

QST

devoted entirely to Amateur Radio

September 1978 \$2.00

'79
HANDBOOK
IT'S REALLY NEW!



NBVM

Narrow Band Voice Modulation

Spiraling technology provides more QSOs per Megahertz. That means better communications for you. Get in on the historic tests of this amazing breakthrough.

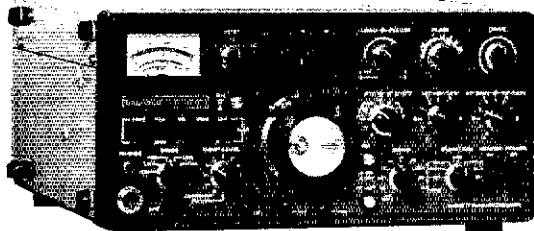
Page 9



nobody knows Kenwood like Henry Radio

IN FACT, KENWOOD SELECTED HENRY RADIO TO FIRST INTRODUCE THEIR PRODUCT LINE TO THE UNITED STATES IN 1970 AND FOR THE NEXT FIVE YEARS HENRY RADIO WAS THE EXCLUSIVE U.S. DISTRIBUTOR. WE REALIZED FROM THE BEGINNING THAT KENWOOD OFFERED SOME OF THE FINEST AND MOST EXCITING EQUIPMENT AVAILABLE. OUR ENTHUSIASM CONTINUES, OUR SALES AND SERVICE PERSONNEL ARE STILL KENWOOD EXPERTS AND WE REMAIN A MAJOR RETAIL SUPPLIER OF KENWOOD

EQUIPMENT. WE STOCK THE COMPLETE LINE ALONG WITH ACCESSORIES AND SPARE PARTS. COME IN, CALL OR WRITE. WE'LL GIVE YOU ALL THE INFORMATION, WORK WITH TRADE-INS AND DEVELOP TERMS. KENWOOD PUT ITS TRUST IN HENRY RADIO... YOU CAN TOO.



TS-820S

Amateur Radio Operators universally respect its superb quality, proven through thousands of hours of operating time under all environmental conditions. The TS-820S has every feature any Amateur could desire for operating enjoyment, on any band from 160 through all of 10 meters. Features such as an adjustable speech processor, IF Shift, extremely accurate digital readout and the latest phase lock loop (PLL) circuitry.

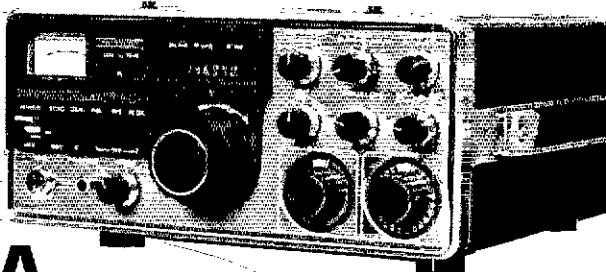


TS-520S

The TS-520S is Kenwood's famous, medium priced, full coverage transceiver, operating on all amateur bands from 1.8 to 29.7 MHz, 160 meter capability WWV on 15,000 MHz. It provides a new improved speech processor, outstanding receiver sensitivity and minimum cross modulation. Its optional digital display (DG-5) provides easy-accurate readout of your operating frequency while transmitting and receiving. The TS-520S has proven itself to be one of the most dependable rigs available and at an affordable price.

TS-700SP

A high performance 2-meter transceiver featuring a digital frequency display, receiver pre-amp, VOX, Semi-break in, and CW sidetone. Operates all mode, 144-148 MHz. Automatic repeater offset capability on all FCC authorized repeater subbands including 144.5-145.5 MHz (with optional plug-in crystal). Simply dial receive frequency and radio does the rest... simplex, repeater or reverse, AC and DC capability, 10 watts RF output on SSB, FM and CW, 3 watts on AM, 1 watt FM low-power switch.



TR-7400A

A superior quality 2-meter mobile transceiver. Features Kenwood's unique Continuous Tone Coded Squelch system, 4 MHz band coverage, 25 watt output and fully synthesized 800 channel operation. Outstanding sensitivity, large-sized helical resonators with High Q to minimize undesirable out-of-band interference combine to give the TR-7400A outstanding receiver performance. Paired with the PS-8 power supply the TR-7400A doubles as a low cost base station.

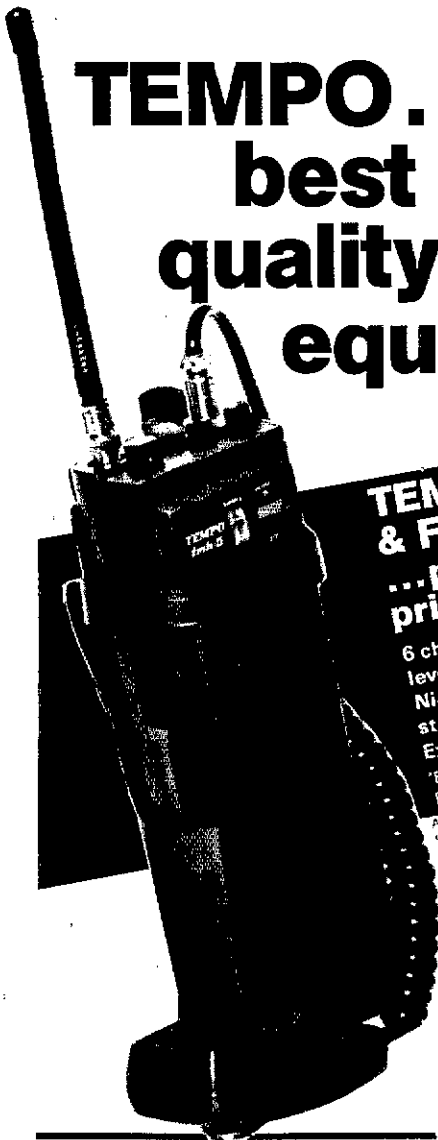
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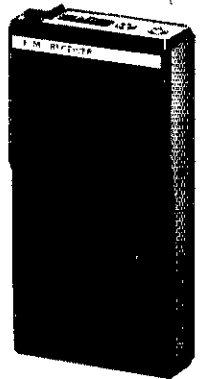
6 channel capability • selectable 1 or 2 - 1 or 5 Watts output (VHF) • Solid-state • Battery level meter • Earphone jack • Built-in charging terminals and separate charging jack for Ni-cad batteries • Flex antenna • Carrying case standard • Excellent frequency stability allows use with booster amplifier 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

 Watch our October ads for
 1978's most exciting technological
 breakthrough in 2-meter FM
 communications

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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

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VHF (135 to 175 MHz)			
Drive Power	Output	Model No.	Price
2W	130W	130A02	\$209
10W	130W	130A10	\$189
30W	130W	130A30	\$199
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	\$240
30W	70W	70D30	\$210
2W	40W	40D02	\$165
10W	40W	40D10	\$145
2W	10W	10D02	\$ 75

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.



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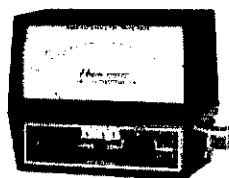
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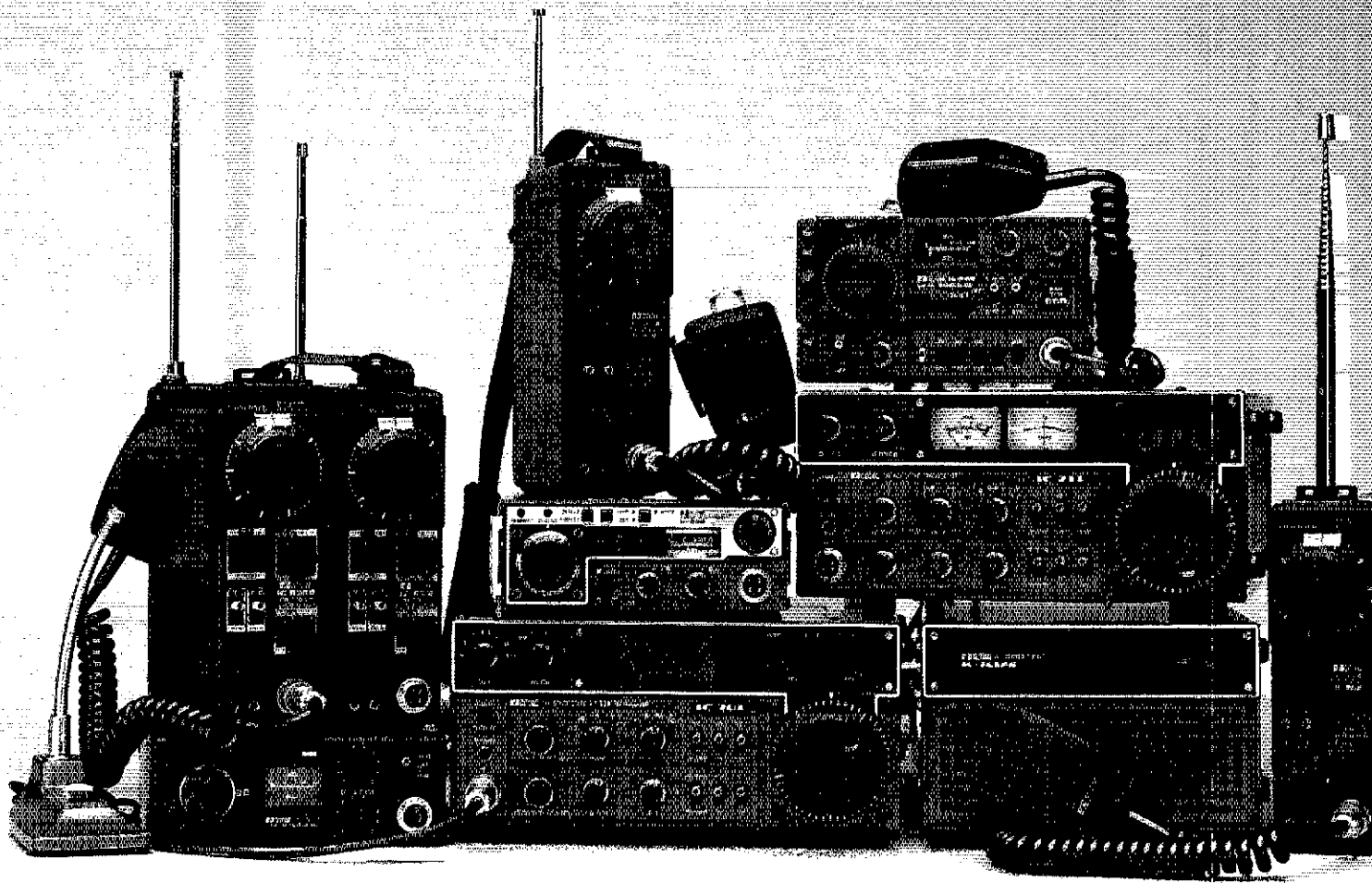


BIRD Model 4362 Thru-line Wattmeter

... 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.

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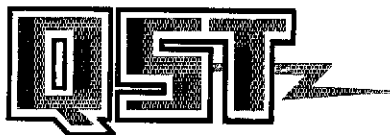


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THE COVER

Narrow-band voice modulation promises to be Amateur Radio's next contribution to the advancement of the radio art. See page 9.



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There are certain times when amplifiers transcend their function and approach the status of art. An amplifier as a reliable source of power is fundamental, an amplifier as an artful precision instrument is unique.

The DTR-2000L achieves this uncommon standard by employing the most powerful final tube legally permitted in the amateur service. The world famous Eimac 8877. Then, following through with features such as a vacuum impregnated power transformer, continuous duty power supply, hi-lo power switching, pressurized forced air cooling, harmonic suppression far exceeding FCC specification, dual meters for monitoring plate voltage and current.

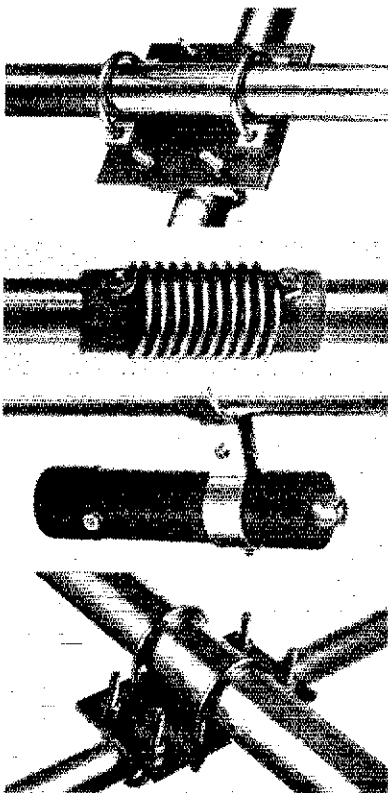
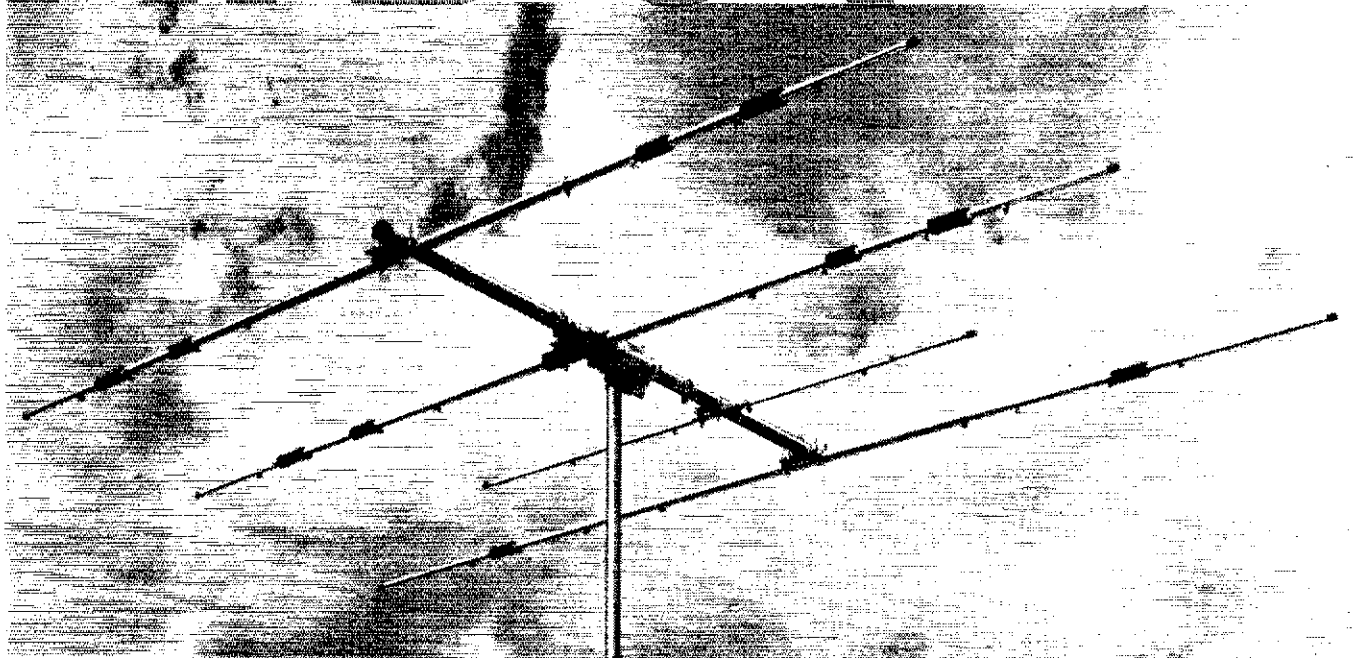
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- FCC TYPE ACCEPTED
- DTR 2000L suggested price \$1099.50



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ATB-34



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Cushcraft engineers have incorporated more than 30 years of design experience into the best 3 band HF beam available today. ATB-34 has superb performance with three active elements on each band, the convenience of easy assembly and modest dimensions. Value through heavy duty all aluminum construction and a price complete with 1-1 balun.

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

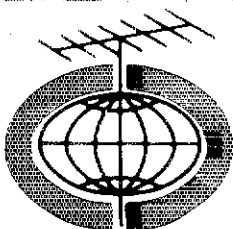
SPECIFICATIONS

FORWARD GAIN -	EXCELLENT	WIND SFC -	5.4 Sq.Ft.
F/B RATIO -	EXCELLENT	WEIGHT -	42 Lbs.
VSWR -	1.5-1	WIND SURVIVAL -	90 MPH.
POWER HANDLING -	2000 WATTS PEP		
BOOM LENGTH/DIA. -	18' x 2 1/8"		
LONGEST ELEMENT -	32'8"		
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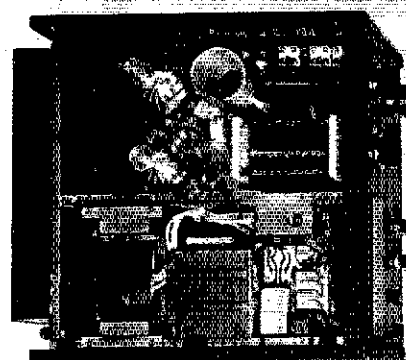
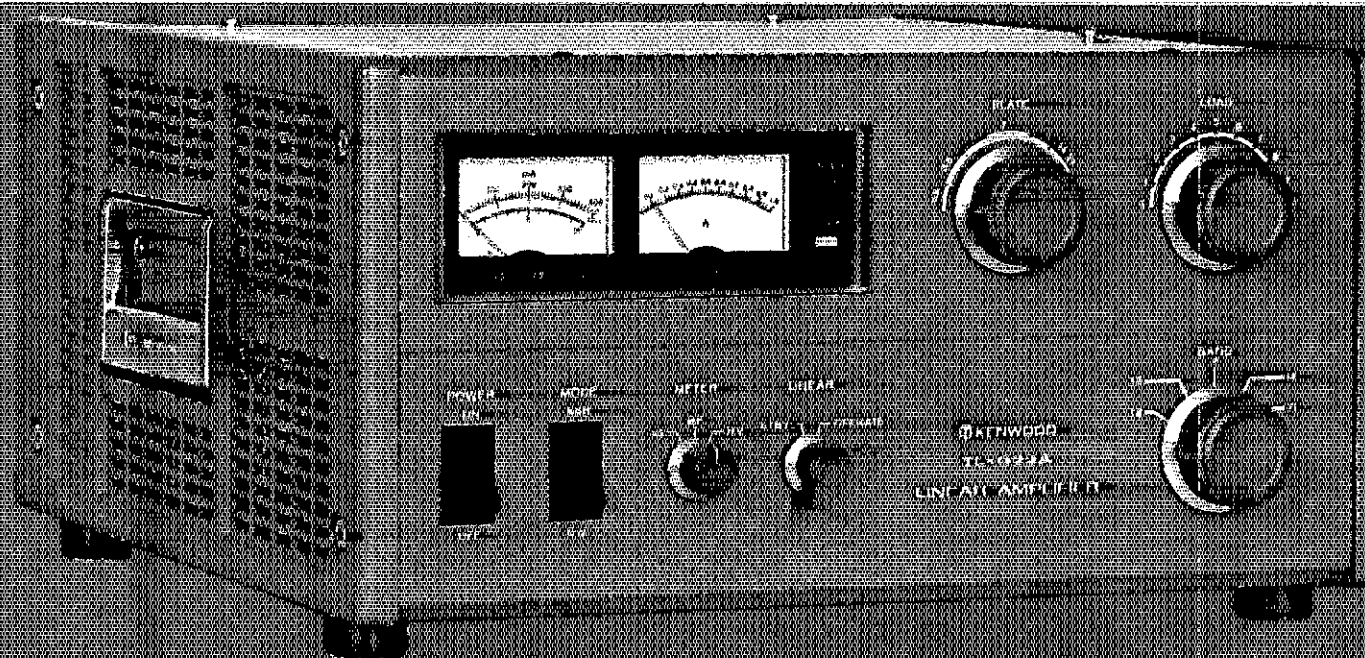
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THE KENWOOD NAME HAS GROWN TO REPRESENT THE FINEST AMATEUR RADIO EQUIPMENT AVAILABLE. THE TL-922A LINEAR AMPLIFIER CARRIES ON THAT TRADITION AS A LINEAR IT GETS YOUR SIGNAL THROUGH TODAY'S CROWDED BANDS AND PROVIDES THE POWER TO REACH THOSE FAR AWAY PLACES WITH EASE. AND BECAUSE IT'S KENWOOD YOU CAN COUNT ON ITS DEPENDABILITY. THE TL-922A IS FCC TYPE ACCEPTED. IT RUNS THE FULL LEGAL LIMIT ON ALL HAM BANDS FROM 160-15 METERS AND IS COMPATIBLE WITH MOST AMATEUR EXCITERS. CONTACT YOUR NEAREST AUTHORIZED KENWOOD DEALER FOR COMPLETE SPECIFICATIONS AND THE BEST DEAL.

TL-922A

WHY SHOULD THE TL-922A BE PART OF YOUR STATION? COMPARE THESE FEATURES AND SPECS. THE ANSWER WILL BE OBVIOUS.

- Instant heating filaments** — The 3-500Z tubes require no warm-up period. Just turn it on and go!
- Time delay fan circuit** — Even after you turn the TL-922A off, the super quiet fan continues to work for approximately 2 minutes to greatly extend tube life.
- Adjustable ALC output voltage** — Lets you tailor the ALC voltage to your exciter.
- Standby position** — Provides amplifier bypassing without having to turn the AC power off.
- Two independent safety interlocks** — One disconnects AC line voltage and the second shunts B+ to ground when tripped.
- Vernier plate control** — For smooth, easy tune up.
- Diecast side panels** — Includes functional carrying handles for easy transportation.
- Thermal protection of power transformer** — Amplifier automatically switches to standby if power transformer temperature exceeds 145°F.
- Tuned Input Circuit** — Means improved spurious characteristics.
- Line voltage selector** — Easily switched between 120 and 240 VAC.
- Multimeter** — Reads high voltage, relative output or grid current (selectable).
- Plate Current Meter** — Separate meter allows continuous monitoring of plate current.



Shown with top panels removed

Frequency Range: Amateur bands, 160-15 meters
Drive Power Required: 80 W nom, 120 W max
Mode and Duty Cycle: SSB, cont for 30 min CW and RTTY, key-down cont for 10 min
RF Input Power: 556, 2,000 watts PEP, CW
 RTTY: 1,000 watts DC
Plate Voltage: (at idla) 3.1 kV SSB, 2.2 kV CW, RTTY
Circuit Type: Class AB₁ grounded grid linear amplifier
Input Impedance: 50 Ω, unbalanced at better than 1.5:1 SWR
Output Impedance: 50 to 75 Ω, unbalanced
Harmonic Suppression: min 40 dB, depending on exciter used
Fan Motor Delay Time: 140±30 seconds (at room temperature)

ALC: Negative going, adjustable threshold, -8 VDC (max output type)
Tubes: Two Eimac 3-500Z
Semiconductors: 18 diodes, 1 Zener diode
Power Requirements: 120 V, 28 A; 230/240 V, 14 A
 50/60 Hz, for maximum SSB input
Dimensions: 390 mm (15 3/8") x 150 mm (7 1/2") x 407 mm (16")
Weight: Net 31 kg (68 lbs), Shipping 38 kg (83 lbs)

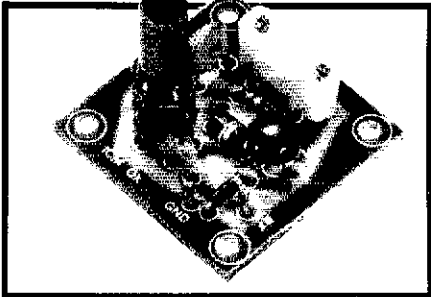
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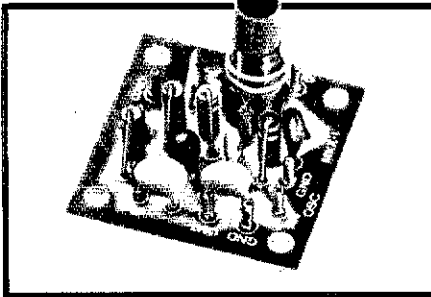


OX OSCILLATOR

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.

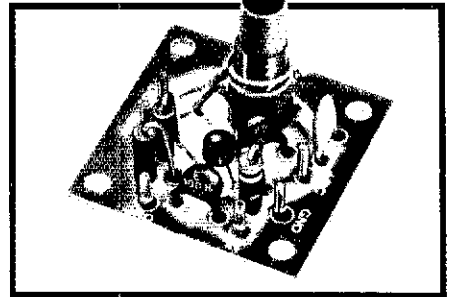


MXX-1 TRANSISTOR RF MIXER

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.

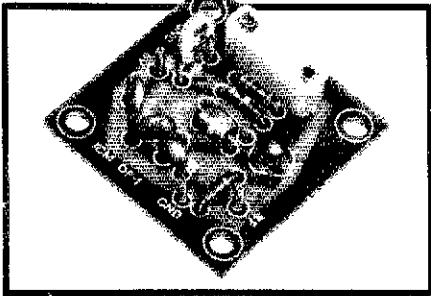


PAX-1 TRANSISTOR RF POWER AMP

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.

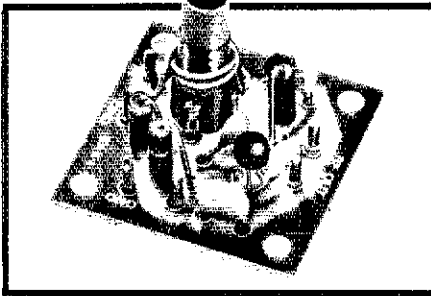


OF-1 OSCILLATOR

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.

Specify when ordering.

\$4.25 ea.

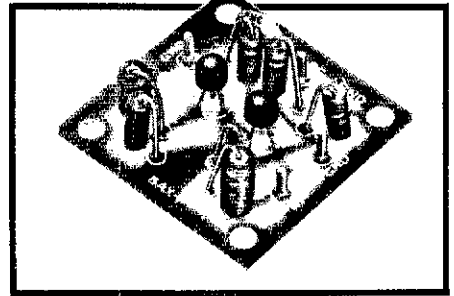


SAX-1 TRANSISTOR RF AMP

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

Specify when ordering.

\$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.

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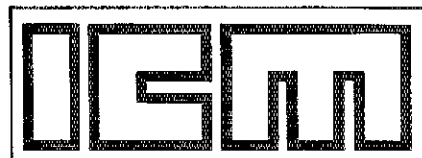
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.02% Calibration Tolerance
EXPERIMENTER CRYSTALS
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Cat. No.	Specifications	
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031081	20 to 60 MHz — For use in OX OSC Hi	
	<i>Specify when ordering</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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 Oklahoma City, Oklahoma 73102

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

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

"Of, by and for the amateur," it numbers within its ranks practically every 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.

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

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Dawn of an Era?

Last December, we were privileged to share with League members the first published information on a technological breakthrough which promises to revolutionize voice communication: narrow-band voice modulation (nbvm). Nbvm is a technique for compressing speech frequencies so that only about half the normal bandwidth is used. The technique was developed by Dr. R. W. Harris, ARRL member from the University of the Pacific in Stockton, CA; J. F. Cleveland, WB6CZX; and T. Lott, VE2AGF/W6.

The benefits of nbvm are obvious to anyone who has recently tuned across the overcrowded voice segments of the high-frequency amateur bands. The worldwide growth of Amateur Radio has brought the total number of licensed stations to more than one million, and this growth is likely to continue for the rest of this century. Even if the 1979 ITU World Administrative Radio Conference provides all of the new allocations being sought for the Amateur Service, congestion will continue to be a serious problem in our most popular phone bands. But if each signal were to occupy just half the space it does now, the congestion would be similarly reduced.

Nbvm has important applications to other services as well. An FCC study group has conducted tests of the system for Land Mobile applications and has tentatively concluded that a considerable saving of spectrum could be accomplished by replacing the present fm mobile equipment with single-sideband gear using nbvm. Typical amateur 144-MHz mobile ssb equipment, already in widespread operation by hams, was used for the tests.

Response to the December 1977 *QST* article was overwhelming, and many members were as disappointed as we were

when construction information did not appear immediately thereafter. However, now the problems which caused the delays have been overcome, and we have in hand the first of a comprehensive, multi-part series of articles describing an improved nbvm system in detail. The objective of the series will be to provide sufficient information to permit amateurs by the thousands to duplicate the system. No modification of existing equipment is required; the frequency compandor units are installed in the microphone and speaker leads in your station. Plans for test transmissions from W1AW are being formulated; you'll hear more about this as soon as a prototype frequency compandor has been received and tested in the ARRL lab. Because frequency-compressed ssb can be received with reduced intelligibility on a conventional ssb receiver simply by switching sidebands and retuning the receiver, it will be possible for you to participate in these historic tests even before you build your own unit. Part 1 of the series is scheduled for November *QST*.

Amateurs traditionally have been the first to adopt new radio techniques, especially those which have led to improved utilization of a very unique, limited resource: the radio spectrum. One only needs to look back over the last quarter-century to see how the near-universal adoption of ssb, pioneered by amateurs, has reshaped the face of hf radio. We may well be on the threshold of an era which will be at least as exciting as the one which led to the popularization of ssb. We're proud that through *QST*, League members will be able to be at the forefront of this important development. And we thank you for your patience since last December — patience which we believe is about to be rewarded. — *W1RU*

League Lines...

URGENT! URGENT! URGENT! DEADLINE IMMINENT! If you upgraded from one class to another after March 24, 1978, and did not know that you were eligible to change call signs, the FCC will allow you to apply for a call sign change until September 1, 1978. Eligibility will be determined by the call sign assignment system which is explained on p. 49 of May 1978 QST. Make your request to the FCC, Gettysburg, PA 17325, by sending a completed form 610, an interim permit showing the examination date, a copy of the upgraded license if received, and a note explaining why a request for the change was not made at the time of upgrading. (We regret that FCC announcement of this policy does not leave much time to take advantage of it. ARRL has requested an extension of 60 or 90 days. -- Ed.)

The FCC has extended indefinitely a waiver of its rules to allow radio amateurs in Hawaii use of 1.8-1.81 MHz from 4 P.M. to 8 A.M. local time, with no more than 100 watts input power. The Commission has reserved the right to cancel the waiver, however, if the Coast Guard reports interference to the Loran radionavigation system.

The United States has concluded a reciprocal amateur radio operating agreement with Greece. If you are planning on visiting Greece and want to operate in that country, contact the International Services Office at Hq.

FCC form 410 is exclusively for use by Canadian amateurs when applying for reciprocal operating privileges in the U.S. If you need one of these forms before you visit the States, write to the Membership Services Department at Hq.

League Hq. is receiving reports that some Technician Class operators are erroneously assuming that they can operate repeaters on 10 meters. Technicians may not operate their stations as repeaters on the 10-meter band. It is only above 50 MHz that Technicians have full amateur privileges. On 10 meters, Technicians are restricted to the Novice subband, where repeater operation is not permitted.

ARRL's proposal for a session on Modern RF Communications Design has been approved for the MIDCOM program of the IEEE to be held December 12-14 in Dallas, TX. MIDCOM info. is available from IEEE, 999 Sepulveda Blvd., El Segundo, CA 90245.

An addition to the DXCC list! The ARRL Board of Directors has recognized United Nations Headquarters as an addition as a result of a recommendation of the DX Advisory Committee. Contacts made with 4U1UN on or after February 4, 1978 will count. However, no credits will be made until November 1 in order to defer an anticipated heavy DXCC workload.

Work has begun on the next edition of the Repeater Directory. Repeater trustees are urged to send in as soon as possible information about new repeaters or changes and corrections about repeaters listed in the current 1978-79 (blue cover) edition of the directory. To simplify reporting, please obtain a new repeater registration card (CD-240) by sending an s.a.s.e. to Hq.

Life member dues will go up to 25 times the annual dues rate effective November 1, 1978. That comes to \$300 for U.S. full and associate members, \$337.50 for Canadian members (including the extra postage for across-the-border mailings), and \$362.50 for membership elsewhere. Life member dues for blind and family members will go to \$50.

The ARRL Board of Directors' Membership Affairs Committee is studying a proposal to change Director and Vice-Director terms of office to four years and would like members' views. Send your comments to the Membership Affairs Committee, c/o Hq.

Enter the ARRL flag-design contest! Put on your thinking caps and watch for further details in QST.

An Inexpensive Capacitance Meter

Basic Amateur Radio: Build this inexpensive capacitance meter using easily obtainable parts. It'll make a nice addition to your basic test equipment.

By Douglas A. Blakeslee,* N1RM

A beginner's first investment in test equipment is usually a volt-ohmmeter. Nicknamed the VOM, even a simple volt-ohmmeter measures voltage and current — both ac and dc — plus resistance. A VOM will take care of many routine maintenance tasks around the ham shack. Plus, it is an invaluable aid when building an electronic project.

Unfortunately, VOMs do not measure capacitance. The variability of capacitors (often called "caps") is notorious, some may be as much as plus or minus 200 percent from the marked value. Others, especially those sold by surplus houses and those found in old TV chassis and on computer boards, are not marked with a value at all. Thus, it is most useful to be able to measure capacitance. In this article

we'll review the various types of capacitors and will describe a simple capacitance measurement unit. The circuit can be built as a stand-alone instrument or as an add-on for a VOM.

Capacitor Basics

Before we set about measuring a capacitor, let's review the basics of the device. A simple capacitor can be made from two metal plates separated by a small air gap. Connecting a battery to the two plates will cause a current to flow momentarily until the capacitor has charged to the potential of the battery. If the battery is removed, the capacitor will retain the charge, demonstrating an important property of capacitors — the ability to store energy. While the capacitor was being charged, current flowed, showing a second important

property, the ability to block direct current while passing varying or alternating current.

Our capacitor uses air as an insulator between the two plates; the insulating medium is called the *dielectric*. Mica, paper, glass and ceramic are popular dielectric materials. The dielectric used will determine the voltage at which a given capacitor will break down. Capacitors should always be operated below their rated breakdown voltages.

If our two metal plates were one inch (25.4 mm) square and spaced 0.004 inch (0.1016 mm) apart, the capacitance value would be 56 pF. The *farad* (F) is the standard measure of capacitance, the ability of a capacitor to hold a charge. A one-farad capacitor would be large indeed. Practical capacitor values are measured in microfarads (μF), one millionth of a

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Two versions of the capacitance meter are shown together here. At left is the author's prototype built using junk-box components in a commercial cabinet, and at right is another version built in the ARRL lab using Radio Shack parts exclusively in a home-built cabinet.

Mechanical layout of board, battery, meter and switch is shown in this photograph. In both units, the parts were mounted in such a way as to allow easy access to board for troubleshooting and IC replacement.

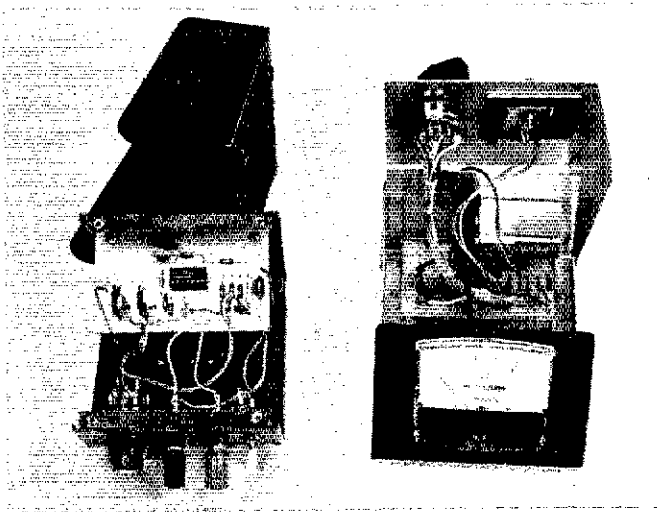
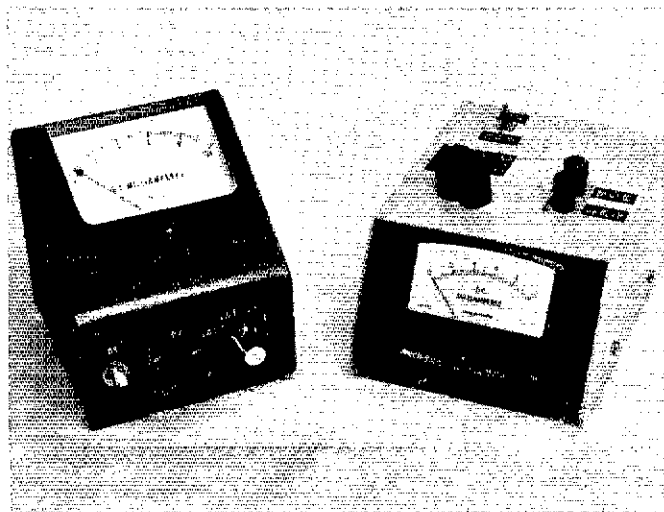


Table 1
Typical Capacitor Characteristics and Applications

Characteristic	Aluminum Electrolytic	Tantalum	Mica	Ceramic	Paper	Air	Polycarbonate	Polystyrene	Polyester
Max. frequency (Hz)	10 ³	10 ³	10 ⁹	10 ⁹	10 ⁵	10 ⁹	10 ⁹	10 ⁹	10 ⁹
Max. capacitance (μF)	10,000,000	1500	0.01	1	100	5,000	10	10	1
Max. working voltage	500	300	800	10,000	5,000	10,000	500	1000	700
Size for given capacitance	very small	very small	small	small	large	large	small	large	small
Stability	poor	good	excellent	fair	fair	excellent	good	excellent	good
Application									
Blocking dc	no	sometimes	yes	yes	yes	yes	yes	yes	yes
Bypass	yes	yes	no	yes	yes	yes	yes	yes	yes
Filter	yes	yes	yes	yes	yes	no	yes	yes	yes
Coupling	no	sometimes	yes	yes	yes	yes	yes	yes	yes
Frequency/timing	no	no	yes	no	no	yes	yes	yes	yes

farad, and in picofarads (pF), one million-millionth of a farad. Typical capacitance values used in radio equipment range from 1 pF to 10,000 μF.

Capacitor Types

Capacitors are denoted by their insulation or dielectric material, i.e., air, ceramic, paper and so on. Thus, a capacitor employing ceramic insulation is usually called simply a "ceramic." Each type of capacitor construction has advantages and disadvantages. A short discussion follows.

Air capacitors are usually made variable where one set of plates, the *stator*, is fixed and one set is variable, the *rotator* or *rotor*. Air is an excellent insulator, so air capacitors feature high working voltages and low leakage, plus the ability to handle high levels of radio-frequency (rf) current. Because they are variable, air-insulated capacitors are widely used in variable-frequency oscillators (VFO), transmitter output stages, and antenna-matching networks. For even higher voltage ratings, the capacitor plates can be placed in a vacuum. Such capacitors are often used in high-power transmitters, and they are commonly called "vacuum variables."

Ceramic capacitors are very popular for *bypass* (shunting rf energy to ground) and interstage coupling applications where the power level is low. The temperature stability of ceramic capacitors is usually poor so they are not used in precision tuned circuits. Ceramics are inexpensive and useable over a wide frequency range. Thus, they can be found in most ham gear.

Mica capacitors overcome many of the shortcomings of ceramic capacitors in rf circuits. The mineral mica provides insulation, often with silver applied using a metalization technique. Mica capacitors are very reliable and stable. They can handle moderate rf power without excessive heating. Micas are widely used in VFO and transmitter circuits.

Paper capacitors use very thin, special paper impregnated with wax, an oil or, until recently, polychlorinated biphenyls (PCB). (Environmental problems have limited or eliminated PCB recently.) Paper capacitors tend to be rather large,

so newer types have been developed where metal is deposited on the paper insulator. Metal foil is still used as the conductor in high-current and high-voltage types. Paper capacitors are generally used in audio and power circuits.

Aluminum electrolytic capacitors are widely employed as power supply filters and in bypass applications in low-frequency circuits. They feature very high capacitance for a given size. A very thin film of oxidation on the aluminum conductor provides insulation. Electrolytics must have dc voltage applied in only one direction; they have specified polarities which must be observed. The dc voltage aids in keeping the insulating layer active. Without voltage, the oxide film deteriorates, so the capacitors cannot be left unused for long periods. Electrolytic capacitors can vary widely from marked values and can be highly sensitive to temperature change. A special family of electrolytics which features better shelf life, better stability and higher capacitance is the *computer grade*. They are more expensive than standard aluminum electrolytics, but the wise shopper can find many available from surplus dealers.

Solid tantalum capacitors pack even more capacitance for a given size than aluminum electrolytics. They consist of sintered tantalum particles packed around a tantalum anode housed in a carbon case. Tantalums are available as either polarized or nonpolar units. The polarized types have dropped in price until they have become very popular in transistor

circuits for audio and low-frequency radio applications.

Plastic-film capacitors are the newest family. They employ polystyrene, polyester, Mylar, polypropylene or polycarbonate for insulation, and high stability is achieved. They are nonpolar and excellent for rf applications. The polycarbonate and polystyrene types are becoming popular in frequency-determining circuits.

In addition to the items listed above, the insulation material and construction technique used for a capacitor also effects the maximum voltage that can be applied. Table 1 summarizes typical characteristics of popular capacitor types and reviews typical applications.

All capacitors exhibit a resistance to the passage of ac current called reactance — *capacitive reactance*. As the value of capacitance is made smaller, reactance goes up for a given frequency, according to the relationship given in the appendix. The subject of reactance and performance of capacitors in ac circuits is complex and beyond the scope of our discussion. But remember, it exists!

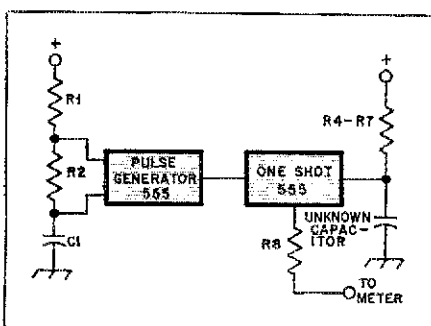
Capacitors, as with all electronic components, are a combination of elements. In addition to capacitance, given units will show inductance, resistance and reactance. The resistance is usually small and can be ignored. In high-frequency applications the connecting leads have sufficient inductance to form a tuned circuit. This is why articles about building transmitter and receiver circuits invariably caution that capacitor leads should be kept short. Wise designers have long used the inductance of the capacitor lead to form a tuned circuit for low-impedance bypass applications. Above its resonant frequency the capacitor will appear inductive and will be unsuitable for most applications, so keep those leads short.

About the Circuit

A block diagram of the capacitance meter is shown in Fig. 1. Two 555-IC-type circuits are used; I employed a 556, which is two 555s in a single package. The inner workings of the 555 have been described in *QST*,¹ so we won't repeat them here.

¹Footnotes appear on page 14.

Fig. 1 — Block diagram of the capacitance meter.



One timer, U1A of Fig. 2, is connected as an oscillator that serves as a trigger for U1B. The ratio of R1 and R2 determines the length of the pulse generated during each oscillation cycle. We have chosen values for R1 and R2 such that the output pulse is of very short duration. R1, R2 and C1 set the frequency of oscillation, which is approximately 500 Hz. Thus, U1B receives a short pulse 500 times per second.

U1B, although it also uses the basic 555 IC, performs an entirely different function. It is connected as a *one shot*, a circuit that produces an output pulse of predetermined length (duration) for each start pulse, regardless of the start pulse length. In our circuit the pulse duration is set by a resistor connected from the positive supply to pins 12 and 13, and an external capacitor. The resistor is a fixed value and the capacitor values can vary over a 10:1 range. A smaller value capacitor will produce a short output pulse from the one shot while a larger value will produce a longer pulse. The pulse output is repeated each time a start pulse is received.

The longer a pulse, the more average power it contains. Or the longer the pulse, the higher the voltage will be as indicated on a dc voltmeter. The meter is much too slow to respond to pulse variations, so it shows the average value produced by repetitive pulses. If appropriate circuit values are chosen, the meter can be made to indicate capacitance values directly.

Our circuit uses a 1-milliamper full-scale meter (or VOM scale) with a large resistance in series, which forms a voltmeter. Capacitance ranges are obtained by switching in resistors. As long as the resistance/capacitance ratio remains the same, the pulse generated by the one shot is the same. Thus by switching resistors, which are decade values, we can read capacitance values over a wide range using a single meter scale. Ranges of 1000 pF, 0.01 μ F, 0.1 μ F, and 1 μ F, full scale, are provided. Separate calibration resistors are provided for the low scale and the higher three scales, R9 and R10, respectively.

This circuit arrangement is by no means original. It has appeared in applications literature by Signetics — the originator of the 555 — and, for both frequency and capacitance measurement, in the *Electronics Casebook*. A somewhat more complicated circuit appeared in *ham radio* several years ago.²

Construction and Calibration

The circuit for the capacitance meter is constructed on a small etched circuit board. You can make your own board from the pattern published in this issue. Fig. 3 shows the parts placement. Before mounting parts, assure that the foil side of the board is clean and shiny. If not, rub the foil pattern with fine steel wool.

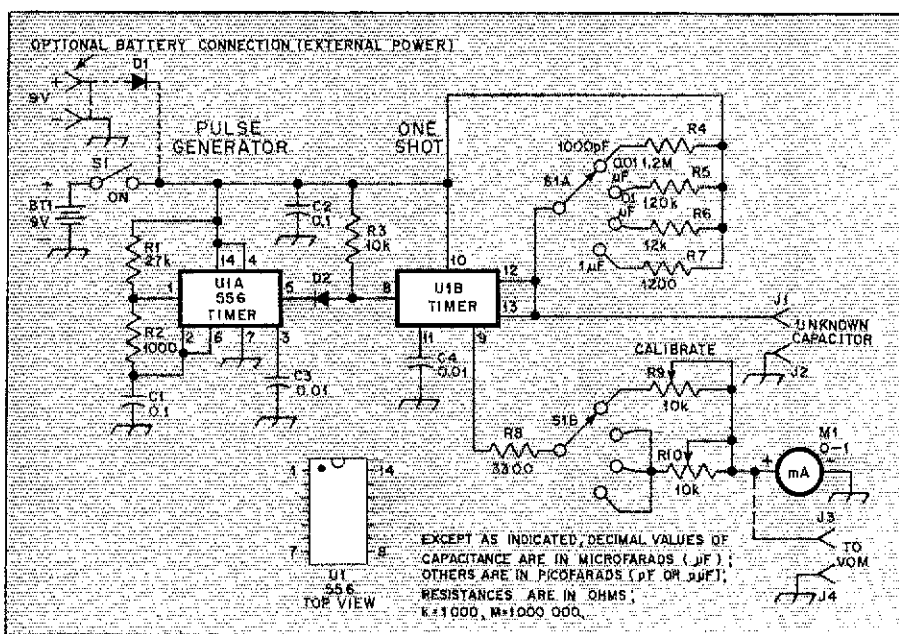


Fig. 2 — Schematic diagram of the capacitance meter. Alternative connections are shown with dotted lines. All part numbers in parentheses below are Radio Shack.

- BT1 — 9 volt, transistor radio type (23-464).
- C1-C4 — Ceramic capacitors (272-120 series).
- D1 — Silicon power-type diode, 50 PIV or more (276-1101).
- D2 — Switching-type diode, 1N914 or equiv. (276-1122).
- J1-J4, incl. — 5-way binding post (274-661 or 274-662).

- M1 — 0- to 1-mA meter (22-052).
- R1-R8, incl. — Carbon resistors, 1/4 or 1/2 watt (271-1300 or 271-000 series).
- R9, R10 — 10-k Ω potentiometers, linear taper, pc mount (271-218).
- S1 — 2-pole, 4 or more position rotary switch (275-1386).
- U1 — NE555 timer IC (276-1728).

Mount the parts a few at a time, following the layout, bending leads slightly to hold them in place. Although not absolutely necessary, it is a good practice to use a socket for U1 (and for most semiconductor devices where lead length is not critical). The socket greatly simplifies troubleshooting and replacement of a defective IC.

Solder the leads using a 20- to 50-watt iron and a small amount of rosin-core solder. Hold the iron in place until the solder melts and runs freely. Inspect each solder joint after it is made. It should be shiny and smooth. Lumped, matted or dull joints are an indication of trouble. Reheat bad joints and apply a small additional dab of solder, if necessary, to make a proper connection. Do not overheat, because prolonged heat can lift the foil from the board. When all components have been installed on the board, check to assure that all parts are in the correct places and those with polarity are oriented properly.

Next, prepare the cabinet. I used a Bud sloping-front enclosure and a Simpson meter from my "junkbox." If you are purchasing the parts, a Radio Shack cabinet (270-232) and "Shack" meter (22-052) are less costly. A Minibox-type enclosure will do if you are going to use your VOM as an indicator. Drill the appropriate holes.

