2 for 1.96
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SPDT 12V BLOCK RELAY, 5A contacts (#M4032)	Each	2 for
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SPDT 12V SENSITIVE, 2000 ohm coil (#M3044)	1.49	2.98
1 - SPST 24V REED RELAY, norm open, 8 style, 12 ohms (#M5175)	1.48	2.96

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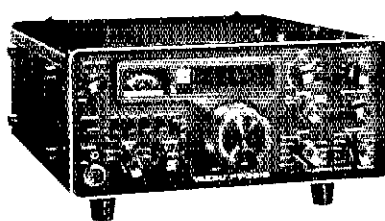


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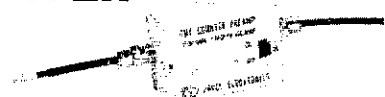
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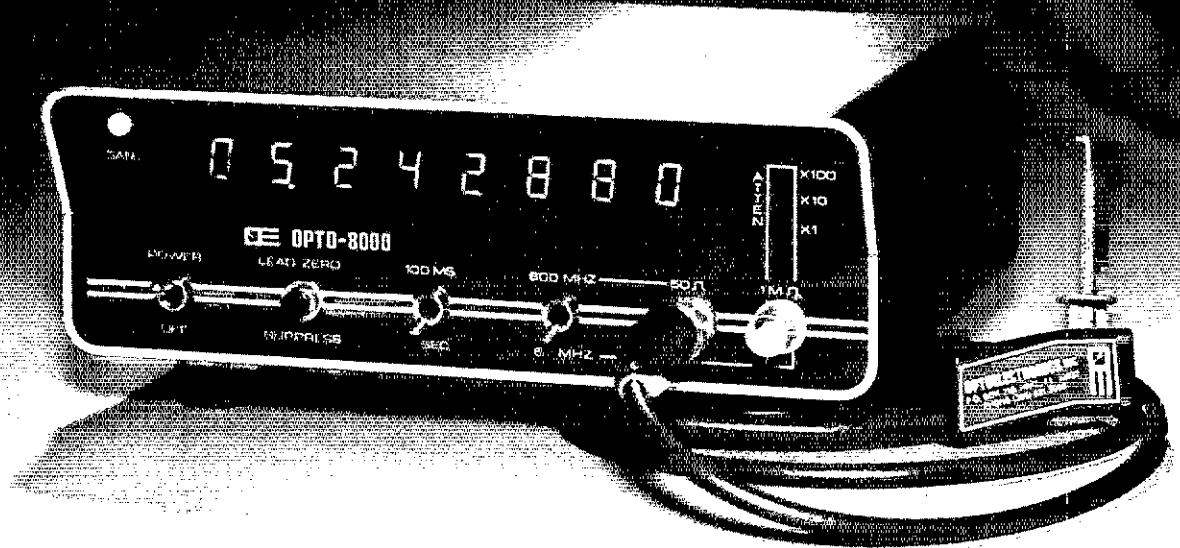


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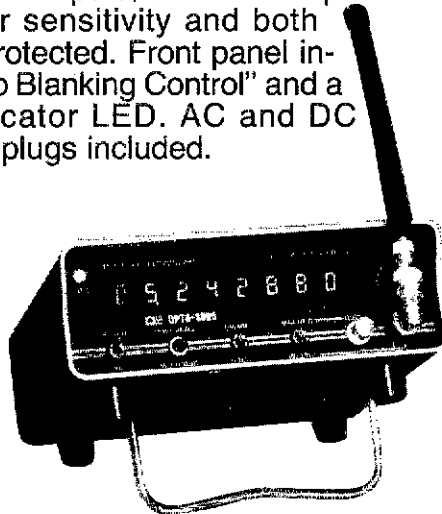
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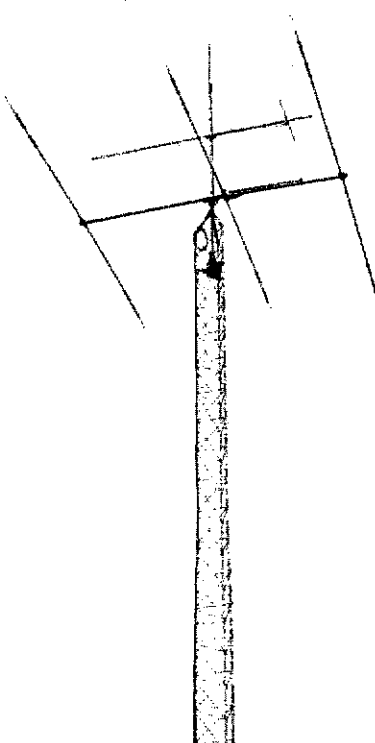
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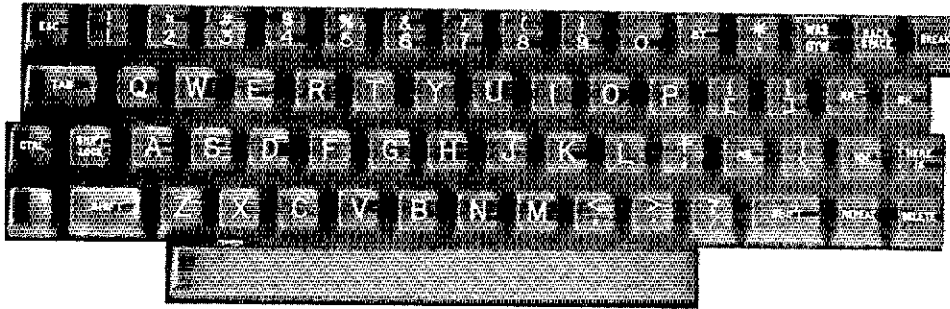
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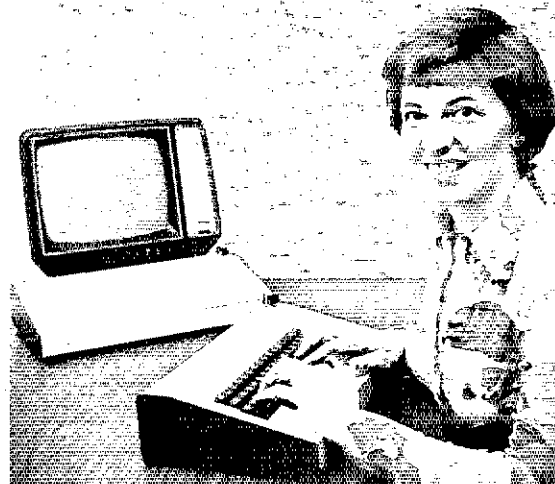
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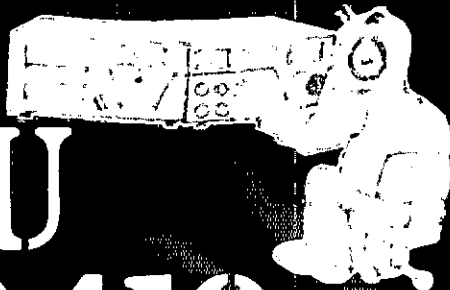
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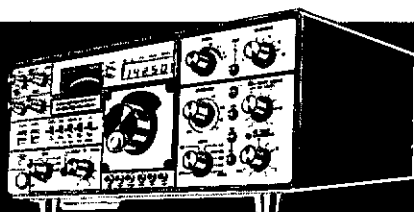
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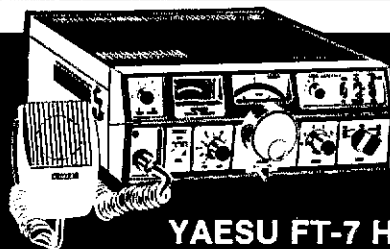
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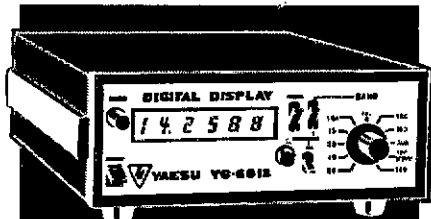
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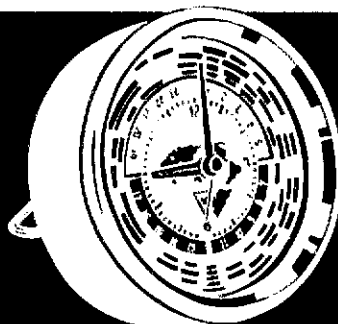
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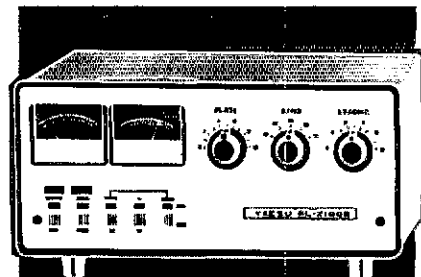
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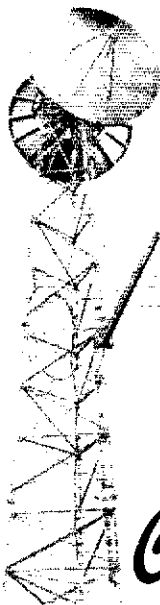
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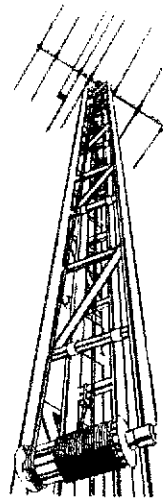
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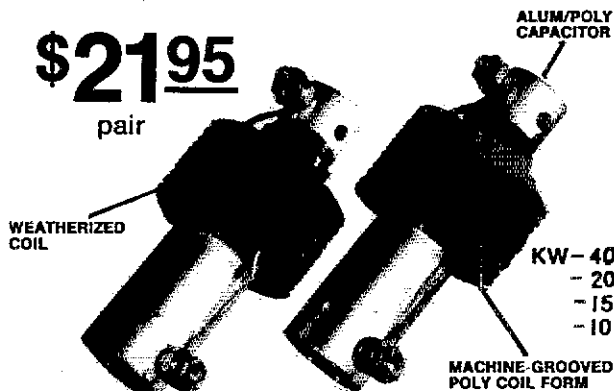
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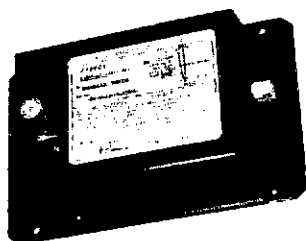
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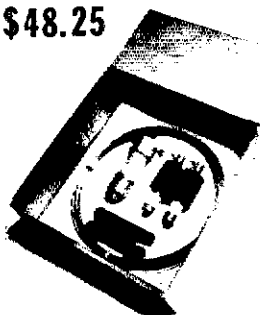