Making a hole for the meter is a chore. A Greenlee chassis punch of the appropriate size is the best answer, although the large punches are far too expensive to be used just once or twice. Another technique is to scribe a circle slightly smaller than the desired meter hole. Then, mark a dotted pattern around the circle with a center or prick punch such that the outer circumference of holes after drilling will almost touch. Then drill the holes and knock out the center. Remove the burrs around the hole with a half-round file. The result might not please a purist, but it is more than adequate to mount a meter. Now spray paint the cabinet in your favorite color.

Next, mount the board in the cabinet and make all required interconnections. Mount the knob on the range selector switch, and mark the controls using Dymo or press-on labels. Install the battery, or connect the unit to an external 9-volt power source. A protection diode is provided to prevent accidental polarity reversal from damaging the meter components.

Calibration requires two capacitors, 0.001 and 0.01 μ F. Ideally, they should be one-percent micas. Use the most accurate capacitors you can obtain. If no precision capacitors are available, try a batch marked with the same value and use the value that represents an average for the group. Place a 0.001- μ F capacitor in the

SELF-POLICING OF OSCAR FREQUENCIES

□ With the advent of new OSCAR enthusiasm, an old problem has reappeared: use of the satellite during its scheduled off day, UTC Wednesday. It has been necessary to set aside a day specifically for recharge of the spacecraft battery, especially during the times of minimum sunlight. New operators are appearing daily on the satellite, and many do not know about Wednesday's operating schedule.

If the more experienced operator should advise you that Wednesdays are reserved for recharge or for special experiments, please adhere to the advice. It is very important to the life expectancy of the spacecraft battery.

Please be polite and use your call when self-policing, if the occasion should arise. Remember that the same regulations apply to space communications as they do for terrestrial. Enjoy your hobby. It may be the best one ever. It's up to you. — **W9KDR**

NO ONE OWNS A FREQUENCY, BUT . . .

□ Often we at League hq. hear the complaint, "How can I listen to code practice from W1AW if someone insists on tuning up their kilowatt on 14080 kHz?" Luckily, most people adapt quickly, resorting to tapes as another means of code practice.

Consider, however, the case of Ron Peterson who lives in Clear Lake, MN. He is a stroke victim rehabilitating himself with assistance from Courage Handi-Hams in Golden Valley, MN. With plenty of free time, he quickly memorized his code tapes, and W1AW became Ron's only source of fresh code practice material. Moral: Before you tune on 3580 kHz or whatever, please remember that for some people, W1AW is all there is. — **WAITZK**

QST congratulates . . .

□ Don Meserve, W0HG, for receiving a Public Service Award from the main offices of the National Weather Service. He is director of the Office of Emergency Preparedness for Johnson County, KS. Don was advertising manager of *QST* from 1929 to 1932.

□ Truett K. Smith, N4TK, of Nashville, TN, for winning an Emmy from the Academy of Television Arts and Sciences for outstanding achievement in sports programming. He was video tape editor of the 1976 Olympic Games.

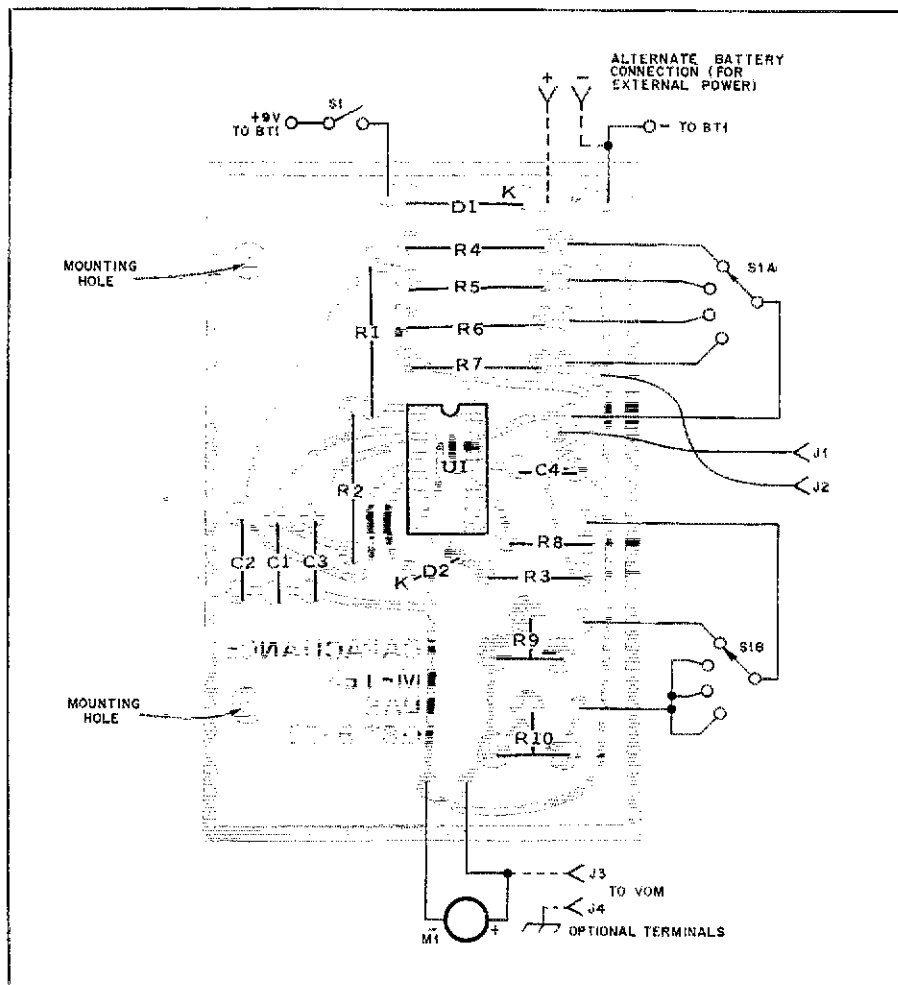


Fig. 3 — Parts placement guide for the capacitance meter. Parts are placed on the nonfoil side of the board; the shaded area represents an X-ray view of the copper pattern. (The etching pattern appears in the "Hints and Kinks" section of this issue.) K indicates the cathode of a diode.

test jacks, set S1 for the 0.001- μ F scale, and adjust R9 until the meter indicates 1 mA. Use the 0.01- μ F capacitor, select the 0.01- μ F scale, and adjust R10 for 1 mA. Save the capacitors to check calibration from time to time. Note that the meter will not go to zero on the lowest range; this is so because the unit is reading stray circuit capacitance and the 556 input capacitance.

Using the Instrument

The cap meter applies a maximum of 6 volts to the capacitor under test. Therefore, any capacitor with a voltage rating of 6 volts or more can be checked. If the capacitor is polarized, assure that its negative lead is attached to the grounded terminal. This is easy to follow if you use color-coded terminals, red for positive and black for negative or ground.

The meter generally cannot be used to check the value of a capacitor soldered in a circuit. In most cases, if the power to the circuit is off, you can unsolder one lead of the capacitor under test. Connect both capacitor leads via short wires to the jacks on the cap meter. The connecting leads

will introduce some error, but if the lengths are kept short reasonably good measurements can be made.

Of course you won't get laboratory accuracy with this inexpensive meter, but at least you will be able to sort out those "hamfest specials" you've been collecting. In most cases, the cap meter should read within ± 10 percent of the actual value.

Appendix

The ac current through a capacitor is proportional to the voltage, capacitance and frequency. The net effect is called *reactance*, which is given by the formula:

$$X_c = \frac{1}{2\pi f C} \quad (\text{Eq. 1})$$

where X_c = reactance in ohms
 f = frequency in hertz
 C = capacitance in farads
 π = 3.1416

Footnotes

- ¹"Time — IC Controlled," Technical Topics, *QST*, June, 1972, p. 36.
- ²Hall, "Direct-Reading Capacitance Meter," *ham radio*, Apr., 1975.

Meet the Remarkable but Little-Known Vackar VFO!

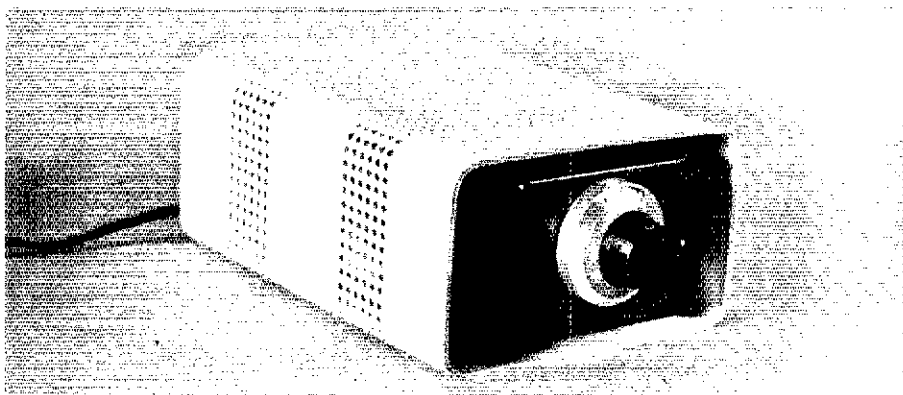
Searching for a VFO with Rock of Gibraltar stability? End your band-edge worries with this self-contained unit. For the serious-minded cw operator, the chirp-free operation and undetectable frequency drift make this VFO a natural!

By Floyd E. Carter,* K6BSU

The dedicated cw operator must make severe demands of his station equipment. He knows that an elusive DX station amateur cannot be asked to tolerate a signal which drifts through the passband of his receiver or one which has keying chirp. For the cw man, his fist and the note of his transmitter form his "voice" to distant stations. Modern electronic keyers have made machine-like keying an inexpensive reality. Couple a keyer with a fine-quality VFO, and the DX station operator just cannot refuse to QSO.

In designing this heterodyne VFO, the goal was to produce a keyed oscillator with undetectable chirp or frequency drift. Keying of a conventional VFO invariably produces some instability because the starting and stopping of an oscillator upsets the fine balance of dc and ac conditions within the circuit, and with each key-down transition oscillation equilibrium must be reached. During this transient period, the oscillation frequency generally changes, resulting in chirp. Keying of a subsequent buffer stage following a free-running VFO generally allows a small portion of the VFO output to reach the receiver during key-up conditions if the station is set up for full-break-in cw. VFO shielding only reduces the feedthrough, but this may not be adequate for very sensitive station receivers.

Heterodyne-frequency generation eliminates all these problems because the VFO operates continuously on a non-harmonically related frequency which is converted to the operating frequency in a mixer or balanced modulator. Both the keyed crystal oscillator and the VFO operate far from the receiver frequency. Therefore, even though the VFO is not keyed, no harmonic of the oscillator will reach the receiver. Fig. 1 shows the block diagram of the heterodyne process, with frequency values applicable to this VFO.



The Vackar oscillator VFO enclosed in an attractive, contemporary-styled cabinet. Below is an inside view showing rather high component density. The U3 output amplifier is on a separate board next to the transformer.

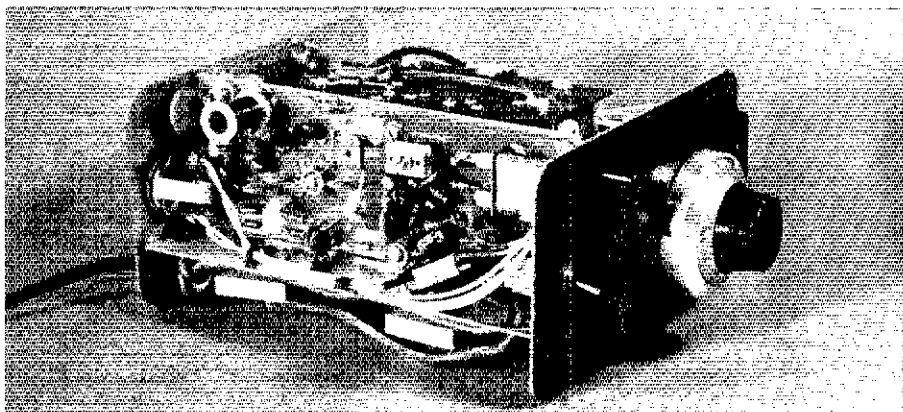
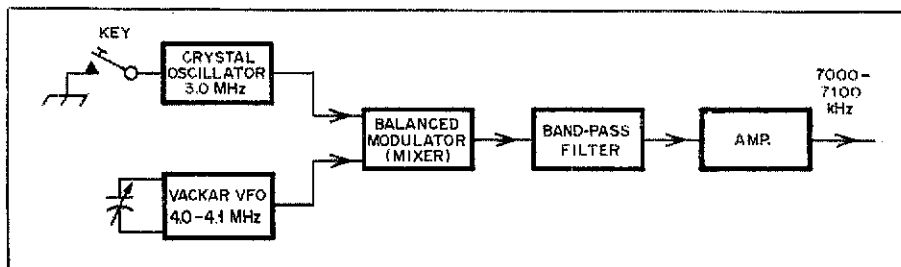


Fig. 1 — Simplified block diagram of the heterodyne VFO.



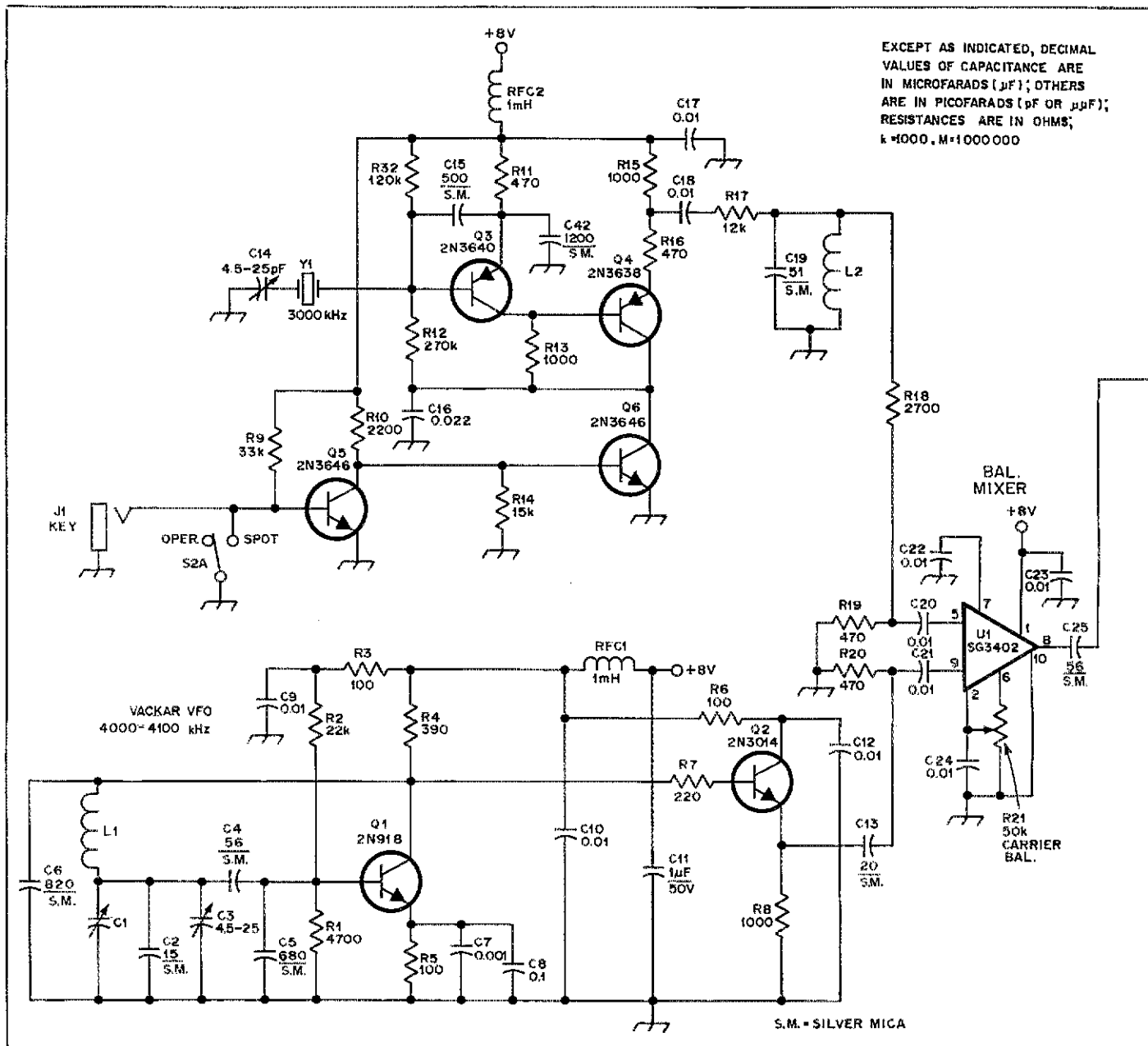


Fig. 2 — Schematic diagram of the heterodyne-oscillator VFO using the Vackar circuit. All resistors are 1/4-watt, five-percent tolerance. U1 is a proprietary product manufactured by Silicon General, Inc., 7382 Bolsa Ave., Westminster, CA 92683. The toroid core for L2, Ferroxcube no. 1041T060/4C4, is produced by the Ferroxcube Corp., Mt. Marion Rd., Saugerties, NY 12477. (For the convenience of builders who are unable to locate small toroids the author has available a limited supply.)

A normal mixer or unbalanced modulator output contains four prominent frequency components — the two input frequencies, their sum, and their difference. Either the sum or the difference may be used as an output by selecting the desired frequency in a band-pass filter. The balanced mixer is a more sophisticated refinement of the basic mixer circuit, because the two input frequencies are eliminated in the mixing process so that the output contains only the sum and difference frequencies. Consequently, subsequent filtering is made easier.

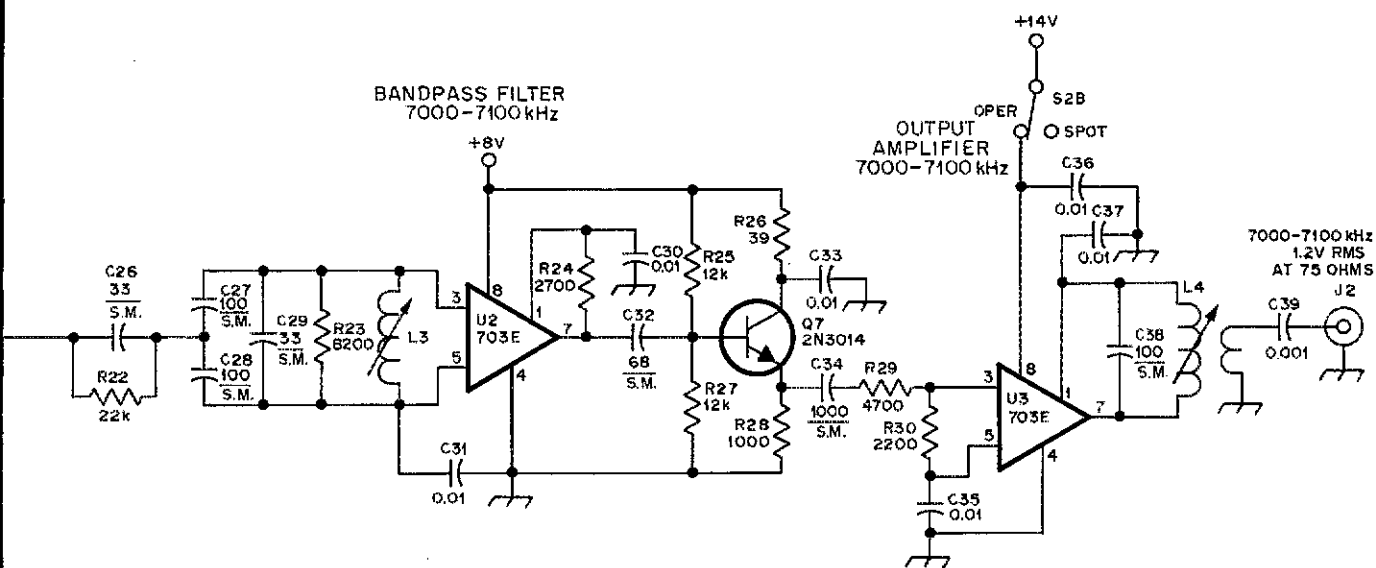
The VFO circuit used in the heterodyne VFO was first described by Vackar¹ in ¹Footnotes appear on page 18.

1949. This circuit formed the basis for further research by Clapp, resulting in his classic article published in 1954.² The Vackar circuit closely resembles the Clapp circuit except for the method of feedback. The Vackar is series tuned like the Clapp, but the tank circuit as well as the transistor are shunted by unusually low reactances which reduce the effects of the transistor reactances. Further refinements of the Vackar circuit were described in 1968 by Jordan,³ who provides design criteria for use at any frequency.

Construction

The photographs suggest one possible layout. For ease of modification and ex-

perimentation, the prototype was built in separate modular form equipped with connectors. Only a few precautions must be kept in mind when designing a layout. First, as with any VFO, mechanical stability is essential. An aluminum extrusion was used as a base for the oscillator. The tank components were bolted to this extrusion and the remainder of the circuit is contained on a glass-epoxy-board bolted to one lip of the extrusion. Heavy solid wire is used to interconnect the tank circuit components to prevent changes in stray circuit capacitance from shock or vibration. The integrated circuits have much higher bandwidths than required, and are capable of oscillations at vhf.



- C1 — Variable capacitor, approximately 2 pF (1 rotor and 1 stator).
- C3, C14 — 4.5-25 pF variable capacitor, CRL no. 825-AZ.
- C7, C39 — Fixed capacitor, 0.001 μ F, CRL no. CE102.
- C8 — Fixed capacitor, 0.1 μ F, CRL no. DDA104.
- C9, C10, C12, C17, C18, C20-C24, incl., C30, C31, C33, C35, C36, C37 — Fixed capacitor, 0.01 μ F, CRL no. CK103.
- C16 — Mylar fixed capacitor, 0.022 μ F, CDE no. 1S22.
- C40 — Fixed capacitor, 1000 μ F 25 V dc, CDE no. HWM 1000-25. (Fig. 3)
- C41 — Fixed capacitor, 500 μ F, 15 V dc, CDE no. HWM 500-15. (Fig. 3)
- D1 — Silicon voltage regulator diode, 8.2 V, 400 mW, Texas Instrument no. 1N756A or equiv. (Fig. 3)

- J1 — 1/4-inch phone jack, Switchcraft no. 11.
- J2 — Chassis rf jack, Switchcraft no. 3505F.
- L1 — 19 μ H, 31 turns No. 22, enameled copper wire, 7/8 inch long, 1 inch diameter. Ceramic form, National no. XR-50.
- L2 — Toroid core, Ferroxcube no. 1041T060/4C4, approximately 50 turns no. 28 enameled copper wire.
- L3 — Miller no. 42A000CB1-2, 26 turns no. 24 enameled copper wire.
- L4 — Miller no. 40A000CB1-2, primary 26 turns no. 28 enameled copper wire, 3/8 inch long; secondary 12 turns no. 28 enameled copper wire.
- Q1 — Npn silicon annular transistor, type 2N918 or equiv.
- Q2, Q7 — Npn silicon annular transistor, type 2N3014 or equiv.

- Q3 — Pnp silicon low-power transistor, type 2N3640 or equiv.
- Q4 — Pnp silicon high-current switching transistor, type 2N3638 or equiv.
- Q5, Q6 — Npn silicon low-power transistor, National Semiconductor type 2N3646 or equiv.
- Q8 — Npn silicon annular transistor, type 2N697. (Fig. 3)
- S1 — Spdt toggle switch, Alco no. MST-105D.
- S2 — Dpdt toggle switch, Alco MST-205N.
- U1 — Variable gain, wideband amplifier/multiplier, Silicon General no. SG3402.
- U2, U3 — Linear IC, monolithic rf i-f amplifier, Fairchild no. 703E.
- U4 — Silicon miniature diode assembly, Motorola MDA 950-2 or equiv. (Fig. 3)
- Y1 — Oscillator crystal, 3000 kHz. Sources listed in QST advertisements.

Therefore the bypass capacitors should be mounted close to the IC with short leads. The planetary ball reduction gear couples the tuning capacitor to the tuning knob. This is not an ideal setup for it is not possible to calibrate the dial because the ball drive slips at the end of travel. However, accurate calibration of a VFO is not a great advantage, inasmuch as crystal band-edge markers are required if one is going to operate within striking distance of a pink slip.

Test and Adjustment

The only tuned circuit which is not adjustable is the 3-MHz band-pass filter consisting of L2 and C19. This should be resonated with a grid-dip meter after first overwinding the toroid core and removing

turns one at a time until the circuit resonates. This circuit removes harmonics from the crystal oscillator and helps to reduce spurious inputs to the balanced modulator.

With the VFO operating and keyed, the output of U1 should be monitored while adjusting R21, the carrier-balance potentiometer, for a null at both 3 MHz and 4 MHz. The null should occur simultaneously. Next, monitor the output of J2 through a length of coaxial cable terminated in the transmitter. The cable is necessary because the cable capacitance is reflected back into the circuit for L4 and C38 and forms part of the total tuning capacitance. Adjust L3 and L4 for maximum drive to the transmitter. While rapidly keying the crystal oscillator, ad-

just C14 for the best starting characteristics. Finally, C1 is adjusted to cover the spread of 4.0 to 4.1 MHz. Adjustment is made with C3 and by bending the plates of C1 for the desired ΔC for full rotation.

If a spectrum analyzer is available, the optimum tuning may be quickly reached for maximum rejection of unwanted frequency components. The prototype circuit had all unwanted components down by at least 40 dB. With key up, the VFO feedthrough at 4 MHz was down 30 dB. This level is not detectable with the station receiver and tuned circuits in the driven transmitter will reject these components.

With S2 in the SPOT position, power is removed from the output buffer amplifier and the crystal oscillator is keyed. This

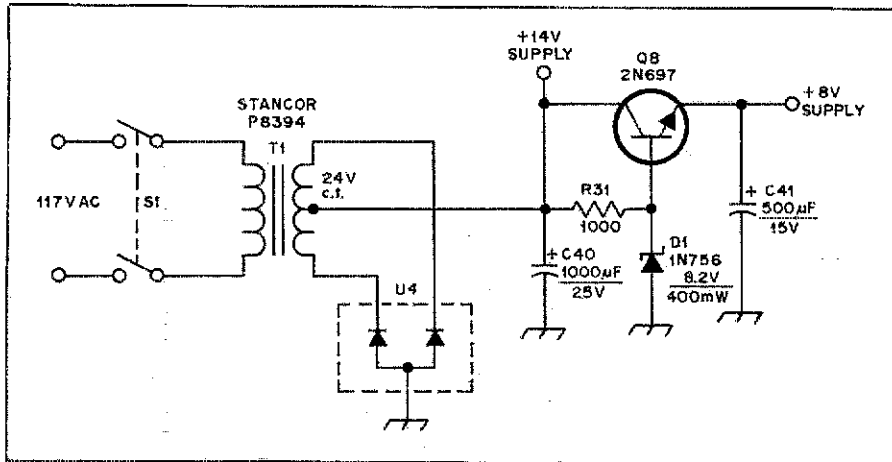
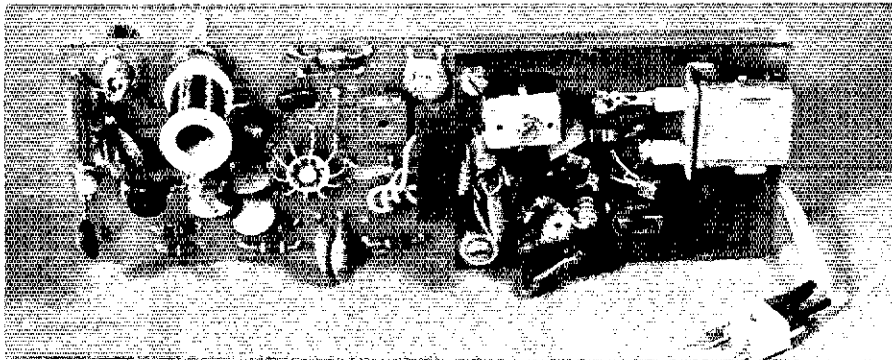


Fig. 3 — Power supply for the heterodyne VFO. Miniature diode assembly U4 is Motorola part no. MDA-950-2 or equiv.

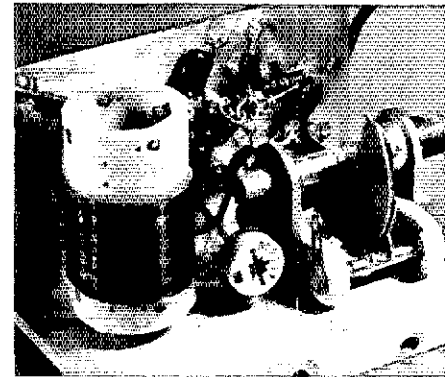


Crystal oscillator and balanced mixer board. The oscillator is a highly modified International AO1 assembly. The small toroid coil on the oscillator board is L2. The balanced mixer (10-lead IC) is on the main board. U2 and Q6 are at far left. As is typical with developmental circuits, the board shows evidence of modifications.

generates a weak signal which can be monitored in the station receiver for frequency spotting. In the OPERATE position, control is transferred to the keyer. Any commercial keyer with an open-collector, current-sinking output will work with this VFO. If there is doubt in one's mind about this feature of a par-

ticular keyer, the schematic diagram of the keyer should be examined, or the manufacturer should be consulted. Of course, a relay output will also work with the VFO

The normal output of the heterodyne VFO is about 20 mW into a load of 75 ohms. The driven transmitter operates



The Vackar oscillator circuit is constructed on a heavy extrusion. Large bus wire interconnects tuned circuit components. L1 is wound on a ceramic form and coated with epoxy resin. C1 is a heavy-duty two-bearing capacitor reduced to one rotor and one stator plate.

straight through on 40 meters for outputs of 7.0-7.1 MHz. Using the driven transmitter as a multiplier, 20-meter output from 14.0-14.2 or 10-meter output from 28.0-28.4 MHz is available. The driven transmitter must also be provided with fixed bias to prevent excessive dissipation in the final amplifier under key-up conditions. For transmitters with cathode or emitter keying, fixed bias should be added to cut off the final amplifier during key-up conditions.

The heterodyne VFO has been in use with a Viking-II transmitter with the station set up for full break-in cw operation. It is the only VFO I have ever used where operation very close to the band edges in the Extra Class portion is possible without constant nervous strain from wondering just where the transmitted frequency will end up after a long QSO.

References

- ¹Vackar, "LC Oscillators and Their Frequency Stability," *Tesla Technical Reports* (Czechoslovakia) Dec., 1949.
- ²Clapp, "Frequency Stable LC Oscillators," *Proc. IRE*, Aug., 1954, pp. 1295-1300.
- ³Jordan, "The Vackar VFO: A Design To Try," *Electronic Engineer*, Feb., 1968.

Strays



THE RAEM AWARD

□ Basic rules require the applicant to submit a minimum of 68 points accumulated by contacting Soviet amateur radio stations above the Arctic Circle. Repeat contacts with the same stations do not count, and a specific city or inhabited area may be counted just once (i.e., only one QSL from Cape Chelyuskin). The exact location is required on each QSL card. *Cw contacts only* count after December 24, 1972.

1) An RAEM contact is 15 points.

2) A contact with a Soviet drifting Arctic station is worth 10 points (i.e., UPOL-21).

3) A contact with a fixed Soviet Antarctic station (usually 4K prefix) is worth 10 points.

4) A contact with Cape Chelyuskin, Cape Schmidt, Vankarem, Dickson, Pevek, Ambarchik or Ustx-Olenex is worth 5 points.

5) A contact with Soviet Arctic Islands is worth 5 points (Wrangel, Ayon, Severnaya Zemlya, Ostrov Dickson, Ostrov Kildin).

6) Other stations or locations above the Arctic Circle are worth 2 points.

7) For South American stations, all points value double.

To apply for this or any other Russian award, send your QSL cards, a cover sheet with your name, call, mailing address, the name of the award you are applying for, plus a list of confirmations (date, call, emission, frequency, reports) to Box 88, Moscow, USSR. Each application must be accompanied by 14 IRCs (the equivalent of one ruble) for return of the cards by registered mail. — W1YL

KM1CC QSL CARDS

□ Any one who worked special event station KM1CC should send a QSL with an s.a.s.e. to W1GAY, P. O. Box 637, Vineyard Haven, MA 02568. After January 1, 1979, all KM1CC cards will be destroyed.

Designing a Vertical Antenna

Graphs cut through the mathematical headaches of antenna design. Put them to work and build a vertical that will shake the air with energy.

By Walter Schulz,* K3OQF

Here is a vertical designed and built from graphs contained in *The ARRL Antenna Book* and *ARRL electronics data book*. In my case the antenna was completely made from discarded Yagi beam elements — a junk box vertical!

By combining information found on transmission lines and antennas in *The ARRL Antenna Book* a design concept may be realized. Explaining further, antennas go through impedance variations in a manner similar to transmission lines. An open-ended transmission line exhibits inductive and capacitive reactances above and below "resonance," respectively. However, at resonance inductive reactance cancels capacitive reactance, leaving only a resistive component. The characteristics of a vertical are similar to those of an open ended transmission line.¹ Engineers use this concept to calculate conjugate impedance at an antenna feed point.

By using graphs of the universal reactance curves² and radiation resistance curves,¹ knowledge of mathematics other than simple arithmetic is not necessary. These charts make the solution to feed-point conjugate impedance and top loading problems simple.

Let's Design a Vertical

The antenna selected for illustration in this article is a top-loaded vertical for the 40-meter band, operating at one quarter wavelength or 90 electrical degrees.

Electrical degrees are often employed as units of measure when working with antennas. Their use not only helps one to mentally visualize antenna length, regardless of wavelength, but they are essential when working with the graphs mentioned above.

In the broadcast industry the practical physical limit for top loading is considered as approximately 30 electrical degrees³ when applied to a disk. To find the actual physical length of a vertical antenna having this full limit of top loading, subtract 30° from 90°. The resulting 60° may then be converted to feet (or meters) by this equation:⁵

$$\text{Length in ft} = \frac{2.73 \times l}{f_{\text{MHz}}} \quad (\text{Eq. 1a})$$

$$\text{Length in m} = \frac{0.83 \times l}{f_{\text{MHz}}}$$

where l = length in degrees

Thus,

$$\text{length} = \frac{2.73 \times 60}{7} = 23.4 \text{ ft} \quad (\text{Eq. 1b})$$

In order to proceed to the next step in the calculations, one should survey the aluminum stock on hand, and select masting having the desired outside diameter (OD). The tubing selected as an example for this article had an outside

diameter of one inch. To obtain dimensions in meters (millimeters) multiply feet by 0.3048 (304.8) inches by 0.0254 (25.4).

Let's now consider the vertical mast as an open-ended transmission line, so that the conjugate impedance and 30° top-loading dimensions can be determined. This equation is for computing the characteristic impedance:⁶

$$Z_o = 60 \left[\ln \left(\frac{2h}{a} \right) - 1 \right] \quad (\text{Eq. 2})$$

where

\ln = natural log (2.3 times the common log),

h = length or height of vertical mast in inches

a = radius of mast in inches

$$\text{Thus, } Z_o = 60 \left[\ln \left(\frac{2 \times 280.8}{0.5} \right) - 1 \right] = 361 \text{ ohms}$$

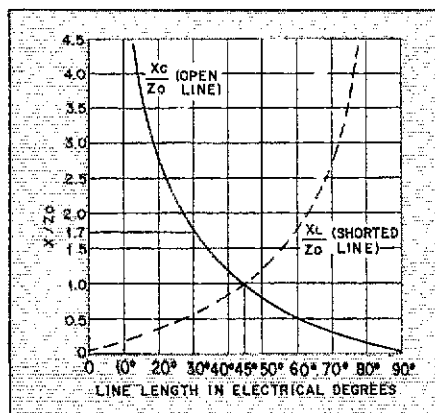
By referring to the universal reactance curves in Fig. 1 the 30° of top-loading reactance can be found. Look across on the abscissa (line length in electrical degrees) finding 30°, and run along the projection vertically to a point on the X_c/Z_o (open line) curve. At that point proceed horizontally toward the ordinate reading $X/Z_o = 1.7$. By transposing $X/Z_o = 1.7$ we observe that $X = 1.7 \times Z_o$, with the result $X = 1.7 \times 361 = 614$ ohms reactance for 30° top loading.

How to Find Your Hat Size

Refer to Fig. 2 for the nomograph for LC constants, taken from the *ARRL data book*.⁷ Place a ruler across 7 MHz and 614 ohms X_c reactance. The ruler crosses the capacitance line at 37 pF. For 30° of top loading, 37 pF of capacitance is required.

Turn next to Fig. 3, the graph of capacitance vs. diameter,⁸ where the proper diameter for 37 pF can be found. Note

Fig. 1 — Universal reactance curves for open and shorted transmission lines.



*3617 Nanton Terrace, Philadelphia, PA 19154

¹Footnotes appear on page 21.

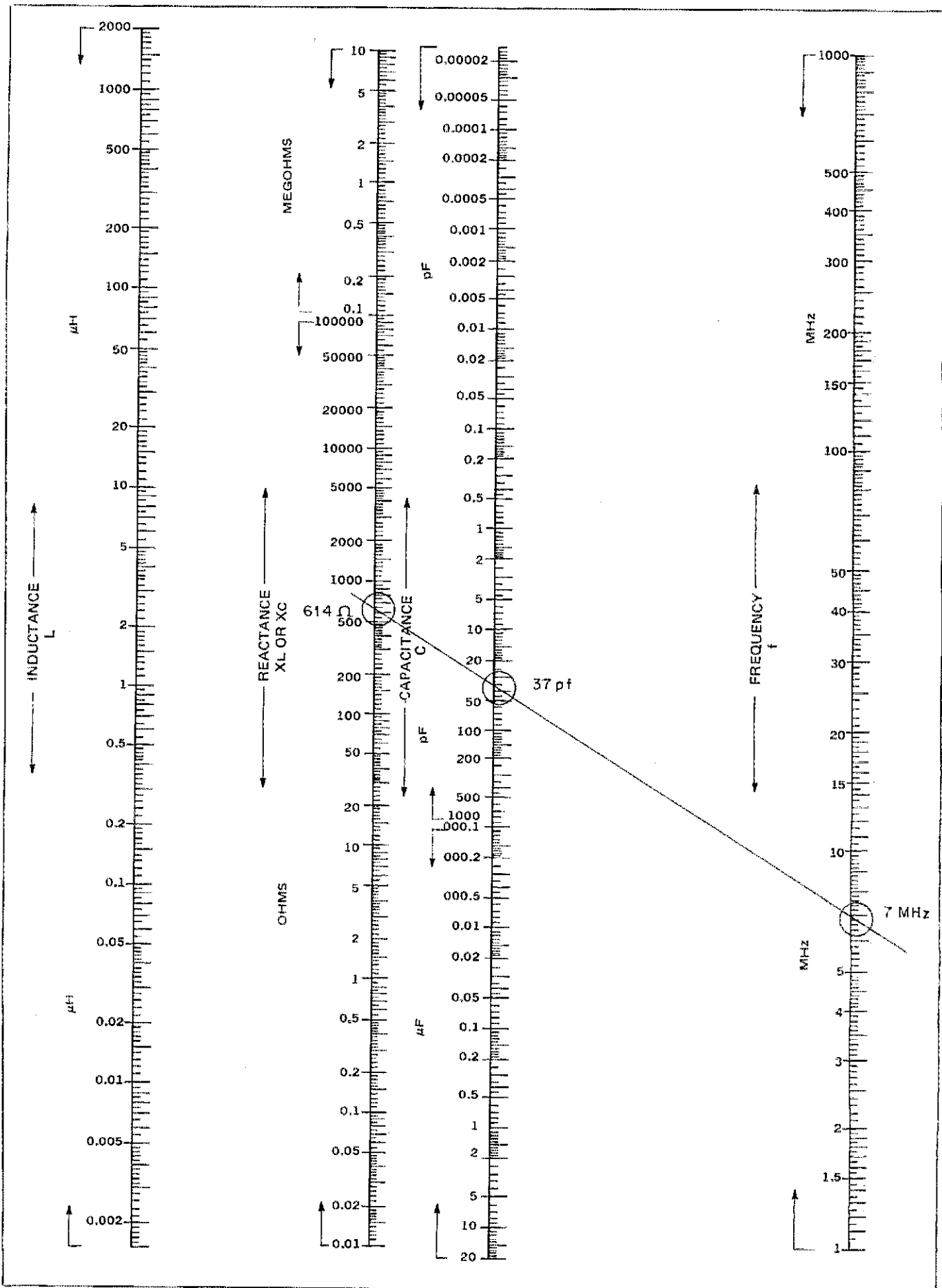


Fig. 2 — Nomograph for LC constants showing how values for the antenna described in the text are plotted.

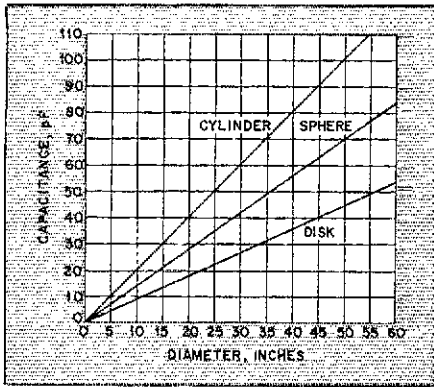


Fig. 3 — Capacitance of sphere, disk and cylinder as a function of diameter. The cylinder length is assumed equal to its diameter.

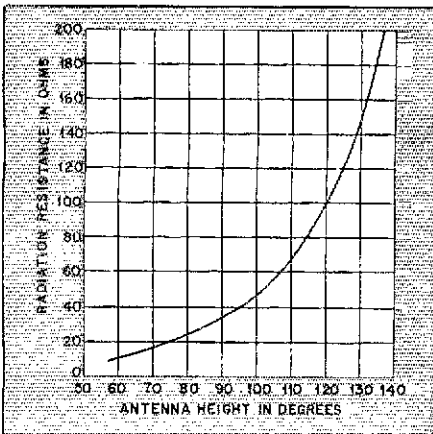


Fig. 4 — Radiation resistance vs. antenna height in degrees, for a vertical antenna over perfectly conducting ground or a highly conducting groundplane.

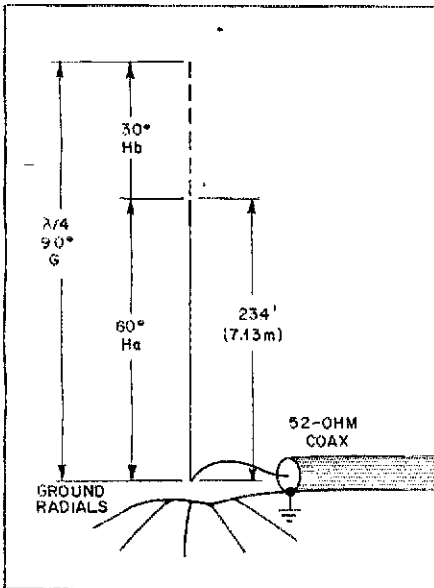


Fig. 5 — Dimensions for a quarter-wave vertical antenna with 30° of top loading. The dimensions in electrical degrees are provided. H_b represents the vertical portion and H_a is the capacitance hat. The antenna is series fed by the coaxial transmission line. There are 60 radials, each 0.2 wavelength long, in the ground system.

the position of 37 pF on the ordinate and the position of the point marked "disk" on horizontal projection. At this point follow the projection down to the abscissa (diameter, inches). The value, 40 inches, is the required diameter of the top-hat disk.

The skeleton disk shown in the photograph is fashioned into a wagon-wheel configuration. Six 20-inch lengths of 1/2-inch wide OD aluminum tubing are used as spokes, each emanating from the hub at equidistant intervals. The spokes terminate at a loop made of no. 14 copper wire. Note that the loop will increase the capacitance slightly.

To find conjugate impedance refer to the radiation-resistance-vs.-antenna-height graph, Fig. 4. Looking at the curve we see that for 90° (on the abscissa) we will have 36-ohms radiation resistance (on the ordinate). An estimated radial ground system loss resistance of 4 ohms for 60 radials, each 0.2 wavelength long,* may be added to the 36-ohms radiation-resistance value. This results in a total resistive value of 40 ohms. (Note: 60 radials were used with the antenna selected for the example).

Again referring to the universal reactance curves, Fig. 1, we see that 90° on the abscissa yields a reactance value of zero. Therefore, the conjugate impedance at the feedpoint is $Z = 40 \pm j0 \Omega$. The electrical design for the completed antenna is shown in Fig. 5.

A further word about the universal reactance curves; these curves in reality are trigonometric functions. The two functions of interest here are $X/Z_0 = \cotan \theta^\circ$ for open transmission lines and $X/Z_0 = \tan \theta^\circ$ for shorted lines. Knowing this information one could make his own graph using trigonometric tables.

For beginning radio amateurs without knowledge of the Smith Chart, use of the graphs facilitates vertical antenna design. They offer numerous possibilities in planning with a simple and direct approach.

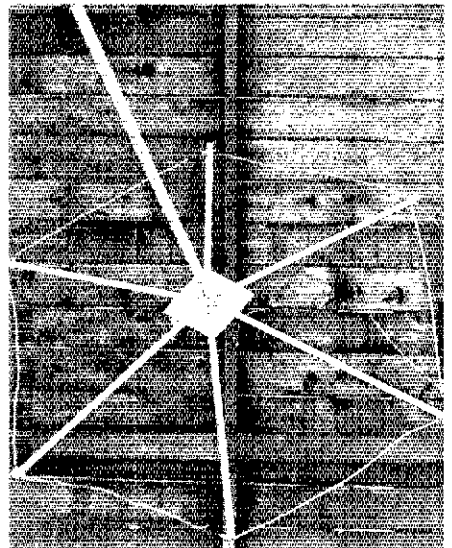
When the 40-meter antenna was finally constructed, stations in Europe could be worked on a daily basis barefoot from the Philadelphia area. On several occasions stations as far away as the Indian Ocean have been worked. QST

Footnotes

- *Jordan, *Electromagnetic Waves and Radiating Systems*, Prentice-Hall, Inc., 1968. pp. 388-396.
- *The ARRL *Antenna Book*, 1968, p. 80.
- *Fig. 2-74, *The ARRL Antenna Book*, 1974, p. 60.
- *Laport, *Radio Antenna Engineering*, McGraw-Hill, Inc., 1952, p. 80.
- *Department of Navy, *Naval Shore Electronics Criteria: HF Radio Antenna Systems*, Naval Electronic Systems Command, Washington, DC, 1970, p. A-6.
- *Jasik, *Antenna Engineering Handbook*, McGraw-Hill, Inc., 1961, p. 19-3.
- *ARRL *electronics data book*, 1976, p. 27.
- *Fig. 2-80, *The ARRL Antenna Book*, 1974, p. 62.
- *Stanley, "Optimum Ground Systems for Vertical Antennas," *QST*, December, 1976, pp. 13-15.



Joseph Blair, W2UI, stands beside a top-loaded 40-meter vertical antenna that is the key to regular contacts with stations in Europe.



A close view of the capacity hat for a 40-meter vertical antenna. The radial arms terminate in a loop of copper wire.

Prescaler Updates the DVM/Frequency Counter

Let your QST-course digital counter reach new highs of up to 250 MHz. This vhf prescaler does the trick!

By Robert D. Shriner,* WA0UZO

As part of a series of articles concerning work with integrated circuits published in *QST* in 1976,¹ the circuit of the digital voltmeter/frequency counter generated widespread interest among radio amateurs. The era of digital electronics for amateur communications had arrived, and here was a device deserving a place in every ham station. It offered a means of measuring voltages with reliable accuracy and also provided a highly dependable method of measuring frequency.

More than two years have slipped by since the prototype DVM/FC appeared as a finished product in the ARRL laboratory. Now the time has arrived to consider the addition of a prescaler that will enable the counter to have a substantial increase in frequency range. Incorporating this extra feature in the basic unit does not demand a forbidding amount of space nor does it require more than a few hours work. Because of the tenfold increase, a 25-MHz counter can be modified to read up to 250 MHz. Indeed, that

should be right down the pike for the vhf enthusiast.

With such a goal in mind, I designed and built the prescaler which I am about to describe. The configuration is an adaptation of a popular circuit published several years ago by the Semiconductor Group of the Fairchild Camera and Instrument Corporation.

Anatomy of the Circuit

The vital organ of the vhf prescaler is Fairchild's popular IC, the 95H90 decade counter. At the front door of the frequency expander is preamplifier Q1 with associated components selected for a frequency range from 25 to 250 MHz. D1 and D2 are the stalwart guards ready to chop down any Rocky Mountain-size signals that otherwise would overload the circuit.

A 95H90 decade counter was chosen for use as U1 because of the very high speed with which it can divide by 10. You can see, by referring to Fig. 1, that Q1 feeds the signal to U1 through C3. The prescaler output is fed to the input circuit of the DVM/FC. Attention is called to the fact that the prescaler should not directly drive

the 82S90 or the 74196 ICs. Because U1 requires about 150 mA, a separate 5-V regulator, U2, is included in the prescaler circuit. The purpose of this regulator is to prevent an overload of the existing 5-V supply. Also, as a preventive measure, R5, a 100-ohm resistor, has been inserted to hold down the work that U2 has to do. This reduces the input voltage to approximately 15 volts. However, if this circuit is to be used with another counter that has a good 12-V supply, R5 may be eliminated.

Putting It Together

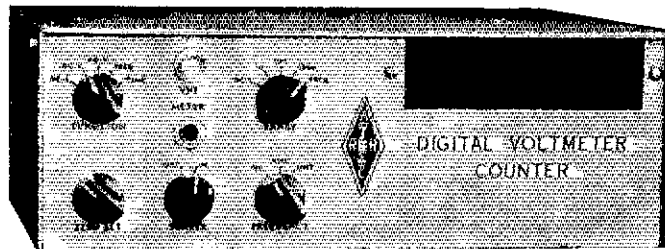
Physically, the prescaler is compact and should fit easily within the DVM/FC structure. For builders who wish to avoid making their own circuit board, the board and a parts kit (less the input connector and switches) are available.² With a prefabricated board, construction of the prescaler becomes a comfortable one-evening project.

For those industrious individuals who want to make their own circuit boards, the etching pattern is given in the "Hints and Kinks" section of this issue. Fig. 2 is a parts-placement guide and Fig. 3 shows the mechanical assembly of the board.

*1740 E. 15th St., Pueblo, CO 81001

¹Footnotes appear on page 24.

The Circuit Board Specialists version of the digital voltmeter/counter described in the popular *QST* article series, "Learning to Work with Integrated Circuits."¹



A compact prescaler designed for use with the *QST* digital voltmeter/frequency counter. The LM340T-5 regulator is in the upper left. The Fairchild 95H90 prescaler IC is visible at the lower left.



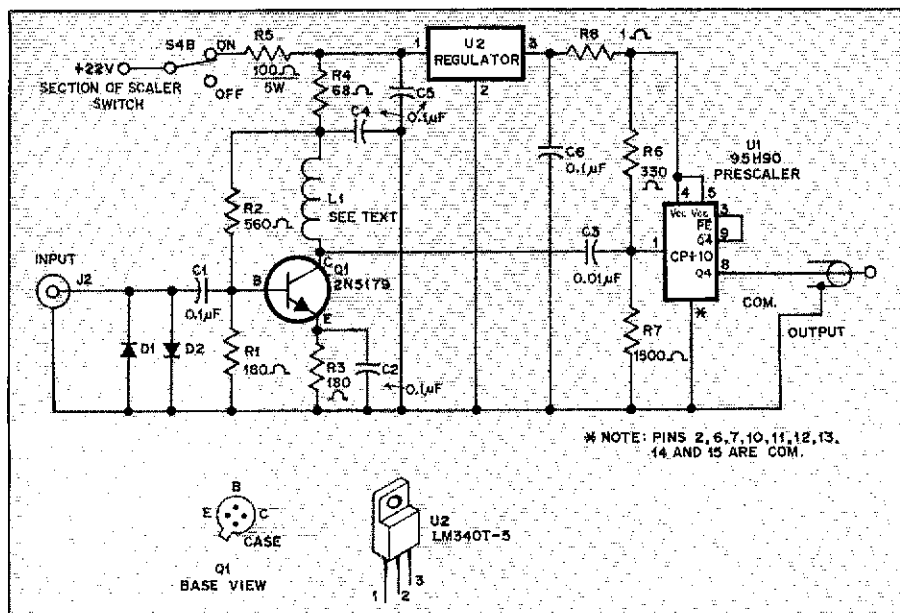


Fig. 1 — The vhf divide-by-10 prescaler circuit. See Fig. 4 for DVM switching modification. No connection is made to pin 16 of U1.
 C1, C2, C4-C6 incl. — 0.1- μ F disk.
 C3 — 0.01- μ F disk.
 D1, D2 — Switching type 1N914N.
 J2 — BNC, type UG-1094.
 Q1 — Npn silicon hf, type 2N5179 or 2N3600.
 R1, R3 — 180-ohm, 1/4-watt.
 R2 — 560-ohm, 1/4-watt.
 R4 — 68-ohm, 1/4-watt.
 R5 — 100-ohm, 5-watt.
 R6 — 330-ohm, 1/4-watt.
 R7 — 1500-ohm, 5-watt.
 R8 — 1-ohm, 1/4-watt.
 U1 — Decade counter, Fairchild type 95H90.
 U2 — Positive voltage regulator, type LM340T-5.
 See Fig. 3 for L1.

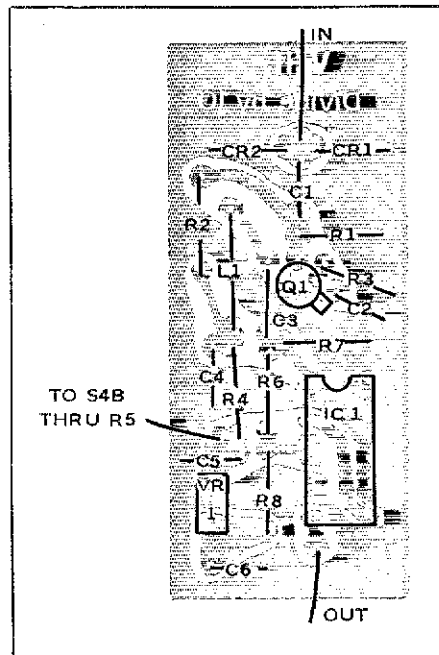


Fig. 2 — Parts placement guide for the vhf prescaler. The shaded area represents an X-ray view of the copper pattern. The etching pattern appears in the "Hints and Kinks" section of this issue. The board is double-sided copper clad, with all but a small strip etched away from the component side (see the photo and Fig. 3).

Fig. 4 shows the modifications needed for the switching circuits of the DVM/FC.

Construction should begin with preparation of the prescaler board and the small BNC connector mounting panel (also made from pc material). Dimensions are given in Fig. 3. A well-centered hole should be made in the small panel to accommodate the BNC connector. A copper strip, shown in the drawing, is placed at the front end of the circuit board to provide a means of soldering the small BNC panel to the circuit board. The foil side of the board is also soldered to the small panel. The dual soldering is done for the sake of rigidity.

As indicated by Fig. 3, the BNC connector nut is to be located properly over the hole and then soldered in place. A good idea is to rub the nut with a piece of emery cloth, or file it lightly before soldering. At this point I should mention that the BNC outer conductor is grounded to the printed circuit board but this part of the connector *must be insulated* from the DVM/FC chassis ground. Also for this same reason, the front side of the little circuit-board upright for the BNC connector should be beveled around the connector hole to prevent contact between the BNC connector and chassis ground. An insulating washer should also be used to isolate the BNC connector from the chassis ground.

Examination of the DVM/FC should disclose a convenient location for mounting the prescaler and providing a front panel hole for the BNC connector.

Builders who obtain the ready-made housing² may find a convenient mounting location between S1 and S2. The hole to be made in the panel of the DVM/FC should have a diameter of 7/16 inch (11.1 mm), particularly if a metal chassis is used for the DVM/FC.

Two construction guidelines apply to this project. Use a low-wattage soldering iron and keep the leads short. Do not use a socket for U1; it just plain won't work.

After preparatory work has been done, assemble the electronic components, making sure that the correct items are on hand. Then mount all components *except* the 95H90 integrated circuit.

Checking the Voltage

As a precaution before the 95H90 is installed, you should make a voltage check. Temporarily connect the prescaler to the voltage source in the DVM/FC. If all is well within the prescaler and the DVM/FC, just 5 volts (and no more!) should appear at the output of the voltage regulator. Damage to U1 will occur if more than 5 volts are allowed to reach the 95H90.

If the voltage is correct, disconnect the temporary power connections and solder the 95H90 in place. Use care to be sure that the IC is inserted in the proper direction and that none of the pins are bent out of position.

At this point the prescaler is ready to be installed in the DVM/FC, and the one-inch (25-mm) input lead connected from the pc board to the center conductor of

the BNC connector. RG-174/U cable should be used between the output switches and the DVM/FC front end. In order to maintain continuity, be certain that the coaxial cable shields are bonded together when completing the circuits to the switch assembly.

Using the Prescaler

The Q1 preamplifier components have been selected for an input impedance of approximately 50 ohms. Therefore, a 1/4-wave whip antenna may be used for rf pickup from nearby equipment. A 1-watt handheld transceiver operating at 146 MHz will key the prescaler/counter from a distance of six to 10 feet. Do not, however, feed a transmitted signal directly into the prescaler, for you will probably put your newly built unit into orbit with OSCAR 8!

Suppose, now, that we want to count a popular 2-meter frequency — 146,940,000 Hz. Remember that we have divided by 10 so our display frequency will be 14,694,000. Adjust the counter for the HZ position and we read 4000. In the KHZ position the reading will be 694.0. In the MHZ position 14.69 is the reading.

"So, we've checked operation in the 2-meter range," you say. "What about 450 MHz? How do we go about that?"

Well, "podner," there's no need to prospect around here for a solution to that. We can solve that nice and easy like. Just make yourself a two-turn loop, one-inch diameter, using no. 12 insulated wire. Connect the loop to a length of coaxial

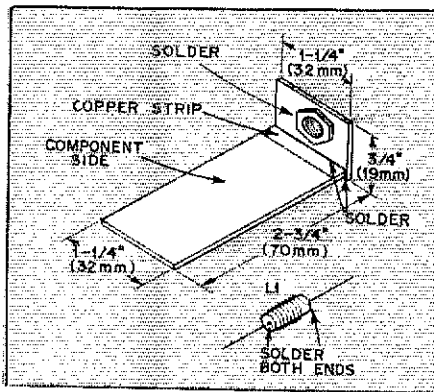


Fig. 3 — The dimensions and construction of the pc board and BNC-connector upright. At the right is L1, an eight-turn coil of no. 28 wire wound on the body of a 1000-ohm (or higher), 1/2-watt resistor.

cable plugged into the prescaler. If you poke the loop around the last multiplier stage of your transmitter and the DVM/counter displays 225 MHz, just multiply that by two. That's it! So, my friend, if you want your digital voltmeter/frequency counter to grow, then this is the way to go!

QST

Footnotes

¹A complete collection of the popular QST series, "Learning to Work with Integrated Circuits," is contained in the new solid-state anthology, "Solid State Basics," available for \$5 (in the USA) from ARRL Headquarters, 225 Main St., Newington, CT 06111.

²At the time of this printing the prefabricated circuit board is available for \$4 and the parts kit (less input connector and switches) for \$21 from Circuit Board Specialists, P. O. Box 969, Pueblo, CO 81002.

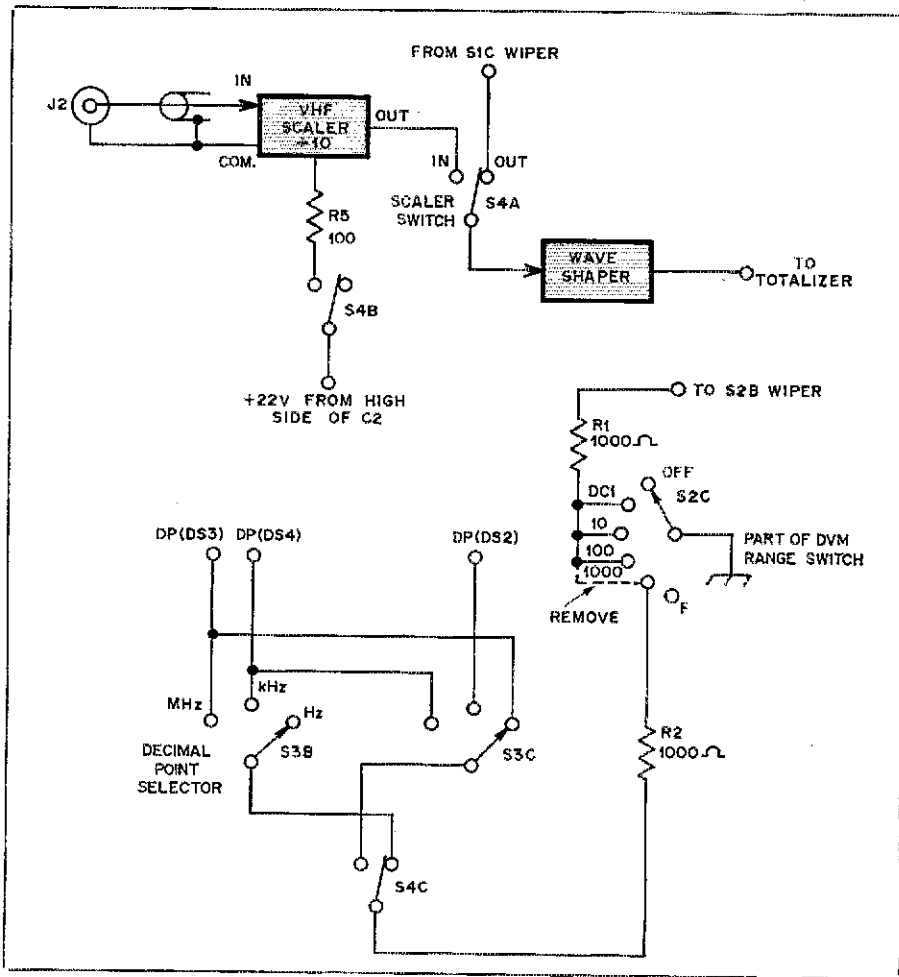


Fig. 4 — Modification of the original QST-course DVM/Frequency Counter circuit to accommodate the vhf prescaler. Reference should be made to the course diagrams, Fig. 26 and Fig. 30.

Strays

ARRL ESTABLISHES HALL OF FAME

At its July 1977 Meeting, the League's Board of Directors authorized the creation of an ARRL Hall of Fame to honor those members and others who have made important, substantial or outstanding contributions in the field of amateur radio. Nominations are solicited in accordance with the guidelines listed below. Nominations received by December 29, 1978, will be considered by the board at its Second Meeting in 1979.

A number of amateur radio pioneers, living or deceased, deserve the honor of being charter nominees. If you are personally familiar with the contributions one of them has made, don't wait for someone else to do it; begin the nominating process yourself!

Hall of Fame Guidelines

1) Purpose: The American Radio Relay League has established its hall of fame to honor those members and others who have made important, substantial, or

outstanding contributions in the field of amateur radio; to ensure that these contributions will not be forgotten by future generations of amateurs; and to motivate today's amateurs to establish high levels of achievement and dedication as their personal goals.

2) Eligibility: Nominees for the ARRL Hall of Fame should be those radio amateurs and others whose achievements or personal dedication have earned for them the lasting respect and admiration of the amateur community. Nominations should be based upon achievements or activities which occurred at least six years prior to submission of the nomination. Nominations may be based upon outstanding technical or operating achievements, important personal contributions to the League or to amateur radio, or substantial contributions over an extended period of time.

3) Nominating procedure: (a) Nominations may be submitted at any time to the Secretary, ARRL. Nominations received in any calendar year will be considered at the Second Meeting of the Board of Directors in the following year. (b) Election to the ARRL Hall of Fame is a high honor

which is not bestowed lightly; therefore, nominations should fully and clearly document the qualifications of the nominee. The nomination must be signed by at least five Full Members of the League. (c) The nominations received during a calendar year will be reported to the membership via the League's journal, QST, no later than April of the following year. The membership will be asked to submit comments or additional information on the nominations. All relevant information on nominations will be made available to each director no later than 30 days prior to the Second Meeting of the Board.

4) Elections: Each director shall cast a single, secret ballot for not more than three nominees. A nominee shall be declared elected to the hall of fame upon receiving the votes of not less than 12 directors during a single balloting.

5) Award: A suitable award shall be devised and presented at an appropriate time and place, and with all due ceremony. A list of members of the ARRL Hall of Fame shall be displayed in the lobby or museum at ARRL headquarters.

An Auditory Dip Oscillator

Need to check that antenna, track down parasitics or neutralize an amplifier? Let this novel dipper do the work. Its advantage? You can literally play it by ear!

By W. Earl Quay,* W4MKC

Over the years numerous articles have been written about the ways in which sightless radio amateurs carry on routine activities at their stations, including the construction and maintenance of their equipment. The alternative methods employed by these amateurs are based on the use of touch and sound. A principal reason for my article is not that I'm departing from the alternatives, but because I wish to emphasize that possession of sight or all sensory capacities is not wholly necessary for being a full-fledged radio amateur. Of course there are difficulties for the sightless, but with a bit of effort most problems can be solved and a few evaded.

My lack of sight may be of little consequence to readers of this magazine but it should evoke a measure of interest in the device described and the form of schematic diagram (or rather the substitute for it) which can be used without sight, or on the air.

Dip oscillators have been used by blind radio amateurs for many years. These devices have been produced in various forms. Some have been cumbersome. Others were complicated.

When I decided to provide myself with a dipper, my plans called for simplicity of design, easy construction, good audible readout and a healthy degree of sensitivity. While I built my device for personal use, it was designed to be shared with others. In particular, I felt that the audible readout feature offered a real advantage to all users of dip oscillators. For those amateurs blessed with sight, the auditory dip oscillator permits full attention to be given to work at hand.

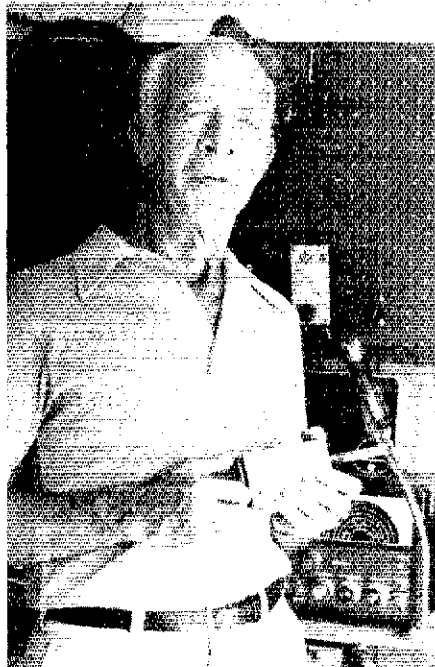
The ADO Design

The beginning or rf portion of the auditory dip oscillator is a modification of

the Heath HD-1250 dip-meter circuit. Following the initial dipper section is the readout circuitry consisting of a detector amplifier and a commonly used audio oscillator/amplifier that drives a small speaker. Provision is made for a headset to monitor modulated signals. The transistors are available at Radio Shack stores.

Except for the Heath dip-oscillator plug-in coils which I used, all the components are assembled inside a 5-1/4 × 3-1/16 × 2-1/8-inch (133 × 78 × 54 mm) enclosure. I've mounted the power switch, miniature speaker, phone jack, pitch control and tuning knob on the case, while the circuit board is placed inside,

Author W. Earl Quay, W4MKC, stands beside his station equipment. In his hand is the auditory dip oscillator described in this article.



adjacent to the tuning capacitor. For the sake of easy removal, the battery is mounted outside.

The Verbal Diagram

My method of handling a schematic diagram is verbal. It bears a resemblance to the instructions found in Heathkit manuals. I've arranged the information about the auditory dip oscillator (Fig. 1) in this manner.

"B-plus (9 volts) goes through S1 to the top of a 50-kΩ potentiometer with the bottom terminal grounded. The arm or slider of this potentiometer goes through a 1500-ohm resistor to the collector of Q1 and through a 0.01 μF bypass capacitor to ground. The collector of Q1 goes through a 47-pF silver-mica capacitor to tank connection no. 1. The collector of Q1 also goes through a 10-kΩ resistance, thence through a 27-kΩ resistor to ground. The junction of the 10-kΩ and the 27-kΩ resistors is connected through a 100-kΩ resistor to the base of Q1. The base of Q1 is connected through a 4700-ohm resistor and a 5-pF silver-mica capacitor in parallel on through a 47-pF silver-mica capacitor to tank connection terminal no. 2.

"The emitter of Q1 goes through a 27-ohm resistance to ground and through a 0.001-μF capacitor to ground. The junction of tank connection no. 1 and the 47-pF capacitor goes through 100-kΩ resistance paralleled by a miniature 25-pF trimmer capacitor to the base of Q2. Tank connection no. 1 is wired to the shell of the phono jack for the plug-in coil and to variable-capacitor stator no. 1. Tank connection no. 2 goes to the tip of the phono connection for the plug-in coil and to the stator of variable capacitor no. 2. The common rotors of capacitors 1 and 2 are both grounded. This completes the dipper portion.

"The base of Q2 goes through 10-kΩ

*4128 S.E. 10th Ave., Cape Coral, FL 33904

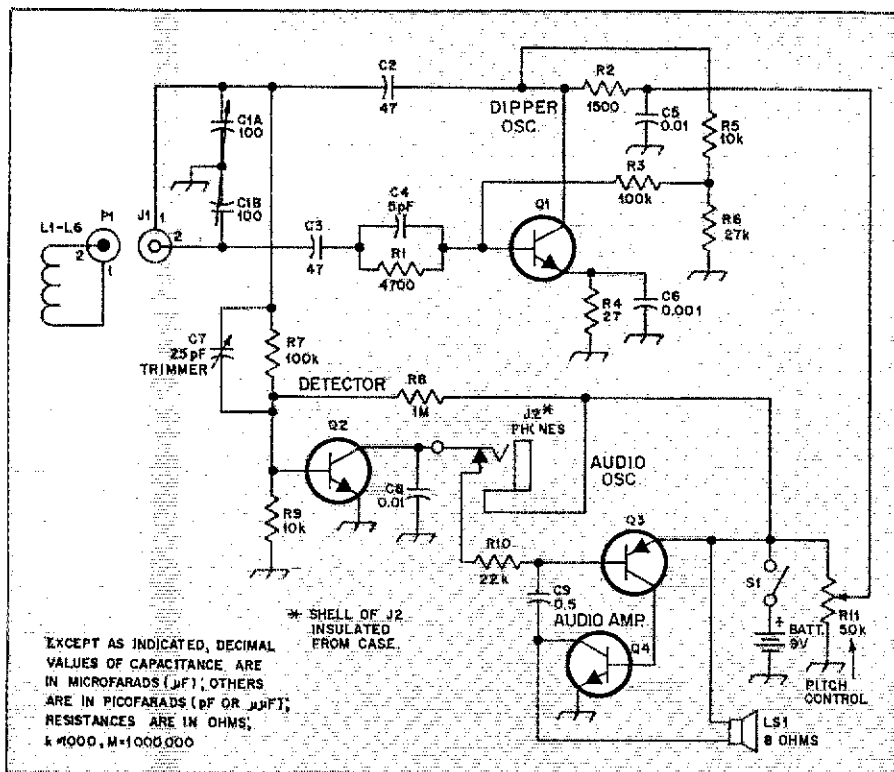


Fig. 1 — The W4MKC auditory dip-oscillator circuit. An audio tone circuit takes the place of a visual meter, an arrangement that is useful to the visually handicapped amateur. L1 through L6 are Heathkit part nos. 40-1689 through 40-1695. All fixed resistors are 1/4 watt.

- C1 — Split-stator capacitor, 100 pF per sec.
- C2, C3 — 47-pF silver mica.
- C4 — 5-pF silver mica.
- C5, C8 — 0.01-μF disk ceramic.
- C6 — 0.001-μF disk ceramic.
- C7 — Trimmer capacitor, 25 pF max.
- C9 — 0.5-μF polyester dielectric tubular.
- J1 — RCA-type phono jack.
- J2 — Phone jack.
- LS1 — Miniature replacement loudspeaker, 8 ohm.
- P1 — RCA-type phono plug.
- Q1, Q2, Q4 — Npn rf oscillator/amplifier

- transistor, Radio Shack RS-2011 or equiv.
- Q3 — Pnp, general-purpose transistor, Radio Shack type RS-2021 or equiv.
- R1 — 4700 ohm.
- R2 — 1500 ohm.
- R3, R7 — 100 kΩ.
- R4 — 27 ohm.
- R5, R9 — 10 kΩ.
- R6 — 27 kΩ.
- R8 — 1 MΩ.
- R10 — 22 kΩ.
- R11 — Linear-taper potentiometer, 50 kΩ, Radio Shack no. 271-1716.

resistance to ground. The base of Q2 also goes through 1 MΩ of resistance to B+ at the bottom of S1. The emitter of Q2 goes to ground. The collector of Q2 is wired through a 0.01-μF capacitor to ground. The collector of Q2 also goes to the tip connection of a phone jack. The shell of the phone jack (insulated from the case) goes to the plus connection under S1. The idler connection on the phone jack goes through a 22-kΩ resistor to the base of Q3. (Note: The 1-MΩ resistor may be changed to a higher or lower value in order that the dipper presents a very low pitch or clicking sound whenever the unit is turned on. Also, when magnetic phones are plugged into the phone jack the audio oscillator is disconnected. A modulated rf signal then may be monitored. Alternatively, a visual meter may be plugged into the jack.) This completes the detector amplifier.

“The base of Q3 goes through a 0.5-μF capacitor to the collector of Q4. The emitter of Q3 is wired to the plus connection

under S1. The collector of Q3 goes directly to the base of Q4. The emitter of Q4 is grounded. The collector of Q4 is wired through the speaker to the plus connection under S1. B-minus, incidentally, is grounded. This completes the audio oscillator and all circuit wiring.

Except for those capacitors otherwise indicated in the diagram and on the parts list, all are disk ceramic. Q1, Q2 and Q4 are Radio Shack no. 276-2011 or equivalent. Q3 is Radio Shack no. 276-2021 or equivalent. The split-stator tuning capacitor consists of two 100-pF sections on a single shaft with a common rotor. Builders may have to shop around for the capacitor. Some suggested sources are other amateurs, flea markets or suppliers of surplus radio equipment. G. R. Whitehouse & Co., 11 Newbury Dr., Amherst, NH 03031, stock a variety of variable capacitors.

Technically minded amateurs may find that developing an actual schematic

diagram from given circuit information is an interesting experience. The wording may appear difficult only at the beginning.

Using the Dipper

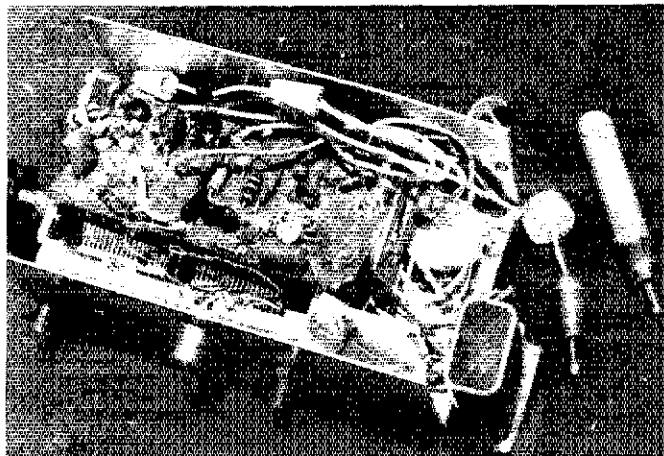
The moment the dip oscillator is turned on a low-pitched tone or clicking sound should be heard. Advancing the pitch control produces a rise in the audio frequency of the tone heard through the speaker. As the tuned circuit of the dipper becomes loaded by an external source, the pitch will drop sharply. Even touching the dipper coil will have a similar effect. Because of the good sensitivity of the dipper, the slightest changes of the circuit under test or a change in the physical conditions surrounding the dipper will be noted by a change in tone.

I have made comparisons of sensitivity with that of dip oscillators belonging to other amateurs. Mine seems to be the equal of any comparison units that were tried. I've observed that even wind blowing on an antenna will result in an excursion of the tone while performing a check of the antenna characteristics.

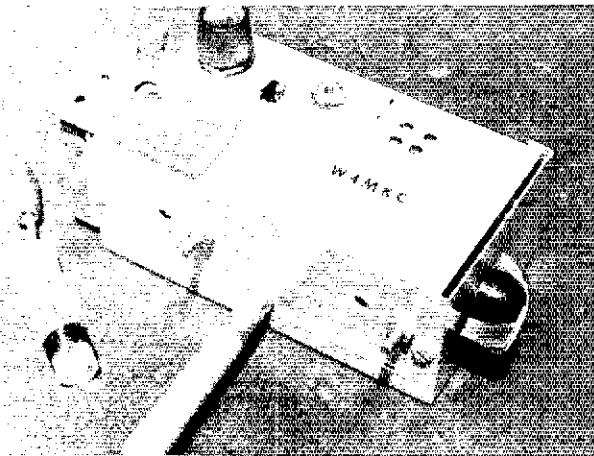
To determine the resonant frequency of a tank circuit, the dipper coil is brought close to the tank inductor. The dipper is then tuned until the audio tone drops. The pointer on the dipper dial, supplemented by a calibrated receiver, indicates the frequency of the tuned circuit under test. The “rightness” or the “wrongness” indicates if adjustment is needed and in what direction the inductor or capacitor must be changed to produce the resonant frequency being sought. Since the rf output of the dipper is somewhat modulated by the audio oscillator, there is no difficulty in locating the dipper signal on a nearby receiver.

The procedure for establishing the value of an unknown capacitor is essentially the same as that used to determine the value of an unknown inductor. If the value of a capacitor is unknown, connect the capacitor in parallel with an inductor of known value. If the value of a coil is to be ascertained, place the coil in parallel with a capacitor of known value. In either case after the dipper coil is brought close to the circuit under test, the dipper is tuned until a pronounced change in the audio pitch is heard. The dial reading of the dipper indicates the resonant frequency of the test circuit. One then has the necessary information to calculate the unknown value from the equation “ f equals 1 over 2 pi times the square root of LC,” where f is the frequency in hertz, L is the inductor value in henrys, and C is the capacitance in farads. Incidentally, do be careful with those decimal points!

A dip oscillator is a practical, simple instrument for making antenna or transmission-line measurements. For use in obtaining a ball-park indication of the characteristics of an amateur's antenna,



This close-up photograph of the inside of the auditory dip oscillator shows the circuit board above the split-stator capacitor. At the right is the 9-V battery and two of the coils.



An external view of the W4MKC dip oscillator. The 9-V battery is mounted at the left. At the right side of the enclosure is the tuning knob. Mounted atop the case are the phone jack, power switch and the pitch control.

the limited accuracy can prove quite satisfactory. One of the easiest measurements that may be made with a dip oscillator is checking the resonant frequency of a center-fed half-wave dipole. The antenna feed line is disconnected and replaced by a one-turn loop. The dipper is placed close to the coil and adjusted until a dip is noted. The lowest frequency at which the dip occurs is the resonant frequency of the antenna. Because the dip measurement is taken at a low-impedance point, the dip should be quite pronounced. Checking the resonant frequency of a grounded quarter-wave antenna is also easily accomplished. The transmission line is disconnected at the antenna feed point, being replaced by a one-turn loop. The dip oscillator is applied as

above. One may find that attempting to determine the resonant frequency of a half-wave dipole at a high-impedance end may not be too satisfactory. The dip is often less pronounced. Capacitive coupling is also required.

As a general practice, antenna measurements should be made with the feed line disconnected. A reason for this precaution is that if the line is not perfectly matched to the antenna a false indication may be given. Furthermore, the dip oscillator should not be coupled to the shack end of a transmission line in order to check the resonant frequency of an antenna. Keep in mind, also, that an antenna will not show the same point of resonance when suspended in the air as it will when measured in a lower posi-

tion near the ground.

After the dip oscillator has been used to determine the approximate resonant frequency, final trimming becomes a matter of cut and try while SWR checks are made and perhaps a field-strength meter is employed to determine when maximum radiation has been achieved.

Whether one wishes to find the Q of a circuit, ascertain the bandwidth of an antenna, check crystals or filters, track down parasitics or neutralize an amplifier, a dip oscillator is a device for these tasks. There should be room for one at every amateur station, including one with an auditory readout.

Consultative assistance in preparing this article and the photography were provided by David W. Bowman, W4OUU.

Feedback

□ In "Transmitter Design — Emphasis on Anatomy," Part 3, in July 1978 *QST*, two errors appeared in the parts placement diagram. In Fig. 8, page 24, the component shown between the base of Q11 and the ground foil should be a 0.01 μF , not "10." The unmarked component shown between the base of Q10 and the other side of T2 secondary should be "10," for a 10-ohm resistor.

□ In "Results, 1978 Simulated Emergency Test" (July 1978 *QST*, page 63), Ball County should have been Bay County, and listed under N. Florida rather than S. Florida. This raised N. Florida's point total to 5991, and reduced S. Florida's total to 4196.

Also, S. New Jersey's reports were included under N. New Jersey. The correct listing is

N. New Jersey	(1246)	620
Bayonne	W2KB	142

Chatham	W2UH	187
Englewood	W2CC	63
Union Co.	N2NS	228
S. New Jersey	(607)	1329
Atlantic Co.	WA2YQV	107
Burlington Co.	K2QJ	1020
Cumberland Co.	WA2EMY	48
Gloucester Co.	WA2SEA	154

□ The postage required for W0SL's HP-67 and -97 az-el programs for OSCARs 7 and 8 and Phase III ("OSCAR 8 Has a Message for You," July 1978 *QST*, page 42) is *Domestic*, one program (O7, O8 and RS or Phase III), 30 cents with s.a.s.e. Two programs, 45 cents with s.a.s.e. *Foreign*, one program, an IRC for 2 oz. and s.a.s.e. Two programs, an IRC for 3 oz. and s.a.s.e. Send to Roy Welch, W0SL, 908 Dutch Mill Dr., Manchester, MO 63011.

□ In "RF Heating in the Ham Bands" (June 1978 *QST*, page 13), the following source reference was omitted: Rogers, S. J. and King, R. S., "Radio Hazards in the m.f./h.f. Band," *Nonionizing Radiation*, December, 1970, pages 178-189.

Strays

The Connecticut Amateur Radio Society was organized largely for the purpose of putting on New England Division Conventions in the Hartford area. It runs great conventions, and it operates in the black. Here, at the Rochester (NY) Hamfest and New York State Convention on May 20, 1978, Lew McCoy, W1ICP, representing CTARS, presents ARRL President Harry Dannels, W2HD, with a check from CTARS to ARRL for \$3000. No wonder W2HD was smiling!



A Solid-State Transverter for 70 Cm

Put those tubes away and move up to the state of the art. Use this device to get on 432 MHz; even work OSCAR Mode B.

By Robert R. Eide,* WØENC

This unit was designed as a replacement for my vacuum-tube type exciter. It provides 1 watt output, enough to drive a solid-state linear amplifier to the 10- to 15-watt power range. It is driven from a low-level output supplied by a transmitter or transceiver operating in the cw or ssb modes on 28 MHz. The transverter has been duplicated by several other builders with no major difficulties encountered.

Circuit Description

The components called out in this description are located in Fig. 1. The oscillator circuit is similar to one described by WØMJS in the *AMSAT Newsletter*.¹ Provisions have been made on the circuit board for a second oscillator stage so that the transverter may be used

over two frequency ranges such as 432-434 or 435-437 MHz by switching the Zener-regulated supply voltage to either of the two oscillators. Crystals used are in the 67-MHz region. The oscillator output is diode switched by D2 and D4 to Q2 which triples it to 202 MHz. A potentiometer in the emitter circuit of Q2 provides adjustment for the proper output level from the oscillator chain. Q3 doubles to 404 MHz, while Q4 amplifies the signal and provides a separate output connection which may be used to provide LO injection for a receive converter.

Q5 and Q6 operate as a balanced mixer with the output tuned by means of variable-coupling loop L6. A potentiometer in the source circuits provides dc balancing. Balance of the output circuit is obtained by adjustment of capacitors C44 and C45. The linear-amplifier stages, Q7, Q8 and Q9 operate in class AB. Trimmer potentiometers are provided for bias ad-

justment on transistors Q8 and Q9. The bias voltage is regulated by a Zener diode. The tuned circuits for these stages utilize striplines etched on the circuit board.

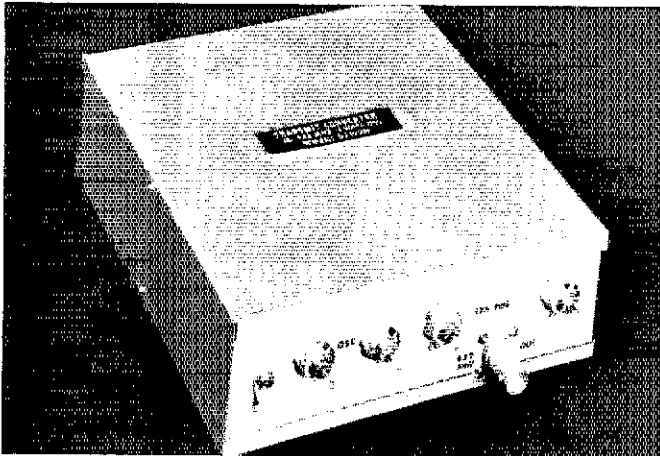
Construction and Adjustment

The circuit is constructed on G-10 glass-epoxy single-sided circuit board 1/16-inch (1.6-mm) thick and 6-inches (152-mm) square. After etching and drilling, the board was plated with Kepro immersion tin-plating solution. Capacitors specified as disk ceramic should be small enough to fit on the circuit board. C2, C54, C3 and C55 should be temperature-stable types to assure oscillator stability. Fixed resistors are 1/4 watt except R1, R30 and R19, which are 1/2-watt types. All resistors may be 10-percent tolerance. All components are seated against the circuit board to avoid long lead lengths. The transistors should be spaced not more than 3/16 inch (4.8 mm) above the circuit

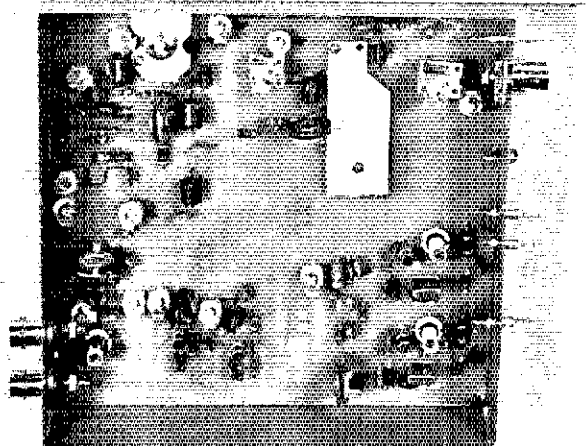
*53 St. Andrew, Rapid City, SD 57701

¹Footnotes appear on page 30.

A front view of the 432-MHz transverter showing the feedthrough capacitors for power and control functions and the output connector. The nameplate is made from a Kepro Black Anodized Nameplate Kit, cat. no. NP-404, available from Kepro Circuit Systems, Inc.



Interior view of the WØENC transverter. The oscillator and mixer stages are along the top of the box with the driver and final amplifier at the bottom. A photocopy of the designer's layout for the circuit board is available from ARRL for 50 cents handling charge and an s.a.s.e. This layout may be helpful to those builders who are experienced in the preparation of etched circuit boards.¹



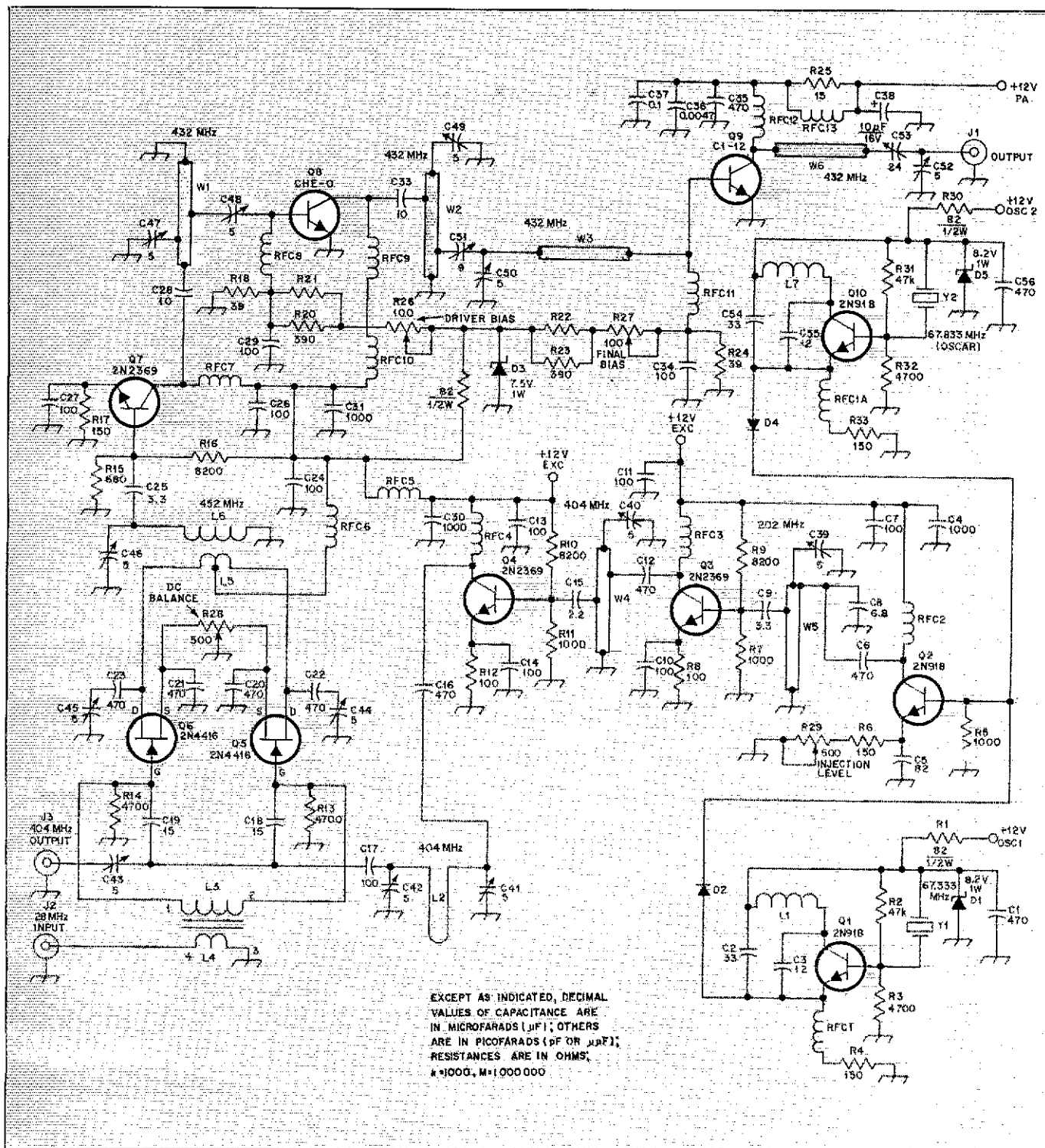


Fig. 1 — Schematic diagram of the transverter. L2, L5 and stripline inductors are on the designer's layout.

C40-C50, C52 — 5-pF variable capacitor, Johnson 187-0103-005 or equiv.
 C51 — 9-pF variable capacitor, Johnson 189-0503-005 or equiv.
 C53 — 24-pF variable capacitor, Johnson 189-0509-005 or equiv.
 D1, D5 — 8.2-V 1-W Zener diode, 1N4738.
 D2, D4 — Silicon switching diode, 1N914.
 D3 — 7.5-V 1-W Zener diode, 1N4737.
 L1, L7 — 7-1/2 turns no. 28 enam. wire on Miller 25A014 form (white core).
 L3 — 19-3/4 turns no. 26 enam. wire on Miller 25A014 form (green core).
 L4 — 2-3/4 turns no. 26 enam. wire wound over L3.
 L6 — See Fig. 3.
 Q1, Q2, Q10 — Npn silicon amplifier transis-

tor, 2N918.
 Q3, Q4, Q7 — Npn silicon switching transistor, 2N2369.
 Q5, Q6 — N-channel JFET, 2N4416.
 Q8 — CTC CHE-0, driver transistor, Communications Transistor Corp.
 Q9 — CTC C1-12, power transistor, Communications Transistor Corp.
 R21, R22 — See text.
 R26, R27 — 100-ohm potentiometer, linear taper, pc mount, TRW X201R101B.
 R28, R29 — 500-ohm potentiometer, linear taper, pc mount, TRW X201R501B.
 RFC1 — Rf choke, 20 turns no. 28 enam. wire wound on 1000-ohm 1/4-watt resistor.
 RFC2 — Rf choke, 12 turns no. 24 enam. wire, close wound, 1/8-inch diameter.

RFC3 — Rf choke, 6 turns no. 24 enam. wire, close wound, 1/8-inch diameter.
 RFC4, RFC7, RFC9 — Rf choke, 7 turns no. 24 enam. wire, close wound, 1/8-inch diameter. RFC4 has Amidon 43-101 ferrite bead on cold end.
 RFC5, RFC8, RFC10, RFC11 — Rf choke, 2-1/2 turns no. 24 enam. wire wound on large ferrite bead (Amidon 43-801).
 RFC6, RFC12 — Rf choke, 9 turns no. 24 enam. wire, close wound, 1/8-inch diameter.
 RFC13 — Rf choke, 2-1/2 turns no. 28 enam. wire wound on ferrite bead (Amidon 43-5111).
 Y1 — 67.333-MHz crystal, 0.001-percent tolerance, HC-25/U holder.
 Y2 — OSCAR crystal 67.833-MHz, 0.001-percent HC-25/U holder.

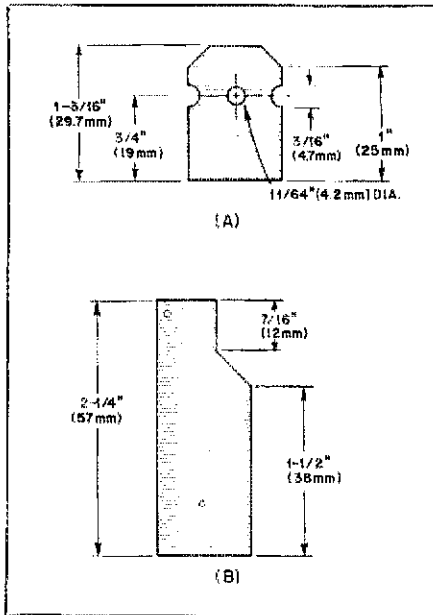


Fig. 2 — Templates for making the heat sinks for Q8 (at A) and Q9 (at B). The material is 3/32-inch (2 mm) thick aluminum. The heat sinks are attached to the circuit board with no. 2-56 fasteners.

board. Transistors Q8 and Q9 require heat sinks. Construction details for the heat sinks are given in Fig. 2. Connect only one lead of RFC10 until the bias voltage for Q9 has been set. Cleaning the circuit board of excessive rosin with a rosin removing solvent such as Kester AP20 will lend a professional appearance to the finished project.

Set potentiometers R26 and R27 to midrange. Before applying drive, remove the dc power from the oscillator terminal. Ground the base connections of Q8 and Q9 with short jumper leads. The supply voltage can be between 12 and 13.8 volts,

however it should be the same voltage that will be used in future operation. Connect +12 volts to the exciter terminal and through a milliammeter to the loose end of RFC10. The potential measured across D3 should be approximately 7.5 volts. If it is, remove the jumper leads from the base connections. Adjust R26 for a Q8 collector current of 2 to 3 milliamperes. If this cannot be done, the combined resistance of R20 and R21 must be changed. Increasing the combined resistance will decrease collector current and decreasing the combined resistance will increase the collector current.

Once the proper operating point (2 to 3 milliamperes) is set, install R21 (if used) and permanently install RFC10. The same procedure is followed for setting the bias for Q9. The milliammeter is connected in series with the PA terminal and resistors R22, R23 and R27 are adjusted for a collector idling current of 5 milliamperes.

Connect +12 to +13.8 volts to the OSC, EXC and PA terminals, a 50-ohm load to the 432-MHz output connector and an hf exciter capable of delivering 1-V pk-pk at 28 MHz to the i-f input. Too much drive signal will decrease the output, cause nonlinear operation, and if the level is much above 1 volt will destroy the mixer FETs. The proper drive level can be verified by measuring the 28-MHz exciter output into a 50-ohm load with an rf probe and setting it for 0.6 volt before connecting it to the transverter.