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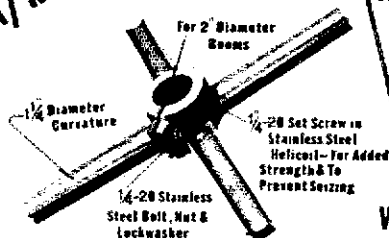
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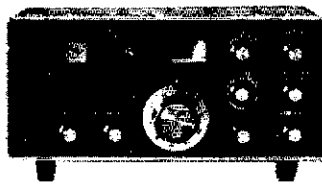
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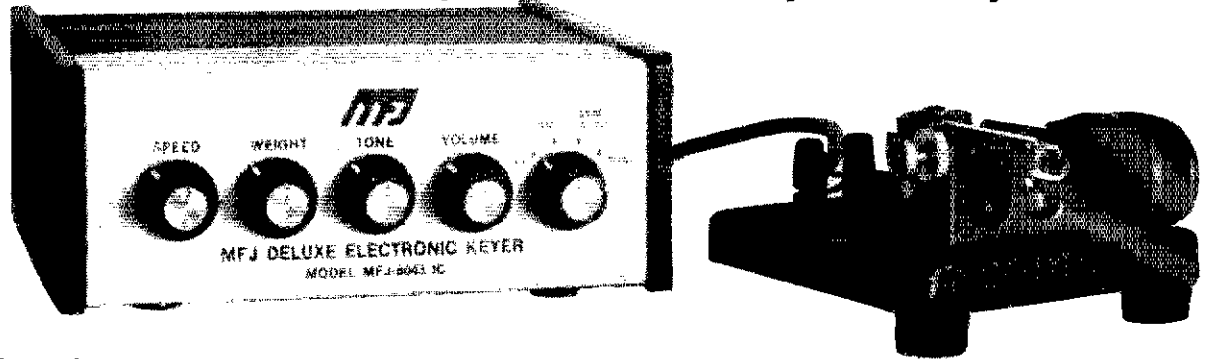
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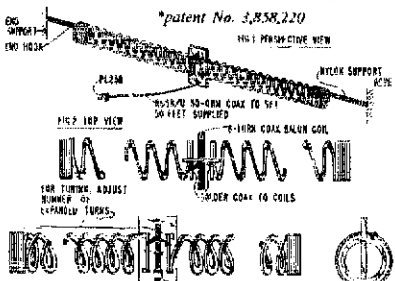
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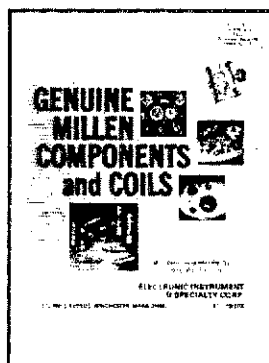
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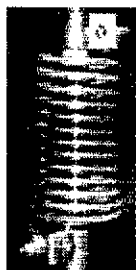
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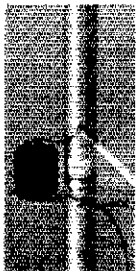
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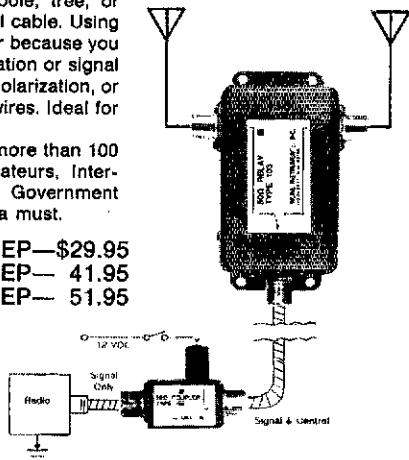
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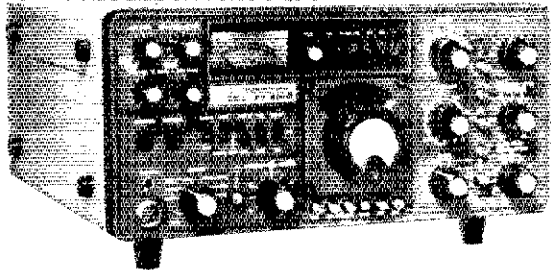
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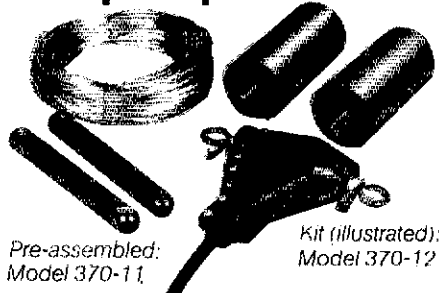
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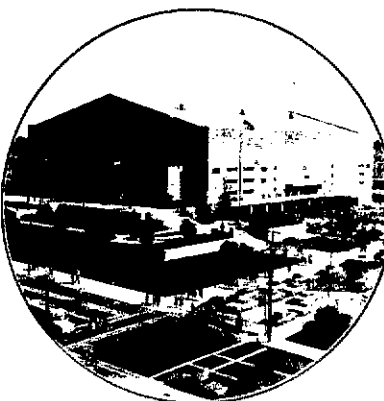
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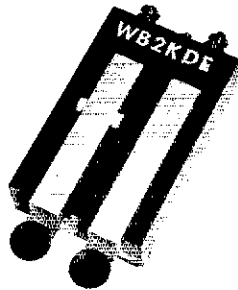


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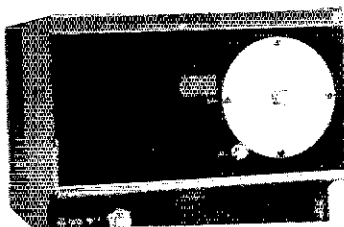
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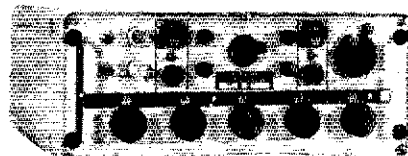
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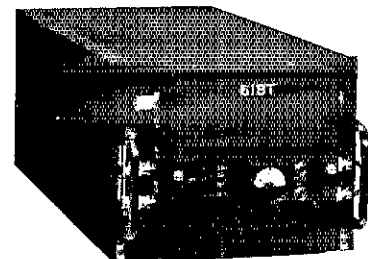
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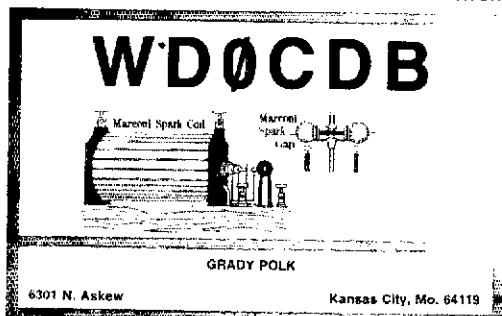
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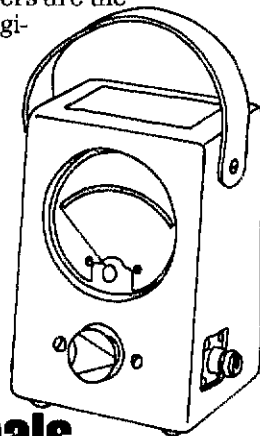
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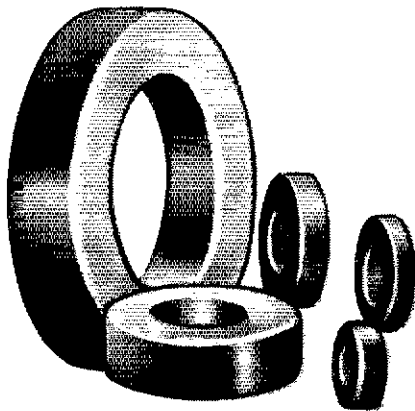
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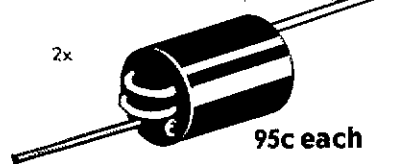
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Index of Advertisers