All tuning adjustments in the transverter are made for maximum output at 432 MHz. If an rf wattmeter is not available use an rf probe and electronic voltmeter as an indicator. Final amplifier collector current should not be allowed to exceed 200 milliamperes. A counter or 432-MHz receiver can be used to determine that the transverter is operating on the proper frequency. Mixer-output link

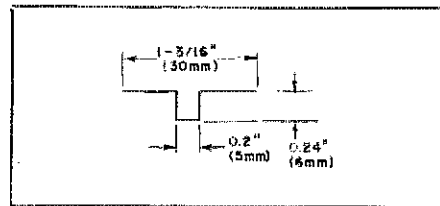


Fig. 3 — Dimensions for L6. The material is no. 24 copper wire. If possible it should be silver plated.

L6 should be adjusted for minimum oscillator-chain feedthrough to the output. This should be checked with the i-f excitation removed. The best setting for L6 is usually in the vertical position. The finished transverter may be mounted in a box made from pc-board material. Recheck all tuning adjustments after mounting the unit in the box.

Performance

Although the transistors used are not linear types, the ssb quality is good. Two-tone tests performed by the author showed the distortion products to be down a minimum of 36 dB. Tests were made from a distance of one mile with the transverter driving a 35-watt amplifier. No spurious signals were detected in the output over a frequency range of 200 to 500 MHz.

A word of thanks is due WA0QLP for his help and encouragement with this project. Also to the many who have built this transverter and to those who are using ready-to-operate units, a big thanks.

Footnotes

- ¹"A 432/435-MHz Converter For OSCAR 7," *AMSAT Newsletter*, June, 1974, p. 18.
- ²Complete or basic parts kits are available from the author.

Strays

ROUGH WEATHER FOR THE CLIPPERTON DXPEDITION

□ The sailing vessel *Felipe* was en route from San Diego to Clipperton Island for a DXpedition when high winds and heavy seas put her in distress. Weather information was unobtainable through normal channels, so ham radio came to the rescue.

Hugh Vandegrift, WA4WME, aboard ship, contacted Bill Christian, K4IKR, of Huntsville, AL. Bill immediately informed the Weather Service Office. Eventually, the San Francisco office relayed to K4IKR where weather conditions were best, and Bill was able to help the *Felipe* steer out of the rough weather. All arrived safely at Clipperton. — *W5VOW*



Burt Simpson, WA8GBQ (right), president of the Santa Clara County (CA) Amateur Radio Association presents a check for \$50 to ARRL Pacific Division Director Bill Stevens, W6ZM.

HELPING HAM RADIO GROW

□ ARRL-affiliated clubs throughout the United States are showing increasing interest in the new League program to aid the growth of amateur radio in developing countries. This money will enable Headquarters to send one complete, simple, 20-meter station in kit form to a needy student of amateur radio in one of the developing countries of Africa or Asia. Is your club interested? Complete details are available from the International Services Officer, ARRL Hq., Newington, CT 06111. — *WA6IDN*

SMILE FOR YOUR LICENSE

□ Much the same as passports, FCC radiotelegraph licenses must now bear the licensee's photograph. Full details are available from FCC, Regional Services Division, 1919 M St., N.W., Washington, DC 20554.

Technical Correspondence

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

HOW DANGEROUS IS RF RADIATION?

Workers at Motorola have recently conducted experiments of great interest to most amateurs. Their results have been published in several IEEE publications.¹⁻³ I'm grateful to Mr. Ronald Brecher, WA2EUN, who supplied a copy of the March, 1977, document.

The experimenters constructed a simulated human head and torso and exposed it to the radiated fields from 150- and 450-MHz 6-watt, handheld transceivers. Both radios were equipped with helical or "rubber duck" antennas. In addition, tests were performed with a 1/4-wavelength antenna installed on the 450-MHz unit. A thermal probe was used to measure temperature rise due to exposure. These experiments were performed because of concern that the newer, high-power units might pose a health hazard. Previous measurements of the field strength surrounding these radios had indicated that an incident field intensity exceeding 10 mW/cm² might exist. This is a safety standard for human exposure to rf energy at higher frequencies.

Because the field would be concentrated by a probe causing nontypical localized heating, the probe was removed while the transmitter was operating. The "dummy" was exposed for from 15 to 60 seconds. After power was removed, the probe was again inserted and the temperature change determined. Steps were taken to prevent thermal transients caused by insertion and removal of the probe. It would have been possible for heating to occur in small areas not being monitored by a probe. To look

for "hot spots," an IR (infrared) scanner was used to take thermograms of the dummy.

Assuming the transceiver was positioned as it would be during normal operation, no significant heating effects were noticed on either band. Even at 450 MHz, the temperature rise was slight. At a shallow probe depth (0.2 inch or 5 mm), the greatest temperature rise was less than 1°C. At deeper probe penetrations the temperature rise was less. Attempting to determine possible hazards from a measurement of radiated field intensity may cause misleading results. The low total energy and high field impedance which exist when such radios are brought in close proximity to the body will result in lower energy transfer than field-strength measurements alone would seem to infer. For example, at a point two inches (50 mm) from the helical antenna of the 150-MHz transmitter (Fig. 1), a Narda field probe measured a maximum field intensity of 168 mW/cm². This value greatly exceeds the 10 mW/cm² exposure standard. Measurements based on the penetrating effects at the same point indicate a maximum power flow density in tissue of 2.8 mW/cm². On 450 MHz, with the same spacing from the 1/4-wavelength whip antenna (Fig. 3), a maximum radiated intensity of 16 mW/cm² was found. Power-flow density was only 2.5 mW/cm². The radiation meter indicates a hazardous condition, while actual measurement of the effects shows this is not the case. Power absorption in all cases was less than 1mW/cm².

IR thermograms did not detect any unusual hot spots. A health hazard exists when the tip of the antenna is close to the eye (within 0.2

inch or 5 mm) and the transmitter is operated. In this case, an rf burn will result on the cornea. The thick plastic cap on the tip of the antenna makes this unlikely to occur. When the radios are held in the normal position for use, no eye hazard exists.

While these tests were performed at 150 and 450 MHz, I think it is safe to assume we need not fear our portable 220-MHz rigs either. These tests point out the fallacy of using radiated field intensity as a criterion of safety. Some consumer publications have begun to measure the field strength radiated from CB radios. Consumers have been warned not to stand close to the mobile whip while a 5-watt CB transmitter is operating, due to the high field strength! These papers have shown that radiated power may greatly exceed that which is absorbed and converted into heat. Amateurs should continue to exercise prudence when using uhf and microwave equipment, of course. It does seem that our portable transceivers pose no threat to our health. — J. E. Kearman, W1XZ, RFD, Collinsville, CT 06022

¹Balzano, Garay and Steele, "Energy Deposition In Biological Tissue Near Radio Transmitters At Vhf And Uhf," *IEEE 1977 Conference Record of Vehicular Technology Group*, March, 1977. Experiments at 150 and 450 MHz.

²Balzano, et al, "A Comparison Of The Energy Deposition Between Portable Radio Transmitters At 900 And 450 MHz," *IEEE 1978 Conference Record of Vehicular Technology Group*, March, 1978.

³Balzano, et al, "Heating of Biological Tissue in the Induction Field of VHF Portable Radio Transmitters," *IEEE Transactions On Vehicular Technology*, May, 1978. Results of experiments at 150 MHz.

Fig. 1 — This drawing shows the position of the 6-watt 150-MHz radio in relation to the head of the dummy. In this configuration, with the transmitter operated for 60 seconds, the temperature increases noted were observed.

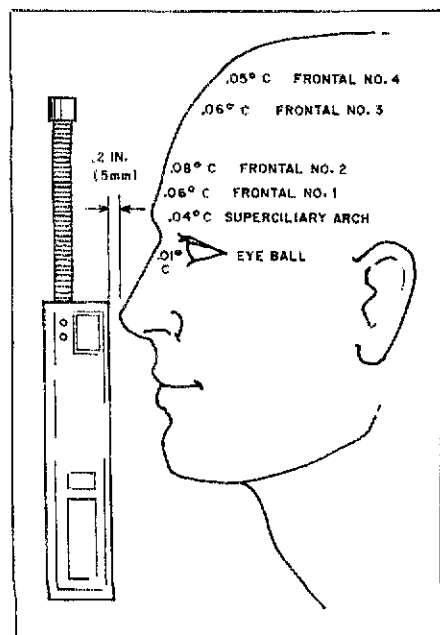


Fig. 2 — Position and thermal effects of a 6-watt, 450-MHz radio equipped with a helical or "rubber duck" antenna. A "hot spot" exists near the tip of this antenna. The eyeball is shadowed in its recess and receives very little exposure.

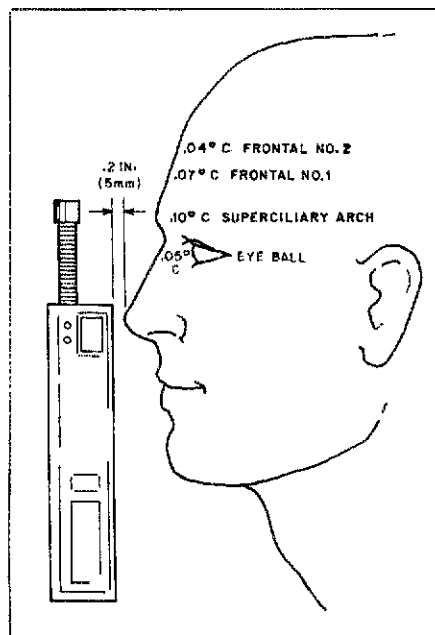
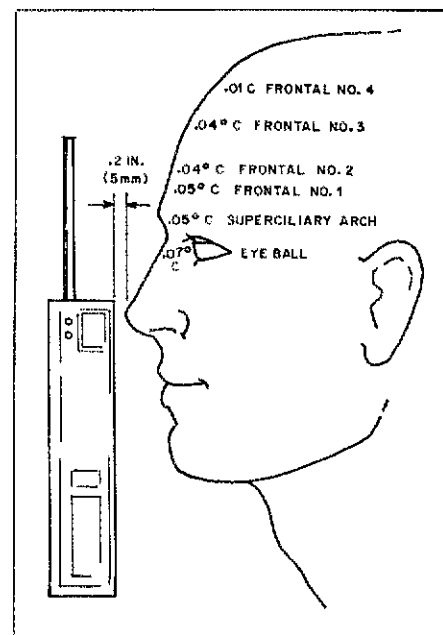


Fig. 3 — The same 450-MHz rig, this time with a 1/4-wavelength whip installed. Power density in the eye is greater, but still very low.



[] The article, "RF Heating in the Ham Bands," which appeared in *QST* for June, 1978, includes some statements which, in light of extensive experiments performed in our research laboratories, are not correct. Although Dr. Ruderman properly warns amateurs to use caution to avoid unnecessary exposures, the power-density levels he quotes are too high to be realistic. At a distance of 10 meters from a half-wavelength 10-meter dipole connected to a one-kilowatt output source, the power density in the horizontal direction is about 0.08 mW/cm², not 0.8 mW/cm² as stated by the author. This last value would be found at a distance of 10 meters in the bore sight direction of a 10-dB-gain beam antenna.

Turning to the vhf bands, Dr. Ruderman states that a mobile installation transmitting 10 watts effective radiated power (erp) from an antenna mounted on the left fender, less than one meter from the driver (how much less isn't specified), could expose him to a power density of 10 mW/cm². This value is not corroborated by experimentation. Some research departments at Motorola, Inc., have conducted careful measurements of power density inside the cabins of cars equipped with mobile transmitters. The Narda model 8310 radiation monitor, calibrated for vhf operation, was used. In the situation described by Dr. Ruderman, at a distance of 1.1 m between driver and antenna, the maximum power density measured was 0.05 mW/cm², substantially lower (23 dB) than the 10 mW/cm² level quoted by Ruderman. The 0.05 mW/cm² level is slightly less than the power density one would find in free space (in the direction of maximum gain) at about one meter from a vhf dipole connected to a 10-watt output source.

In the matter of portable transmitters, Dr. Ruderman states that 30-40 mW/cm² power densities exist in the immediate vicinity of a 144-MHz antenna connected to a 1-watt-output transmitter. These values are not supported by experimental evidence either. First of all, it is difficult to define, let alone measure, power density so close to an rf source. At a point near the radiator, different parts of an antenna contribute fields propagating in completely different directions, precluding any obvious definition of power flow. In these conditions, one can measure only energy density (mJ/cm³), by separately evaluating the E and H fields with appropriate instrumentation. In the near field, however, the electromagnetic energy density does not have a simple relationship to power flow. Unlike the far-field case, part of the energy is stationary (static type) and part is propagated. To avoid these difficulties, we measured power deposited in simulated humans, by operating 6-watt-output 150-MHz portable radios equipped with helical antennas. Helices were selected because they caused much higher energy density readings in field probes than did quarter-wavelength telescopic antennas. The results of these measurements were presented in a recent paper.⁴ The experiments have shown that, at vhf, electromagnetic energy in the immediate proximity of a portable radio antenna does not penetrate into muscle or brain tissue of the human body. There is energy deposition only in the very surface fatty layers. In addition, it was found that if a user operates a 1-watt portable radio with the case 0.2 inch (5 mm) from his mouth, the maximum absorbed power density (which can be measured from heating effects) is less than 0.2 mW/cm². This value is much lower than the deposition levels (8-10 mW/cm²), due to an

incident power level of 30-40 mW/cm² which, Dr. Ruderman states, exist near a portable transceiver.

I would like to reassure radio amateurs of the absence of any detected thermal radiation hazard from commercially available mobile and portable radio transmitters, if such equipment is properly installed and operated in accordance with simple common sense. — *Quirino Balzano, Ph.D., Manager, Antenna Systems Research Laboratory, Communications Division, Motorola, Inc., 8000 West Sunrise Blvd., Ft. Lauderdale, FL 33322*

⁴Balzano, et al, "Heating of Biological Tissue in the Induction Field of Vhf Portable Radio Transmitters," *IEEE Transactions on Vehicular Technology*, Vol. VT-27, No. 2, May, 1978.

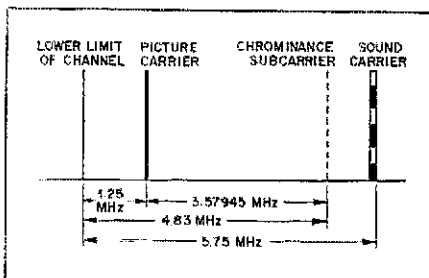
COLOR TVI

[] I would like to call your attention to a TVI phenomenon that has been in existence for years, yet which has never received much publicity. It is a "color TVI" problem since it results in colored hash marks on color TV programs only. There are absolutely no signs of interference on black-and-white pictures.

For the past few years, a number of amateurs in the Detroit area have been experiencing color TVI on channel 4. While I have been successful in pinpointing the cause, I have had no success in trying to cure it. Color TVI occurs when a harmonic from an amateur transmitter beats against, or heterodynes with, the chrominance subcarrier frequency transmitted by the TV station. The color subcarrier is a comparatively weak signal which rides piggy-back on the main picture carrier. It is 4.83 MHz above the lower frequency limit of the TV channel (see Fig. 4).

Because of the low level of this signal, it is extremely susceptible to interference. The interference increases as the color brilliance level is increased. The number, width and angle of the stripes vary in relation to the difference between the heterodyne and the 15,734.264-Hz horizontal oscillator frequency. On 20 meters, the stripes appear to make a 360-degree rotation about every 3.15 kHz (fifth harmonic of 3.147 kHz \approx 15,734) across the interfering range. The following TV channels will be susceptible to interference from amateur transmitters:

Fig. 4 — Diagram showing the relative positions of the video carrier, chrominance subcarrier, and audio carrier in a broadcast TV signal. In practice, the actual position of the video carrier may be offset by \pm 10 kHz. The frequency of the chrominance subcarrier, which is a modulation of the video carrier, is considered to be 3.57945 MHz. When the harmonic of a transmitted signal falls near the position of this subcarrier in the signal, a heterodyne is generated. This beat frequency generates bars which appear on the screen of a color TV set.



Channel 2: Interference range 29.3-29.5 MHz. The second harmonic of 29.415 MHz = 58.83 MHz, the color subcarrier frequency.

Channel 4: Interference range 14.1-14.25 MHz. The fifth harmonic of 14.17 MHz = 70.83 MHz, the color subcarrier frequency.

Channel 6: Interference range 28.8-29.0 MHz. The color subcarrier frequency is 86.83 MHz, the third harmonic of 28.94 MHz.

A number of tests have been made from seven amateur stations located as close as two miles (3.2 km) to the channel 4 transmitter. All stations produced color TVI on channel 4 when operating on 20-meter sideband between 14.2 and 14.25 MHz. Several makes of amateur and television equipment were used. Various types of low-pass filters were tried without improvement. All TV receivers had outdoor antennas and were equipped with high-pass filters. I'd appreciate hearing from anyone who has solved this problem. — *Ralph A. Dage, W8PHZ, 8078 Lochdale, Dearborn Heights, MI 48127*

ON "PREDICTING RADIO HORIZONS AT VHF"

[] I read Walker's article (*QST*, June, 1978, page 28) with interest. However, I noticed two errors related to the 33-percent additional distance factor mentioned by the author.

This adjustment factor serves to account for atmospheric refraction, as Walker correctly states on page 28. It is *not* related to diffraction, as discussed on page 29. The 33-percent factor is incorrectly used. In the equations used to calculate distance to the horizon, the radius of the earth should be increased by one-third. The amount of atmospheric refraction, or bending, depends upon the rate of change of the index of refraction with respect to height. At vhf and uhf, the index is a function of atmospheric pressure, temperature and water vapor content of the air. For average conditions the curvature is on the order of $3.9 \times 10^{-5} \text{ km}^{-1}$, although it may vary greatly from this figure with time. Curvature of the earth is about $15.7 \times 10^{-5} \text{ km}^{-1}$. This represents a radius of curvature of

$$\frac{1}{13.8 \times 10^{-5}}$$

or 7246 km, a value 33 percent larger than that of earth. Solving for the distance to the horizon (x), we find it is related to the radius of the earth (R) and antenna height (h), as $x = \sqrt{2Rh}$, for $h \ll R$. For the optical horizon, R is approximately equal to the radius of the earth, 6370 km. For the vhf radio horizon, R should be increased by 33 percent, so that

$$x = \sqrt{(2)(1.33)(6.37 \times 10^6)(h)} \approx 4120 \sqrt{h}$$

where distances are in meters.

Note that this increases the distance to the radio horizon by a factor of $\sqrt{1.33}$, or 1.15 times the distance to the optical horizon. This equation is essentially the same as one appearing on page 11 of the *Antenna Book* (13th ed.), which was, in part, the basis for Fig. 1-6 on page 12 of that edition. The radio horizon is about 15 percent farther from the observer than the optical distance. Fig. 2 of Walker's article gives distances which are about 15 percent too high. — *Russ Lee, WA4VLE, 933 Bluestone Rd., Durham, NC 27713*

[Editor's Note: We goofed, not Mr. Walker, the author. His original information presented data based on the optical horizon only, and we supplemented it during editing to provide data on the radio horizon.]

Product Review

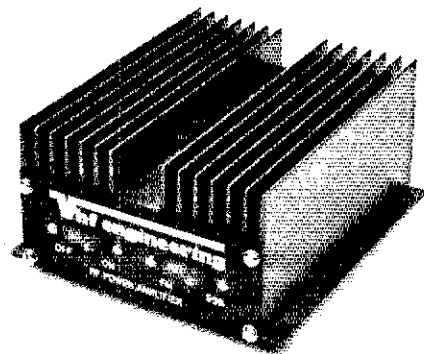
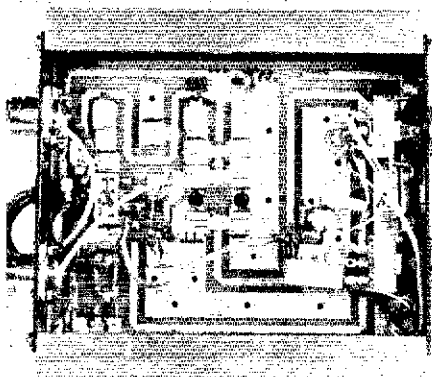
VHF Engineering "Blue Line" RF Power Amplifier

Most vhf/uhf transceivers and transverters now on the market generate about 10 watts output. This is especially true of the multimode rigs which are seeing increasing use on cw and ssb, particularly on OSCAR. Now, you can have a lot of fun at that power level; in fact, if you're using an efficient, high-gain antenna for satellite work you're well advised not to run any more, or you'll show up on the list of "bad guys" who are overloading the satellites. But there are hordes of hams who need a bit more power, at least occasionally, and a half-dozen companies whose products are designed to fill that need.

One of the most interesting of these companies is VHF Engineering. Started literally as a basement operation by Bob Brown, W2EDN, just a few years ago, VHF Engineering now employs about 60 people in ever-expanding facilities in Binghamton, NY. Best known for its line of repeaters, the firm got its start supplying inexpensive kits for vhf fm, and now enjoys a booming export business and a growing list of government and commercial customers.

The "Blue Line" was introduced last year as a full line of vhf/uhf amplifiers in factory-wired form. Pete Rau, WA2EYN, is responsible for the design. The various models use common components and circuitry wherever possible, including circuit boards (see photo). The model chosen for testing is the BLE 10/40, which produces 40 watts of clean output when driven with 10 watts in the 420-450 MHz band. The BLE 10/40 would be of particular interest to OSCAR 7 Mode B operators and to users of 10-watt-output fm, cw and ssb rigs who are looking for an easy way to boost their power by 6 dB.

As with most similar amplifiers, the "Blue Line" units are simply installed in the feed line between the transceiver and the antenna. Connectors on the BLE models are type N. The only other connection is to a hefty 12-volt (nominal) supply. Internal circuitry switches the amplifier into the line when rf drive is applied to the input, and out again when the drive is removed. An illuminated front-panel switch selects Class C or linear operation, and in the



Internal and external views of the VHF Engineering BLE 10/40 amplifier. The circuit board is double-sided G-10 glass-epoxy board with plated-through holes. The same board is used for all of the 40-watt amplifiers in the "Blue Line" series; not all of the stripline inductor is utilized in this model.

latter position also provides a half-second delay in the relay dropout to eliminate relay chatter during cw and ssb operation. Another switch disables the amplifier for straight-through operation. There are no internal tuning adjustments; the only reason you might have for opening the attractive blue-and-black box would be to admire the component layout.

Because of the ease with which such an amplifier can be installed and operated, a word of caution is in order. Forty watts of uhf energy deserves to be treated with a certain amount of respect. Most roof-mounted antennas will place the radiated power far enough away from people to stay well within the permissible levels of exposure. However, indoor antennas and those mounted close to the ground, including mobile antennas, should be used with care, especially if there is a chance of exposure for a long period of time.

In operation, the amplifier has proved to be at least as free of spurious emissions as any 432-MHz exciter we have been able to find to drive it. The FCC does not have specific limita-

tions on spurious emissions for equipment operating above 235 MHz, but the more stringent test is whether you can operate without affecting your neighbors, ham or otherwise! In this regard, the BLE 10/40 passes muster nicely. The second harmonic was measured in the ARRL lab as being 58 dB down. — K1ZZ

VHF Engineering BLE 10/40 RF Power Amplifier

Frequency range: 420-450 MHz.
Power output: 40 watts, nominal, with 10 watts drive.
Dimensions (HWD): 2-3/4 x 5-5/8 x 7 inches (70 x 143 x 178 mm), including switches, connectors and mounting flanges.
Weight: 2 pounds, 7 ounces (1.1 kg).
Power requirements: 13.5 V dc, approx. 6 A on ssb, 5 A on fm, for rated output.
Price class: \$180.
Manufacturer: VHF Engineering, Box Q, 320 Water St., Binghamton, NY 13901.

FLUKE 8020A MULTIMETER

Digital. The mere mention of the word in promotional literature for a piece of gear suggests state of the art and associated high sales. Unfortunately, digital readout offers only greater precision as opposed to analog readout systems. The accuracy of a readout is determined by the scheme used for the measurement and the quality of the measurement equipment, not by the medium (digital or analog) itself. What good are five digits of readout if the accuracy is low enough that the last two digits don't mean anything?

If a highly accurate means of measurement is employed in a digital readout system, a totally different situation exists. Full advantage of the greater readout precision can be taken, and readings "down to a gnat's eyebrow" are

possible, with far greater ease than with an analog system. The Fluke 8020A is just such a piece of test gear.

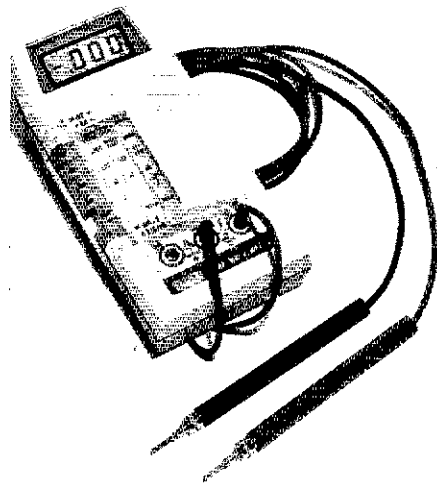
The John Fluke Manufacturing Company has been in the test-instrument business for years. Only now are they entering the consumer market with the 8020A. The quality associated with their other equipment is retained with the 8020A.

The 8020A is a 3-1/2-digit portable multimeter. All the standard VOM functions are included as well as a conductance function. The table shows all the functions as well as their associated ranges. Any of the functions or ranges can be selected from a row of interlocking push buttons on the side of the unit.

There are two conductance ranges on the 8020A; 0.1 nanosiemens (nS) to 200 nS and

0.001 millisiemens to 2 mS. (A siemens is the new international unit for conductance. One siemens is equal to 1/Ω, replacing the mho.) This translates to effective resistance ranges of 5 MΩ to 10,000 MΩ and 500 Ω to 1 MΩ. High values of resistance such as capacitor leakage can be measured, as well as dc current gain (beta) of transistors.

The resistance ranges also offer an interesting feature. Some of the ranges (200 Ω, 20 kΩ, and 200 kΩ) allow in-circuit resistance measurements. The open-circuit voltages produced on these ranges will not forward bias semiconductor junctions, which would cause invalid measurements. Thus semiconductors need not be removed from circuits under test. Thoughtfully Fluke has provided for testing of semiconductors. The remaining resistance



The Fluke 8020A multimeter with test leads. The large, easy-to-read liquid-crystal display keeps current consumption down, making battery life long.

Fluke Multimeter

Functions: Dc volts, ac volts, dc current, ac current, resistance, conductance.
 Dc voltage ranges: 200 mV, 2 V, 20 V, 200 V, 1000 V.
 Dc voltage accuracy: $\pm 0.25\%$ of reading +1/-0 digit.
 Dc voltage input impedance: 10 M Ω .
 Ac voltage ranges: 200 mV, 2 V, 20 V, 200 V, 750 V rms.
 Ac voltage accuracy: Depends on frequency, but is better than 5% of reading +5/-0 digits through 5 kHz.
 Ac voltage input impedance: 10 M Ω , capacitance 100 pF.
 Resistance ranges: 200 Ω , 2 k Ω , 20 k Ω , 200 k Ω , 2000 k Ω , 20 M Ω .
 Conductance ranges: 2 mS, 200 nS.
 Dc current ranges: 2 mA, 20 mA, 200 mA, 2000 mA.
 Dc current accuracy: $\pm 0.75\%$ of reading +1/-0 digit.
 Ac current ranges: 2 mA, 20 mA, 200 mA, 2000 mA.
 Ac current accuracy: Depends on frequency and range, but is better than 2% of reading +2/-0 digits.
 Power: 9-volt alkaline battery recommended or Fluke Model A-81 battery eliminator.
 Battery life: 200 hours typical.
 Battery indicator: Display reads BT when battery life of 20% remains.
 Size (HWD): 1-1/2 x 3-3/8 x 7-1/8 inches (38 x 88 x 181 mm).
 Weight: 13 ounces (370 grams) with battery.
 Price class: \$170.
 Manufacturer: John Fluke Mfg. Co. Inc., P. O. Box 43210, Mountlake Terrace, WA 98043.

ranges provide a measurement voltage large enough to forward bias a p-n junction, allowing checks to be made.

The unit is based on a custom LSI chip. Analog-to-digital conversion as well as readout functions are performed by this one chip. A sturdy plastic case houses the electronics. The case is durable enough to withstand falls from a workbench without a scratch. Large liquid-crystal displays provide the readout. Overload protection is provided on all ranges, protecting both the instrument and the user.

By virtue of the liquid-crystal display, bat-

tery life is quite sustained. Fluke claims up to 200 hours of use from a single 9-volt alkaline transistor radio battery (which they supply). A battery eliminator is available as an option, as is a carrying case and specialized probes. Test leads are supplied with the 8020A.

Documentation of the unit is well provided in the manual. Measurement techniques as well as theory of operation are described in detail. A certificate of calibration, tracing the measurement standards used for calibrating that particular instrument, is among the documents which come with the 8020A. Fluke claims long-term calibration adherence in the 8020A (1 year). Fluke service centers throughout the world can refurbish and recalibrate any 8020A out of warranty (the warranty is valid for 1 year) for a fee of \$40, ensuring continued reliability of measurements made by the owner. — KIJX

WILSON ELECTRONICS SYSTEM ONE 4-ELEMENT TRI-BAND ANTENNA SYSTEM

The antenna arrived during a mid-winter New England snowstorm; it was well below freezing outside and the prospects, just before Christmas 1977, of getting the antenna up for a quick preview were just about nil. However, making a few concessions to family convenience, I unpacked all the tubing and hardware in the family room and assembly began. Taking it in easy stages, a few evenings later I completed the assembly of the five elements, as well as the five sections which comprise the boom. Then the entire antenna was removed to the garage where it hung out of the way awaiting the end of the holidays. Needless to say, Christmas was barely over before the urge to get the antenna on top of the 60-foot tower became overpowering.

The cold (+15°F or -9°C), the slippery and precarious conditions on the hill in the vicinity of the tower, and the icy brook that had to be crossed countless times are not really part of this review. The actual raising of the antenna on New Year's Day, however, will stand out in this reviewer's mind for a long time. Winter is definitely not the recommended time for erecting antennas in the Northeast.

System One instructions are detailed drawings that do an excellent job of explaining how all the parts fit together; and there are many parts to be assembled. However, in attempting to follow the diagrams or exploded views, several times I made the mistake of installing a piece of hardware that subsequently had to be removed to allow another piece to be slid onto the boom. A suggestion has been made to the manufacturer that, at least as far as the boom is concerned, detailed sequential instructions be supplied. But then, perhaps you will be luckier — or smarter. A few minor errors had crept into the instructions. Wilson has prepared new instructions which correct the errors found. These new instructions are now being shipped.

Basically, the System One antenna functions as four elements on 10, 15 and 20 meters. The fifth element mentioned above does duty as the reflector on 10, where the spacing would otherwise be unsatisfactory using the element that functions as the reflector on 15 and 20 meters. While there are five elements on the boom, it defies convention and common sense to call it a five-element beam. Only four elements work at

any time. These antennas are a definite improvement over the previous types of tri-band antennas, but let's not get carried away.

The Wilson System One employs dual-band traps. That is, each trap includes the circuitry to function on 10 and 15 meters. Two sets of adjustments are provided, one for cw and one for phone. At resonance, and for a reasonable distance either side, the VSWR is below 1.5:1. However, if you frequently work both modes (as this reviewer does), a third set of adjustments, straddling the two that are provided, would be most welcome. This has been suggested to Wilson. For example, if the resonant points for phone operation were 28.50 instead of 28.65 MHz, 21.25 instead of 21.325 MHz, and 14.2 instead of 14.275 MHz, the setting would more nearly serve the needs of those who prefer the low end of each of the phone bands while enhancing cw operation as well. As is, when the antenna is set for phone operation, the VSWR at the low end of the cw segment will be well over 2:1.

A 1:1 balun is recommended by Wilson for use with the System One, however it is not provided. Imagine the disappointment of a new purchaser in a remote area who finds, as he is about to hoist the antenna to the top of his tower, that he still needs something else before he can put the antenna on the air. Wilson Electronics makes the balun, and it has been suggested that the balun be made part of the antenna package with the price adjusted to include the cost of the balun.

All hardware and fittings are first class, and every last nut and bolt was present. Wilson has done a fine job of providing an antenna that goes together in a straightforward manner, and that also will give the operator the convenience of working three bands with one antenna while offering performance nearly equal to mono-band antennas.

The boom is approximately 25 feet 6 inches (7.8 m) in length, while the longest element is approximately 26 feet 6 inches (8.1 m).

Since the first of the year, hundreds of contacts have been made in perhaps a hundred countries while running 500 watts PEP during casual operation. The antenna seems to perform equally well on all bands. — W7SE

Wilson System One Tri-Band Antenna

Weight: 55 lb (25 kg).
 Input impedance: 50 ohms.
 Form of matching: Beta.
 Surface area: 8.6 ft² (0.8 m²).
 Maximum power input: Legal amateur limit.
 Price class: \$250.
 Manufacturer: Wilson Electronics Corp., 4288 S. Polaris Ave., Las Vegas, NV 89119.

COMMUNICATIONS POWER WM-7000 WATTMETER

Are you looking for a portable rf wattmeter that can serve your shack at home, mobile or perhaps at that vacation QTH? The Communications Power WM-7000 should do the job. This unit boasts a large (3-1/2-inch or 89-mm wide) easy-to-read meter and displays a number of necessary station measurements: forward watts in 20-, 200- or 1000-watt scales, VSWR calibrated from 1.2:1 to 3:1, and peak

or average power. A common 9-volt transistor-radio battery supplies power to the unit so that no ac is necessary. This reviewer operates quite a bit of hf mobile, so the portability of the WM-7000 has been found particularly convenient. The VSWR scale has been very helpful in getting some mobile-antenna loading coils adjusted to resonance.

There is no means for checking to see that power to the unit is turned on, except for the position of the on-off switch; therefore, two batteries were prematurely run down by my accidentally leaving the WM-7000 turned on for a couple of days at a stretch. How about an LED for an on/off indicator? There is a handy switch for checking the condition of the battery, and it appears that under normal use, there should be long battery life, especially if an alkaline cell is used.

A look inside the unit shows neat and tidy construction. The WM-7000 is made in the USA by Communications Power, Inc., 2407 Charleston Road, Mountain View, CA 94043. — WA1EEA

Communications Power WM-7000 Wattmeter

Description: Peak-reading wattmeter/SWR indicator.
Size: 6 x 5 x 3-1/2 inches (152 x 127 x 89 mm) HWD.
Weight: 1 lb (0.5 kg).
Color: White cabinet with black panel; white lettering.
Cabinet: Aluminum.
Ranges: 20, 200, 1000 watts; 1.2 to 3:1 SWR.
Price class: \$65.

PARTS PROCUREMENT CORNER

Already the letters are rolling in. At the time of this writing (late June) we've received a dozen or so letters concerning this column. If this is any indication of what's in store, there shouldn't be any problem filling this column with useful material each month. Most of the letters we've received thus far read something like this. "Hey, have you heard about Joe's Discount Parts Emporium? Send them a quarter and they'll mail out a catalog. Here's the address." Guess it's not too surprising that we've never heard of many of the suppliers.

Last month we listed a few of the well-known, large-scale distributors across the country. It's only fair that this month we highlight some of the smaller, perhaps not so well-known distributors. If you would like to have the name of your outfit included in a subsequent listing drop us a line and a copy of your catalog.

All of the outfits carry a varied line of products too numerous to mention. A self-addressed stamped envelope (business size) will most likely assure a return of one of their catalogs or flyers.

Jameco Electronics
1021 Howard Ave.
San Carlos, CA 94070

Delta Electronics
P. O. Box 1
Lynn, MA 01903

D & V Radio Parts
12805 W. Sarle
Freeland, MI 48623

Electronic Instrument & Specialty Corp.
MC Division
5 Lowell Ave.
Winchester, MA 01890

Adva Electronics
Box 4181
Woodside, CA 94062
Alpha Electronic Laboratories
2302 Oakland Gravel Rd.
Columbia, MO 65201

Amateur Radio Center
11 S. Morris
Mesa, AZ 85202

Poly Paks
P. O. Box 942
Lynnfield, MA 01940
Circuit Specialists Co.
P. O. Box 3047
Scottsdale, AZ 85257

Fair Radio Sales
Box 1105
Lima, OH 45902

G. R. Whitehouse & Co.
11 Newbury Drive
Amherst, NH 03031

Key Electronics
P. O. Box 3506
Schenectady, NY 12303

John Meshna Jr.
P. O. Box 62
E. Lynn, MA 01904

Caddell Coil Corp.
Poultney, VT 05764

Modern Radio Laboratories
P. O. Box 1477
Garden Grove, CA 92642

If you are looking for ready-made circuit boards for amateur projects, there are at least two names that come to mind. Contact them directly to find out what boards they have available.

Circuit Board Specialists
P. O. Box 969
Pueblo, CO 81002

RTC Electronics
P. O. Box 2514
Lincoln, NE 68502

Circuit Board Specialists also provides complete parts kits for some of the projects featured in *QST* and other League publications. Again, contact them directly for information on what is available.

For the serious vhf-er a special deal is available on GaAs FETs (gallium-arsenide FET — extremely low noise), courtesy of Microwave Semiconductor Corporation. See June 1978 *QST* for particulars. These devices, designated MSC H001, are available only to licensed amateurs in quantities of from one to 10 units. The special amateur price is \$40 per unit. To order, send a certified check or money order (no cash) payable to Ham Trans, P. O. Box 383, South Bound Brook, NJ 08880.

Be sure to include your call sign with your order. Please do not call about these devices since this special offer is made possible by elimination of normal administrative costs. No phone orders will be accepted. — W1VD

NEW BOOKS

Handbook of Linear Integrated Electronics for Research, by T. D. S. Hamilton. Published by McGraw-Hill, cloth-bound edition 416 pages, 8 x 10 inches. Price: \$24.50.

If you're interested in the theory behind linear integrated circuits (ICs) — how the devices work, and their functions in circuits — you should be interested in this new publication from McGraw-Hill. Although this book is in-

tended for use mainly by research scientists and engineers who use electronics in their work, the emphasis is on theory rather than specific applications, thus making it useful to those advanced amateurs interested in this area. Also included is up-to-date info on recent developments and available products.

The first chapter is a "Review of Basic Circuit Theory," which goes from Ohm's law through Laplace transforms. The next seven chapters cover op amps, feedback systems, various amplifiers, oscillators, circuit functions, power supplies and circuit devices. The last two chapters discuss optoelectronics and signal detection.

Handbook of Linear Integrated Electronics for Research contains over 300 illustrations, author and subject indexes, and an extensive set of references. — KITX

110 Electronic Alarm Projects, by R. M. Marston, published by Hayden Book Co., Inc., 50 Essex St., Rochelle Park, NJ 07662. Paperback edition 5-1/2 x 8-1/4 inches, 112 pages. Price: \$4.95.

The last listing of the ARRL stolen equipment registry contained over 60 ham rigs which were "lost" to the criminal element. Surprised? Don't be. This isn't really such an alarming figure, however, many other items are swiped from hams every day! And usually because they weren't properly protected.

Not that most of us don't *think* about protecting ourselves from theft, it's just a long way between *thinking* and *doing*! Maybe the reasons are legitimate, but it usually boils down to "I can't find the kind of alarm I need."

One solution to the above dilemma is to build an alarm circuit to fit your needs and specifications. *110 Electronic Alarm Projects*, by R. M. Marston, is a prime source of information on home, auto and equipment alarms. No matter how unusual your alarm needs, in this book you can find a circuit or combination of circuits which should perform the task satisfactorily. Divided into seven chapters, the volume devotes the first five to industrial and home type alarms, including burglar, temperature, light-sensitive, proximity, power-failure, sound and contact-operated varieties.

Chapter 6 gives an in-depth analysis of automobile protection. Details of immobilizers, antitheft alarms, ice-hazard alarms, overheat alarms, and low-fuel alarms are included.

In his final chapter, Mr. Marston discusses instrumentation alarms. These circuits should interest anyone who wishes to protect expensive equipment from damage due to over-voltage or similar conditions. If you have ever destroyed a valuable circuit because the regulation in your power supply went haywire, you can appreciate the many applications of these protective circuits. Chapter 7 displays alarms which can be activated by ac or dc current or voltage, or by resistance.

All alarm circuits contained in *110 Electronic Alarm Projects* are complete with easy-to-read schematics and part values. According to the author, all circuits described have been built and evaluated. They utilize readily available semiconductor devices, with most circuits being designed around standard bipolar transistors, 741-type operational amplifiers, CD4001 quad two-input MOS NOR gates and SCRs.

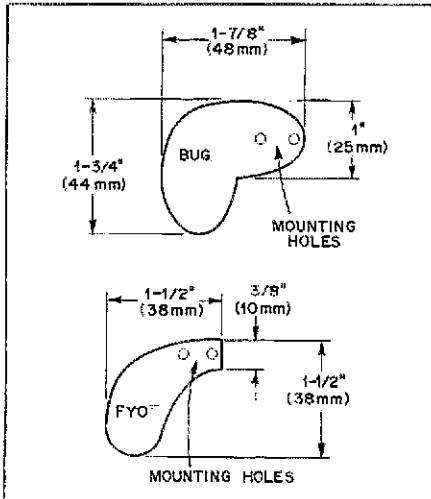
As an aid to readers, Mr. Marston provides in an appendix the outlines and pin connections of all semiconductors used. — KITX

Hints and Kinks

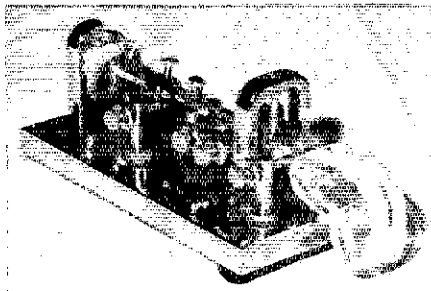
PADDLES REDUCE FATIGUE

In using my bug keyer, I found that the arrangement of the paddles was conducive to muscle tiring. After a little head scratching and a hint from W9DU, I produced a new set of paddles that reduced the fatigue. As may be seen in the photograph a set of L-shaped thumb and finger pieces have been applied to the bug.

The new paddles are made of 3/8-inch (10-mm) thick Plexiglas. Dimensions may be varied to suit the individual operator. To accommodate a pair of bevel-head machine screws for mounting the paddles, I drilled the thumb (dit) piece and both drilled and tapped the finger (dah) piece. For keyers requiring less operating force, such as the FYO, 1/8-inch (3-mm) plastic may be used and shaped as drawn. — *James J. Di Spirito, Jr., WB9TCT*



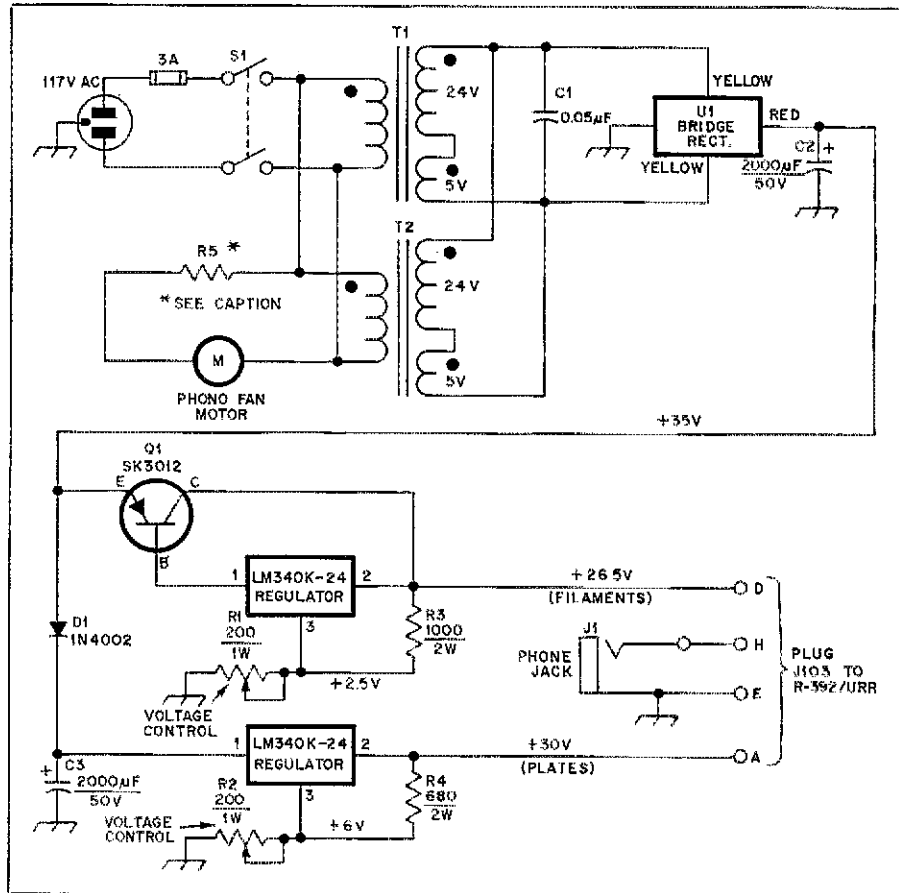
Patterns for making fatigue-reducing paddles for a bug (top) or a W8FYO keyer (bottom).



These Plexiglas paddles make sending with a bug easier.

STABILIZING THE R-392/URR RECEIVER

Restoration of a military surplus R-392/URR receiver has rewarded me with a set that has high performance, is compact yet rugged, and offers such features as the reception of cw, voice and single-channel frequency-shift radioteletype. With the improved power supply



The military surplus R-392/URR receiver may be stabilized by the use of this dual-voltage regulated power supply.

- J1 — 1/4-inch phone jack.
- Q1 — Pnp germanium transistor, RCA SK3012 or equiv.
- R1, R2 — Bourns Trimpot, 200 ohm, 1 watt, wire wound, model 3345.
- R5 — Fan voltage dropping resistor, 10 W. Value determined according to motor specifications and speed (250 ohms suggested).

- S1 — Dpst switch.
- T1, T2 — See text.
- U1 — Bridge rectifier, 12 A, Motorola MDA-980-3 or equiv.
- U2, U3 — Voltage regulator, National Semiconductor LM340K-24 or equiv.

shown on these pages, the set provides fine results on ssb in addition to successful reception of weather map information which is fed into my RJ-4 military-type facsimile recorder.

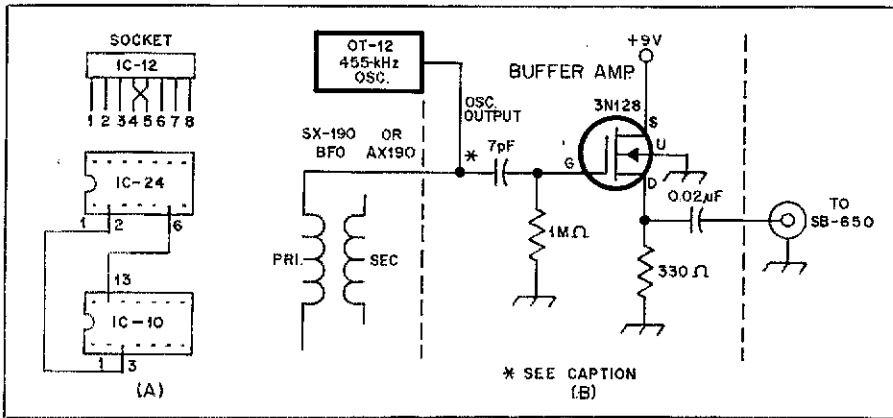
Like much of the surplus gear that's available, this set suffered from years of neglect and lack of operation. Thorough cleaning and lubrication plus alignment were required for restoration. Switches and contacts were treated with TV contact cleaner, while high-quality lubricating oil was carefully applied to shaft bearings and moveable parts. Access to the bandswitch required removing the audio chassis along with disconnecting the associated cables and bandswitch shaft. Holes in the bottom of the panel provide access to some of the areas that required cleaning.

A troublesome 100-hertz BFO shift was resolved by employing the dual-voltage regulated power supply shown in the drawing. Action of the crystal-oven thermostat caused the voltage change responsible for the difficul-

ty. The new power supply not only made ssb tuning a pleasure, but also reduced the frequency-measuring error to less than 100 hertz. By applying 30 V dc to the plates while maintaining 26.5 V dc on the filaments, performance was further enhanced.

An alternative for the 25-A bridge (which may no longer be available), I suggest that the builder get the no. MDA 980-3, 12-A bridge from James Electronics, 1021 Howard Ave., San Carlos, CA 94070. Power transformers T1 and T2, no. FA-6705, are from Fair Radio Sales, Box 1105, Lima, OH 45803. Substitute transformers are no. 18A1743-4 from Burstein-Applebee, 3199 Mercier, Kansas City, MO 64111, or Radio Shack no. 273-1514.