AGI Electronics: 147
ALDA Communications: 103
Alliance Manufacturing Co.: 82
Amateur Electronic Supply: 107, 108, 126, 145, 153
Amateur License Instruction: 164
Amateur Radio Supply of Nashville — ARSON, Inc.: 104
Amateur Radio Supply of N. Atlanta — ARSON, N. Atlanta, Inc.: 105
Amateur Wholesale Electronics: 100, 101
American Radio Relay League: 76, 113, 115, 117, 119
Amidon Associates: 106
Anphenol RF Division: 131, 132
Antenna Supermarket: 159
ARRL National Convention — San Diego: 116
Art's Engraving: 164
Atlantic Surplus Sales: 145
Atronics: 118, 164
ATV Research: 163
Autek Research: 109, 134
Autocode: 128
Barker & Williamson: 162
Barry Electronics: 157
Benchet, Inc.: 98
Bob's Amateur Radio Center: 140
Butternut Electronics: 161
C Comm: 162
CFP Communications: 108
CW Sendin' Machine: 146
Caddell Coil: 108
Clegg Communications: 95, 149
Cohoon Amateur Supply: 37
Command Productions: 92
Communications Center: 111, 112
Communications Services: 140
Communications Technology Group: 134
Cubex Company: 146
Cushcraft: 5, 78
DGM Electronics: 86
DSI Instruments: 124, 125
D & V Radio Parts: 132
DX Engineering: 92
Dames, Ted: 140, 164
Damon Electronics: 92
Davis Electronics: 110, 145
Dentron Radio: 4
Dielectric Communications: 165
Drake, R. L.: 96, 97
Dynamic Electronics: 132
ETL Electronics: 155
Easy Way Stores: 162
Ehrhorn Technological Operations: 84
Electrocom Industries: 155
Electronic Distributors: 109
Electronic Research Corp. of Virginia: 130
ElectroSpace Systems: 145
Fair Radio Sales: 160
General Electric: 123
Germantown Amateur Supply: 141
GLB Electronics: 127
Gothau: 98
Greater Louisville ARRL Hamfest: 118
Greene Insulator: 132
Group III Sales: 127
HAL Communications: 137
Ham Radio Center: 135
Ham Radio Outlet: 76, 77
Hamtronics: 133
Harrison Radio: 129
Hartwell's Office World: 131
Hawkeye Ham & Computer Fest: 163
Heath Company: 120, 121
Heights Manufacturing: 147
Henry Radio Stores: 1, Cover II
Hewlett-Packard Co.: 89
Hy-Gain Electronics: 80
ICOM: 2
Inline Instruments: 161
International Crystal Mfg. Co.: 7
Interproducts: 145

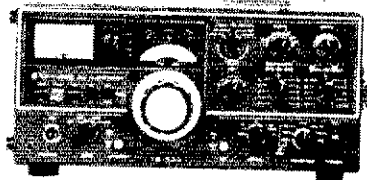
Ivy Communications: 122
Janet Laboratories: 127
Kengore Corp.: 122
Kirk Electronics: 126
Kryder Electronics: 138
LaRue Electronics: 114
Latin Radio Laboratories: 109
Leader Instruments: 106
Long's Electronics: 156
MC Division: Electronic Instrument & Specialty Corp.: 160
MFJ Enterprises: 122, 146, 160, 168
Madison Electronics: 136
Mierling Corp.: 154
Mid Com Electronics: 116
Midland International Corp.: 79
Mini-Products: 118
Murch Electronics: 131
N & G Distributors: 142
New Orleans Hamfest-Computerfest: 165
New Tone Electronics: 127
New York Institute of Technology: 162
Nye Co., William: 108
Omni-Communications: 160
Optoelectronics: 132
Pace-Traps: 128
Pagel Electronics: 151
Palomar Engineers: 166
Personal Computing 78 Show: 148
Pickering Codemaster: 157
Piezo Technology: 151
Poly Paks: 150
Quik-Key: 164
RCA Global Communications: 164
Radio Amateur Callbook: 75
Radio Communications of Charleston, Inc.: 122
Radiomasters: 141
Radio World: 145
Rush Electronics: 159
Rusprint: 127, 165
SST Electronics: 144
Savoy Electronics: 136
Scientific Radio Systems: 128
Shakespeare: 83
Sherwood Engineering: 122
Skylark Products: 141
Skytec: 149
Sound Electronics: 146
Southeastern Communications: 140
Space Electronics: 138
Spectronics (IL): 132, 141, 146, 153, 162
Standard Communications Corp.: 92, 91
Swan Electronics: 143
Telephone Equipment Co.: 132
Teleton Corp.: 160
Telrex Labs: 102, 130
Ten-Tec: 109, 132, 140, 153
Texas RF Distributors: 110, 114
Thomas Communications: 81
Towtee Corp.: 161
Tri-ex Tower: 88
Trio-Kenwood: 6, Cover IV
Tutt's Radio Electronics: 139
UHF Lab: 155
UPI Communications: 157
Unadilla Radiatron: 158
Unique Products: 146
United High Power: 155
United Workers for the Blind of Missouri, Inc.: 92
Universal Amateur Radio, Inc.: 163
Universal Radio: 128
Van Gorden Engineering: 128
Webster Radio: 167
Western Radio Electronics: 141
Whitehouse, G.R. & Co.: 99
Wilson Electronics: 90, 91
Wrightapes: 128
Yaesu Electronics: 85, Cover III