I do recommend that cooling air be directed between the transformers, over the transistors and over the chassis beneath the bridge. Regulators should not be mounted near the transformers. — *Joseph F. Stephany, N2XS, ex-K2KSJ*



The Heath SB-650 frequency display may be used with the Allied AX-190 receiver by employing this buffer amplifier. Except for the addition of an International Crystal OT-12 oscillator at point X, the circuit is identical to the original which appeared on page 43 of *ham radio magazine* for June, 1973. The 3N128 is a depletion type FET. A crossover of the connections to pins 4 and 5 of IC-12 in the SB-650 permits the counter to count up for two periods and down for one.

USING THE SB-650 WITH THE ALLIED AX-190

Ham radio magazine in June, 1973, presented a modification of the Heath SB-650 frequency display for use with receivers and transceivers of brands other than Heathkit, for which it was designed. The circuit arrangement I am providing applies to the use of this device with the Allied AX-190 receiver. The modification corrects an error of ± 1.5 kHz that would always be present in the readout and compensates for an a-m readout error of 455 kHz. It appears because the AX-190 BFO oscillator is switched off in this mode. The AX-190 is the amateur version of the SX-190.

As the original article stated, three oscillator signals are used from the receiver to actuate the frequency counter. These are from the HFO, LMO or VFO, and the BFO. The AX-190 uses two crystals in the BFO (456.5 kHz for lsb and 453.5 kHz for usb).

For some time I tolerated this condition, but finally I came up with a simple solution. A separate 455-kHz crystal oscillator could be installed inside the counter and connected directly to the BFO input. In my case an International Crystal OT-12 board was purchased as well as a surplus 455-kHz crystal. I used a buffer amplifier similar to the one described in *ham radio magazine*. To operate the crystal oscillator and buffer amplifier, 12 V dc was taken from Zener diode D6 in the counter. An explanation of the counter operation is too lengthy to be presented here, but I do suggest that the original article be obtained from *ham radio magazine* or through a library. The drawing I have shown for IC-12 (SN74192N) in the SB-650 correctly indicates that this is a 16-pin device, and not 14-pin as referred to in the article mentioned above. With the error problem solved, the readout is now as accurate as the capability of the counter. — C. A. Chamberlain, W5RSH

USEFUL SEMICONDUCTOR REFERENCE BOOK

The 1978 edition of the *Archer Semiconductor Reference and Application Handbook*, available at Radio Shack stores, contains cross reference listings of more than 46,000 transistors, diodes and other interchangeable devices. The computerized information is based on a careful analysis of important

parameters of listed devices. The 144-page handbook also provides application information, including actual circuit diagrams for most listed ICs, clock chips and modules. Detailed information will also be found on the 8080A CPU chip. — Dave Klemp, WB1AND

CHARGING BATTERIES WITH SOLAR ENERGY

Putting sunlight to work charging batteries is a project my 11-year-old granddaughter developed for a school science project. With a bit of guidance from me, she constructed a charger using the circuit shown in the accompanying diagram. A selector switch allows a choice of the number of cells to be engaged

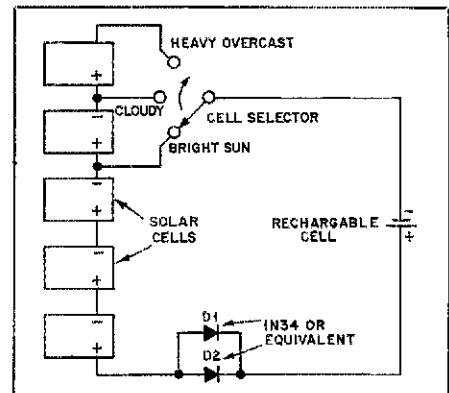
when charging. Overcast skies require the use of more solar cells than on sunny days.

Solar devices of the type employed in the charger are available as single cells or as two cells in series. A single cell, on a bright day, can deliver 0.5 V with a full current capacity of 50 mA.

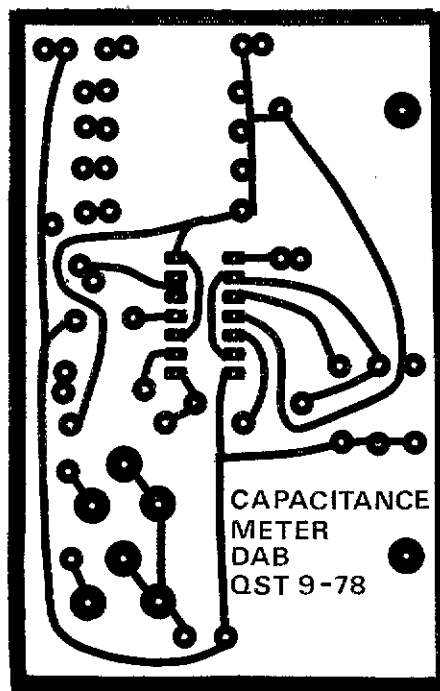
Two diodes are incorporated in the circuit to prevent battery discharge during darkness. Because of the voltage drop through the diodes (0.2 to 0.4 V) another solar cell may be included to compensate for the drop.

Some cells do not have leads. Leads made of fine wire (such as no. 26 or smaller) may be very carefully soldered to the bare metal on the negative (purple) side as well as on the positive section. Dropping or bending a solar cell will break the glass base. Mounting them on a piece of wood or plastic offers suitable protection. — Joe Rice, W4RHZ

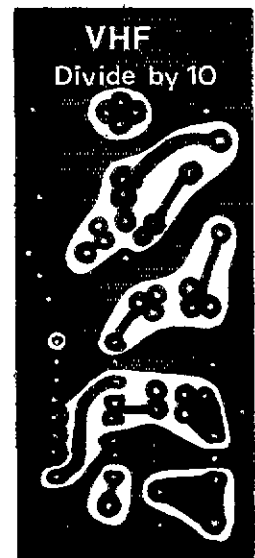
A solar-operated battery charging circuit. The solar units are Radio Shack parts no. 276-128. Similar devices, sold under the Calctro label, are available from many parts distributors.



Circuit-board etching patterns. At A is the pattern for the inexpensive capacitance meter (see the parts layout in Fig. 3, page 14 of this issue). At B is the pattern for the vhf prescaler (parts layout in Fig. 2, page 13). In each pattern, shading represents copper. The patterns are shown at actual size from the foil side of the circuit board. The board for the vhf prescaler is double sided (see article).



(A)



(B)

Direction Finding, European Style

In North America, it's an occasional club or hamfest activity or a defense against repeater jammers. In Europe, it's serious Olympic-style competition on an international scale.

By David Sumner,* K1ZZ

Ham radio in a track suit — that's what amateur radio direction finding (ARDF) is all about, at least in Europe. In North America, ARDF is variously known as foxhunting, bunny hunting, or (less colorfully, but more accurately) simply as transmitter hunting. There's another major difference, besides the name: The American version most commonly is done, as one might expect of Americans, while sitting in an automobile.

The concept is simple: Put a transmitter on the air on a known frequency from a hidden location, and see who can find it the fastest. Back in the fifties it was popular on 10-meter a-m, and with tube-type equipment there was ample justification for doing it from the mobile instead of on foot! Today we're seeing a revival of interest in the subject, especially on 2 meters, where the skills thus developed

can be put to good use in tracking down repeater "kerchunkers," stolen equipment, and the like. The exact rules vary from club to club, but generally it's like this. The hunters gather at a prearranged starting point. Then, the hidden transmitter, or "fox," is put on the air for a minute or two, to permit everyone to take bearings and start off in pursuit (actually, the fox remains stationary). The fox transmits only one or two minutes out of every five. On local option, the fox either must be visible from a public road or may be hidden in as clever a fashion as can be devised.

If the American version of ARDF sounds like a road rally, the European version resembles a track and field event. Not only must competitors have the skill to operate and, in most cases, to build direction-finding equipment; they must also have the stamina to cover an eight-kilometer (five-mile) course through fields

and woods. It's little wonder that even in the "senior" competition most successful foxhunters are in their late teens and early twenties!

A two-part series of *QST* articles by LA5CH¹ two years ago generated considerable interest in ARDF, especially as a way of involving young people in amateur radio. Therefore, when IARU headquarters was invited to send an observer in September 1977 to the IARU Region 1 ARDF Championships in Skopje, Yugoslavia, I jumped at the chance to go — despite WIRU's threatened insistence that I run the course with the competitors! (Fortunately, I found that observers are not allowed beyond the starting line, because they might inadvertently assist or hinder the hunters.) The timing of the event permitted the trip to be combined

*Assistant Secretary, IARU

¹Holter, "Radio Foxhunting in Europe," *QST*, August and November, 1976.

They're off! Three competitors, one from each of the three categories (see text), begin at once, every five minutes. They cannot listen to their radios or look at a map of the area before they are ready to start running.

Nic, LA5CH, in action.



with some other IARU travel in preparation for the 1979 ITU World Administrative Radio Conference (WARC). For me, one of the most attractive aspects of the trip was that it would renew some acquaintances and friendships which had developed on two previous trips to Yugoslavia for the IARU. There can hardly be a more friendly, hospitable and enthusiastic group of radio amateurs in the world than the YUs!

Arrival in YU

Upon my arrival at Belgrade Airport, Mario Miletic, YU1PCF, met me with some good news and some bad news. The good news was that I would have a chance to visit the famous club station in Pancevo, YU1BCD, before flying on to Skopje. The bad news was that I would not be going to Skopje until the next day, because my seat on the plane was needed for the interpreter accompanying the Hungarian ARDF team! Mario, whose English is somewhat better than mine, is employed servicing the computers which Digital Equipment Corporation of Maynard, Massachusetts, has sold in Yugoslavia, and comes to the U.S. for occasional training courses. On his last visit he walked into the FCC office in Boston and passed every amateur exam through the Extra, and now holds the call sign N1YU for use on future trips stateside! Fortunately, the DEC computers were in good repair during the ARDF Championships, and Mario was able to spend the entire week shepherding me around, a kindness which I greatly appreciated.

After an overnight stop at Mario's apartment in Pancevo, during which his wife discovered that skinny Americans don't eat as much as healthy Slavs, we flew south to the beautiful Macedonian city of Skopje. The city was heavily damaged by an earthquake in 1963, though

you would hardly believe it to see how it is thriving today. There is a tremendous civic pride in the city, and a deep appreciation for the massive quantities of aid which were rushed there from every corner of the world in the aftermath of the disaster. A better atmosphere for an international event such as the ARDF Championships could hardly exist. A bus ride brought us to the hillside "Olympic Village" where the competitors, trainers and observers from 16 countries were staying. This was also the site of a special amateur station which operated throughout the competition with the special call signs YU0IARU and 4079WARC, the latter to mark a WARC consultative session of which I was asked to be chairman and which was conducted in parallel with the competition.

An International Jury

The IARU Region 1 Division is the only one of the three Regional Divisions which sponsors ARDF championships. The championships are supposed to be held every two years, with a different membership of Region 1 serving as the host each time. Unfortunately, it has not always been possible to adhere to this schedule. The rules call for a member of the Region 1 Executive Committee to serve as chairman of an International Jury for each championship, with one member of the jury being supplied by each of the societies represented in the competition. The jury has the authority to resolve any disputes which may arise in the course of the competition, and to certify the final results. Wojciech Nietyksza, SP5FM, of Komorow, Poland, was chairman in Skopje. Wojciech is slated to be a part of the IARU team in Geneva during WARC-79, and while we had met before I welcomed the opportunity to become better acquainted with him.

The major issue which the International Jury was called upon to resolve, before the competition even began, involved the participation of a team from the People's Democratic Republic of Korea (North Korea). While Korea is outside Region 1, the team had been invited to Skopje by the host society, *Savez Radio-Amatera Jugoslavije (SRJ)*, in an effort to promote the cause of amateur radio in that country. (Politically, Yugoslavia is regarded as a leader in much of the nonaligned world, and as a result its radio amateurs have an opportunity to promote amateur radio in parts of the world in which Americans have little influence or access. The recent activity of the club station in Baghdad, Iraq, YU1BGD, which was set up by Yugoslav amateurs at the invitation of the Iraqi government, is yet another example of this.) After some discussion, the International Jury agreed that the Korean team should be invited to compete on an equal basis with the European teams.

Despite the fact that most of the teams

Team results, 1977 IARU Region 1 Amateur Radio Direction Finding Championships, Skopje, Yugoslavia.

3.5-MHz Seniors

- 1) People's Republic of Bulgaria
- 2) Socialist Republic of Romania
- 3) Union of Soviet Socialist Republics

3.5-MHz Women

- 1) Union of Soviet Socialist Republics
- 2) Socialist Republic of Romania
- 3) German Democratic Republic

3.5-MHz Juniors

- 1) Union of Soviet Socialist Republics
- 2) Socialist Republic of Romania
- 3) People's Republic of Bulgaria

144-MHz Seniors

- 1) Hungarian People's Republic
- 2) Socialist Republic of Romania
- 3) Union of Soviet Socialist Republics

144-MHz Women

- 1) People's Republic of Bulgaria
- 2) German Democratic Republic
- 3) Czechoslovak Socialist Republic

144-MHz Juniors

- 1) Czechoslovak Socialist Republic
- 2) Hungarian People's Republic
- 3) Union of Soviet Socialist Republics

represented Eastern European countries, English was the official language of the International Jury because it was the single most common language of those present. Simultaneous translation facilities were not available, although translators were provided by the hosts. A sentence spoken in English would be translated into Serbian or Macedonian, then into Russian or another language for the benefit of the non-English-speaking participants.

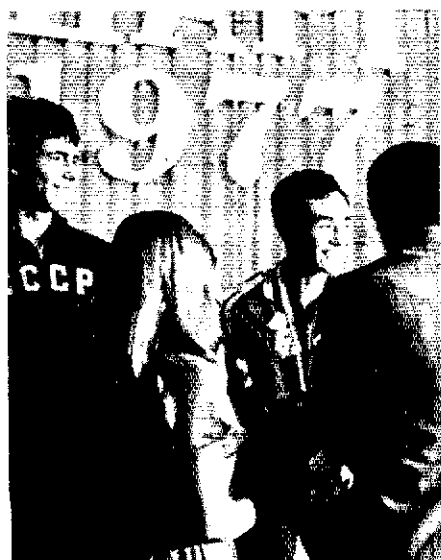
Is This the Olympics?

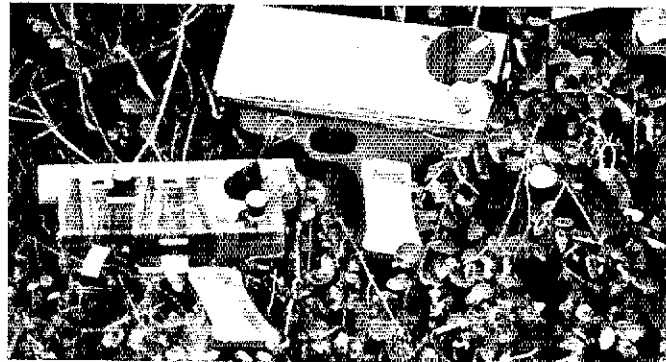
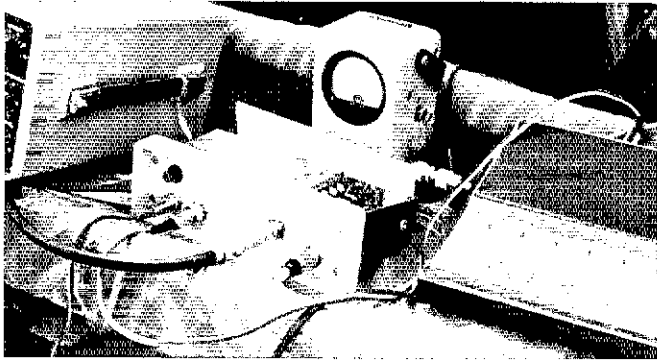
The articles by Nic, LA5CH, referenced earlier, concentrated on the basics and on how to involve young people, such as Scouts, in amateur radio. If that is considered to be the Novice level, the competitors in Skopje were definitely Extra Class. Most of them, especially those representing Eastern European countries (the bulk of the entrants), had been selected for their national teams through a series of local and regional championships. It was a particular pleasure to find Nic in Skopje, competing as a one-man team from Norway using only the simple equipment he designed for Scout use. This gear works on 80 meters, which is one of the two popular bands for ARDF in Europe, the other being 2 meters. Of course, it is easier for youngsters to get equipment working at the lower frequency. Competition on the two bands is held and scored separately, and in Skopje was held two days apart in order to permit some rest in between for those entering both events.

How It's Done

My duties as chairman of the WARC consultation conflicted with the 2-meter competition, but I was able to observe enough of the activity at the starting line of the 80-meter event to see how it's done. Five transmitters are hidden, preferably at

One winner, Gong Gae Yun of the People's Republic of Korea, receives his gold medal.





Left: The hidden transmitters were controlled remotely by this uhf equipment from the rear of a car parked near the starting point. An FT-101, partially visible at the left, was used to monitor the transmitters. All transmissions were recorded on tape in case a malfunction had to be documented. Right: Two designs of 3.5-MHz direction-finding receivers. The equipment used in ARDF in Europe is invariably homebrew. Several models sported built-in stopwatches.

a site made up primarily of rolling woodland and away from houses, main roads, and power lines. They are arranged in such a way that the straight-line distance between them is about eight km (five miles). Each transmitter is activated for one minute out of five, in sequence, all on the same frequency; distinctive identification is used to let the hunters know which transmitter they are hearing. A member of the jury is stationed at a hidden spot near each transmitter so he can observe the competitors. At Skopje the transmitters were all remotely controlled by uhf from the starting point, though different methods to ensure proper sequencing are used by different sponsors. There are three categories of competition: Seniors (men 18 years old and above), Juniors (younger boys), and Women (no age limit). Three competitors, one in each category, start the hunt every five minutes. They are not permitted to listen on their equipment until they are ready to start running, and are not given maps of the area until just before the start. While they never start together, several competitors from a given country may be in the field at the same time, and so, of course, the exchanging of information is prohibited.

The photographs convey the flavor of the competition much better than simple prose ever could. Some countries take ARDF very seriously, and regard it as a legitimate contender for Olympic status someday. Others, especially those in Western Europe, tend to approach it somewhat more casually. At the start of their run, though, it's hard to detect the difference on the faces of the competitors! Incidentally, while they were all regarded as radio amateurs, not everyone had a personal call sign. A transmitting license is not required to be a direction-finder.

On 80 meters, the bearing to the transmitter is found by orienting the ferrite-rod antenna for a null. There are nulls off both ends, so another reading must be taken using a "sense antenna" in combination with the rod. With the receiver turned 90° from its original orien-

tation, the two antennas working together provide some directivity and the direction of maximum signal strength can be found. The technique is explained in more detail in the Holter article. Operation is similar on 2 meters, though the antennas used are, of course, quite different. The most commonly used antenna is a two-element driven array whose design is attributed to HB9CV. The elements are made from material similar to that used in steel tape measures, to permit the hunter to plow through heavy brush without catching the elements in the branches.

Because each transmitter is on the air only one minute out of five, the hunter must record the bearings on the map as he takes them; it is not possible simply to follow the signal to its source. It is helpful to take at least two bearings on each transmitter from widely separated points, which explains why the competitors are in such a hurry to get away from the starting line!

To the Victors Belong . . .

At the conclusion of the Championships, the competitors, trainers and observers gathered in an impressive building downtown for the awards ceremony. The ceremony was carried on television throughout Eastern Europe, underscoring the importance which is attached to the event. The individual winners were awarded gold, silver and bronze medals, in the Olympic tradition, and the teams were awarded trophies. Team scores were calculated from the total time of two competitors, who had to be identified *before* the competition began; in other words, if a country had more than two competitors in a given category, it could not simply take the two best scores after the fact. The winning teams are listed on page 39.

The highlight of the ceremony was the awarding of the gold medal for Juniors at 3.5 MHz to Gong Gae Yun of Korea, who was one of the smallest competitors. He had completed the course in less than 44 minutes, more than seven minutes ahead of the rest. There couldn't have been a

happier youngster or a broader smile anywhere on that day.

The Bottom Line: International Friendship

The 1977 Region 1 ARDF Championships closed with a reception and banquet, which gave everyone a final opportunity to exchange pins, pennants, small gifts, and QSL cards. The same spirit you often find on the air was present in Skopje, only multiplied hundredfold. It's a spirit which comes from discovering that you share a common interest in amateur radio with people from all kinds of backgrounds and cultures, and from all corners of the world. The tokens of international friendship and goodwill exchanged in Skopje will serve as a continuing reminder that this spirit exists among radio amateurs, irrespective of geographical, political or ideological barriers.

One thought, expressed several times in Skopje, was that the IARU should work to introduce European-style amateur radio direction finding in other parts of the world, including North America. If this were done, perhaps one day we would see a World ARDF Championship, or even an Olympic event. This would be a big undertaking, and not one which the IARU could begin while the World Administrative Radio Conference preparations are underway; but perhaps, if the interest is there, some day it will be done.

I would like to express my appreciation to the SRJ for their excellent preparations for the Region 1 ARDF Championships, and especially to SRJ President Misa Danon, YU1AU, Secretary Mirko Mandrino, YU1NQM, and IARU Liaison Officer Miroslav Bogosavljev, YUISJ, and to the Amateur Radio Union of Macedonia and its President, Pero Ivanovski, YU5DA, for their fine hospitality. They deserve to be proud of the high esteem in which amateur radio is held in Yugoslavia and especially in Macedonia, as evidenced by the number of receptions and banquets which were hosted by government and other officials during the week of the Championships.

JG1QFW, First Solo Explorer to Reach the North Pole

To assist, fellow hams set up an emergency circuit and followed Naomi Uemura's dog sledge from reports relayed through the Nimbus 6 satellite.

By Carl L. Bixby,* W1TKG



“**M**ayday” is not a distress call to Naomi Uemura, JG1QFW, but a cry of victory. It was on May 1, 1978, that he reached the North Pole — the first man to make it alone!

Fortunately the emergency measures organized by JG1QFW, the Smithsonian Institution, ARRL, The National Capitol DX Association (NCDXA) and Japanese and Canadian hams on Ellesmere Island did not have to be activated.

Uemura, 37, reportedly started exploring to overcome an inferiority complex. He climbed the highest peaks on five con-

tinents, floated down the Amazon river on a balsa raft and mushed from Greenland to Alaska on the world's longest sleigh ride. In March of this year he set out from Canada's remote Ellesmere Island for a 500-mile solo trek by dog sledge' to the North Pole.

Sledge-to-Satellite Beacon

To track JG1QFW's position on the arctic ice floes, the Smithsonian Institution in Washington, DC, installed a beacon transmitter on the sledge. Nimbus 6, a weather satellite, monitored the

beacon and sent its telemetry to NASA's Goddard Space Flight Center in Greenbelt, MD, where personnel relayed data on Uemura's progress to the Smithsonian.

One feature of the beacon transmitter on the sledge was an alarm button to be activated in the event of an emergency. The alarm signal was to be immediately reported to the Smithsonian, which in turn would contact Uemura's base camp at Alert, NWT, located on the northernmost point of Ellesmere Island.

There was a problem, however. How could the emergency message be sent 3000 miles to the base camp at Alert? Normal communication channels were much too slow.

DXers Take Action

ARRL First Vice President Vic Clark, W4KFC, came up with the answer. Since radio amateurs regularly maintain schedules around the world, this assignment was right down their alley. In fact, a club he belongs to, the National Capitol DX Association had only recently completed a joint effort with Bermudan amateurs during a public emergency.¹

Dr. Lee Houchins, research associate at the Smithsonian, briefed NCDXA members on the expedition's communications circuits. Uemura did not have any amateur gear on his sledge, but he did have a 5-MHz transceiver to maintain communications with his support group at Alert, which included both Japanese and Canadian amateurs. One of them, Yuko Tada, JH1FOA, had, along with Naomi, applied for and received permission to operate in Canada. But there was no

Naomi Uemura, JG1QFW, his dogs and sledge, en route to the North Pole. In the background is the "cool scenery" that greeted him day after day.



*11 Birch Lane, Madison, CT 06443

¹Footnotes appear on page 42.

amateur rig that could be used on 20 meters, the best band for that path.

The Canadian amateurs at Alert were military personnel who operated VE8RCS, a well-equipped station used primarily to keep in touch with families and friends. Their QTH was only a few miles from Uemura's base camp.

Emergency Circuit Set Up

Following the Smithsonian briefing session, the DXers and the ARRL immediately went to work to establish an emergency circuit to Ellesmere Island. ARRL General Manager Dick Baldwin, W1RU, contacted Trio-Kenwood Communications, which generously agreed to donate a new TS-820 transceiver for JHIFOA's use at the base camp. Kenwood even supplied an instruction manual in Japanese. The rig was immediately shipped to Alert.

The Smithsonian contacted the Canadian Embassy in Washington to obtain permission for VE8RCS to handle traffic with the Washington-area hams. The request was approved, and in early April schedules were arranged with the VE8RCS operators.

Steve Jarrett, K4FJ; Lynn Lamb, W4NL; Bob Peterson, W3YY and Stephen Thompson, N4TX, were on nightly maintaining schedules and handling traffic. They reported that communications to the Arctic were often difficult to maintain, particularly when intense solar flares disrupted the circuit.

Bear Trouble and Frigid Temperatures

Uemura encountered a hungry polar bear who destroyed his tent and ate the dog food before Uemura killed it with a rifle shot. An emergency airdrop resupplied the dogs with food.

Then the temperature fell to -50 degrees F and he had to contend with severe facial frostbite. To combat the loneliness of the solo journey, Naomi kept a diary which he planned to sell to help cover the cost of the expedition. [Too bad he couldn't have worked a little DX. — Ed.]

The ice, meanwhile, was in terrible con-



Members of the Polar Amateur Radio Club, VE8RCS, who assisted Washington-area DXers in maintaining communications between the Smithsonian and Uemura's base camp. Front row: Merril Beach (l), Ed Ripmeester; second row: Bernie Routhier, Bill Ralph and Eric Coles. "Doc" Bernard Villeneuve missed out on the picture taking.

dition. Pressure ridges 150-foot high rose up out of the ice ahead of the sledge. Then a violent storm that caused the ice to break up cast Naomi and the dog sledge adrift on a hunk of ice only 300 feet in diameter. It was almost 24 hours before they drifted back to solid ice again.

Murphy Strikes

Possibly practicing for Field Day, Murphy struck at the sledge — a runner cut through the beacon's antenna cable. Few amateurs have had to make repairs under such conditions. However, Uemura soon had the beacon back on the air and pushed on toward the pole.

Now telemetry from the Nimbus satellite reported the output from the sledge's beacon battery was dropping. This was a signal that the GTE/Sylvania prototype, lithium battery had to be replaced. An Amateur Radio message over the emergency circuit provided the

pilot at Alert with the latest position of the sledge. Naomi was supplied with the replacement battery on schedule and once again was on his way.

The Pole at Last

At 0445 UTC on May 1, Naomi Uemura, JG1QFW, arrived at the North Pole — the first person to make it alone! That night the DX Association hams and VE8RCS handled messages of congratulation from all over the globe! □

[Editor's Note: This article is based almost entirely on information obtained from Dr. Lee Houchins of the Smithsonian Institution, project officer for the Naomi Uemura Expedition.]

Footnotes

¹Sledge is a vehicle with low runners that is used for transporting loads over ice or snow. A sleigh is used for transporting persons.

²"Public Emergency Met by Hermudan Amateurs." "International News," March 1978 QST, page 69.

Strays

INTERNATIONAL THIRD-PARTY TRAFFIC

□ The FCC reminds that U.S. amateurs may exchange legal third-party traffic with amateur stations in the following countries: Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Ghana, Guatemala, Guyana,

Haiti, Honduras, Israel, Jamaica, Jordan, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay and Venezuela.

The U.S. also holds a special agreement with the International Telecommunication Union in Geneva which allows U.S. amateurs to handle traffic for American amateurs operating station 4U1ITU. In addition, traffic may be handled for stations in Greenland bearing the XP prefix, U.S. stations operating portable from Barbados (e.g., W1RU/8P6), and station

WD5AJE/SU in the Sinal area. Note that third-party traffic is no longer permitted with HZ1AB in Saudi Arabia. — WA6IDN

FCC GETTYSBURG

□ All FCC form 610 applications, as well as questions regarding amateur licensing, and changes in mailing address should go to the FCC Gettysburg office. The address is FCC, P. O. Box 1020, Gettysburg, PA 17325.

Operation Outreach

The media need good stories. We amateurs have good stories that need to be told. What are we waiting for!

By Stephen Mendelsohn,* WA2DHF

You pick up your local newspaper, go past the main events of the day, and what do you find on page six? The daily CB story, right? Nothing wrong with a CB story, but wouldn't it be nice, you say to yourself, if I could see a story about amateur radio just as often? Heck, we're out doing lots of public service, inventing things and helping people. Why, just read *QST* or the other ham magazines and you'll see all the things we do! So why don't we see them in the local newspaper?

For years the media have been staffed by hams. Just try your local radio station or newspaper; many of those in your home radio club work somewhere in the media. If you think about it, broadcasting itself was just about started by Home Amateur Mechanics (HAMs). Having so many people in the various media seems like a wasted resource if we either can't or don't make use of these valuable contacts.

What Can You Do About It?

Some time ago the ARRL created the job of PRA — public relations assistant. Who are they? Just the people in the media? No! Each of us is a potential PRA. In my capacity as an engineer for the CBS Radio Network, working closely with the news department, I have been able to see just how much news gets "eaten up" each day. The wire services send hundreds of stories daily, only a few of which are ever broadcast. It has been quite a shock to see that one wire service has set up a special heading for CB stories. How do you think this happened? The CB industry has set up its own "PRAs" to get the word out, that's how. Many thousands of dollars have been spent telling the public just how much fun they have been having on CB.

Okay, you say, how do I go about getting out the word about amateur radio? If something newsworthy happens in your area, your local scribe jots it down and sends it to the various ham periodicals for reporting to the rest of us avid readers. We hams have been doing this for years,

and have many public service certificates to prove it.

So what! How many butchers, bakers and congressmen do you think read amateur radio magazines? Very few.

Hams have been patting themselves on the back for many years. But without knocking the efforts of those who go out and do the good deeds or those who see to it that they get mentioned in the amateur magazines, it seems that the general public rarely gets to hear about the local hams' actions because nobody reports them properly. It is surely time this was remedied.

What to Do and Whom to See

Charity — and good news contacts — begin at home. Start with your local radio club or ham organization and see if any member works for a newspaper, radio station, or TV station. If so, ask for an interview or meeting with his local news assignment editor; he or she determines what stories will make print or get aired that day. Cousin Jim, who minds the transmitter for the town TV station, has very little to say about editorial content, so no sense arguing with him about whether or not your own Field Day story will get told. He can't help there, but he surely can introduce you to the local assignment or feature editor who *can* help.

Remember, these people are journalists. They are interested only in what makes a good story, not the technical details of your new keyer. Point out how your story is significant — if it is. A good point to keep in mind is that you are competing for air time, or space, with many other stories that may have more local impact. But once you have met the people who plan coverage, keep reminding them that you are around. They are nice folks to have in your corner. If you're lucky enough to have a ham in the journalistic group, you're halfway there.

Points and Pitfalls

Some things to remember once you get to talk to an assignment editor:

1) Be ready to explain why your story is of local significance. The President of the United States has his own traveling press corps, and they cover him because your

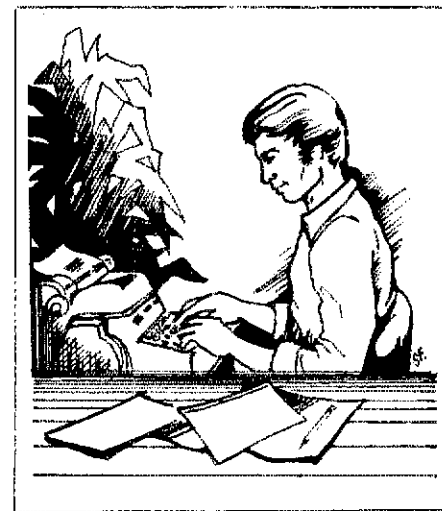
local paper can't afford to send a man with him. Likewise, they can't have reporters all over the world, so they subscribe to a wire service that gives them world news. If you have a local slant or an original angle on your story, it will sell. Things of interest to the communities the media sell to, interest the media. It's simple economics.

2) Try to remember that if you provide communications as a service to another organization or group, you are just a subsidiary group, not the main story. In 1976, Dave, WA2EXP and I headed a group of 50 amateurs who provided communications and coverage, by radio, for the New York City Bicentennial Marathon (March 1978 *QST*, page 51). More than 50 hams in all five boroughs of the city made a tremendous effort to see that events moved smoothly throughout the 26-mile course. But we received not a word of press coverage, just the thanks of the race sponsors and the kind words of some of the 2200 runners who provided the real spectacle.

With the advent of telephones in everyone's home some 50 years ago, the idea of having worldwide communications capability has made the public think that we are just a natural fixture in the scheme of things. The moral? If you are just contributory support, you have to have a special reason for getting mentioned.

3) If you are providing the only communications during an event or disaster, appoint someone to tell the press that this is the Amateur Radio Service. The average reporter has been bombed with so much CB literature, propaganda and noise that it must be pointed out that this is not CB! As Archie Bunker says, "Ya know, dey all look alike except to dere own kind." Well, we do too. If you were to try to fathom a new hobby or technical specialty how much of the jargon would you know at the first meeting? Have a "translator" who speaks both English and concepts standing by.

4) If you have a story . . . go out and



sell it. If not to the daily assignment editor, then ask for the weekend or feature editor. Weekends in the news business are like a slow death over a medium-warm fire. So weekends are the ideal time to get your story told. Invite the weekend editor or feature editor out for a bite to eat and tell him in simple, nontechnical terms about your story and why he should consider doing it.

5) Remember that weekends come early in the news business. A newspaper has to print its weekend feature stories on Thursday or Friday, so if you have a story for the weekend get in touch on Monday.

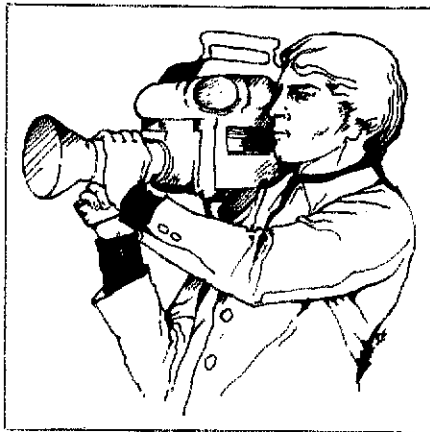
6) Think multimedia. If you have a story, be "PR-aware" of the outlets for your story. Everyone thinks "media" refers to newspapers and television. Not so. Remember radio? There are thousands more radio stations than TV stations in most countries, and ours is no exception. Counting college stations and public radio outlets, as well as independents and network affiliates, there is about a 10:1 ratio of radio stations to television stations in the U.S. That means there is a 10 times better chance of a radio station doing your story than a TV station.



And if you don't think radio is still listened to in this day of TV, just glance at the guy in the car next to you when you take your next drive. Odds are he's listening to his car radio.

If you think you have a visual story, by all means try the local TV outlet. But if you get greeted with a negative response, remember that newspapers have a picture section also. If all you have is a story to tell, and picture content is lacking, try radio.

7) Remember the term "wire services"? This refers to the Associated Press, United Press International and Reuters News Service. Each has either a full-time reporter or a stringer (part-timer who gets paid by the piece, not full-time) who might live or work nearby. Find out who he is. The wire services must send out thousands of items each week; the only



way to get those thousands of items is if someone goes out to do a story or the story is called in. Another good contact. If you live in a small town, find out who the local stringer is. Usually your local newspaper will have someone who can identify the nearest wire service employee.

8) Very few people seem to know that UPI and AP have an audio service. This is just a fancy name for groups that do telephone interviews and feed them to radio stations that subscribe to the service. This can add another possible outlet for your story. When you make contact with the local wire service reporter, stringers or bureau people, find out who takes care of the audio service and seek them out.

9) When you find your attentive ear, the person who will report your story, try make yourself understandable. Start your story by explaining in the broadest terms what is happening, and then get down to the specifics. Frequently ask if there are any questions. Things like these allow the reporter to tune in to your wavelength.

Another tip worth mentioning. If you saw, heard or read something on the reporter's station, or in his paper, that you did not like, now is *not* the time to mention it. It seems simple enough, but I have frequently been berated about a CBS show originating from Hollywood while doing an interview for my ARRL radio show, "The Wide World of Amateur Radio" (available from League headquarters). Even though I am not acting in any CBS capacity, or involved with programs from Hollywood, people seem to think that if you work for a network then you know all the people at the top and can get their views across. It just isn't so. Try not to discuss the reporter's paper or his station's policy until long after the interview sees the light of day.

Other Ideas Worth Pondering

In my travels I have found that others have embraced the concept of "Operation Outreach" — getting the amateurs' story, and worth, across to the public via the media. If you have a club or a 2-meter repeater with many commuters during heavy travel hours, why not try and "sell"

it as a service to some of the small radio stations in your area? In the New York City area many of the smaller stations do not have the money to use a helicopter for traffic reports. So one enterprising club, the Long Island Mobile Amateur Radio Club, has agreed to give traffic reports directly from many of the most heavily traveled roads to several small stations. This is done every 20 minutes or so on tape, or, when a special condition warrants, live.¹ The verbal okay of the hams is secured beforehand, of course. The only thing the club requests is the tag line, "This report is brought to you by (station call letters) and the cooperation of local amateur radio operators."

This concept not only provides a public service but gives the small station the ability to compete with its bigger neighbor for listeners. And it gets the amateur radio story across during "drive time," the golden time of radio. One ham disc jockey in upstate New York has been so successful with the concept that three of his station's local competition have asked him to provide an equal service to them and he does. Three times as many people hear about ham radio that way!

Commercial for the Home Product

If you can't get the story out any other way, or want to make sure that our fellow amateurs know about your event, call 203-667-0138 any time day or night and let ARRL headquarters know your story. Just leave a name and number, and as soon as possible someone from League hq. will contact you. The ARRL Public Information Officer will usually get the story to his contacts at the wire services to get it told, so by all means call!

If you are in the media in any way, send your name, call and other important information such as telephone number and employer to the ARRL. The League now has a variety of 15-minute radio shows, all public-service oriented, telling some of the story of amateur radio for the general public. These are part of Operation Outreach.²

But you are the most vital part of Operation Outreach, for it is through all of our efforts that we pick up the paper, listen to radio, or watch television, and hear or see someone telling the general public about our hobby. It is our way to combat the TVI-generator image of amateur radio while emphasizing just how much amateur radio does for the community. Look around you — we're doing quite a bit.

Footnotes

¹However, the station needs prior FCC authorization to rebroadcast an amateur transmission, and the amateur transmission may not refer to the rebroadcast.

²For further details about promoting amateur radio through the broadcast media, see "Ham It Up on the Broadcast Band," June 1977 QST, pp. 65-69.

Ask Not What Amateur Radio Can Do for You

Where does effective public relations begin? With each of us, says a dedicated practitioner of the art.

By Lenore Kingston Jensen,* W6NAZ

When Lenore Jensen, W6NAZ, speaks, people listen. The ARRL public relations assistant and long-time activist on behalf of the Amateur Radio Service raised some particularly timely issues in a speech before last year's ARRL Pacific Division Convention. Excerpts from her remarks follow:

We've borrowed a phrase: "Ask not what amateur radio can do for you, but what you can do for amateur radio." Before we know it, the World Administrative Radio Conference (WARC) will be here. But for us, the important moment is right now. We're anxious to preserve our frequencies and perhaps gain a few. We need all the friends we can find, here and abroad.

Most of all, we need each other. We need to form a tremendous chain of amateurs, with each link equally important. One weak link might be devastating to our future. We must strengthen our identity to the public and maintain a strong public service capability.

It was interesting to hear Charles Higginbotham, WB3DLT, chief, Safety and Special Radio Services Bureau, FCC (now retired), tell us to "blow our own horn" when we provide important emergency communications. Speaking at another ARRL convention, he suggested that people in high places, who make decisions, will thus be reminded of the particular abilities we have.

Does your club have an active PR chairman? It's not that your good deeds are performed for thanks, but our survival may depend on letting the world know. PR means good relations with the entire community, not just news fit for print or broadcast.

It's important that good relations are established with the media *before* our big moments, so that we'll know who to notify in a hurry when a ham saves a life

or a club swings into action in an emergency.


As you think in terms of publicity, remember this: Ham radio itself isn't news; the effect of amateur radio on other people is news. Take photographs of hams in action, identify your cars or handhelds, wear an armpatch, or adorn that portable station with a sign showing those two important words, Amateur Radio, in case it might be confused with another service.

The League provides excellent publicity kits for anyone willing to ask for them. Publicity for one ham is publicity for all of us. Help us find radio stations to broadcast the public service announcements recorded by generous stars — Bob Hope, Dick Van Dyke and Edgar Bergen.¹

And now we have two filmed spots for television. Dave Bell has produced for the League 20- and 30-second filmed an-

nouncements featuring the success of your division's great work at the recent Marble Cone fire. These are being distributed nationally. If you have a personal contact at a TV station, help us get them aired.

Bookings are also needed for the League's 12-minute film, *Moving Up to Amateur Radio*. Can you ask program chairmen, service clubs or schools to show it? You might go along as the one to answer questions.

What a wide world the Amateur Radio Service is! We know what it can do for us, and it's obvious what everyone should do for it: get involved. Pay back something to the service that provides us with such a wonderful opportunity for fun, for learning and for helping our fellow man. 

¹Baseball star Joe Rudi, WA6PVA and Daryl Dragon, of the Captain and Tenille, have since donated their time to the betterment of amateur radio as well.

A former radio actress, Lenore Kingston Jensen, W6NAZ, is one of the more active of the League's array of public relations assistants. (Norm Chalfin, K6PGX, photo)



PRAs — Who Are They?

In 1965 ARRL created the job of public relations assistant to strengthen public information about amateur radio at the local level. Today, there are over 150 PRAs serving every ARRL section. The objective of the program is to take advantage of the expertise of active radio amateurs who are also professional radio, TV, newspaper or public relations people.

PRAs are appointed by the directors and function as consultants to the directors, SCMs and ARRL affiliated amateur radio clubs in their areas. They work closely with club publicity chairmen to help develop public information plans and programs.

Dee Logan, W1HEO, was a pioneer in the PRA movement, and helped develop guidelines for the program. Over the years, he has been active in both the Hudson and New England divisions. Lenore Jensen, W6NAZ and Stephen Mendelsohn, WA2DHF, both contributors to this issue of QST, are also among the more active of the League's public relation assistants.

Good public relations is important to the healthy growth of amateur radio. The League can use your help. If you feel qualified to work as a PR consultant, contact your division director for further information. — W1TKG

*14867 Round Valley Dr., Sherman Oaks, CA 91403

Theme: WARC-79

Topics ranged from the cosmic to the comic, but WARC-79 dominated the ARRL Board of Directors' summer sessions, July 20-21 in Hartford.

By Perry F. Williams,* W1UED

“ . . . **T**here is much that we have to be proud of in our preparation for this [World Administrative Radio] Conference, no matter what happens. Amateur Radio has never prepared so thoroughly nor so extensively for any conference. Amateur Radio worldwide will go to this conference with an almost single and universal position, which is a position of strength. If that message can be conveyed to our members, there will be less division in our ranks, division caused by a criticism which is unknowledgeable and unfair . . .”

“If we were to discontinue our WARC preparation this very day, we would be further ahead than we have ever been before in preparatory objectives. Obviously, we will not stop now, nor will we slow down. In fact, our WARC activities are continuing at an even more accelerated pace!” — *The President's Report, July 1978*

These words concluded a 31-page “White Paper,” presented to the Board by General Manager Baldwin documenting domestic and foreign preparations for next year's WARC, which will decide frequency allocations for the remainder of this century. Problems were stated, too — an ITU which increasingly makes political decisions, an increased competition for spectrum space from all sides, a particularly heavy push for expanded spectrum space by the high-frequency broadcasters, voting by blocs, an ITU membership of about 154 countries, and IARU membership around 100. But directors heard about the baker's dozen African countries where there is a chance of establishing Amateur Radio societies; the four proposed new IARU members in the

Americas, with only Cuba to go; the special study of broadcasting's audiences done by SRI International for ARRL; the Eighth Notice of FCC and similar WARC preparations in Canada; the “dry run” of the IARU team at Geneva during the Aeronautical Conference in February.

Closely allied to preparations for WARC in the minds of members — and directors! — is the quality and depth of ARRL representation in Washington, DC. Reports sent to directors in May and presented in person at the July meeting outline ARRL's team approach involving as many as 13 individuals (three of them resident in the Greater Washington area) linked together through the coordinator named as a result of Minute 26 a year ago, Hal Steinman, K1FHN. The great philosophical question, “How much is enough?” can never be answered, but the Board's decision at Minute 76 continues the team approach: “. . . The report by the President and General Manager . . . is accepted by the Board as fulfillment of Minute 40 of the January 1978 Board meeting, and that the position description contained therein serve as the task assignment of the Washington Coordinator. . .”


Getting down to specific chores in the Government arena, ARRL will file a Notice of Appeal in the Federal Courts (see Minute 91) if a study of the FCC's denial of reconsideration in Dockets 21116 and 21117 (FCC's ban on amplifiers operating in 24 to 35 MHz and type acceptance rules for amplifiers) indicates any chance of success. The Board also directed the President to take all possible steps to insure that Amateur Radio clubs are not required to surrender existing call signs — including authority to seek judicial review of any order by FCC along those lines (Minute 61). All-mode privileges for Novices on the 220- to 225-MHz bands will be sought, pursuant to Minute 51, giving newcomers a taste of voice and possibly even computer communications in a band which, in many areas, can easily afford additional amateur occupancy. FCC will be reminded by Minute 69 of the long-unanswered, noncontroversial request for normal (16F3-type) fm opera-

tions in 52.0-52.5 MHz, supposedly part of the repeater subbands and yet with typical operation not technically permitted!

“Reduced to a single comprehensive statement, this study clearly shows that any demands made by hf broadcasters for increased spectrum due to increased audience demand simply cannot be supported by the information now available.” — *The Audience For High Frequency Broadcasting, SRI International, June 1978*

Turning to organizational matters, the General Manager may employ consultants for six months, to aid in seeking grants from foundations for some of ARRL's work (Minute 23). Dues for Life Membership will be computed at 25 times the annual rate (instead of 20 times as at present) for those signing up or beginning an eight-payment plan after November 1, 1978, according to Minutes 19 and 20. On another front, when there is a local legal case for which ARRL financial assistance is sought, guidelines adopted at Minute 55 will apply.

In operating matters, Minute 56 decries harmful operating tactics and improper language, particularly during DXpeditions to rare locales. Contest disqualification criteria were strengthened at Minute 26. On the positive side of the hobby, two commendations will be available for meritorious operating, one for emergencies, and one for notable public service (Minute 17). The DX test will be held on one weekend for cw, one for phone beginning in 1979 (Minute 27).

It was a longer-than-usual meeting, with more than usual interest. Don't stop now — go on to read the full minutes under “Moved and Seconded,” on the following pages! 

*Manager, Membership Services Dept.

Moved and Seconded...

MINUTES OF THE 1978 SECOND MEETING OF THE BOARD OF DIRECTORS OF THE AMERICAN RADIO RELAY LEAGUE, INC. July 20-21, 1978

1) Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc., met in second session at the Holiday Inn, Hartford, Connecticut, on July 20, 1978. The meeting was called to order at 9:30 A.M., with President Harry J. Dannals, W2HD, in the Chair, and the following directors present: Garfield A. Anderson, K0GA, Dakota Division; Max Arnold, W4WHN, Delta Division; Charles M. Cotterell, W0SIN, Rocky Mountain Division; Richard A. Egbert, W8ETU, Great Lakes Division; Jack D. Gant, W5GM, West Gulf Division; Paul Grauer, W0FIR, Midwest Division; Jay A. Holladay, W6EJJ, Southwestern Division; Harry A. McConaghy, W3SW, Atlantic Division; Don C. Miller, W9NTP, Central Division; Larry E. Price, W4RA, Southeastern Division; William J. Stevens, W6ZM, Pacific Division; John C. Sullivan, W1HHR, New England Division; Robert B. Thurston, W7PGY, Northwestern Division; L. Phil Wicker, W4ACY, Roanoke Division; Stan Zak, K2SJO, Hudson Division. Also in attendance, as members of the Board without vote, were Victor C. Clark, W4KFC, First Vice President; Noel B. Eaton, VE3CJ, Vice President; Carl L. Smith, W0BWJ, Vice President; and Richard L. Baldwin, W1RU, General Manager. Also in attendance, at the invitation of the Board as nonparticipating observers, were the following Vice Directors: Jesse Bieberman, W3KT, Atlantic Division; Maurice O. Carpenter, K0HRZ, Rocky Mountain Division; George Diehl, W2IHA, Hudson Division; Fred Evans, W1JFF, New England Division; George H. Goldstone, W8AP, Great Lakes Division; Peter F. Matthews, WB6UA, Southwestern Division; Edmond A. Metzger, W9PRN, Central Division; and Gay E. Millus, W4UG, Roanoke Division. There were also present Honorary Vice President Robert York Chapman, W1QV; Treasurer John Huntoon, W1RW; General Counsel Robert M. Booth, Jr., W3PS; Canadian Associate Counsel B. Robert Benson, QC, VE2VW; Assistant General Managers Robert Myers, W1XT and David Sumner, K1ZZ; and Membership Services Manager Perry F. Williams, W1UED. The President reported that illness in the family of Ron J. Hesler, VE1SH, Director from the Canadian Division, prevented his presence at the meeting.