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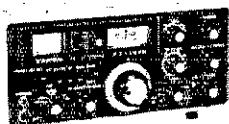
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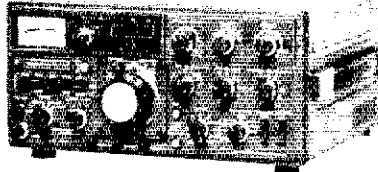
TRISTAO CZ-454
Reg. \$825. SALE \$660.

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Reg. \$825. SALE \$660.

Total Tower lines available.

ROTORS

CD44 \$154.95 - SALE \$?
Ham III \$194.95 - SALE \$?
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KENWOOD Transceiver
TS-820S 160 thru 10M
\$1098.

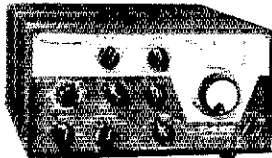
Plus
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DRAKE



DRAKE TR-7/DR-7 \$1072.
PS 7 \$166.

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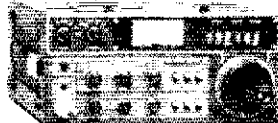
DRAKE TX T-4XC \$699.
RX R4C \$699 160 thru 10M

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YAESU Receiver
FRG-7 Broadcast to 30 Mhz \$315.
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ICOM



ICOM IC-701S, 160 thru 10M
Call for Your Price and info!

ROTORS

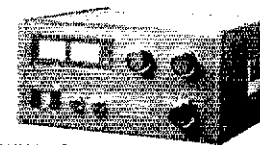
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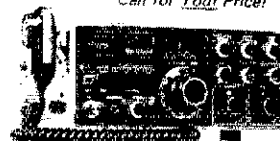
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KENWOOD FM/SSB
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KENWOOD 2M FM
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KENWOOD DG-5 Digital Frequency
Display for TS-520 \$179.
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New from ICOM -
DASH MOUNT, TRUNK MOUNT TRANSCEIVER
FULL 4 MHz
**Call for Brochure and
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Price!**

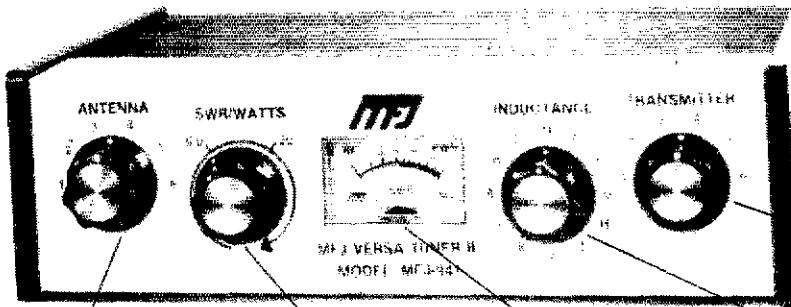
Webster radio, inc.

2602 E. Ashlan, Fresno, CA 93726 Ph. (209)224-5111

HOURS: 9 a.m. to 6 p.m. Mon. thru Fri. / 9:30 a.m. to 5:30 p.m. Sat.

This NEW MFJ Versa Tuner II . . .

has SWR and dual range wattmeter, antenna switch, efficient airwound inductor, built in balun. Up to 300 watts RF output. Matches everything from 160 thru 10 Meters: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balance lines, coax lines.



BRAND NEW

\$79⁹⁵

Antenna matching capacitor. 208 pf. 1000 volt spacing.

Sets power range, 300 and 30 watts. Pull for SWR.

Meter reads SWR and RF watts in 2 ranges.

Efficient airwound inductor gives more watts out and less losses.

Transmitter matching capacitor. 208 pf. 1000 volt spacing.

Only MFJ gives you this MFJ-941 Versa Tuner II with all these features at this price:

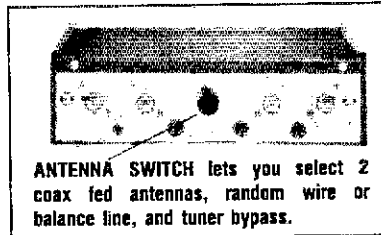
A SWR and dual range wattmeter (300 and 30 watts full scale) lets you measure RF power output for simplified tuning.