2) By consent, the agenda was amended to include, under item 5, reports of the Amateur Satellite Service Council and the ARRL RFI Task Group.

3) On motion of Mr. Thurston, seconded by Mr. Sullivan, unanimously VOTED that the Minutes of the 1978 Annual Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

4) At this point, supplementary oral reports were offered by the officers of the League. President Dannals commented on the dedication ceremony for the new Headquarters station for Air Force MARS; the hearing on Senate Bill 864, during which ARRL supported Senator Goldwater's proposals leading to better radio frequency interception rejection in home-entertainment devices; the potential renewal of the threat to the 220- to 225-MHz band proposed by a recent study; the work load of officers and directors; the team approach to preparation for the World Administrative Radio Conference (WARC); abuses in the reciprocal operator permit program; assistance by directors, vice directors and assistant directors in evaluating local legal problems; and the healthy state of varied Amateur Radio activities.

5) First Vice President Clark, who is also President of IARU Region 2, reported on development of the regional organization and efforts to provide support and encouragement to Region 2 member societies in their preparations for WARC, including personal visits by him to 14 of these societies during the first five months of this year. Four additional societies in Region 2 have applied for IARU membership in the past six months. Mr. Clark also reported on the

meeting of the Region 2 Executive Committee in La Paz, Bolivia; the forthcoming Region 2 Triennial Conference in Panama, September 3-8, at which ITU Secretary-General Mili will speak; the bilingual publication, *Region 2 News*; the Geneva meeting of IARU President Eaton's International Working Group and the ITU Aeronautical Conference; and his participation in ARRL conventions and local club meetings.

6) The Board was in recess from 10:35 to 10:50 A.M.

7) Vice President Eaton presented his report for the first six months of 1978 almost entirely dealing with preparation for WARC-79 and his work as President of the International Amateur Radio Union. The report covered the International Working Group meeting in Geneva; the reception for participants in the Aeronautical Conference held at Geneva; the change in emphasis, and consequent change in name, of the International Working Group to the President's Advisory Committee; the composition of the IARU Observer Team for WARC-79; the Triennial Region 1 Conference in Hungary; the forthcoming Region 2 Conference in Panama and Region 3 Conference in Bangkok with additional proposed travel to Fiji, Tonga, New Zealand, Australia, Indonesia, Singapore and Hong Kong. Mr. Eaton reported that IARU is in the process of voting on its 100th member, Grenada. Additional applications, for Senegal, Haiti, Antigua, and the British Virgin Islands, are also being voted on now. The Fellowship Program continues to attract visitors from abroad. Mr. Eaton's report concluded with a request for additional support of IARU projects, particularly during the next 18 months.

8) Vice President Smith reported briefly on his work with the VHF Repeater Advisory Committee, the ARRL Radio Frequency Interference Task group, as a speaker at the IEEE Vehicular Technology Conference in Denver, and the opportunity which his retirement in August will present for greater involvement in ARRL affairs.

9) The oral report of General Manager Baldwin included growth reports for both ARRL and Amateur Radio as a whole with membership at 166,300 and the U.S. license population at 342,000 as of June 30. The ARRL Training Program continues to be the basis for the growth in both areas. A discussion of League financial affairs followed, with identification of problem areas, and suggestions for coping with them. U.S. preparation for the World Administrative Radio Conference (WARC) was the highlight of the General Manager's report. ARRL has filed comments in response to the 8th Notice of Inquiry, Docket 20271, which included a report by SRI International counteracting the claims of the high-frequency broadcasting interests. He also reported on the formation of the Department of State Advisory Committee for WARC, which includes Merle Glunt, W3OKN, representing ARRL. A timetable for further WARC preparations followed, and mention was made of a "white paper" which outlines for directors and their members the steps ARRL has taken in preparing for the Conference. During the course of the above, the Board was in recess for luncheon from 12:29 to 1:20 P.M.

10) Treasurer Huntoon reported briefly on changes in the portfolio of securities held by ARRL both for its General Fund and Life Membership. The Board was in recess from 2:37 to 2:50 P.M.

11) General Counsel Booth reported on changes in the Federal Communications Commission; problems caused by its obsolete data processing system; changes proposed in the Communications Act by Congressman Van Deerin with specific authorization to use volunteers as one of the important points; the status of the Radio Frequency Interference bills; the effective work of Harold Steinman, R1FHN, as Washington Area Coordinator; pending dockets and petitions for rulemaking; interconnect problems associated with phone patches; and the local legal problems of radio amateurs. During the course of the above, the Board was in recess from 3:35 to 3:50 P.M.

12) Associate General Counsel Benson reported on Canadian legal matters including the proposed

Experimenter License and provisions for packet radio, under which amateur computers could talk to each other. A demonstration of this new mode had been presented in Montreal by amateurs, under the sponsorship of Dr. deMercado of the Department of Communications.

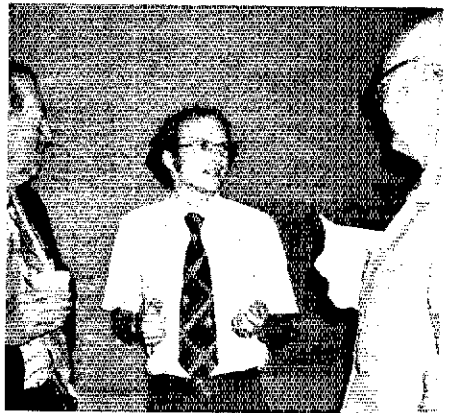
13) Mr. Zak, as Chairman, read the report of the International Affairs Committee, which touched on international travel, WARC preparations, and the work of members of the United Nations Radio Club to permit IARU to receive nongovernment organization status with the United Nations by year-end. Mr. Anderson, as Chairman, presented the report of the Plans and Programs Committee, which had as assignments from the 1978 Annual Meeting the studies of Minute 28, Minute 51 and Minute 72. The Committee is not recommending action on technical coordinators in each Division, a special no-code license for microprocessor enthusiasts in the vhf bands, nor creation of a Public Relations Advisory Committee at this time.

14) Mr. Gant, as Chairman, presented the report of the Membership Affairs Committee. Recommendations on criteria for the election of Honorary Vice Presidents were reported informally. Mr. Gant moved, Mr. Cotterell seconding, that the Headquarters Contest and Awards Committee be renamed the ARRL Awards Committee, and that in cases of appeal by a disqualified entrant, his first avenue of appeal will be to the Communications Manager and final appeal will be to the Membership Affairs Committee, if filed within 60 days following notification by the Communications Manager of his decision. After extended discussion, on motion of Mr. Sullivan, seconded by Mr. Thurston, VOTED that the matter is laid on the table.

15) Moved, by Mr. Cotterell, seconded by Mr. Wicker, that a policy of the ARRL be established so that the Division Director be the only individual in each Division eligible to apply for a mailing permit in the name of the American Radio Relay League. After extended discussion, on motion of Mr. Smith, seconded by Mr. Wicker, the matter was laid on the table.

16) The Board was in recess for dinner from 5:48 to 8:00 P.M., reconvening with all attendees present.

17) On motion of Mr. Gant, seconded by Mr. McConaghy, it was unanimously VOTED that the Public Service Award be replaced by two new awards, one for recognition for an amateur's contribution during an emergency, and the second for outstanding or notable communications to the public by an amateur. The General Manager shall provide suitable guidelines.



Assistant General Manager Dave Sumner, K1ZZ, demonstrates how to drive a sports car to General Counsel Robert M. Booth, W3PS (l) and Dakota Division Director Gar Anderson, K0GA. (photo by W9PRN)

The two awards will be named Public Service Commendation and Emergency Service Commendation. It is further asked that the General Manager take in the following points as he sets up the guidelines: (1) A request for recognition as a recipient of the Emergency Service Commendation should be either initiated by or endorsed by the SEC. (2) A request for recognition as a recipient of the Public Service Commendation should be either initiated by or endorsed by the SCM. (3) Only the outstanding, meritorious participants should be recognized by either commendation. (4) Recognition by commendation should not be limited to ARES, but available to all amateurs. (5) With the issuance of commendations limited to those who are outstanding and meritorious, a Letter of Commendation would be appropriate to all other participants.

18) Mr. Arnold, as Chairman, presented the report of the Management and Finance Committee. The Committee recommended to the General Manager that he review the schedule of multiple-year membership rates, as provided for in Bylaw 4; that he investigate and report to the Board the costs of the various services which are available from the Headquarters; the philosophy of providing extensive services to nonmembers of the League; and that policies on membership contact travel to conventions and hamfests be reviewed.

19) Mr. Sullivan moved, Mr. Grauer seconded, that Bylaw 1(c) be amended by striking out the word "twenty" and inserting the word "twenty-five," effective November 1, 1978. The ayes and nays being ordered, all of the directors voted in the affirmative and so the Bylaws were amended to provide that Life Membership is available upon payment of a fee of twenty-five times the annual dues rate.

20) Moved, by Mr. Sullivan, seconded by Mr. Stevens, that Bylaw 1(d) be amended by striking out the word "twenty" and inserting the words "twenty-five," effective November 1, 1978. The ayes and nays being ordered, all of the directors voted in favor so the Bylaw was amended to provide for Family Life Membership at twenty-five times the annual family dues rate.

21) On Motion of Mr. Grauer, seconded by Mr. McConaghy, after discussion, unanimously VOTED that the General Manager is directed to publish a question and answer book for radio amateurs, following the multi-question format of the FCC, the book to be the size of the old League *License Manual*.

22) On motion of Mr. Price, seconded by Mr. Sullivan, unanimously VOTED that the General Manager is directed to prepare for approval by the Management and Finance Committee a chart of League Headquarters organization. The approved chart shall be made available to any member upon request.

23) On motion of Mr. Arnold, seconded by Mr. Stevens, after discussion, VOTED that the proposal of the General Manager to employ the professional grant seeking consultants for a six-month experimental period is approved as presented to the Board. Mr. Grauer requested to be recorded as voting opposed.

24) Mr. Egbert, as Chairman, reported briefly for the Legal and Regulatory Committee. The Committee has been working on guidelines under which financial assistance may be provided to amateurs with local legal problems which might establish precedents affecting the amateur community.

25) Mr. Smith, as Board Liaison, presented the report of the VHF Repeater Advisory Committee covering changes in personnel; Docket 21033; the California plan for 10-meter repeaters; the 144- to 146-MHz band plan; the 220-MHz band plan; the 420-MHz band plan; and its discussions about amateur television repeaters. The Committee continues to study tone access standards; the 1215-1300 and 2300-2450 MHz band plans; autopatch standards, operations, and regulations; and standards for 10-GHz links.

26) Mr. Zak, as Board Liaison, presented the report of the Contest Advisory Committee. As directed at the January meeting, the Committee had studied Minute 24, Minute 49 and Minute 65. With respect to the first, the Committee did not recommend any particular motions on the subject of shortwave listening categories in ARRL contests, but did have a series of recommendations should an SWL program be adopted. On motion of Mr. Zak, seconded by Mr. Sullivan, it was unanimously VOTED, in response to Minute 49 of the January 1978 Board Meeting, that the following criteria — established by the Contest Advisory Committee and approved by the Board concerning the rejection and disqualification of logs submitted for all ARRL sponsored operating activities — are adopted: (1) Concerning the removal of QSOs from a contest log, a bad QSO should be verified as much as possible but the log checker should be able to use his own or her own discretion. However, such discretion should be applied as impartially as possible. (2) "Rubber clocking" in excess of 2 percent of the total operating time shall be cause for automatic disqualification.

Rubber clocking is the act of altering the actual time a series of contacts was made to increase the total operating time so that it is greater than the maximum allowable limit. This is usually done just before or just after a time out. (3) Unremoved duplicate contacts in excess of 2 percent of the total contacts made shall be cause for automatic disqualification. If a call sign is misspelled and results in a duplicate contact, it would not be considered a duplicate. UK9AAN and OK9AAN would not be considered duplicate contacts even though UK9AAN's log showed that they were duplicates. However, the OK9AAN would be removed from the log and would be applied to the present 2 percent score reduction rule. (4) The present rule which states any log which is reduced in excess of 2 percent from the claimed score may be subject to disqualification, will remain in effect.

27) On motion of Mr. Zak, seconded by Mr. Sullivan, it was unanimously VOTED that, in response to Minute 65 of the January 1978 Board Meeting, the following criterion is established by the Contest Advisory Committee and approved by the Board, concerning log checking burdens: based on an overwhelming response from contesters at various conventions and through the mails during the past six months, effective in 1979, the ARRL DX Contest shall be shortened to one weekend per mode. The final choice of weekends will be made by the Headquarters staff and should be two of the four weekends already used for the DX Contest. The Contest shall run from 0000 UTC Saturday until 2400 UTC Sunday and the maximum operating time for all stations shall be the full 48 hours.

28) Mr. Milius, as Board Liaison, presented the report of the DX Advisory Committee. During the first half of 1978 the Committee reports the following items as having been adopted: deletion of Spanish Sahara from the current countries list; and recognition of United Nations Headquarters in New York as a separate country, to be effective October 1, 1978. It rejected deletion of countries for honor roll purposes on the basis of no amateur activity in 10 or 15 years; deletion of countries with no official licensed amateurs; listing Aosta Valley of Italy as a separate country; and listing of the Pribiloff Islands as a separate country. The report also outlined future areas of discussion.

29) Mr. Arnold, as Board Liaison, presented the report of the Emergency Communications Advisory Committee. Whereupon, on his motion, seconded by Mr. Sullivan, it was unanimously VOTED that the Board thanks field organization officials for holding emergency communications forums at ARRL conventions and actively encourages such forums as part of the program at every ARRL convention and hamfest.

30) On motion of Mr. Arnold, seconded by Mr. McConaghy, it was unanimously VOTED that the General Manager is directed to promote increased participation in the Amateur Radio Emergency Service by undertaking a program including, but not necessarily limited to, improved audio visual aids and printed promotional material for recruiting ARES members from among active amateurs and beginners; placing greater emphasis on ARES in QST; encouraging clubs to support ARES; utilizing mailings to new amateurs and new League members to promote ARES; and implementing a publicity program to acquaint all amateurs with ARES and their role in it.

31) Mr. Holladay, as Board Liaison, presented the report of the VHF/UHF Advisory Committee covering the 23-centimeter band plan; Docket 21033; band plans for 144, 220 and 420 MHz; and the need for awards recognizing vhf/uhf accomplishments. Whereupon, on motion of Mr. Sullivan, seconded by Mr. Thurston, it was unanimously VOTED that the Membership Affairs Committee study establishing an award recognizing communications on 220 MHz and above, with designated ARRL sections and countries, similar to the 6-meter "600 Club" Award.

32) On further motion of Mr. Sullivan, seconded by Mr. Anderson, it was unanimously VOTED that a special plaque award be established for the first 10 amateurs to accomplish WAS on 220 MHz and above. Thereafter, a particularly attractive certificate would be provided.

33) Mr. Holladay moved, Mr. McConaghy seconding, that the chairman of each advisory committee be added to the distribution list for Directors' Letters. After discussion, moved by Mr. Price, seconded by Mr. Thurston, that the motion is amended by striking the text and substituting therefor the following: The Membership Affairs Committee is directed to study the distribution of Directors' Letters; but the motion to amend was lost, seven in favor to eight opposed. Moved, by Mr. McConaghy, seconded by Mr. Cotterell, that Mr. Holladay's motion be amended by the addition of the following words: And in return, the chairman will provide directors copies of their reports. On motion of Mr. Zak, seconded by Mr. Grauer, the matter was laid on the table.

34) Mr. Holladay, as Chairman, read the report of

the Amateur Satellite Service Council revealing the healthy state of OSCARS 7 and 8. He reported that the problem with OSCAR 8 orbit predictions had been corrected first in QST; that adequate funding remained a problem; and that the Oscar Education Program, while accepted, needed additional participation from amateurs.

35) Mr. Smith, as Chairman, presented the report of the ARRL Radio Frequency Interference Task Group, touching on the hearings held by Senator Goldwater respective to his RFI bill, S864, and on planned participation in the second EMI Conference to be sponsored this autumn by the National Bureau of Standards.

36) The Board recessed at 10:17 P.M., reconvening at the same place at 8:30 A.M., on July 21 with all persons herein before mentioned present.

37) On motion of Mr. Price, seconded by Mr. Thurston, unanimously VOTED that the Board approve the application of the Orlando Amateur Radio Club to sponsor an ARRL National Convention in the city of Orlando, Florida, on March 13-15, 1981.

38) On motion of Mr. Price, seconded by Mr. Sullivan, unanimously VOTED that the Board reaffirms its commitment to an efficient and effective outgoing ARRL member QSL bureau and directs the General Manager to continue to employ such resources as are necessary to ensure that outgoing QSL cards are dispatched in an accurate and timely manner.

39) On motion of Mr. Gant, seconded by Mr. Stevens, VOTED that nominees for the position of Honorary Vice President of ARRL may be selected from the categories of either volunteers in service or paid employees of the League. It is further moved that the following criteria be followed in the selection of such nominees. Voluntary Service: (1) Must have attained position of Director or Officer in the ARRL. (2) Must have no less than 20 years service to the League in positions of SEC, SCM, Assistant Director, Vice Director, Director, Officer, in some combination. (3) Must have made notable contribution to the health and strength of ARRL recognizably beyond accepted duty or obligation. Paid Service: (1) Must have no less than 30 years of service to the League, which could include prior or later volunteer service of notable nature. (2) Must have contributed significantly to the efficiency and unity of the operation of League affairs. At least 30 days before election of Honorary Vice Presidents, to be held at the Annual Meeting of the Board, the Director or Officer making a nomination must supply a written biographical sketch to the Membership Affairs Committee that they may review and verify the nominee's qualifications as to fulfillment of criteria.

40) Moved, by Mr. Miller, seconded by Mr. Sullivan, that, with permission, the phone number of the Vice Directors be added to the listing on page 8 of QST. After discussion, on motion of Mr. Price, seconded by Mr. McConaghy, voted that the matter is laid on the table.

41) On motion of Mr. Arnold, seconded by Mr. Stevens, the following resolution was ADOPTED: WHEREAS, the Board of Directors, through its Executive Committee, directed some years ago the employment of an outside Public Relations Consultant, and WHEREAS, at the time of such action the Board perceived the need for the infusion of new and innovative ideas concerning public relations activities, and WHEREAS, in the intervening years a new spirit of awareness of the importance of public relations activities has developed among the staff and management of the League, and WHEREAS, an effective and efficient public relations branch now operates as a part of the Headquarters organization, and WHEREAS, a volunteer field force of public relations assistants now contributes greatly to an increased awareness by the public of the positive attributes of Amateur Radio, now, therefore BE IT RESOLVED, by the Board of Directors of the American Radio Relay League, in meeting assembled, that, in order to restore increased managerial flexibility to the General Manager to enable him to employ scarce resources in the most effective and economical manner, that the previous directive of the Executive Committee is rescinded as no longer required. Mr. Cotterell requested to be recorded as voting opposed.

42) On motion of Mr. Zak, seconded by Mr. Baldwin, VOTED, that an official ARRL flag be established. The General Manager, in conjunction with the Membership Affairs Committee shall establish contest criteria for requesting designs from the general membership to be used as the official flag. The approved winning design shall be presented to the Board at its January 1979 meeting.

43) On motion of Mr. Grauer, seconded by Mr. Sullivan, unanimously VOTED that all future ARRL National Conventions be listed monthly in QST, under "Coming Conventions."

44) Moved, by Mr. Sullivan, seconded by Mr. Price, that the ARRL adopt the recommendations of

the DX Advisory Committee concerning single-mode DXCC, to be effective July 1, 1980. After discussion, moved by Mr. Miller, seconded by Mr. Zak, that the matter be tabled; but the motion to table was LOST. On motion of Mr. Arnold, seconded by Mr. Egbert, VOTED to amend the motion by striking the text and substituting therefor the following: Moved, that the ARRL adopt the following policies with respect to single-mode DXCC awards: (A) Valid contacts for all single-mode DXCC awards shall require that the applicant both transmit and receive in that mode with the confirming station. (B) To be creditable toward single-mode DXCCs, the QSL must specifically indicate that the same mode was used by both stations. (C) The above policies shall not be applied retroactively, but shall apply only to contacts made on or after July 1, 1980. However, the question being on the motion as amended, the motion was LOST. Mr. Sullivan requested to be recorded as voting in favor. During the course of the above, the Board was in recess from 9:36 to 9:50 A.M.

45) On motion of Mr. Stevens, seconded by Mr. Thurston, unanimously VOTED that the General Manager proceed to have 10,000 ARES decals manufactured at the estimated cost of \$50 per 1000. The decal will be similar in size, shape and color to the ARES shoulder patch. The decal may be given to the membership or sold at a nominal charge as determined by the General Manager.

46) On motion of Mr. Wicker, seconded by Mr. McConaghy, unanimously VOTED that the Membership Affairs Committee study the feasibility of establishing a new appointment, to be known as QSL Bureau Assistant, to be issued to voluntary assistants in the operation of the ARRL Incoming QSL Bureaus.

47) On motion of Mr. Cotterell, seconded by Mr. Grauer, unanimously VOTED that League publications, whenever using the words, "Amateur Radio," capitalize both words in any article or text, and further, that all members of ARRL are encouraged to do the same.

48) Moved, by Mr. Price, seconded by Mr. McConaghy, that the Bylaws are amended, with effect from November 1st, 1978, by the insertion of a new paragraph 1. (e): A paid up Life Membership in the League shall be available to any Full or Associate Member who has been an annual member for at least 20 years and who has attained the age of 65 years upon the payment of a fee of 12.5 times the annual dues rate. After discussion, moved by Mr. Arnold, seconded by Mr. Wicker, that the matter is laid on the table; but the motion to table was LOST. Mr. Price requested to be recorded as voting opposed. After further discussion, a roll call vote being required, the motion was LOST. All directors present voted opposed except Messrs: Holladay, Price, Stevens and Thurston, who voted in favor. During the course of the above, the Board was in recess from 10:26 to 10:41 A.M.

49) On motion of Mr. Holladay, seconded by Mr. Grauer, after discussion, unanimously VOTED that the Management and Finance Committee be directed to study the desirability and feasibility of publishing the League's audited financial statements in the pages of QST.

50) Moved, by Mr. Gant, seconded by Mr. Cotterell, that the Board of Directors of the ARRL take a position by a vote of yes or no as to whether or not it is in favor of supporting Petition for Proposed Rulemaking RM-2926 filed by the American Radio Council. After discussion, the motion was LOST.

51) Moved, by Mr. McConaghy, seconded by Mr. Miller, that the General Manager petition the FCC for Novice all-mode privileges on the amateur 220-MHz band. After discussion, moved by Mr. Sullivan, that the matter be referred to the Legal and Regulatory and Plans and Programs Committees for joint study; but there was no second. Moved by Mr. Cotterell, seconded by Mr. Sullivan, to amend the motion by referring the matter to the Plans and Programs Committee; but the amendment was LOST. The question then being on the original motion, it was ADOPTED. Mr. Thurston requested to be recorded as voting opposed.

52) On motion of Mr. Miller, seconded by Mr. McConaghy, VOTED that the Membership Affairs Committee study possible mobile operation awards and report at the January Board Meeting.

53) On motion of Mr. Anderson, seconded by Mr. McConaghy, unanimously VOTED that the Plans and Programs Committee be directed to further study the public relations function of the League; to take full advantage of available talent and ideas, and, to make them available to club publicity chairmen, bulletin editors, program chairmen, as well as PRAs and others.

54) On motion of Mr. Arnold, seconded by Mr. Holladay, unanimously VOTED that the President is instructed to undertake a study, using consulting assistance from members of the Board, Officers, Staff, or elsewhere as required, to develop recommendations for organizational changes which will assure

an adequate response to the growing workload arising from membership contact and support, while also enabling the Board of Directors to devote greater attention to League policy and management affairs.

55) On motion of Mr. Egbert, seconded by Mr. Thurston, after discussion, unanimously VOTED that, when legal assistance is requested of the League, the extent of the League's financial participation in any legal case shall be determined primarily by two factors. (1) That a legal precedent of substantial value to Amateur Radio is likely to be established; or, that an established legal precedent which has been of substantial value to Amateur Radio is in danger of being overruled. (2) The financial ability of the amateur to participate in covering the costs of the case. The legal merit of the case shall be judged by the General Counsel based on its possible long-term effect on legal precedent. The financial ability of the amateur to participate in covering the costs of the case will be judged on the basis of a confidential financial statement furnished by the amateur to the General Manager and on an evaluation of the financial resources available locally (such as from affiliated clubs). The General Counsel and the General Manager will present their recommendations to the Executive Committee, based on the above evaluation, and the Executive Committee will authorize the specific limit of payment.

56) On motion of Mr. Zak, seconded by Mr. Eaton, after discussion, unanimously VOTED that the Board express its continuing concern over harmful operating tactics and procedures and improper language being heard with disturbing frequency on the amateur bands, particularly during rare DXpeditions, and directs the General Manager to undertake suitable educational programs through channels available to the League so that the international image of amateur radio is not tarnished and so that our stature at international radio conferences will be enhanced.

57) Moved, by Mr. Grauer, seconded by Mr. Zak, that the General Manager shall submit to the Membership Affairs Committee for review, his proposals for the adoption of new titles in the series of books published by the League. After discussion, on motion of Mr. Cotterell, seconded by Mr. Sullivan, VOTED that the matter is laid on the table.

58) On motion of Mr. Sullivan, seconded by Mr. Egbert, unanimously VOTED that Mr. F. George duPont, WAISVY, is named an Industry Director of the ARRL Foundation.

59) On motion of Mr. Wicker, seconded by Mr. McConaghy, unanimously VOTED that the Board expresses its continued interest in stimulating uhf/microwave activities, along the lines laid down in Minute 19 of the 1977 Second Meeting.

60) On motion of Mr. Cotterell, seconded by Mr. McConaghy, unanimously VOTED that the General Counsel or other ARRL competent authority make known to the FCC that at least one, possibly more companies are offering broadband linear amplifiers under the guise of a crystal-controlled amateur transceiver, without a crystal, that will operate on the 11-meter band by using a 4-watt or less modulated rf source in place of a crystal.

61) On motion of Mr. Price, seconded by Mr. Sullivan, unanimously VOTED that the President is directed to take all possible steps to insure that Amateur Radio clubs are not required to involuntarily surrender existing call signs in favor of some arbitrarily assigned "club" prefix. The President is further directed to seek judicial review of any final administrative action which would cause such call-sign changes to begin.

62) On motion of Mr. Holladay, seconded by Mr. Miller, unanimously VOTED that the Plans and Programs Committee is directed to study ways in which the resources of the ARRL can most effectively be employed to plan for operational use of the next generation of amateur radio satellites.

63) Moved, by Mr. Gant, seconded by Mr. McConaghy, that the Board instruct the General Manager to prepare a pamphlet of not more than 10 pages designed specifically for information on Amateur Radio to be presented or mailed to all members of the U.S. Congress. The pamphlet should contain facts, figures and pictures covering such items as: (1) International goodwill (2) Emergency Communications (3) Massive cost to Government if Amateur Service were lost (4) Educational aspect (5) Message handling. The pamphlet should be informative as to the importance of the complete Amateur Service, not the ARRL. It would be acceptable to have on the cover the statement, "Prepared by the American Radio Relay League." After discussion, on motion of Mr. Holladay, seconded by Mr. Sullivan, VOTED that the matter is laid on the table. The Board was in recess from 12:30 to 1:20 P.M. reconvening with all persons herein before mentioned present.

64) On motion of Mr. Miller, seconded by Mr. Holladay, VOTED that the VUAC, in conjunction with the Plans and Programs Committee, be asked to recommend three specific 420-MHz band frequencies

which will permit ATV simplex and repeater operation in a legal and noninterfering manner.

65) On motion of Mr. Arnold, seconded by Mr. McConaghy, VOTED that the July 1979 Board Meeting be convened on the Wednesday and Thursday preceding the Friday, Saturday and Sunday ARRL National Convention scheduled for the third weekend of July 1979, in Baton Rouge, LA.

66) Moved, by Mr. Egbert, seconded by Mr. Sullivan, that in view of the information supplied to the Board in Directors' Letter No. 1713-B, relative to the matter of Washington representation, no further action is to be taken by the President and General Manager at this time relative to Minute 40 of the January 1978 meeting, and that the General Manager is directed to accelerate and complete the implementation of Minute 26 of the July 1977 Board Meeting relative to the full-time staff position as coordinator of ARRL activities in the Washington, DC, area. During the course of discussion, at 1:58 P.M., Mr. Dannels relinquished the Chair to Mr. Clark. Moved, by Mr. Price, seconded by Mr. Miller, to amend the motion by striking the text and substituting therefor the following resolution: WHEREAS, this Board in Minute 40 of the 1978 Annual Meeting directed the establishment of a resident Washington, DC, area representative of the League, and WHEREAS, in response to the directive of Minute 40 the President and General Manager have prepared a comprehensive Report of their views on the subject of a Washington office, and WHEREAS, the Report was prepared with the usual thoroughness and careful attention to detail which we have come to know and expect from our President and General Manager, and WHEREAS, the Report contains a position description itemizing the responsibilities of the person appointed to the position, and WHEREAS, the factors that led to adoption of Minute 40 continue to exist, and WHEREAS, time is of the essence in moving forward in a positive and orderly fashion toward the establishment of an Office, now, therefore, BE IT RESOLVED, by the Board of Directors in meeting assembled this 21st day of July, 1978, that the position description contained in the Report of the President and General Manager is approved as presented. But after discussion, on motion of Mr. Holladay, seconded by Mr. Zak, VOTED that the matter is laid on the table.

67) On motion of Mr. Grauer, seconded by Mr. Miller, VOTED to lift from the table the motion concerning publication of the telephone numbers of vice directors in QST. The question then being on the original motion, the same was unanimously ADOPTED.

68) Moved by Mr. Sullivan, seconded by Mr. Cotterell, the adoption of the following amendment to the Bylaws of the ARRL Foundation: "On questions of order and procedure not otherwise determined by these Bylaws the provisions of the current edition of Roberts Rules of Order shall prevail." A roll call vote being required, all directors voted in the affirmative.

69) On motion of Mr. Smith, seconded by Mr. Thurston, the following resolution was unanimously ADOPTED: WHEREAS, in its Report and Order in Docket 18803 the Federal Communications Commission established a repeater subband of 52-54 MHz; WHEREAS, at that time F3 emission with a deviation of 5 kHz or more was not permitted in the 52.0- to 52.5-MHz segment, and is not permitted to this day; WHEREAS, in 1976 the FCC proposed sweeping changes in permitted bandwidths of emissions from amateur stations, in Docket 20777; WHEREAS, in response to the FCC proposals, the Board, among other things, recommended that F3 with a maximum bandwidth of 16 kHz be permitted in the band 52-54 MHz; WHEREAS, comments to that effect were filed with FCC on behalf of the League; WHEREAS, the ARRL band plan for this repeater subband was established with the understanding that favorable action would be forthcoming; WHEREAS, no action on this noncontroversial matter has been forthcoming from the Commission; WHEREAS, this lack of action has retarded the growth and development of repeater operation in the 52- to 54-MHz band; now, therefore, BE IT RESOLVED, that the Board directs the President and General Manager to proceed by appropriate means to encourage the FCC to provide relief from this circumstance at the earliest possible date.

70) Moved by Mr. Stevens, seconded by Mr. McConaghy, that the Club & Training Department develop plans to initiate and/or modify the comprehensive program for a shortwave listener contest following the recommendation of the Contest Advisory Committee report, the time line for the first contest to be set by the Club & Training Department. After discussion, on motion of Mr. Sullivan, seconded by Mr. Zak, unanimously VOTED that the matter is referred to the Membership Affairs Committee for study.

71) On motion of Mr. Wicker, seconded by Mr. McConaghy, unanimously VOTED that with the heavy increase in the number of hamfests and similar

events being staged by Amateur Radio clubs and groups, this Board urges clubs and groups considering sponsorship of such events to consolidate their efforts toward joint hamfests with other clubs and groups in their area, and that the clubs and groups be advised to make use of the two-year registry of hamfest dates at ARRL Hq. to avoid conflicts and increase chances for successful events.

72) On motion of Mr. Cotterell, seconded by Mr. Holladay, unanimously VOTED that the Board proceed to discuss informally the Annual Report for 1977. Following this discussion, the Board was in recess from 2:59 to 3:13 P.M. At this point, Mr. Dannels resumed the Chair.

73) On motion of Mr. Price, seconded by Mr. Holladay, unanimously VOTED that the editor of QST is directed to take necessary steps to insure that the QST column "Product Review" (formerly known as Recent Equipment) includes in a review: (1) all significant operating parameters of specimen equipment as measured in the technical laboratory, and (2) where appropriate, manufacturers' specifications of claimed performance compared with actual measurements.

74) On motion of Mr. Holladay, seconded by Mr. Stevens, VOTED that funds be contributed to the Personal Communications Foundation in the amount of \$250 per month for the last six months of 1978. Mr. Grauer abstained.

75) On motion of Mr. Miller, seconded by Mr. Gant, VOTED to remove from the table the motion concerning preparation of an informational pamphlet on Amateur Radio. After discussion, on motion of Mr. Price, seconded by Mr. Sullivan, VOTED to postpone consideration indefinitely. Messrs. Gant, Holladay and Miller requested to be recorded as voting opposed.

76) On motion of Mr. Egbert, seconded by Mr. Arnold, VOTED to remove from the table the motion concerning Washington representation. Moved by Mr. Egbert, seconded by Mr. Sullivan, to amend Mr. Price's amendment by striking the text and substituting therefor the following: Moved, that the report by the President and General Manager which was transmitted by Directors' Letter No. 1713-B is accepted by the Board as fulfillment of Minute 40 of the January 1978 Board Meeting, and that the position description contained therein serve as the task assignment of the Washington Coordinator described in Minute 26 of the July 1977 Board Meeting. After discussion, Mr. Egbert's amendment was ADOPTED. The question then being on Mr. Price's amendment as amended, the same was ADOPTED. Finally, the motion as amended was ADOPTED. Messrs. Gant, Holladay, McConaghy and Miller requested to be recorded as voting opposed.

77) On motion of Mr. Cotterell, seconded by Mr. McConaghy, VOTED to remove from the table the motion concerning proposals for the adoption of new titles in the series of books published by the League. Moved, by Mr. Cotterell, seconded by Mr. McConaghy, that the motion is amended by striking the text and substituting therefor the following: Moved, that the format of new ARRL publications and contemplated changes in format of existing publications be routinely reviewed by the Membership Affairs Committee. After further discussion, the amendment was ADOPTED. The question then being on the motion as amended, the same was ADOPTED.

78) On motion of Mr. Cotterell, seconded by Mr. McConaghy, VOTED to lift from the table the motion concerning mailing permits. Moved by Mr. Gant, seconded by Mr. McConaghy, to amend the motion by striking the text and substituting therefor the following: Moved, that since the ARRL Director in each Division is the official elected agent on policy matters, any nonprofit mailing permit in the name of the American Radio Relay League shall be applied for and issued to only the Division Director or his designee according to U.S. Postal policy. Moved by Mr. Wicker to further amend the motion by including therein reference to Section Communications Managers; but there was no second, so the motion was LOST. The question being on Mr. Gant's amendment, the same was ADOPTED. Thereupon, the motion as amended was ADOPTED.

79) On motion of Mr. Price, seconded by Mr. Cotterell, unanimously VOTED the approval of the following ARRL Conventions to be held in the Southeastern Division during 1979: South Florida Section ARRL Convention, January 27-28, 1979, Miami, Florida, sponsored by the Dade Radio Club; Southeastern Division Convention, March 2, 3, 4, 1979, Orlando, Florida, sponsored by the Orlando Amateur Radio Club; Florida State ARRL Convention, November 17-18, 1979, Clearwater, Florida, sponsored by the Gulf Coast Council of Amateur Radio Clubs. Mr. Chapman left the meeting at 4:31 P.M.

80) On motion of Mr. Gant, seconded by Mr. McConaghy, VOTED to remove from the table the mo-

tion concerning the Headquarters Contest and Awards Committee. Moved by Mr. Gant, seconded by Mr. Stevens, that the question now be considered; but the motion was LOST. On motion of Mr. Egbert, seconded by Mr. Anderson, VOTED to amend the motion by deleting everything after the words "ARRL Awards Committee." The question then being on the motion as amended, the same was ADOPTED.

81) On motion of Mr. Stevens, seconded by Mr. Gant, after discussion, unanimously VOTED to adopt the Membership Affairs Committee recommendation that when a contest operator has been erroneously disqualified, a correction shall be published in the earliest available issue of QST, and, wherever possible, shall be repeated with the announcement of the following year's contest. During the course of the above, the Board was in recess from 5:13 to 5:26 P.M.

82) Moved by Mr. McConaghy, seconded by Mr. Stevens, that Article 4 is amended by the deletion of the first three sentences and the replacement with the following: "The affairs of the corporation shall be governed by a Board consisting of sixteen directors who shall be elected for terms of four years by the members eligible to vote. Four directors shall be elected each year by mail vote in accordance with the rules and regulations prescribed by the Board of Directors in the Bylaws." After discussion, on motion of Mr. Holladay, seconded by Mr. Price, unanimously VOTED that the matter is referred to the Membership Affairs Committee for study.

83) Moved by Mr. Miller, seconded by Mr. McConaghy, that a column in QST be established where original and specialized communication techniques are reported and described. This column would report developments on a month to month basis. Relative priorities would be determined by editors of QST. But, after discussion, the motion was LOST.

84) Moved by Mr. Miller, seconded by Mr. McConaghy, that all references to women in QST be referred to as "YL" instead of "XYL." But the motion was LOST.

85) On motion of Mr. Arnold, seconded by Mr. Price, the following resolution was unanimously ADOPTED: WHEREAS, Louis Muhleisen, Jr., KSLM, has recently completed a full term as Chairman of the DX Advisory Committee, and WHEREAS, Louis Muhleisen, Jr., KSLM, during that chairmanship, has voluntarily expended a large portion of his own time, his own finances and his own ability in the pursuance of the efficient and successful operation of the DXAC, BE IT RESOLVED, that the Board of Directors of the ARRL assembled at Hartford, CT on July 21, 1978, hereby commends Louis Muhleisen, Jr., KSLM, and extends its sincere appreciation for his personal dedication.

86) Moved by Mr. Egbert, seconded by Mr. McConaghy, that nonprofit mailing permits issued to Division Directors in the name of ARRL may, with the approval of the Division Director, be used for mailings of campaign material provided that, if any candidate for a given office be afforded this opportunity, all candidates for that office be given the same opportunity. After discussion, on motion of Mr. Clark, seconded by Mr. Zak, VOTED that the matter is referred to the Membership Affairs Committee for study.

87) On motion of Mr. Grauer, seconded by Mr. Sullivan, unanimously VOTED that in order to further the purposes and functions of the League as a nonprofit educational and scientific organization, the General Manager is directed to study the feasibility of contributing to technical schools, radio societies and the like any remaining unsold copies of League books when they are replaced by a new edition.

88) On motion of Mr. Sullivan, seconded by Mr. Wicker, unanimously VOTED that the Board of Directors of the American Radio Relay League set aside an appropriate time at each meeting to observe a moment of silence and recollection for those amateurs that have joined the ranks of the Silent Keys as well as for those amateurs who are suffering the pain and discomfort of illness.

89) The Board was in recess for dinner from 6:32 to 7:59 P.M., reconvening with all attendees present except Messrs. Chapman, Goldstone and Huntoon.

90) On motion of Mr. Thurston, seconded by Mr. Holladay, the following resolution was unanimously ADOPTED: WHEREAS, John Russell Griggs, W6KW, has served as Director of the American Radio Relay League, incorporated, from the Southwestern Division for more than seventeen years, exhibiting devotion to duty, intelligence and tenacity in reflecting the will of his constituents, and WHEREAS, for an additional eleven years he served as a volunteer assistant to the elected Director in the Southwestern Division, and WHEREAS, he was five times elected by his peers on the Board of Directors to serve on the Executive Committee of the League, and WHEREAS, he was Liaison Director for the VHF Repeater Advisory Committee from 1968 through 1972 and first Liaison Director of the VHF/UHF Advisory Committee, and

WHEREAS, he served with distinction as an officer of the San Diego Amateur Radio Club, the San Diego Council of Radio Clubs, the Southern California Chapter, Quarter Century Wireless Association, and the Inglewood Amateur Radio Club, and WHEREAS, he is a Charter Life member of the League, now therefore, BE IT RESOLVED, the Board of Directors in meeting assembled at Hartford, Connecticut, this twenty-first day of July, 1978, does hereby declare its esteem for JOHN RUSSELL GRIGGS, W6KW; extends its thanks for his untiring devotion to the League; and wishes him prompt recovery from illness.

91) On motion of Mr. Thurston, seconded by Mr. Sullivan, unanimously VOTED that after a review of the Order to be issued by the FCC on Dockets 21116 and 21117 denying the League's petition for reconsideration, the General Counsel file a notice of appeal with the appropriate court if there appears to be a reasonable possibility that a reversal of the FCC's action can be obtained, and to file appropriate briefs.

92) On motion of Mr. Stevens, seconded by Mr. McConaghy, the following resolution was unanimously ADOPTED: WHEREAS, among the skills necessary to the licensing of Amateur Radio operators is proficiency in the International Morse Code, and WHEREAS, that proficiency can be attained and developed only through regular and frequent practice, and WHEREAS, this practice is most realistic when the International Morse Code transmission is actually over the air, and WHEREAS, the ARRL Code Proficiency program needs the assistance of volunteer Amateur Radio operators and their stations in many parts of the country to supplement transmissions from the Hiram Percy Maxim Memorial Station, and WHEREAS, for a great many years regular, frequent code practice has been offered to West Coast students over the air by Donald Johnson, W6QIE, at his own expense of time and material in a spirit of public service, now, therefore, BE IT RESOLVED, by the Board of Directors of the American Radio Relay League, incorporated, in meeting assembled at Hartford, Connecticut, this twenty-first day of July, 1978, that it extends hearty thanks and a warm "well done" to DONALD JOHNSON, W6QIE, for his unstinting service to his fellow amateurs and the American Radio Relay League.

93) On motion of Mr. Stevens, seconded by Mr. McConaghy, the following resolution was unanimously ADOPTED: WHEREAS, a knowledge of the International Morse Code is a necessary ingredient in the licensing of Amateur radio operators, and WHEREAS, skill in receiving the International Morse Code is a matter of pride among Radio Amateurs, and WHEREAS, the program of the American Radio Relay League to test the International Morse Code skills of its members each month would be incomplete without a West Coast Qualifying Run, and WHEREAS, Forrest A. Bartlett, W6OWP, has been since 1948 the principal provider of the monthly West Coast Qualifying Run, and WHEREAS, he has established, maintained and operated the necessary Amateur Radio equipment for this purpose from his own resources as a voluntary activity, now, therefore, BE IT RESOLVED, by the Board of Directors of the American Radio Relay League, incorporated, in meeting assembled at Hartford, Connecticut, this twenty-first day of July, 1978, that it does warmly thank and heartily commend FORREST A. BARTLETT, W6OWP, for his tireless devotion to the cause of Amateur Radio and to the work of the American Radio Relay League.

94) On motion of Mr. Wicker, seconded by Mr. Zak, unanimously VOTED that Standing Instruction No. 67 is modified to provide that Vice Directors are authorized to attend two Board Meetings per term of office. Their attendance will be subject to approval by the Division Director and expenses will be chargeable to the Division allotment.

95) On motion of Mr. Price, seconded by Mr. Wicker, after discussion, unanimously VOTED that the 1979 Annual Meeting of the Board shall be held in Miami, Florida, on January 24-25, 1979, just prior to the Tropical Homboree.

96) On motion of Mr. Clark, seconded by Mr. Holladay, unanimously VOTED that Rule 4 of the Rules and Regulations concerning Advisory Committees be changed to remove the final sentence and replace it with the following: "Members may be reappointed by the President for one or more additional terms. Members may be terminated by the President prior to the expiration of their term when circumstances warrant."

97) There followed informal remarks by all members of the assembly. There being no further business, on motion of Mr. Thurston, seconded by Mr. Zak, the Board adjourned, sine die at 9:53 P.M. Total time in session as a Board 19 hours 11 minutes. Respectfully submitted, Richard L. Baldwin, W1RU Secretary

Amateurs Lose on Reconsideration of 10-Meter Amplifier Ban

As reported in this column in June, the League and several other parties filed petitions for reconsideration of the Federal Communications Commission's recent action to ban the commercial manufacture and marketing of external radio frequency power amplifiers capable of operation between 24 and 35 MHz. Those filing petitions (other than the ARRL) include Heath Company; R. L. Drake Co.; American Radio Council; W. F. Kruper, WB0PRE; R. J. Stanek, W0HAH; Richard E. Perkins, N1RP and Ronald A. Reed, W6ODX. The Commission met June 28, 1978, to act on these petitions for reconsideration.

With the exception of the approval of a minor change in wording to clarify the meaning of "capable of operation below 144 MHz," the petitions for reconsideration were denied. Of the three Commission Bureaus that made presentations to the Commissioners that day, two were in favor of dropping the 10-meter amplifier ban as requested by the petitioners. So substantial was the staff's support of the petitions that one nationally read magazine

reported in its next edition that the amplifier ban had been dropped! Unfortunately, such was not the case, as the Commissioners had voted to uphold the ban.

C. Phyll Horne, chief of the Commission's Field Operations Bureau, argued in support of the ban, saying that its adoption had been a good decision, that ample time had been allowed for interested parties to make known their views, and that the ban had been successful in ridding the marketplace of amplifiers capable of being illegally used in the CB service. Raymond E. Spence, chief engineer of the Commission, agreed with Horne that the FCC had been successful in removing these amplifiers from the marketplace, but stated that this success was not because of the ban, but because of the Commission's rigid type-acceptance specifications adopted at the same time. He said that the type-acceptance program alone was adequate to keep these amplifiers out of the hands of those who would use them illegally. Carlos V. Roberts, chief of the Safety and Special Radio Services Bureau, in a rever-

sal of the Bureau's previous position, presented arguments opposed to the continuation of the ban. Roberts said that the Bureau had changed its stand based on new evidence that had come to its attention since last February when the ban was originally adopted. He said that the petitions for reconsideration presented data which demonstrated that Amateur Radio manufacturers would suffer significant financial harm from the ban. He also said that the new forfeiture legislation recently passed by Congress, which empowers the FCC to directly fine unlicensed individuals who violate its rules, gave the Commission new clout that it lacked earlier.

Commissioner White reiterated her earlier opinion (see May 1978 *QST*, page 46) that the ban was regulatory overkill for cosmetic purposes. — *Hal Steinman, K1FHN*

[Editor's Note: At the ARRL Board Meeting, July 20-21, 1978, the directors voted to file Notice of Appeal with the Federal Court system, if it appears after study there is any possibility of reversal. See Minute 91 in "Moved and Seconded," elsewhere in this issue.]

NEEDED: ADVISORS TO THE ARRL BOARD OF DIRECTORS

Are you active in and familiar with the specialty areas of DX, contests, emergency preparedness, vhf repeaters or the multimode world of vhf/uhf/shf? If you are, perhaps you belong on one of ARRL's advisory committees, which provide membership input and expertise to the Board of Directors and Headquarters on issues involving these interests.

Nominations are open for the five advisory committees. Eleven members serve on each one, representing the 10 U.S. call areas plus Canada. Terms are normally for two years. Later this autumn, President Dannals will pick replacements for members whose terms are expiring; he also has the option of reappointing a member for one additional term. The applications of those not chosen this time remain on file, to serve as a bank from which to fill vacancies as they occur. Nomination forms, available from Hq., should be signed by three Full Members of the League.

Each candidate should have been a member of the League for the past two years, licensed as a Technician or higher for the past three years and should be currently active and knowledgeable in the field in which the committee operates. The complete rules governing the advisory committees are found in the same pamphlet with the Articles of Association and Bylaws of the League. (Copy available upon request, accompanied by a self-addressed stamped envelope.)

In addition to the 11 members of each committee, a Board member and a staff member

also serve as liaisons. See Table I for a list of current advisory committee members. — *Perry Williams, W1UED*

COMMUNICATIONS ACT OF 1978

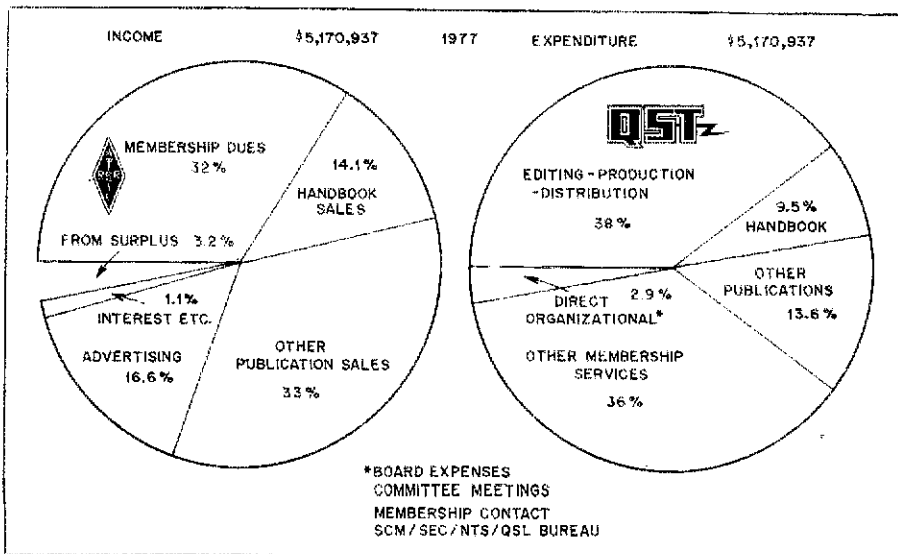
House Communications Subcommittee Chairman Lionel Van Deerlin and Representative Louis Frey, Jr., ranking minority member of that subcommittee, have introduced in the House of Representatives a proposed rewrite of the Communications Act of 1934, the law which forms the basic framework for U.S. communications policy, and which authorizes the FCC to regulate the communications field.

The proposed rewrite has been dubbed the "Communications Act of 1978."

One provision of the rewrite would be to abolish the FCC in favor of a new "Communications Regulatory Commission" which would regulate the communications field "to the extent marketplace forces are deficient." This commission would be comprised of five commissioners appointed for 10-year terms in lieu of the FCC's seven commissioners appointed for seven-year terms.

Other provisions of the rewrite would allow for the use of volunteers to assist the CRC in the fulfillment of its functions, and would

ARRL expenses and revenues, 1977.



*Membership Services Assistant, ARRL

Table 1

League Advisory Committees and Their Members for 1978

DX Advisory Committee

Anthony C. Berg, W1OT, 11 Vanderbilt Rd., Acton, MA 01720.
Allen T. Clark, W7YTN, 2216 S. 120th St., Seattle, WA 98168.
James A. Douglas, W3ZN, 22432 Goshen School Rd., Gaithersburg, MD 20760.
John C. Kanode, N4MM, RFD 1, Box 73-A, Boyce, VA 22620.
Daryl H. Kiebler, WB8EUN, 517 Farmstead La., Lansing, MI 48917.
Robert C. Locher, Jr., W9KNI, chairman, 1145 Osterman, Deerfield, IL 60015.
Board Liaison — Gay E. Milius, W4UG, P. O. Box 62484, 524 Independence Blvd., Virginia Beach, VA 23462.
Louis A. Muhleisen Jr., K5LM, Box 73, Metairie, LA 70004.
Harold E. Parsons, VE3QA, RR 3, Metcalfe, ON, Canada K0A 2P0.
James T. Rafferty, N6RJ, 178 Paseo Robles, Anaheim, CA 92807.
Robert C. Scully, W2XN, 179 Kendall Blvd., Oaklyn, NJ 08107.
Robert W. Wood, W0UD, 1012 E. Main St., Vermillion, SD 57069.
Hq. Liaison — Don Search, W3AZD.

Emergency Communications Advisory Committee

Board Liaison — Max Arnold, W4WHN, 612 Hogan Rd., Nashville, TN 37220.
James P. Collinsworth, N2JC, 1040 W. Walworth Rd., Macedon, NY 14502.
Monte "Bud" Cone, WA4PGB, 317 Van Buren St., Falls Church, VA 22046.
Bob Josuweit, WA3PZO, 9 Derwen Dr., Haver-town, PA 19083.
Harry E. Legler, W0PB, 304 Miami St., Hiawatha, KS 66434.
W. H. Parker, VE5CU, 214 McMaster Crescent, Saskatoon, SK, Canada S7H 4E3.
William A. Sencabaugh, K1UAQ, 120 Middlesex Ave., Reading, MA 01867.
Arthur R. Smith, W6INI, chairman, 4515 Melissa Way, San Diego, CA 92117.
Everett R. Snider, W7DO, 300 Abbot, Richland, WA 99352.
H. O. Townsend, WA5MLT, 2346 Louise La., Norman, OK 73031.
Bruce B. Woodward, W9UMH, 6208 Bramshaw Rd., Indianapolis, IN 46220.
Hq. Liaison — Robert J. Halprin, K1XA.

Contest Advisory Committee

Mike Badolato, W5MYA, 2 Country Pl., Bedford, TX 76201.
Kenneth M. Bolin, W1NG, chairman, 21 Pleasant Rise Cir., Brookfield, CT 06804.
Robert D. Epstein, K8IA, 21820 Ridgedale Ave., Oak Park, MI 48237.
Richard W. Guy, VE7TT, 6812 Dunnedin St., Burnaby, BC, Canada V5B 1Z2.
Dennis G. McAlpine, W2FVS, 901 Lexington Ave., New York, NY 10021.
Fred A. Minnis, K0MM, RFD 3, Box 273, Clinton, IA 52732.

Fredrick D. Niswander, K7GM, 950 S. Terrace, C-150, Tempe, AZ 85281.
William Olson, W3HQT, RD1 Box 163, Ottsville, PA 18942.
Wayne E. Overbeck, N6NB, 5113 Whitecap St., Oxnard Shores, CA 93030.
Victor A. Shields, K9UIY, 1909 W. Revere St., Freeport, IL 61032.
Melvin F. Wardell, K4PJ, 720 W. Vanderbilt Dr., Oak Ridge, TN 37630.
Board Liaison — Stan Zak, K2SJO, 13 Jennifer La., Port Chester, NY 10573.
Hq. Liaison — Tom Frenaye, K1KI.

VHF Repeater Advisory Committee

Whitman E. Brown, WB0CJX, Box 623, Steamboat Springs, CO 80477.
Lewis D. Collins, W1GXT, chairman, 10 Marshall Ter., Wayland, MA 01778.
Charles Durst, WA4WTX, 4407 Sunny Ct., Durham, NC 27705.
Jack D. Forbing, K9LSB, 1416 Lakewood Dr., Ft. Wayne, IN 46819.
Clay Freinwald, K7CR, 8515 Idelwood Dr., SW, Tacoma, WA 98498.
Charles Harrison, K2MZ, MR 179, Oyster Bay, NY 11771.
Jerome H. Horwitz, N3AA, 14413 Ansted Rd., Silver Spring, MD 20904.
Joe Jarrett, K5FOG, 618 Raintree Ct., Arlington, TX 76012.
Gordon Schlesinger, WA6LBV, 5364 Saxon St., San Diego, CA 92115.
Richmond B. Shreve, W8GRG, 2842 Winthrop Rd., Shaker Heights, OH 44120.
Board Liaison — Carl L. Smith, W0BWJ, 1070 Locust St., Denver, CO 80220.
A. K. Thurber, VE1AKT, 365 Southampton Dr., Fredericton, NB, Canada E3B 4T5.
Hq. Liaison — Jim La Porta, N1CC.

VHF/UHF Advisory Committee

Roy L. Albright, W5EYB/N5RA, 107 Rosemary, San Antonio, TX 78227.
Louis N. Anclaux, WB6NMT, P. O. Box 82183, San Diego, CA 92138.
John C. Fox, W0LER, 321 — 109th La., NW, Minneapolis, MN 55433.
Board Liaison — Jay Holladay, W6EJJ, 5128 Jessen Dr., LaCanada, CA 90731.
Ted E. Hartson, WA8ULG, 2444 W. Halbert Rd., Battle Creek, MI 49017.
Richard T. Knadle, Jr., K2RIW, 316 Vanderbilt Pkwy., Dix Hills, NY 11746.
Stuart G. Mitchell, WA0DYJ/4, 14761 Dodson St., Woodbridge, VA 22193.
Joe Reisert, W1JR, chairman, 17 Mansfield Dr., Chelmsford, MA 01824.
Don Roberts, W7FN, 6105 — 92nd Ave., SE, Mercer Island, WA 98040.
Anthony F. Souza, W3HMU, P. O. Box 169, Ottsville, PA 18942.
Jack Spencer, W9YF, RR 1, Box 60, Minooka, IL 60447.
J. Leslie Weir, VE3AIB, 42 Cobham Crescent, Toronto, ON, Canada M4A 1V6.
Hq. Liaison — Jim Kearman, W1XZ.



Ron Hesler, VE1SH

BEHIND THE DIAMOND

The flags of Canada and the United States fly together in front of the Headquarters building as a reminder that the ARRL is a bi-national organization. The Canadian Radio Relay League, also known as the Canadian Division, is the organization which represents League members "north of the border." Its Director, Ron Hesler, VE1SH, is this month's Behind the Diamond personality.

Hesler was born in Montreal, PQ, but moved to Sackville, NB, at the age of three. He attended local schools until 1938 when he was accepted to the Valley Forge Military Academy in Wayne, PA. Returning to Canada in 1940, he continued his education at Mount Allison University in Sackville. World War II interrupted Ron's educational pursuits, however. "By virtue of graduating from Valley Forge, I was a 2nd Lieutenant in the U.S. Cavalry despite my remaining a Canadian citizen," he explained. "Eventually, the U.S. War Department and the Canadian Army agreed I should be an officer in the Canadian service." Ron initially served with the artillery, transferring later to the R.C.E.M.E. (Royal Canadian Electrical and Mechanical Engineers). At war's end, he went into the advertising business, retiring at age 46 as executive vice president of a national advertising agency in Canada.

His retirement meant more free time, of course, and he turned much of his attention to his new "career" with the ARRL. In 1974, Hesler was appointed both SEC for the Maritime-Newfoundland Section and assistant director. In 1975, Ron was appointed vice director, and in 1976, he became director. The following January, the Board elected Ron to the Executive Committee, a responsibility often keyed to seniority on the Board. For a time, Ron was the youngest radio amateur in Canada starting with VE1KS in 1937. He was also licensed as VE2QF, receiving VE1SH when he returned to New Brunswick (his wife Donna is active, too, as VE1YX). Other hobbies include flying a Cessna 310 and photography. (He takes pictures both professionally and for fun.) Ron is a member of Lebanon Lodge no. 28 F. & A.M. in Sackville and Luxor Sphinx Temple in St. John. — Mark Starin, WA1TZK

create a "spectrum use fee," by which users of the radio frequency spectrum would be charged according to the "scarcity value" of the spectrum occupied. It is not clear how this would apply to amateur radio.

The League will maintain a constant vigil as this proposed legislation proceeds through the hearing stage, and will be invited to appear before the Communications Subcommittee on behalf of the interests of the Amateur Radio Service. — Hal Steinman, K1FFH

FCC EMPLOYEES UNIONIZE

On June 27, FCC employees voted by a greater than two-to-one margin to unionize. In an election supervised by the Department of Labor, the National Treasury Employees Union won the right to represent all nonsupervisory personnel at the Commission. One source indicated that a major impetus of the move toward unionization came from a change in the working hours at the Commission.

Let's Stop the Carnival

A few months ago, the CARF general manager addressed a letter to the ARRL president, vis-a-vis the future respective roles of CARF and CRRL in Canada. It contained the request to immediately implement what he alleged to be the League policy commitment to gradually turn over many of the League's representative functions in Canada.

We feel that in order to "clear the air" insofar as the established League policy in Canada is concerned, it is timely to make a few quotes from League President Harry Dannals' recent reply.

"It is doubtful that any statement was made at Kingston [referring to a meeting held, five years ago, between chief officials of both CARF and ARRL — Ed.] that would indicate that CARF would 'undoubtedly come about' as being recognized as the national amateur radio society in Canada . . . There was little doubt in the minds of anyone at Kingston that CARF did not then, nor does it appear today, have the resources to fully undertake the responsibilities of a national society as encompassing as ARRL. It was agreed, however, that certain of CARF's positive points could be mutually beneficial and would provide the amateurs of Canada with very much needed timely news-carrying facilities. This point specifically related to CARF's bulletin service which carried a shorter lead time than QST and

would certainly provide in-depth coverage of amateur radio news specifically concerning Canada.

" . . . there never was the concept entertained of a 'gradual turn-over of responsibilities as CARF's strength and resources developed.' . . . What was indicated at Kingston very clearly and emphatically was that a greater cooperation should be undertaken for the welfare of the individual Canadian radio amateur. This cooperation has never materialized.

"And, therein, Art, lies the key to the whole discussion at Kingston . . . the welfare of the Canadian radio amateur. The ARRL exists for the basic purposes of service to its members and the protection of the future of amateur radio. When one traces the history of the ARRL in Canada, it is noted that that was the basic idea behind the mutual crossing of the border. To provide a continuity of communications and extension of ties of amateur radio across a border that has never really been a border or barrier in the many years of friendly cooperation between our respective nations.

"As you most certainly recall, I have steadfastly continued the policy of nonintervention in Canadian amateur radio affairs insofar as possible. While a number of aspects of the CARF/ARRL (CRRL) relationship throughout the years have given me much personal

concern about the impact on the individual radio amateurs in Canada, I still think that the appropriate Canadian liaison lies within the office of the ARRL (CRRL) director.

" . . . you can see that your final request for 'positive action on these statements, requests and agreements' clearly cannot be met because there is a sincere and honest disagreement in several areas. I can assure you that I stand ready and willing to work with any group of interested parties who have the future well-being of amateur radio firmly in mind . . . I truly hope that it is possible for the leadership of CARF and CRRL to cement their relationships to the point where Canadian amateur radio is united and fully represented before your Department of Communications with the best interests of the individual radio amateur always at heart."

The CRRL feels that there is room and perhaps even a constructive purpose (i.e., the two-party system) for the continued existence of the two societies in Canada; provided, of course, that there can be a harmonious working relationship between the two organizations. We would like to herewith make a plea, to the officials and membership of both societies, to sincerely work toward this purpose and — stop the carnival — as to which one is largest or best and/or which one may wish to obtain or inveigle from the other, etc., etc.

EXPERIMENTER LICENSE POLL RESULTS

Following are the results of the recent CRRL opinion poll, conducted with reference to 16,000 Canadian amateurs. Unfortunately, the late delivery by the post office which resulted in many not receiving the questionnaire until after the closing date specified, certainly militated against a much greater return. As it was, however, we did receive a 10-percent return as follows.

In favor of license class — yes, 36.89 percent; no, 62.35 percent. Agree with pulse on 2 meters — yes, 3.24 percent; no, 96.75 percent. Packet radio only on 220 MHz — yes, 2.50 percent; no, 97.49 percent. Novice license — yes, 62.47 percent; no, 37.10 percent.

ARRL TRAINING COURSES FOR NEW AMATEURS


The ARRL Club and Training Department publishes, six times a year, a most informative Instructors Newsletter for the express purpose of distributing news and teaching information of interest to the amateur radio instructor. Although most of the ARRL training material currently produced is oriented toward the FCC amateur license requirements, Canadian instructors will find it extremely useful *in all respects*, other than the respective regulations. It is suggested that all Canadian course instruc-

tors register their names with the ARRL Club and Training Department in order that they may receive all the information as published.

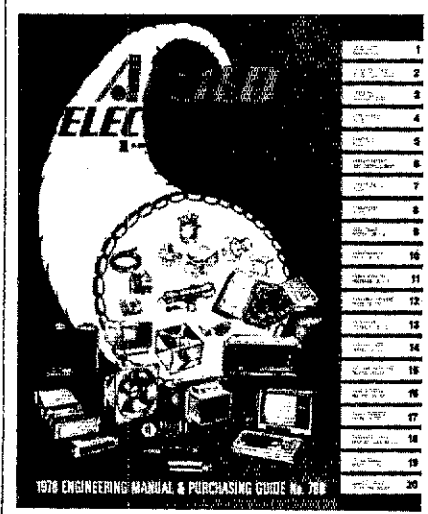
VISIT OF FRENCH AMATEURS TO CANADA

This past summer a study tour of a group of French radio amateurs was made to Canada under the auspices of the national society of France, the Reseau des Emetteurs Francais. The CRRL cooperated with the REF in making arrangements and recently received the following communication from the president of REF: "Thank you for your letter relating to temporary licenses for a number of French radio amateurs on a study tour of Quebec. We would hope in return to greet a Canadian delegation in France thus affording all these young people an opportunity to better know France and Canada. It would prove once again the Franco-Canadian good relationship reality."

NEW RADIO SPOTS AVAILABLE

A new series of public service radio announcements have recently been recorded for CRRL, by Canada's own Lorne Green of "Bonanza" fame. Tape copies are now available to anyone who might get them aired over local radio stations. Lorne Green now joins Dick Van Dyke, Bob Hope and Edgar Bergen, all of whom have recorded PSAs for CRRL, promoting amateur radio. The tapes are still available upon request to CRRL headquarters. 

Strays



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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Looking for parts? Allied Electronics has informed the Technical Department at Hq. that the 1978 *Engineering Manual and Purchasing Guide* is available free to QST readers. Send your name and address to Allied Electronics, Dept. QST, 401 East 8th St., Fort Worth, TX 76102. This 236-page volume sells for \$1 in Allied retail outlets. — K1TX

*Director, Canadian Division

Correspondence

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

A GOOD HOBBY

□ What is amateur radio? Can you really say that it's snagging rare DX, logging contacts in a contest, working low power? True, these things are part of amateur radio but are they really what it is? What keeps it alive and exciting? What keeps you awake while the world is asleep? It's the knowledge that you can do it that keeps you going; it's the skill involved that makes it exciting. We are the ones who discovered and pioneered radio and we should be proud of it. When I had my first contact as a Novice it was a unique thrill of accomplishment. As another correspondent said, "When I first found out I was WB7QNI, a thrill enveloped me that has never left. If I give up this call there will always be something missing." The correspondent also said, "There is no substitute for time-seasoned experience." I agree. There are certain things which symbolize experience to an amateur. For me, it's a straight key with a good fist or a die-hard cw operator. I hope all amateurs feel the way I do about our hobby. It's a good one. Let's keep it that way. — James Li, WB7QNI, Seattle, WA

□ I was appalled and distressed recently at the behavior of hams during the Clipperton Island DX-pedition. I was most ashamed of the U.S. hams who operated out of band, used abusive language, and generally acted like children. Is this any way to impress the ITU for the upcoming WARC? I heard hams in this country criticizing other U.S. hams for being out of band. What were they themselves doing there? I've tried not to be one of those self-appointed "policemen" who live to report infractions, but this fiasco, together with unhappy memories of the Mariposa Incident at Christmas a few years ago, just might change my mind. — Louis Bohorfoush, WB4CXD, Birmingham, AL

□ It seems to me that as amateur radio operators we are constantly having to "keep our ducks up" in order to maintain the high standards of the service. If worse comes to worse, I guess most of us would die to keep amateur radio alive. — Matthew Moody, WD5FXK, Palms, CA

□ Suffolk County Radio Club take a bow. I would like to thank you for having arranged the FCC exams given at the State University at Stony Brook, NY. Over 400 hams showed up to take over 600 exams. How the club members were able to coordinate such a large group was really amazing. Talk about the ham spirit! Everybody was businesslike, friendly and helpful. There were lots of friendly bodies around to answer the million-and-one questions asked by us nervous Novices. I hope I can reciprocate some day. — Ralph Freda, WA2QDT, Valley Stream, NY

□ I'm not a new member, just one who came back after 20 years. I got disgusted with QST after 1957 because most of the articles were too technical for the average ham. QST is not as technical now. Many new hams are CB operators who have learned the code. That is why I'm writing. Many old operators have gone to transceivers which are expensive CB rigs in my book. Many new hams do not touch the dials after a CQ, and, if you are not zero beat they turn on the automatic keyer for another 60-second CQ. This makes for a lot of QRM. I have two suggestions. I have been running a test on CQs and find that I get more QSOs on shorter CQs. Also, check for a clear spot before starting to send. — Karl Mayo, W6VAQ, Long Beach, CA

□ During the 23 years that I have been a ham I've spent more time listening than transmitting. It's like the slot machine at Vegas: Did I hit the jackpot with long distance? Maybe it's a ship at sea? Or a guy in the old hometown? Lots of fun but nowadays too many hams seem secretive about their QTH. Let's get back to the old correct way. It only takes a few minutes and it sure makes listening a lot more fun. — James Mansfield, W6RWU, Florence, OR

UNFAIR

□ The FCC Part 97 Rules are good rules except for one which states "A voluntary examiner must have a General class (or above) license, and he or she must be 18 years or older." This seems very unfair. I hold an Advanced class license but cannot give an exam because I am only 15 years old. Why can't we give amateur exams? Are we dishonest or incompetent because we are under 18? If the FCC exempted women or an ethnic group for the same type of reasons they exempt us I'm sure they would never hear the end of it. The FCC should encourage not discourage younger hams. — Steven Webster, WA1ZGR, Cape Elizabeth, ME

[Editor's Note: Don't take it personally, Steven. The restriction is based on the question of "legal age" for the signing of documents and so on — no lack of confidence by FCC was intended!]

IMRA TRAFFIC

□ I wish to officially congratulate ARRL for the articles with the guidelines published in QST (August 1977 and February 1978) regarding third-party traffic. We are in complete accord with all you say and thank you for alerting us to international operation and the rights of fellow hams on nets. Please continue to educate us in this regard. We are doing our best to alert all our IMRA members to the seriousness of observing this regulation. Our net manager has instructed the net controls to announce the following: "Net participants are asked to make sure that all third-party traffic complies with the limitations of FCC regulations, paragraph 91.114." We will always pledge our support of the ethics of amateur radio on our International Mission Radio Association Net. — Br. Bernard Frey, WA2IPM, Interlaken, NY

PHONE PATCH RAISES MORALE

□ It is with great personal pleasure that I send you this letter to express my appreciation to Stella McPherson, WA4WPN, for the considerable amount of time and effort contributed in placing phone patches on behalf of my crew. The volunteering of time, expertise and equipment was a significant factor in the high morale of my crew during our recent long and arduous deployment. It is heartwarming to know that in this fast-paced world there are people like her who will use their valuable time for such a humanitarian effort. Rest assured that this effort has been much appreciated by the crew of La Moure County. — E. L. Schneider, Commander U.S. Navy

ONLY THE PONTIFICATED HAVE WISDOM

□ As a school district administrator I wish to express to you how much I enjoyed your editorial, "The Fox Control Committee Boo-Boos" (QST, May, 1978). While your editorial no doubt was directed at the Federal Communications Commission, I believe you have eloquently characterized so many agencies or commissions, both federal and state, who, without thinking, meddle in the affairs of the wrong people. I'm sure it is done in the belief they are making things better. However, this is not always the case. I'm beginning to believe that only the pontificated have wisdom. I wish to share this editorial with my fellow administrators. — James Constantine, Knox Memorial Central School District, Russell, NY

THE DEALER'S OBLIGATION

□ A 90-day delay in receiving merchandise ordered from an electronics dealer has prompted me to write this letter. Just where does the dealer's obligation to the consumer begin and where does it end? In my opinion, one obligation the dealer owes the consumer

is to have the product on the shelf ready for delivery before advertising it for sale in an internationally distributed magazine. After this experience, I'll spend a few more of those hard-earned dollars for a phone call to the dealer to see if he actually does have in his stockroom, those items he is advertising. — Charles Watts, WB4VKT, Florence, SC

THE CALL-SIGN DILEMMA

□ When the Extra Class subbands were set up I was careful not to venture into them since to do so would destroy my moral right to feel that CB violators should be skinned alive. I felt that as a more or less old-timer I should somehow be "grandfathered" into Extra Class. When that failed to materialize I went to the FCC and passed the Extra Class test. Now, I had to decide whether or not to change my call sign. There was a time when a "one-by-two" was an old-timer, but lately it appears that many of these are "young squirts." In the course of my ham career I have done many interesting things but never as W2WHB. My call was not one of the famous ones so I decided to go ahead and change it. Lo and behold, K2VX came back. The FCC had been nice since VX has just the sort of "swing" I like on cw and has the "punch" needed for phone. At first I was elated. Then dismayed. I got on the air and felt like an imposter. I had a call-letter plaque on top of my rig which had been given to me at the 1949 ARRL Hudson Division Convention. It said W2WHB. I would say, "This is K2VX" and W2WHB would stare at me reproachfully like an abandoned teddy bear. I moved it to a place where it wouldn't look at me. I have abandoned my past. Like Christopher Robin, I have left what had once been the magic forest. — David Wiesen, K2VX, Newark, NJ

THE PAST REVISITED

□ When my son John, WA2VPK, received his Novice call sign he immediately ran to the shack. I tuned up the rig in the Novice band and his first contact was K2TV. In the shack with us was Harry, K2AAN. The interesting part of this is that K2AAN instructed me for my Novice license about 20 years ago: K2TV came to me years ago and I gave him his Novice examination. K2TV was also teaching my son the theory necessary for his General. — Lester Kahan, K2ENC, Babylon, NY

RIDICULOUS TRAP

□ I write this in an effort to help others avoid the ridiculous trap in which I now suffer. I participated in a Novice class, submitted a Form 610 to Gettysburg and began waiting. Within a couple of weeks I got itchy, went to the district office, and passed my Advanced. When I asked what to do about the written materials for the Novice still en route from Gettysburg I was told to mark them "not taken" and return them. This is what my instructor did. I waited patiently for eight weeks, then called the district office. I was told, "No problem, new calls, etc. Wait for 90 days and call Gettysburg." After 90 days I called Gettysburg (a total of 118 days had now elapsed). This time I found a sympathetic voice who listened. She checked the records and told me the Novice file was not yet closed and the computer will not accept a second input because of the possibility of issuing two station licenses. She agreed to clear the Novice application as "closed" and said she would notify the amateur section so they could begin processing my other application. The sour note is that she further went on to tell me, "You can expect your license in four to six weeks but if you haven't heard by then give us another call." The moral of this story is if you try to move rapidly, make every effort to be sure that the commission and its lovely computer close out each request. — Richard Peterson, K73??, Rockville, MD

We Are Not Alone!

QST is the monthly membership journal of the ARRL. Everyone knows that. But did you also know that it is the official organ of the International Amateur Radio Union (IARU), and is sent to the Union's 101 member-societies around the world every month? Of course, *QST* has a lot of readers from overseas, too — about 7,000 of them.

Unfortunately, far too many amateurs are unaware that there are *more than 50* amateur radio magazines and journals published by amateur societies throughout the world. Each month these publications are read at Headquarters (although we readily admit that for some of the more obscure languages, we just enjoy studying the schematics and pictures!). We look for news of interest to ARRL members and technical breakthroughs, and we try to grasp the general flavor of the situation in each country that publishes an amateur magazine.

Pictured at the bottom of this page are most of these publications. Readers and members who are interested in subscribing to any of them can obtain addresses from the International Services Officer, ARRL Hq., Newington, CT 06111.

KEEPING THE WESTERN HEMISPHERE INFORMED = NO EASY TASK

Pictured elsewhere on this page is a small publication titled *Region 2 News*. It may be

*International Services Officer, ARRL

small physically, (actually, it's 5-1/2 x 8-1/2 inches) but inside are more than 50 pages of articles, news items, photographs, charts, quips and quotes regarding the world of amateur radio in North and South America — otherwise known as ITU Region 2. We told you about *Region 3 News* in a previous column (March 1978 *QST*, page 69).

Region 2 News is published quarterly by a team of volunteers residing in the Washington, DC area. They read all the bulletins of the 28 IARU member-societies in the region, correspond with officers of these societies, solicit news from IARU/ARRL Hq., and contribute material of their own which they feel would interest their readers.

Perhaps the most unique feature of *Region 2 News* is its bilinguality: Each page is written in English and Spanish, including the photo captions. This feature is appreciated by all the member-societies, for the native tongue of most of the societies in Region 2 is, of course, Spanish.

The *News* completed its second full year of publication in May, 1978, and as this is written the team is preparing the ninth issue for distribution at the IARU Region 2 Triennial Conference in Panama, where all the region's societies will meet for the final time before the World Administrative Radio Conference (WARC) convenes in Geneva next year.

W4KFC, OA4AV, YV5BPG, LU2DX, CX1EK and K3ZO compose the editorial staff, led by Managing Editor Pat Morton, LU1BAR. They meet together regularly to translate each page, iron out difficulties, and



proofread the typed copy. Then the material is sent to IARU Hq., where it is printed and mailed to all IARU societies around the world.

Readers of this column who have material they think would interest fellow amateurs in the Western Hemisphere are encouraged to send it to *Region 2 News*, c/o IARU Hq., Box AAA, Newington, CT 06111. QST-1



YL News and Views

Conducted By Louise Moreau,* W3WRE



The Newsletter

That club publication may be a single typed sheet or a multipage bulletin. It may be issued monthly or only sporadically, but it is one of the important parts of a YL club that helps keep the widely distributed membership in touch with each other.

Margot, DK5TT, was the moving spirit behind the German YL publication *DL YL Informationen*. The rapidly growing YL group of Germany was receiving dribbles of publicity in the DARC magazine but never could get a regular space reporting their activities, so Margot went to work with the DL YL club. She became the reporter who found the material, the publisher chasing down printers and photographers, and ended up mailing copies all over the world for ideas and exchange. The German YLs have been very enthusiastic, and the news and pictures of this rapidly growing national club has been of great influence in bringing an increase of interest in amateur radio among the German women.

Lillian Abbott, K8CKI, is in the same category as all our newsletter editors. She is the reporter, printer and mailing department of *The Buckeye Burr*, the only link for a year between the meetings of the Ohio state YL club. The *Burr* includes net changes, news of the members, achievements, new ideas, club activities, and introduces new members. Lillian writes that she often pleads for material for the *Burr* telling the members that the bulletin is really the club on paper reaching the Novice

and Technician members who are unable to join the Buckeye Belle Nets.

When she isn't hunting news and putting the *Burr* together Lillian, OM Jim, K8CKJ and nephew Gene, W8UQU, teach classes in code and theory twice yearly for the Greater Cincinnati Amateur Radio Association with as many as 130 persons in a class.

TOT Topics, the bulletin of the Ontario Trilliums, is published four times a year. Here the information is gleaned from on-the-air contacts with each other, correspondence from the vast membership of Canada's oldest YL club, their work with the White Caners, DX news, nets and net control changes, new regulations, and the assignments in their major activity as the VE3 QSL Bureau. The editor's job has changed hands only three times in the long history of the Trilliums. Thelma, VE3CLT, held it for almost 10 years, planning the makeup and style of *TOT Topics*. She was followed by Barbara, VE3BFN. Shirley, VE3BRE, has just resigned after a year of working with this newsletter, and until a new editor is appointed VE3CLT will handle the next issue.

Whether the newsletter be on the national club level as in Japan, Germany, South Africa, CLARA's *Clarion*, the *YL Harmonics* of YLRL, *Voice of YLISSB*, or the hundreds of local clubs, all are similar in that the gal with the title of editor does everything that the bulletin requires except make the news. To make it a worthwhile publication she is dependent on the membership and their being interested enough to not just want to read about what other members are doing, but, as one

desperate YL editor wrote, "Please gals, tell me about you, your nets, awards and new gear, for your club bulletin is only as interesting as the interest that is shared by the membership."

1978 YL-OM Contest Winners

YL	OM	
DJØNT	Phone Trophy	K4JRB
K5YL	CW Trophy	W5UN
KH6CBT	2nd Worldwide Phone	W9LNQ
K8ONV	3rd Worldwide Phone	AA4FF
K1NEI	2nd Worldwide CW	W7ULC
WA2WHE	3rd Worldwide CW	VE3EMA



Lillian Abbott, K8CKI, 1978 Buckeye Belle president with OM, Jim, K8CKJ. Lillian is the editor of the *Buckeye Burr*, the bulletin of the statewide Ohio YL club. Both she and Jim teach classes in code and theory with dozens of new amateurs to their credit.

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

50 Years Ago

September, 1928

□ On October 1st we are to use official prefixes for the first time — W in the continental U.S., K in possessions. The "ou" (Northamerica-Unitedstates) intermediate is replaced by "de."

□ Ross Hull has enclosed his 171 oscillator in an aluminum shield can and taken other steps to achieve stability required by the new regulations. He shows that 1929 techniques can be used for medium- and high-power also, with a handsome hi-C 204-A unit.

□ But you can't work 'em if you don't hear 'em, so Harold Westman makes a few suggestions to improve receiver performance, particularly for traffic men, with accent on greater bandspread.

□ And terminology is changing also; *QST* presents arguments for replacing wavelength and meters with frequency and kilocycles, easier to compute and to measure.

□ The League has convinced the Department of Commerce to reinstate the Amateur Extra First Grade license, requiring 20 w.p.m. and a tough technical exam.

□ You can easily build a "radiovision" receiver by running your present audio output into a neon bulb back of a scanning disk — but a vague Crazy Kat silhouette is about the best you can expect.

□ The Radio Corporation has brought out the UX860, an 852 with a screen grid, but you can buy one only through the engineering division in New York.

□ 6ANN (same call today) tickles our ribs with a piece about YL trouble.

□ The Government call book is 25¢, but may be discontinued because of meager sales.

25 Years Ago

September, 1953

□ W2QZ uses a pair of 6146s and a good design in a linear amplifier for sideband, which he calls the "little firecracker."

□ That key jack gets much attention this month. W6LNN has a simple modulator whose output can be fed into a cathode keying circuit as an easy way to get on voice. And W2RKB has built a transistor audio oscillator into an oversize key jack so you can get m.c.w. on bands where permitted.

□ Heavy interest in mobile work continues, and *QST* responds. W8AUN uses tuning rods at the base of his whip to adjust frequency with low losses. W2GDW saves dashboard space by mounting only a tuning capacitor and connecting it through coax to the oscillator in the trunk. And if you want to dig deeply into the principles of loading short antennas, VE3BLW tells the story in detail.

□ Conelrad is still with us, and W4BIW describes a unit to monitor key stations automatically for air-raid alerts.

□ Grid-block keying has many advantages in control and adjustment, and W2JXM shows how the system can be used to key an oscillator simultaneously, even without relays.

□ Amateurs performed yeoman service during and after tornadoes which struck Flint, Mich., and Worcester, Mass., with our Emergency Corps the nucleus of organization.

□ There are now 292 volunteer committees assisting the Federal Communications Commission in solving television interference problems. FCC has also come out with a strong statement blaming poor receiver design for problems arising from 21-Mc. amateur operation.

□ The 420-Mc. DX record was broken twice in July. — *W1RW*

Strays

QST congratulates . . .

□ Dave Bell, W6AQ, who won an Emmy recently from the Academy of Television Arts and Sciences as an executive producer of the documentary series on science and health, "Medix." This is the fifth time the series has been honored by ATAS. Dave is producer of the ARRL's "Moving Up to Amateur Radio" and "Ham's Wide World" films, and a *QST* author.

Washington Mailbox

Conducted By Hal Steinman,* K1FHN

FCC Exams

One question often received at FCC offices and ARRL hq. is "Where and when can I take my amateur examination?" This month, instead of the usual question and answer format, we are providing a complete listing of Commission examination points along with times examinations are conducted and months of the year when examinations are administered in cities other than those where FCC offices are located.

Although this information is current as this is written, it would be advisable to verify examination times by phone before visiting an FCC office. Of course, no tests are administered on national holidays. Where additional examination points are listed after the office schedule in most districts, a completed 610 form must be filed during the previous month with the FCC office conducting the examination. Indicate the city and month desired for the examination, and you will be notified when and where to appear.

It is not possible to obtain a Novice class license at an FCC examination point. FCC administers tests only for Technician, General, Advanced and Amateur Extra Class licenses. Novice examinations are conducted by volunteer examiners who must be 18 or older, hold a General or higher class license, and are unrelated to the applicant.

The Radio Amateur's License Manual contains many more details about the examination process. It is available from your favorite dealer, or ARRL hq.

FCC examination points and times follow:

1) Boston, MA 02109; India and State Sts., Wed., 9 A.M., exams with code test; Tues. and Thurs., 9-11 A.M., no code required. Also conducts examinations at Bangor, ME in Feb. and Aug.; Hartford, CT in Jan., Apr., July and Oct.; Portland, ME in May and Nov.; Burlington, VT in Mar. and Sept.

2) New York, NY 10014; 201 Varick St., corner of Houston, Wed., 9 A.M. Also conducts examinations at Albany, NY in Mar., June, Sept. and Dec.

3) Philadelphia, PA 19106; 601 Market St. Without code test, Mon.-Wed., 10-12 A.M.; with code test, Tues.-Wed., 9 A.M.

4) Baltimore, MD 21201; 823 Geo. M. Fallon Federal Bldg., 31 Hopkins Plaza. With code, Mon., 8:30 A.M. Also conducts examinations in Charleston, WV in Mar., June, Sept. and Dec.

5) Norfolk, VA 23502; Military Circle, 370 North Military Highway. Thurs., 9 A.M. Also conducts examinations at Salem, VA in Mar. and Sept.; Wilmington, NC in May and Nov.; Winston-Salem, NC in Feb., Apr., Aug. and Nov.; Charlotte, NC in Jan. and July.

6) Atlanta, GA 30309; 1365 Peachtree St. N.E., Rm. 440. Tues. and Fri., 8:30 A.M.-noon; exams with code test, Fri. only, 8:30 A.M. Also conducts examinations at Birmingham, AL in Mar. and Sept.; Montgomery, AL in June and Dec.; Albany, GA in Feb. and

Aug.; Columbia, SC in May and Nov.; Knoxville, TN in Mar., June, Sept. and Dec.; Memphis, TN in Jan., Apr., July and Oct.; Nashville, TN in Feb., May, Aug. and Nov.

6S) Savannah, GA 31402; Bull and State Sts., P. O. Box 8004. By appointment one week in advance only. Tel. 232-4321, ext. 320.

7) Miami, FL 33130; 51 S.W. First Ave. Exams with code test, Thurs. 9 A.M.; others, Tues. and Wed., 8:15 A.M.-1 P.M. Also conducts examinations at Jacksonville, FL in Apr. and Oct.

7T) Tampa, FL 33602; 809 Barnett Bank Bldg., 1000 Ashley St. By appointment only, made one week in advance. Tel. 228-2872.

8) New Orleans, LA 70130; 600 South St., Rm. 829. With code, Tues. 8 A.M. Not requiring code, Tues. 10 A.M.-noon, Wed. 8 A.M.-noon. Also conducts examinations at Jackson, MS in June and Dec.; Little Rock, AR in Feb., May, Aug. and Nov.; Shreveport, LA in Apr. and Oct.; Mobile, AL in Jan., Apr., July and Oct.

9) Houston, TX 77002; 515 Rusk Ave. Without code, Tues.-Thurs. 8-11:30 A.M. With code, Wed., 8:15 A.M. 20 wpm, 8:45 A.M. 13 wpm, 9:30 A.M. 5 wpm. Also conducts examinations at San Antonio, TX in Feb., May, Aug. and Nov.; Corpus Christi, TX in Mar., June, Sept. and Dec.

9B) Beaumont, TX 77701; Rm. 323, Federal Bldg., 300 Willow St. By appointment only, one week in advance.

10) Dallas, TX 75202; Rm. 13E7, Federal Bldg., 1100 Commerce St. Tues. 8:30 A.M. only. Also conducts examinations at El Paso, TX in June and Dec.; Lubbock, TX in Mar. and Sept.; Oklahoma City in Jan., Apr., July and Oct.; Tulsa in Feb., May, Aug. and Nov.

11) Long Beach, CA 90807; Suite 501, 3700 Long Beach Blvd. With code, Wed., 8 A.M. and noon. Without code, Tues., Wed. and Thurs. 8 A.M.-2 P.M. Also conducts examinations at Bakersfield, CA in May and Nov.; Las Vegas, NV in Jan. and July; Phoenix, AZ in Jan., Apr., July and Oct.; Tucson, AZ in Apr. and Oct.

11SD) La Mesa, CA 92041; 7840 El Cajon Blvd. Without code, Wed. only, by appointment. With code, Fri. only, by appointment. Tel. 293-5478.

12) San Francisco, CA 94111; 555 Battery St. Wed., with code, 8:30 A.M., 20 wpm, 10 A.M. 13 wpm, 11 A.M. 5 wpm. Without code, 8-10 A.M. Wed. only. Also conducts examinations at Fresno, CA in Mar., June, Sept. and Dec.; Reno, NV in Apr. and Oct.

13) Portland, OR 97204; 1782 Federal Office Bldg., 1220 S.W. Third Ave. With code, Fri., 8:45 A.M. Without code, Tues. and Wed., 8:45-noon. Also conducts examinations at Boise, ID in Apr. and Oct.; Pocatello, ID in Nov. and June; Medford, OR in Sept. and May.

14) Seattle, WA 98174; 3256 Federal Office Bldg., 915 Second Ave. Fri., 8:30 A.M. Also conducts examinations in Billings and Helena, MT in Apr. and Oct.; Spokane, WA in Feb.,

May, Aug. and Nov.

15) Denver, CO 80202; Suite 2925, The Executive Tower, 1405 Curtis St. Wed., with code, 9 A.M. Without code, 9 A.M.-1 P.M. Also conducts examinations at Albuquerque, NM in Apr. and Oct.; Rapid City, SD in May and Nov.; Salt Lake City, UT in Mar., June, Sept. and Dec.; Casper, WY in May and Nov.

16) St. Paul, MN 55101; 316 N. Robert St. Fri., 8:45 A.M. Also conducts examinations at Bismarck, ND in Apr. and Oct.; Fargo, ND in June and Dec.; Marquette, MI in May and Nov.; Sioux Falls, SD in Apr. and Oct.; Duluth, MN in Apr. and Oct.

17) Kansas City, MO 64106; 601 E. 12th St., 1703 Federal Bldg. Tues., 9 A.M. Also conducts examinations at Des Moines, IA in Mar., June, Sept. and Dec.; Omaha, NE in Jan., Apr., July and Oct.; St. Louis, MO in Feb., May, Aug. and Nov.; Wichita, KS in Mar. and Sept.

18) Chicago, IL 60604; Rm. 3935, 230 S. Dearborn St. Tues. and Fri., 9 A.M.-5 P.M. Also conducts examinations in Rock Island, IL in Feb., May, Aug. and Nov.; Fort Wayne, IN in Feb., May, Aug. and Nov.; Indianapolis, IN in Jan., Apr., July and Oct.; Louisville, KY in Mar.; June, Sept. and Dec.; Milwaukee, WI in Mar., June, Sept. and Dec.

19) Detroit, MI 48226; 1054 Federal Bldg., 231 W. Lafayette St. Wed. and Fri., 9 A.M. Also conducts examinations in Grand Rapids, MI in Jan., Apr., July and Oct.; Cincinnati, OH in Feb., May, Aug. and Nov.; Cleveland, OH in Mar., June, Sept. and Dec.; Columbus, OH in Jan., Apr., July and Oct.

20) Buffalo, NY 14202; 1307 Federal Bldg., 111 W. Huron St. With code Fri. 9 A.M.; others, 10 A.M. Groups of 10 or more by appointment. Also conducts examinations at Pittsburgh, PA in Feb., May, Aug. and Nov.; Syracuse, NY in Jan., Apr., July and Oct.; Wilkes-Barre, PA in Mar. and Sept.

21) Honolulu, HI 96813; 7304 Prince Jonah Kuhio, Kalaniana'ole Bldg. With code, Wed., 8 A.M. Without code, 1 P.M. Also conducts examinations in Guam, in July, Sept., Nov., Jan., Mar. and May; in Hilo, in Aug., Nov., Feb. and May; Lihue, in Sept., Dec., Mar. and June; in Wailuku, in Aug., Nov., Feb. and May.

22) San Juan, PR 00903; 323 U.S. Post Office and Courthouse, P. O. Box 2987. Without code, Thurs. and Fri. 8:30 A.M. With code test, Fri. 10 A.M. only.

23) Anchorage, AK 99510; U.S. Post Office Bldg., Rm. G-63, 4th and G Sts., P. O. Box 644. Mon.-Fri., 8 A.M.-noon. Exams with code test, Mon.-Fri. by appointment only. Also conducts examinations in Fairbanks in Jan., Apr., July and Oct.; Juneau and Ketchikan, in May and Nov.

24) Washington, DC 20554; 1919 M St. N.W., Rm. 411. With code, Wed. 9 A.M. Without code, Wed. 9 A.M.-1 P.M. This office will move to Presidential Bldg., 6525 Belcrest Rd., Suite 830, Hyattsville, MD sometime in August. Exam schedule remains the same. ~~6525~~

*Deputy Manager, Membership Services, ARRL

Hamfest Calendar

***Florida:** The Platinum Coast ARS hamfest is September 9 and 10 at the Melbourne Civic Auditorium and Holiday Inn East. Admission \$3.50 per family. Contact Richard M. Cosel, WA4AYR, 327 Deland Ave., Indialantic, FL 32903.

Georgia: The Amateur Radio Club of Augusta hamfest is September 17 at the Julian Smith Casino, Augusta. Hospitality room Saturday night, barbecue Sunday. Bingo, prizes and flea market.

Georgia: The Lanierland ARC Hamfest is September 24 at the Lanier Islands Dogwood Pavilion, Gainesville. Swap and shop, exhibits, prizes and family recreation. LI charge \$2 per car. Talk-in on 07/67. Write Bob Cochran, W4DIX, 607 East Lake Dr., Gainesville, GA 30501.

Illinois: The 21st Peoria Area ARC hamfest is September 17 at the Exposition Gardens, W. Northmoor Rd., Peoria. Free coffee and doughnuts 8:30. Tickets \$1.50 advance. \$2 at door. Swapfest, exhibits, forums and ladies shuttle to mall. Saturday Smorgasbord at the Heritage House, 8209 N. Mt. Hawley Rd., starting at 7. Talk-in on 16/76. Write John Sutton, WD9BJJ, 608 W. Teton Dr., Peoria, IL 61614. Tel. 309-691-7073.

***Illinois:** The Sangamon Valley RC hamfest is September 24 at the county fairgrounds, New Berlin, 16 miles west of Springfield. Indoor and pavilion areas. Overnight camping. Exhibits, kids activities and Clipperton talk by WA4WME. Tickets \$2 at gate or \$1.50 from Carole Churchill, WB9QWR, 1025 S. Sixth St., Springfield, IL 62703.

Illinois: Radio Expo '78 is September 30 and October 1 at the Lake County Fairgrounds, Rtes. 45 and 120, Grayslake. Free camping, tech sessions, FCC and ARRL discussions, exhibits and flea market. Convention center at Holiday Inn, Mundelein. Tickets \$3 at gate or \$2 advance from Chicago FM Club, P. O. Box 305, Maywood, IL 60135.

Indiana: The first Hoosier Back Yard hamfest is September 10 at the Phoenix Farm, Rte. 46, Ellettsville, nine miles west of Bloomington. Admission \$1, under 12 free. Limited overnight parking. Swapfest, homebrew contest, and limited space for noncommercial demos. Talk-in on 78/18 and 04/64. S.a.s.e. to Community Broadcasting Corp., WR9AFY, 7391 W. Hwy. 46, Ellettsville, IN 47429.

Indiana: The Valpo Tech hamfest is September 24 from 7 to 3:30 at the Valparaiso Technical Institute, Rte. 130. Talk-in on 94, W9SAL. Door tickets \$2 or \$1.50 advance from Dale E. Smedley, WB9SFF, Valpo Tech Alumni Association, Box 490, Valparaiso, IN 46383.