An antenna switch lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

A new efficient airwound inductor (12 positions) gives you less losses than a tapped toroid for more watts out.

A 1:4 balun for balance lines. 1000 volt capacitor spacing. Mounting brackets for mobile installations (not shown).

With the NEW MFJ Versa Tuner II you can run your full transceiver power output — up to 300 watts RF power output — and match your



ANTENNA SWITCH lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

transmitter to any feedline from 160 thru 10 Meters whether you have coax cable, balance line, or random wire.

You can tune out the SWR on your dipole, inverted vee, random wire, vertical, mobile whip, beam, quad, or whatever you have.

You can even operate all bands with just

one existing antenna. No need to put up separate antennas for each band.

Increase the usable bandwidth of your mobile whip by tuning out the SWR from inside your car. Works great with all solid state rigs (like the Atlas) and with all tube type rigs.

It travels well, too. Its ultra compact size 8x2x6 inches fit easily in a small corner of your suitcase.

This beautiful little tuner is housed in a deluxe eggshell white Ten-Tec enclosure with walnut grain sides.

SO-239 coax connectors are provided for transmitter input and coax fed antennas. Quality five way binding posts are used for the balance line inputs (2), random wire input (1), and ground (1).



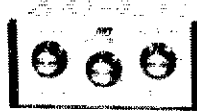
\$59⁹⁵

BRAND NEW

MFJ-901 VERSA TUNER

New efficient air wound coil for more watts out.

Only MFJ uses an efficient air wound inductor (12 positions) in this class of tuners to give you more watts out and less losses than a tapped toroid. Matches everything from 160 thru 10 Meters: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balance lines, coax lines. Up to 200 watts RF output. 1.4 balun for balance lines. Tune out the SWR of your mobile whip from inside your car. Works with all rigs. Ultra compact 5x2x6 inches. SO-239 connectors. 5 way binding posts. Ten Tec enclosure.



\$49⁹⁵

BRAND NEW

MFJ-900 ECONO TUNER

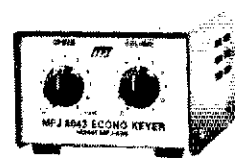
Same as MFJ-901 Versa Tuner, but does not have built-in balun for balance lines. Tunes coax lines and random lines.



\$39⁹⁵

MFJ-16010 RANDOM WIRE TUNER

Operate 160 thru 10 Meters. Up to 200 watts RF output. Matches high and low impedances. 12 position inductor. SO-239 connectors. 2x3x4 inches. Matches 25 to 200 ohms at 1.8 MHz.



\$39⁹⁵

BRAND NEW

MFJ-400 8043 ECONO KEYS

MFJ brings you a reliable, full feature economy keyer using the famous CURTIS-8043 keyer-on-a-chip.

Panel Controls: Speed (8 to 50 WPM), pull-to-tune; volume, on/off; 3 conductor, 1/4 inch phone jack for keying output and key paddle input.

Internal weight control lets you adjust dot-dash-space ratio for a distinctive signal to penetrate QRM for solid DX contacts. Sidetone and speaker. Internal tone control.

Lambic operation with squeeze key. Dot memory. Instant start. Self completing. Jamproof spacing. Reliable solid state keying: grid block, cathode, solid state transmitters (—300V, 10 ma. max. and +300V, 100 ma. max.).

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FT-225RD 2 METER TRANSCEIVER DIGITAL READOUT

ALL MODE: SSB CW AM FM
SOLID STATE
PLUG IN MODULE



NEW ON 2 FROM YAESU

A compact versatile transceiver for the dedicated two-meter DXer, the built-in memory and twenty-five watt output puts the FT-225RD far ahead. See it at your dealers today, or write for our 1978 full line catalog.

SPECIFICATIONS:

General

Frequency Range: 144-145 MHz, 145-146 MHz, 146-147 MHz, 147-148 MHz
Frequency Readout: Digital readout to 100 Hz, analog display resolution better than 1 KHz.
Modes of Operation: LSB, USB, CW, AM, FM
Frequency Stability: Within 100 Hz during any 30 minute period after warmup. Not more than 20 Hz with 10% line voltage variation.
Intermediate Frequencies: 1st IF=10.7 MHz; 2nd IF=455 KHz.
Antenna Impedance: 50 ohms unbalanced
Repeater Split: 600 KHz installed, any split up to 1 MHz with optional crystal.
Power Requirements: AC 100/110/117/200/234 Volts
DC 13.8 Volts, negative ground

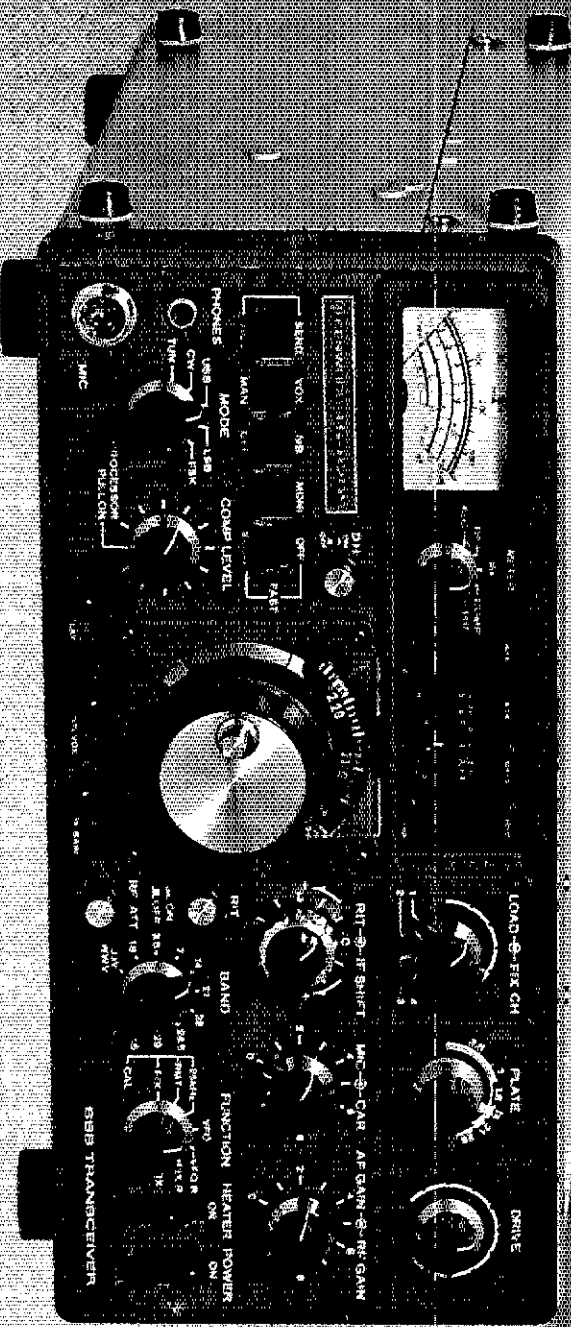
Price And Specifications Subject To
Change Without Notice Or Obligation



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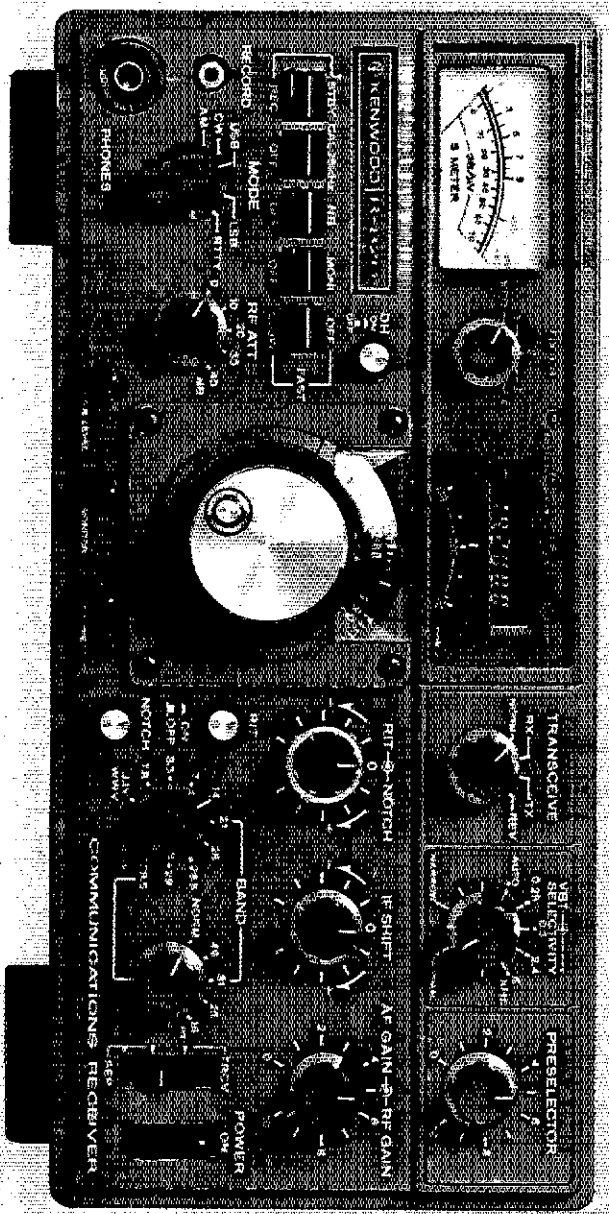
The radio.

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R-820

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