***Iowa:** The Cedar Valley ARC hamfest is October 8 at the Hawkeye Downs Exhibition Building, Rte. 218, Cedar Rapids. Camping and picnic areas. Tech talks, movies, ARRL, exhibits and prizes. Talk-in on 3970, 52, 16/76 and 223.5. Tickets \$2 at door or \$1.50 advance from Cedar Valley ARC, P. O. Box 994, Cedar Rapids, IA 52406.

***Kentucky:** The Greater Louisville hamfest is September 30 and October 1 at the Kentucky Fair and Exposition Center off I-65 or I-264. Air-conditioned flea market and exhibit area. ARRL, nets and tech sessions. Prizes. Two-day admission \$3, under 12 free. Accommodation info from Doug or Susie Wilkens, 6210 Big Ben Dr., Louisville, KY 40291, Tel. 502-499-1826. Other details from Kentuckiana RC, c/o Denny Schnurr, K4GOU, 2415 Concord Dr., Louisville, KY 40217, tel. 502-634-0619.

***Louisiana:** The New Orleans area hamfest, sponsored by the Jefferson Parish RC, New Orleans VHF Club, and Crescent City Computer Club, is September 16 and 17 at the Airport Hilton, Kenner. Admission \$5. Homebrew contest, luau, FCC tests, forums, exhibits and flea market. Write to New Orleans Hamfest-Computerfest, P. O. Box 10111, Jefferson, LA 70181, Tel. 504-887-5022 or 721-5509.

Maine: The Augusta ARC hamfest is September 16 and 17 at the Windsor Fairgrounds, Rte. 32 at S. Windsor. Camper hookups for nominal fee. Entertainment, indoor swap tables and more. Talk-in on 52 and 10/70. Contact Dot Young, WITGY, 47 Longwood Ave., Augusta, ME 04330.

Maryland: The Gaithersburg hamfest, sponsored by the Foundation for Amateur Radio, is October 8, rain

or shine, at the Gaithersburg Fairgrounds. Family events, prizes, exhibits and large flea market. Spaces \$5; commercial \$15, register by October 4. Admission \$2. Write to Ron Levin, W3GBU, 802 Greenview Ct., Reisterstown, MD 21136, or call 301-833-1816.

Massachusetts: The 29th New England DXCC meeting is September 30 at the Waltham Holiday Inn, Rte. 128 exit 48. Program at 2:30, banquet at 6 with a display by NAZC. Register by the 16th, please. Details from Lanny Bailey, W1OO, 224 Holmes Rd., Scarborough, ME 04074. Tel. 207-883-5903.

Michigan: The Grand Rapids ARA Swap-n-Shop is September 16, 7 to 3, at the Hudsonville Fairgrounds, 10 miles west of Grand Rapids on Rte. 21. Indoor and outdoor swap shop, free tables and trunk sales. Prizes. Admission \$2. Write GRARA, P. O. Box 1333, Grand Rapids, MI 49501.

Michigan: The L'Anse Creuse Swap and Shop is September 17 at L'Anse Creuse High School, Mt. Clemens. Food and prizes. Talk-in 52 and 69/09. Tickets \$1.50 at door or \$1 advance from Ted Bak, WB8ZME, 35751 Dunston, Sterling Heights, MI 48077. S.a.s.e. please.

Michigan: The Adrian ARC hamfest is September 24 at the Lenawee County Fairgrounds. Tickets \$1.50 advance. \$2 at gate. Tables \$2 and \$4, trunk space \$1. Prizes. Satellite seminar by WB8DQT, computerized station by WD8CRY and K8HCL. Talk-in 52 and 31/91. Write Adrian ARC, P. O. Box 26, Adrian, MI 49221. Call Bob or Sally Fay, 517-265-8016.

Michigan: The Five County Swap-n-Shop is September 24 from 7:30 to 4 at Southwestern High School, 1420 W. Twelfth St., Flint. Tickets \$2 per person, \$3 for family. Tables \$2.50 and \$3. Talk-in on 87/27, 31/91 and 52. More info from Five County Swap-n-Shop, Box 7671, Flint, MI 48507. Call Gordon LaVere, 313-233-3844.

Michigan: The Blossomland Fall Swap-Shop is October 1 at the Berrien County Youth Fairgrounds, Berrien Springs. Large and convenient facilities, prizes, refreshments and fun. Open all night for setup. Advance ticket donation \$1.50, tables \$2. Talk-in 22/82 and 94. Write John Sullivan, P. O. Box 345, St. Joseph, MI 49085.

Michigan: The Lansing Swap and Shop, sponsored by Central Michigan ARC and Lansing RA, is October 1 at Grand Ledge High School, 950 Jenne St., seven miles west of Lansing. Prizes and food. Talk-in on 34/94 and 22/82. Contact Lansing RA, P. O. Box 10073, Lansing, MI 48901. Tel. 517-321-2765.

***New York:** The Hamburg International Hamfest is September 16 at the Erie County Fairgrounds, Buffalo, Thruway exit 57. Speakers, manufacturers, indoor and outdoor flea markets, ladies' programs, and prizes. RV hookups available. Talk-in on 52 and 31/91. Admission \$3 advance, \$4 at gate. Contact Bert Jones, W2CLUU, 143 Orchard Dr., Kenmore, NY 14223, tel. 716-873-3984 or Jim Ciurczak, WB2IVO, 10404 Cayuga Dr., Niagara Falls, NY 14304, tel. 716-297-0539.

New York: The Elmira ARA hamfest is September 30 at the Chemung County Fairgrounds, W. Grand Central Ave., Elmira. Free flea market, tech talks, and prizes. Contact John Breese, WA2FJM, 304 West Ave., Horseheads, NY 14845.

***New York:** The Radio Amateurs of Greater Syracuse host their 14th annual hamfest at the New York State Fairgrounds, Arts and Home Center, Syracuse, on October 7. Exhibits, indoor and outdoor flea markets, awards and entertainment. Tickets before October 1, \$1.50; \$2 at the gate. Under 12 free. Overnight parking available. Talk-in on 90/30 and 31/91. Write RAGS, P. O. Box 88, Liverpool, NY 13088.

New York: The Northeastern States 160-Meter ARA holds its annual banquet on October 8 at Kozel's Restaurant, West Ghent. Flea market from 1 to 4, dinner at 6. Details from William M. Derby, Jr., WA5IOD, 197 Shaw Farm Rd., Holliston, MA 01746.

***New York:** The Yonkers ARC hamfest is October 8 (rain date, 15th) at Redmond Field, Cooke Ave., Yonkers. Admission \$1. Contact Seymour G. Schlitt, W2SI, 49 Frum Ave., Yonkers, NY 10704.

***North Carolina:** The Western Carolina ARS hosts the Asheville Autumnfest on October 7 in the Asheville Civic Center. Indoor flea market, dealers and prizes. Family activities. Ted McElroy Memorial CW Competition, preregistration required. Tickets

\$2, 3/\$5, under 12 free. Tables \$3. Talk-in 31/91, 04/64, 16/76, 52 and 94. S.a.s.e. to WCARS, P. O. Box 1488, Asheville, NC 28802.

Ohio: The 42nd annual Cincinnati hamfest is September 17 at Stricker's Grove, Rte. 128, one mile west of Ross (Venice). Flea market, exhibits, prizes, food and music. Hidden transmitter hunt and air show. Tickets \$7.50 advance. Info from Lillian Abbott, K8CKI, 1424 Main St., Cincinnati, OH 45210.

Oregon: The 32nd annual Walla Walla (WA) hamfest is September 23 and 24 at the Milton-Freewater (OR) Community Building. QCWA, ARRL and dealer displays. Contests for homebrew, DX cards, antiques and homecrafts. Potluck Sunday 12:30. Talk-in 52, 94, 04/64, 16/76, 19/79 and 28/88. Write WWVRAC, Box 321, Walla Walla, WA 99362.

Pennsylvania: The Central Pennsylvania RA Electronic Swapfest is September 17 in the Park-n-Shop Garage, 200 Walnut St., Harrisburg. (Vehicles over 7 ft high use adjacent lot.) Gates open 8 A.M. Registration \$3, wives, children and tailgating free. Talk-in on 16/76, 34/94 and 52. Contact Wilbert Lawrence, WB3HXH, 9 Redwood Vil. of Pineford, Middletown, PA 17057. Tel. 717-944-7017.

Pennsylvania: The Sky Views Swap and Shop is September 17 from 12 to 4 at Sokol Camp, Lower Burrell. Ham registration \$1. CW contest, prizes and good food, parking and shade. Talk-in on 04/64. Info from Jim Jackson, Jr., K3VRU, RD 1, Box 7A, Apollo, PA 15613.

Pennsylvania: The Radio Association of Erie Ham-Jam is September 24 from 9 to 4 at Waldameer Park, Erie. Admission \$1.50 advance, \$2 at gate. Refreshments and prizes. Talk-in 22/82, 34/94 and 52. Write HamJam '78, RAE, Box 844, Erie, PA 16512.

Pennsylvania: The Mt. Airy VHFRC (Pack Rats) hosts the Mid-Atlantic States VHF Conference on September 30 and Hamarama '78 on October 1. The conference is at the Treadway Inn, Easton Rd., (Rte. 611) Willow Grove (turnpike exit 27). Prominent chiefs will moderate an all-day program. Registration includes admission to Hamarama at the Bucks County Drive-In, Rte. 611, Warrington. Rain or shine, 8 to 4. Talk-in on 52, W3CCX/3. Hamarama only \$2, tailgating \$2 (bring your table). Contact Ron Whitsell, WA3AXV, Chairman, P. O. Box 353, Southampton, PA 18966. Tel. 215-355-5370.

Pennsylvania: The Conemaugh Valley ARC and the Laurel Mountain VHF's hold their hamfest on October 1 at the Ebensburg Fairgrounds. Ample parking, large indoor and outdoor flea markets, prizes, displays and food. Talk-in on 34/94. Contact David Knepper, W3BJZ, Box 43, Sidman, PA 15955.

Pennsylvania: The Tamaqua Area Side Band ARA banquet is October 7 at the New England Fire Company quarters, Tamaqua. FCC exams at noon. TABBAR dinner at 6:30, \$7.50. FCC speaker K3CT. Talk-in on 07/67, 69/09 and 52. Form 610 and dinner reservations must be received by September 30. Send to A. J. Sarli, W3CMA, 164 Spruce St., Tamaqua, PA 18252.

Texas: The South Texas Swapfest is September 30 at the Texas National Guard Armory, 1430 Horne Rd., Corpus Christi. Sponsorship by Corpus Christi ARC and South Texas ARC. Free admission and tables, dealers, contests and prizes. Talk-in 34/94 and 28/88. Info from J. E. Rehler, W5KNZ, 526 Pasadena, Corpus Christi, TX 78411.

Texas: The Tideland ARS hamfest is October 8 at Galveston County Park, League City. Setup on Saturday. Flea market, auction, prizes, games and barbecue. Registration \$1. Write TARS, P. O. Box 73, Texas City, TX 77590.

Virginia: DXPO '78, sponsored by the National Capitol DX Association, is September 16 and 17 at the Ramada Inn, Tysons Corner. Two half-day sessions with many special-interest topics and Saturday banquet. The AMRAD ARRL Technical Symposium is on the morning of September 16. Write to Richard Vincent, K3AO, Rte. 1, Box 230, Bryantown, MD 20617.

***Virginia:** The Tidewater Radio Convention and computer show is September 23 and 24 at the Scope Convention Center, Norfolk. Advance admission \$2.50, at the door \$3.50. Tailgating \$5/day or \$7.50 both days, tables \$10/day. Talk-in 52, W4NV and local repeaters. Write TRC1, P. O. Box 9371, Norfolk, VA 23505.

Coming Conventions

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, Boxborough, MA

November 11-12
Hudson Division, McAfee, NJ

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

*Date Change

ARRL NATIONAL CONVENTIONS

July 20-22, 1979
New Orleans, LA

July 25-27, 1980
Seattle, WA

March 13-15, 1981
Orlando, FL

NEW ENGLAND DIVISION

October 14-15, 1978, Boxborough, MA

The tiny hamlet of Boxborough, MA (also shown as Boxboro on some maps), will play host to the New England Division Convention this year. The convention will be held at the beautiful Sheraton Boxborough Hotel. Moved out into the "country" from Boston this all-new show will feature a large indoor and outdoor flea market both days, free parking, and exhibits by every leading manufacturer and distributor of amateur gear.

FCC exams will be given on Saturday only

and by pre-arranged appointment. Those wishing to take exams (no Novice are given) should send a properly filled-out FCC form 610 to the FCC exam chairman: Sheldon M. Goldberg, K1LJN, 40 Isabella St., Stoneham, MA 02180. Only those received by September 20th will be honored (FCC regulation). There will be a bus tour to the ARRL headquarters in Newington leaving Boxborough at approximately 10 A.M. Saturday. You will have lunch in Newington and return in plenty of time for the big prime rib roast beef banquet, show and dance Saturday night. Special YL activities will include a fashion show and brunch Saturday and a tour of famous Lexington and Concord

Sunday. Exciting seminars both days will feature top speakers on DX, antennas, ATV/SSTV, transceivers, computers and a feature presentation of slides and movies of the recent Clipperton expedition by Hugh Vandegrift, WA4WME, of the FO0 team. Prize awards will be made both days this year and family participation is encouraged at the show as those under 16 do not have to register.

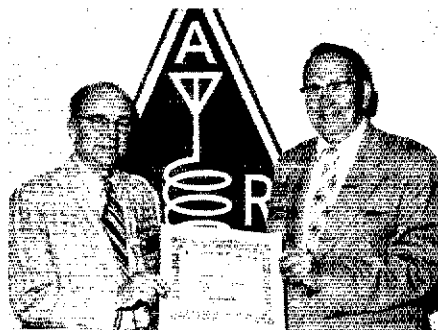
Camping fans will be glad to know that the Minuteman KOA Campgrounds are just 3 miles from the convention on Route 2A. Hookups are \$5.50 per night (\$6.50 with electricity) and include a rec room, pool, etc. Reservations should include the first night's deposit and be sent c/o P. O. Box 122, Littleton, MA 01460, Phone — 617-772-0042. Convention rates at the Sheraton are \$34 single, \$40 double (kids under 18 with parents free). Make reservations directly with the hotel. Should the hotel be filled try the Holiday Inn in Marlboro or the Sheraton in Lexington. Make reservations early as this is the fantastic fall foliage season!

Early birds \$4, at the door \$5. Prime rib banquet/show/dancing, \$16 per person includes tax and gratuity. Dutch-treat cocktail party around the indoor pool prior to dinner Saturday night. Ticket information and orders c/o George F. Stewart, W1ZQQ, 17 Barnes Avenue, East Boston, MA 02128. Please include s.a.s.e. Tel. 617-567-2212.

Repeater frequencies on the Digital Equipment Club station will monitor 147.84 input, 147.24 output and 52.86 input, 52.66 output. They will guide you to the show.

The show's sponsor is the Federation of Eastern Massachusetts Amateur Radio Associations which has been presenting ARRL conventions in the Boston area since 1958.

Strays



Ben Stevenson, W2BXA (left), receives the first Satellite DXCC award from ARRL Communications Manager George Hart, W1NJM. (W1YL photo)

SATELLITE DXCC NO. 1

What is it like to be number one? Ben Stevenson, W2BXA, knows. On May 16 he was presented the first Satellite DXCC by Communications Manager George Hart, W1NJM, at ARRL hq. DX awards are not new to W2BXA. He is presently top man on the DXCC Honor Roll and holder of 5BDXCC award no. 302.

When asked about his success, Ben said, "You have to have a goal. Mine was to work 100 countries using

satellite communications." Then he pointed to his wife Dot, "I couldn't have done it without her help.

"The QSLs required for DXCC are probably the hardest to come by," Ben stated. "It's always best to have more than the required 100. Just in case, I brought along a spare."

An anxious moment came when Don Search, W3AZD, came up with a questionable card in the stack. However, it checked out OK and the counting continued. Finally the announcement came: W2BXA was indeed qualified to receive the first Satellite DXCC.

"How do you get them to QSL?" Ben was asked.

"One of my methods is to write a letter and ask a few specific questions they have to answer. I don't use IRCs, s.a.s.e.s and the like — just a letter. It took me four years to do it, and it took a lot of help from my friends informing me of new countries active on the 'bird.' The DXpeditions are what put me over the top. Actually I wasn't the first to work 100 countries. Pat, G3IOR, was first, but he had more trouble than I did getting the QSL cards."

What's next? Ben thinks that with sunspots on the increase, the first DXCC on 6 meters may be just around the corner.

Even now with satellite enthusiasm at an all-time high, the best is yet to come. All agreed it's here to stay and our efforts today will influence space involvement for generations to come. With the Phase III satellite to go up soon, DXCC may be easier to achieve, but not everyone will be able to work 100 countries. The barrier has been broken and it's up to you. DXCC or just listening to the action, you are involved in one of the most exciting aspects of amateur radio. Let's see now, where is that W1AW bulletin on OSCAR reference orbits? Isn't it time for the next pass? I wonder if that /VP5 is active? CQ OSCAR THIS IS _____ — W9KDR

REWARD YOUR NEWSLETTER EDITOR

The Amateur Radio News Service is sponsoring a publications contest to recognize and reward writers who demonstrate excellence in Amateur Radio journalism. If you wish to nominate your favorite Amateur Radio publication for an award, submit three different issues of your choice, accompanied by a statement noting: (a) name and address of the editor, (b) name and mailing address of the issuing agency, and (c) average circulation during the period for which the entry was submitted. General circulation magazines and professional-type journals are not eligible for consideration.

The judges will determine up to three places of standing in the following categories: (1) *General format*, which includes the publication's title, date and frequency of issuance, layout, spelling and grammar, and i-d of organization, editor and officers; (2) *Member contributions*; (3) *Editorials*; (4) *Club activity coverage*; (5) *Recruiting activity and training*; (6) *Technical articles*.

Nominations must be of publications from January 1977 to the present. The contest deadline is September 10, 1978.

Send the issues and supporting information to Norm Monro, K4FRY, 215 Brindley St., Gadsden, AL 35901. Material submitted cannot be returned.

VE8BR'S FIRST — AND LAST — QSO

Shortly before midnight local time one night, VE8BR contacted K6UXO. At midnight, the Canadian started signing as Y1BR. Yukon had a new prefix. It was VE8BR's first ham contact, and his call changed in the midst of it! — K6UXO

FM Repeater News

Conducted By Lew McCoy,* W1ICPWR1ABH

And the Beat Goes On —

Since the last column, there have been some changes made in the Repeater Advisory Committee (VRAC), at least as far as the Headquarters representation is concerned. The new liaison for the committee is Jim La Porta, N1CC, who replaces W1ICP. Jim comes to Hq. by way of Dallas and has considerable experience in the field of repeaters and fm. For those interested in the historical background of VRAC as far as Hq. liaison is concerned, the first holder of the job was Ed Tilton, W1HDQ, who was followed by Doug Blakeslee, W1KLL, and then Lew McCoy, W1ICP.

For some years the philosophy was that the liaison job for fm should be held by someone in the Technical Department, simply because of the technical nature of the problems involved. This has changed, however, and N1CC, who is deputy communications manager (in training), Communications Department, will provide a new (and needed) dimension to the job.

AN APOLOGY

"Dear Lew:

"Reference your "FM Repeater News" column in the July 1978 issue of QST:

"Colorado Council just voted to stay with 30 kHz above 146, but 20 kHz on the new subband." This is entirely incorrect. I don't know your source of information, but it's incorrect. The council voted to retain our 15-kHz separation all through the repeater segment of 2 meters.

"The above is also reflected by the balloting of the other VRAC members, of which I am also a member. I am probably the most pro 15-kHz member on the committee, and my numerous letters, memos and arguments throughout the VRAC supporting this end seem to be well known.

"I remember at the March IEEE meeting in Denver

*c/o ARRL hq.

when we discussed this very subject, you said I was crazy.* As indicated by the VRAC balloting and outcome I am not alone.

"At any rate, I would greatly appreciate if you could make some mention of the column's error in your next issue, I'm going to catch all kinds of flack on this one!

73s
Whit Brown, WB0CJX
Colorado Frequency Coordinator VRAC
P. O. Box 623
Steamboat Spr., CO 80477"

*[Editor's Note: Actually, Whit is a good friend and I am fairly sure I said "nuts," not "crazy" — hi! In any case, my information came from someone outside the council. I apologize for the error.]

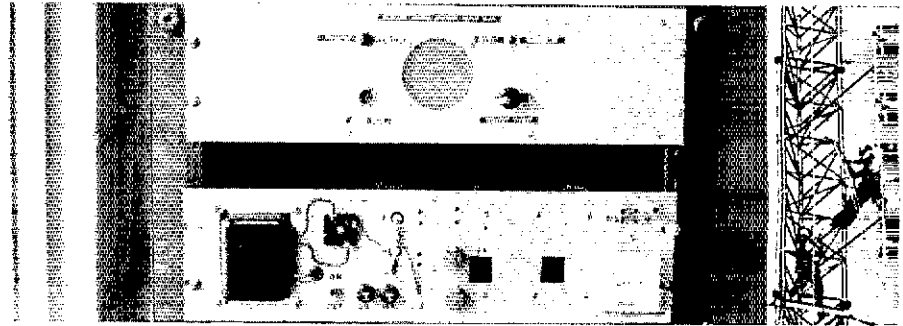
UPDATE — REPEATER COUNT

The latest ARRL Repeater Directory (now available)

carries some interesting information about the changes that have taken place since last year. The total number of repeaters, all bands, now numbers 3820, an increase of 24 percent over last year. A breakdown by band:

Band	Total	Change
10 M	27	+69%
6 M	165	+33%
2 M	2699	+18%
220 MHz	325	+36%
450 MHz	544	+38%
23 Cm	5	-17%

Repeaters now using autopatch number 1175, an increase of 38 percent, and more important, there are now 1006 repeaters capable of operating on emergency power, an increase of 165 percent. The directory lists 100 repeaters also operating RTTY and 11 machines on ATV. Now if we could just get ASCII okayed for use, hmmm.



In case you cannot read the fine print it says "The Eastern Ozarks Amateur Radio Club Repeater." It was built by W0IFU and WA0UTH. The repeater is located near Farmington, MO, at about 1700 feet msl. Coverage is about 75 miles. At right: the EOARC repeater antenna being installed. (photographs courtesy of W0FWY and The Farmington Evening Press.)

Silent Keys

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

K1AIG, Thomas C. MacDonald, Amherst, MA
WB1AQK, John U. Bete, Marion, MA
W1BNP, James B. Gray, S. Windsor, CT
K1EMQ, The Rev. Gilbert L. Leduc, N. Billerica, MA
W1HBG, Harold E. Baker, Bridgton, ME
W1IMF, Walter Hardman, Holyoke, MA
W1IOB, Fred W. Rockwood, Cheshire, CT
Ex-W1JVN, Wallace F. Moore, Orange City, FL
W1QER, Alfred F. Palokat, Cornwall, CT
W1RXL, C. Stanley Marshall, Pawtucket, RI
W2BKZ, Charles T. Kolz, Lakehurst, NJ
WA2JUK, Edward C. Sodemam, Rochester, NY
Ex-W2KC, Martin E. Soltar, Pennsauken, NJ
K2MLS, Albert F. Peacock, Clayton, NJ
W2NA, Edwin L. Clark, Waretown, NJ
K2OJO, Noranne F. Turrin, Colts Neck, NJ
WB2OTF, Henry E. Robson, Verona, NJ
W2QF, George T. Nolan, Englewood, NJ
WB2RJS, Robert L. Oakes, Bath, NY
W2WVS, James A. Smith, Newburgh, NY
K2YBQ, Walter S. Watson, Bogota, NJ
W3CPH, James P. Simpson, North Wales, PA
K3EDK, George Fasekas, W. Newton, PA
W3EKZ, Raymond W. Rock, Joppa, MD
K3HQJ, Kenneth J. Phillips, Arnold, PA
K3JST, Donald A. Ferguson, Sayre, PA
W3KE, Nathan C. DeStefano, Altoona, PA
K3MDF, C. E. "Luke" Diffenderfer, Highspire, PA
K3PDC, Milford C. Bitner, Grayling, MI
K3ULN, Michael Drozdo, Oil City, PA
WA3ZPJ, Clarence N. McDaniel, Beaver Falls, PA

K4FBU, Lloyd Morse, Orlando, FL
W4FSG, Glynn P. Markham, Cleveland, TN
N4IH, C. Robert Shaffer, Palm Bay, FL
WD4JBU, Merrill B. Worden, W. Palm Beach, FL
W4KGS, Guy N. Ferrell, Tampa, FL
WD4KXT, Norman L. Viney, Bemus Point, NY
K4LZ, Leon A. Ames, Deltona, FL
WD4MZF, Chester S. Hatcher, Lebanon, TN
W4OUS, Edward W. Galins, Lexington, KY
W4PE, Mayberry W. Rozar, Hobe Sound, FL
W4PHQ, Bob D. Delius, Jr., Kingsport, TN
K4WY, Francis J. "Tod" Darke, Pinellas Park, FL
W4ZPN, John W. Burge, Pensacola, FL
WA5ATE, Capt. George T. Boyett, Sour Lake, TX
K5CPR, Raymond P. Reynaud, Lutcher, LA
WB5OGW, Lawrence R. Patterson, Booneville, MS
WB5TWQ, Thomas G. Gnagi, Garland, TX
W5TX, Dr. Maury H. McRae, Corinth, MS
W5VST, R. E. Persohn, Little Rock, AR
WB5ZDF, Gene M. McCauley, Kountze, TX
W6AR, William B. Pond, Callistoga, CA
K6CP, Dr. Frederick W. Schubert, Oakland, CA
W6DAA, Jesse G. Sadler, Walnut Creek, CA
WA6DJM, John Riskoski, Imperial Beach, CA
W6ENP, Cornelius J. Smith, Woodland Hills, CA
KH6EWA, George C. Wilkins, Sr., Kaneohe, HI
W6GYG, Otis H. Clark, Victorville, CA
W6HKO, Joseph A. Wetzel, San Jose, CA
W6LNZ, Ross R. Grover, Sacramento, CA
WA6PKZ, Edwin T. Colyer, Yucca Valley, CA
W6TLI, Clinton W. "Curly" Lee, Hawthorne, CA
K6UNU, Sid H. Stichel, Montebello, CA

W7BHW, Harvey A. Aggerbeck, Kirkland, WA
WB7DTZ, Bernard D. Hoover, Las Vegas, NV
K7GOL, Lee C. Barnes, College Place, WA
W7GZW, Hermann M. Plantz, Aurora, OR
WB7QJH, Lester V. Knowland, Tucson, AZ
WA7RKN, B. Keith Harlow, Rogue River, OR
WB8ADT, Bruce C. Smith, Northport, MI
W8GF, Robert L. Miller, Cincinnati, OH
Ex-W8HRN, William P. Mader, Fremont, OH
W8ICC, Harry F. Steiger, Bucyrus, OH
WB8LNR, Harold F. Wetherall, Parkersburg, WV
K8NSH, John J. Dunlevy, Coshocton, OH
W8RVK, Donald R. Blazer, Columbus, OH
W9AJO, Philip P. Purles, Sullivan, IL
K9CZA, Mervin T. Reed, Terre Haute, IN
W9MQX, Ivan R. Damon, Tinley Park, IL
Ex-W9NXP, Thomas V. Tomaszewicz, Chicago, IL
W9RCC, George E. Starck, Haugen, WI
W9RGL, Louis J. Gamache, Berkeley, IL
W9SW, Ralph J. Knout, LaGrange, IL
K0JAD, J. Howard Drew, Columbia, MO
K0LNI, A. Haswell Lang, St. Paul, MN
W0TAH, Edward A. Keller, St. Paul, MN
W0UYV, Harvey V. Headen, Minneapolis, MN
VE4RF, Clifford F. Sawyer, Winnipeg, MB
VE6JX, Andrew Malowanchuk, Calgary, AB
VE6MN, Merlin O. Noss, Lethbridge, AB
KP4WQ, Rafael L. Zamora, Aguadilla, PR
KV4IK, David F. Howard, St. Thomas, VI
PY1ARN, Paulo Barthel, Rio De Janeiro, Brazil
TI2OFR, Oscar F. Rohrmoser, San Jose, Costa Rica
ZL4DO, R. J. Hope, Invercargill, New Zealand



How to Receive More QSLs — Part 2

This month's column starts by continuing the discussion of where to send your QSL cards.

If you plan to use the QSL bureau route, you can send one or more cards directly to the bureau of a particular country. Addresses of existing foreign bureaus are listed in the *callbook*. However, it is far easier for ARRL members to collect all outgoing cards, and once a month send them to the ARRL's Overseas QSL Service. See "QSL Corner" of recent months for details.

Incidentally, in order to receive cards "via the bureau" you must maintain a 5" x 7-1/2" s.a.s.e. on file with the bureau for your call area. (See "QSL Corner" every other month for bureau addresses.) The Overseas QSL Service and the DX Bureau System (for incoming cards) are described in articles in October 1976 *QST*, pages 51-53, and frequently in "QSL Corner."

When you send direct, you obviously need a specific address. The most reliable is the one obtained from the DX station during the QSO. But if the operator is trying to work as many stations as possible, and is just giving signal reports, he may not want to slow down to tell you his mailing address. Frequently in this situation he will give the QSL route every few minutes, so just keep listening after your QSO. Also, operations of this nature are usually well publicized, and the correct address is widely published or known by many other amateurs.

Published Addresses

There are many published sources of QSL routing information. The DX edition of the *callbook* contains thousands of addresses of foreign amateurs, plus other useful information, and is updated with three quarterly supplements. The basic volume is more than \$15, including postage, while the complete set with

supplements is about \$25. Write to Radio Amateur Callbook Inc., 925 Sherwood Drive, Lake Bluff, IL 60044.

Other available services concentrate on information about the rarer DX stations. Two of these basically give the QSL manager's call sign only, so you must find his address. The *Directory of Stateside QSL Managers* is a computerized listing of more than 1300 U.S. QSL managers. Updated weekly, it's available postpaid for \$1.35 from Gary Yarus, WB0MSZ, 921 N. Clay Ave., St. Louis, MO 63122. The *Directory of QSL Managers* lists about 3000 QSL managers, both U.S. and foreign. Published quarterly, it's available postpaid for \$5 from Franz Langner, DJ9ZB, Carl-Kistner-Str. 19, D-7800 Freiburg, West Germany.

QSL Report, published periodically in Japan but written in English, contains both U.S. and foreign QSL managers and addresses of many managers and foreign stations. A single issue does not list as many managers as the first two directories described above. For more information, write to Hiromichi Katsurashima, 5-2236-33 Iriya, Zama-city, Kanagawa, Japan.

The "QSL Corner" in this section of *QST* lists a variety of QSL information. Many DX newsletters and club bulletins do so also. See this column in the June issue for details about some of them.

As a service, elsewhere in this column — under QSL INFORMATION NEEDED — the calls and QSL routing needs of some hams are listed. This service is designed for QSOs that occurred sometime in the past, so that the QSL information is no longer available in current sources, such as the *callbook*, *QST* and other publications. If you want to use the service, please tell us the month and year of the QSO, as the route may vary, depending on the date.

Incidentally, if you find that hunting addresses is too bothersome, commercial QSL bureaus will mail all your cards for a fee. These

Bouvet in January!

While the old saying — don't count your chickens before they're hatched — is especially true when it comes to proposed DXpeditions, early 1979 may very possibly see some ham activity from Bouvet. In a recent letter, LA5NM says 3Y1VC will be activated from Bouvet Island in January and February 1979 by a meteorological expedition. The four-man team will be there for research, so its members will operate only when they are not busy with meteorological matters. The expedition will leave Norway in December for Cape Town, where it will depart for Bouvet by the ship *Polarstar*. The vessel will go on to Antarctica, where it will stay for about two months before picking up the four men on Bouvet Island at the end of February. QSLs for QSOs with this expedition go via LA5NM, Mathias Bjerrang, P. O. Box 210, 9401 Harstad, Norway. QSLs for the few QSOs made last year from Bouvet go via LA1VC, who will also be on this year's expedition.

frequently advertise their services in the display or classified advertising sections of *QST*.

Other Tips

Basically, you want your QSL card to be very distinctive in a favorable way, so that it will stand out from the mass of cards received. You can of course buy elaborate and colorful cards, but they are expensive. Fortunately, there are other things you can do to make your card noticeable. If the situation permits, try to make the QSO interesting and memorable — include a personal message on the QSL card instead of the usual trite phrase or remark — if you have the ability, write your message in the appropriate foreign language — include some photos — and again, make sure your card is filled out completely, accurately and neatly.

WA4CTA says that some QSL managers,

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

Views of Clipperton provided by Willy Rusch, HB9AHL. On the left, 20-meter QTH sporting a low but effective Wilson 4-element Yagi, with W6HVN, Doug, strolling away. On the right, the operating site as seen from afar.



such as WB4WHE, want the manager's QTH on the return address part of the s.a.s.e., and on its flap, your call, and the date and time of the QSO. That would certainly simplify the manager's work, but it's not known whether all managers want it done.

If you plan to QSL, do so soon after the QSO. The longer you wait, the greater the possibility that something will occur that makes a return QSL impossible. Along this line, you should have some policy about sending another card if there is no reply to the first one. Depending on the circumstances, a wait of at least three months to two or three years might be appropriate. Remember, the foreign operator may be swamped with QSLs, and it may be many months before he has time to answer yours. Also, if you have gone via the bureau, the complete process can take a long, long time! I am still receiving cards from QSOs of six years ago, and other hams have experienced even longer delays. Nor is the direct path necessarily very fast, as the postal service can be very inefficient or unreliable in many parts of the world. It's possible to follow up too soon. I am sometimes guilty of this, and thus earn an irritated reply from the DX operator or manager. As in other aspects of life, patience is a virtue, and sometimes, long after all hope has been abandoned, the QSL card will appear unexpectedly in your mail.

Other QST articles on QSLing have appeared in April, 1976, and October and November, 1977.

THE DX SCENE

A9XCE is ready to oblige all those who need Bahrain. Ted can be found from 0230-0400 UTC around 14.080 or 21.064 MHz. QSL to Edward D. Ross, P. O. Box 5750, Bahrain.

CE0X. Remember K1MM from his CE0ZM operation in 1977? Bill has his license and is aiming to put San Felix on the air, possibly during the CQWW Contest. (LIDXA)

CLARCB is a special call used from the Isle of Pines, Cuba. QSL via P. O. Box 1, Havana. (CO2FA)

D68AD, Comoros, favors 14.005 and 21.005 MHz after 1500 UTC.

FG7AS no longer has a QSL manager. Cards should be sent direct to the callbook QTH, says W7QS.

FG0EAX and PJ8LDH are the two call signs that W5LDH plans to use in the CQWW Contest. Phil previously operated as ZF1DH.

FH — Mayotte. By now, FH8s CJ CY OM and YL should be active and rarrr' to go on all bands.

HK0, San Andres, looks certain for the last weekend in November for the CQWW Contest by members of PVRC. (N3RD)

JW5ZJ will be QRV from Bear Island from December 1978 until June 1979. (LA5NM)

OD5MX (ex-WA6YOU/DU2), recently active from Lebanon, favors 15- and 20-meter cw. He will be there until January 1979.

OX3AB. After 28 years on Greenland, Arne will be leaving for Denmark and his new call, OZ3PE. OX3AB cards, which have been sent direct, will be forwarded to his new QTH.

PJ7VL was operated briefly early in 1978 by VE3BKD. W2BBK is the QSL manager and also for P18AA.

SV1JG, Crete, is very active from 0600 UTC around 14.210 MHz. QSL to Box 564, Athens, Greece. (LIDXA)

VE3TEN 10-meter beacon. Sponsored and maintain-

ed by VE3QB and VE3BNO, it can be heard on 28.175 MHz and not 28.225 MHz as previously reported in this column.

VK9ZR, Mellish Reef. If all has gone according to plan, this rare one should be on the air now. Ten days of operating during the last week of August and the first week of September are planned.

VP8PL, on South Georgia now, was previously on the South Orkneys. Listen on 14.220 or 14.320 MHz from 0030 UTC. (LIDXA)

VR80 is quite active from Tuvalu. Look for Dave for a few hours after 0700 UTC around 14.220 MHz. (WA1AHQ)

VZ6HK, Hong Kong. DXpedition is planned for September 10-24 by W6MJE and WB6JPZ. QSL via W6EL.

4K1A is being heard from Antarctica on 20 cw, reports WB7PSP.

4Y30 and 4Z30 will be prefixes available until the end of the year to honor Israel's 30th anniversary, according to 4Z4NUT. (WA1YAU)

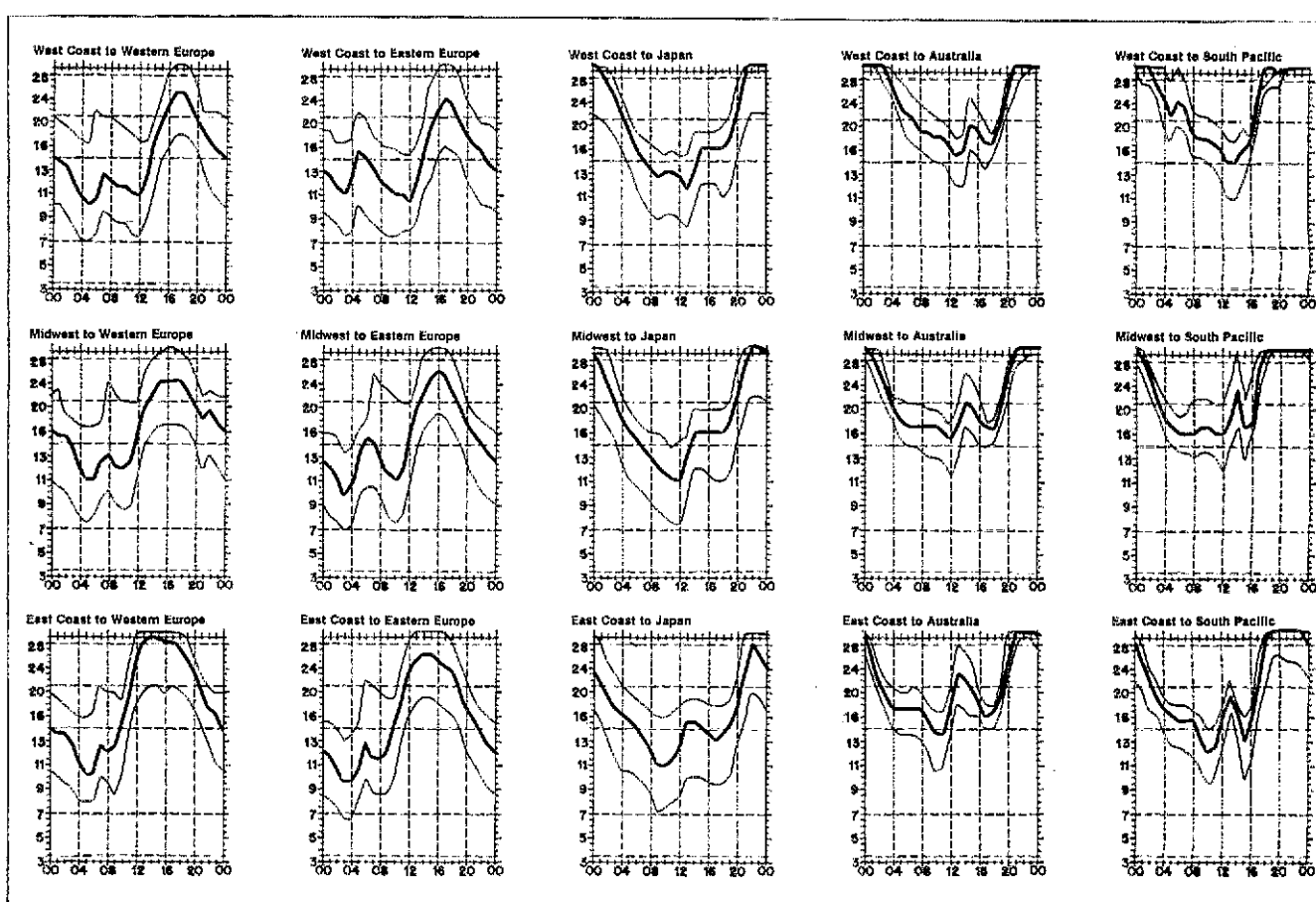
6W8DY has just finished an eight-month visit to Italy. Jacques should be active again from his station in Dakar. (VE4SK)

9K2FX, Emmett, hopes that his new three-element Yagi will greatly improve his signal into all areas. (W4KA)

Thanks to our many contributors, who make this column possible.

QSL MANAGER VOLUNTEERS

The following hams are volunteering their services and should be contacted directly by anyone needing a QSL manager: WA1AHQ, WA1GXE, KA2AWX, WB4AEJ, N4QW, K5BDX, N5GZ, WB5SCI, WA6SSG, N7ABA, WB7PSP, WD8PMA, LA5NM.



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



QTH of the month! Caught in the middle of a move to Florida while Clipperton was on the air, W6EJ/4 had to operate from this unusual shack to make the needed contact!

QSL Corner

Administered By R. L. White, W1CW

Last month I talked a bit about the "incoming" — or domestic — QSL bureaus, and how they function. This month I want to talk about the "outgoing" bureau (the ARRL Membership Overseas QSL Service). This service was established for the League's members, but in a membership organization services for the membership aren't set up to make money (which isn't the same thing as saying services are supposed to be run so they lose money!). One of the objectives of the Overseas QSL Service is to see that the operation is run efficiently. Efficiency in this case being the number of members being given a service compared to the cost of that service. Obviously the two factors in the equation can be juggled. The service provided can be cut down until it meets the cost, or the price for the service can be brought up until it meets the cost. Either way the end result can give an apparent high efficiency figure. However, the first approach isn't acceptable to anyone, and the second one is to be avoided, or minimized, for as long as (and as much as) possible.

So what is the point? The point is there are four very simple requirements on the users of the Overseas QSL Service. They must

- 1) Sort the cards alphabetically by prefix.
- 2) Enclose the address label from the current copy of QST.
- 3) Enclose \$1 check or money order (cash acceptable but not recommended).
- 4) Enclose a self-addressed stamped (15 cent) envelope. This is used to acknowledge receipt of your cards and give you a scheduled mailing date. It also serves to point out anything you may have done incorrectly so you can do it correctly the next time. If no

acknowledgement is needed, just enclose a note to that effect, and no s.a.s.e. need be sent.

Be sure you have complied with the other requirements, though. And what do the four points have to do with efficiency? When complied with, they allow for the most efficient movement of your cards from the time they are received to the time they are mailed out. When they are not complied with it means extra time must be spent on your cards, and when that happens your cards are acknowledged and processed after the cards of those who have followed the requirements. That "after" has meant as much as three weeks delay, and it is fully expected that the use of the Overseas QSL Service will continue to increase, which will make for an even longer delay. So, as you can see, compliance with the four points works to the immediate advantage of the user by increasing efficiency.

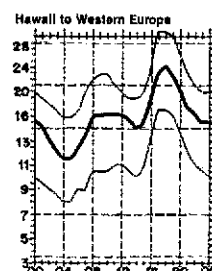
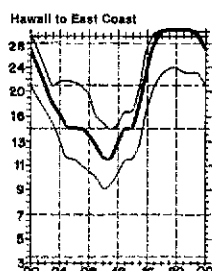
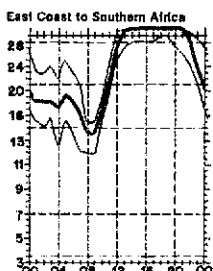
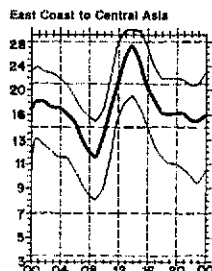
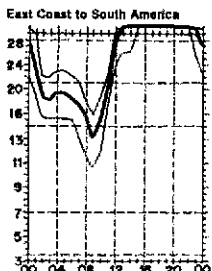
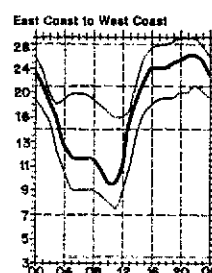
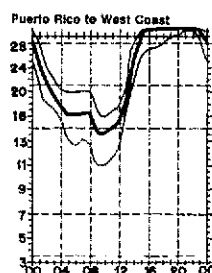
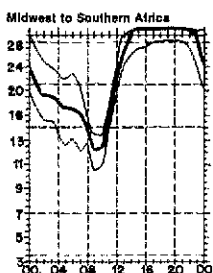
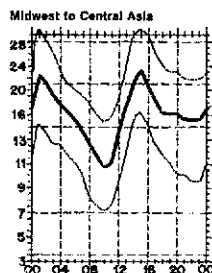
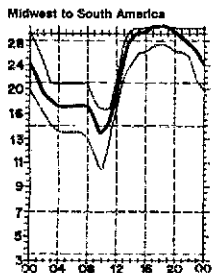
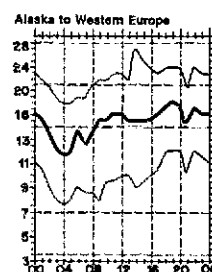
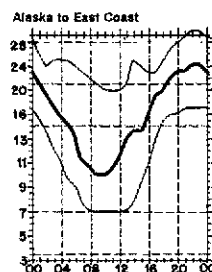
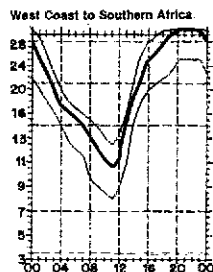
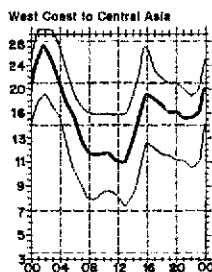
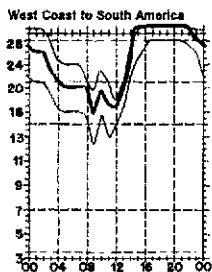
Speaking of efficiency: One of the bigger deterrents to efficiency for the QSL manager is not having a self-addressed, stamped envelope sent with the request for a QSL. When you send a QSL manager a request for a QSL, do yourself a favor and make sure you have included the s.a.s.e. If you don't, you won't find a whole lot of people caring about the fact that the QSL manager didn't answer your QSL request. Even if you sent the manager "something extra," if the manager has to stop and address an envelope it is going to take away from the time he can spend taking care of the people who sent the s.a.s.e. With most QSL managers, time is something of which there isn't enough.

And speaking of QSL managers, here are a few offerings that may be of help to some of you. As always, no guarantee is made for accuracy as they are printed as we receive them:

- GUSCIA, 3800 So. "J" St., Oxnard, CA 93030
- KA6KN, Box 4071, APO SF, CA
- KM6EA, Box 146, Metaline, WA 99152
- KM6EB, EC, 10023 Hiram Way, Lakeside, CA 92040
- PY3CB, P. O. Box 56, 98900 Santa Rosa (RS) Brazil
- VK9NI, Box 290, Norfolk Island, Australia 2899
- VR4CF, C. John Fitch, Box 6, Honiara, Guadalcanal, Solomon Islands

QSL ROUTING INFORMATION NEEDED

If you know the QSL routing information for any of the following, please write directly to the person needing the help: CE0AE ('68), SV0WU ('73), VS9ASP ('67) and 5X5DI ('72) needed by WA4KYR; VQ9B (6/70) by W6NPY; A2CCY (3/73), C29ED (3/73), HSSABK (6/70) and OD5FB (12/69) by WB6WOA; HK0AA (6/75), 5R8AM (11/70) and 9Q5AF (1/70) by N7MQ; KF4BA ('67) by K9KLR.



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 September 15 to October 15, 1978, assume a sunspot number of 108, which corresponds to a 2800-MHz solar flux of 152.

W7FPX/SU, WA7JRL/SU, Sinai Field Mission, Box 21, FPO NY, NY 09527

A9XEC (K4CG)
 CE3XV (WA3NGS)
 CN8CS (WB0MSZ)
 DU6BG/4D6BG
 (WA0TKJ)
 EL2BS (K9QXY)
 FB8XS (F5VU)
 FB8ZM (W4LZZ)
 FO0PJM (WA6PYM)
 G5CLS (WD6CZR)
 GD5CAA (WA3ZAS)
 HH2MC (WA4AKU)
 HL9TD (WB5SAG)
 HZ1AB (K8PYD)
 J3AJ (W7LLC)
 LARIEV/JDI (JA8JL)
 LZ10OJF (LZ2JF)
 N4VV/CE3 (WA3NGS)
 OESREB (K4KBL)
 OX3AB (OZ3PE)
 P29AJ (WA7ILC)
 P29CC (W2NHZ)
 PZ2AC (WB4RRK)
 SLIFRO (Via SSA)
 TJ2P (WB4ZNFH)
 TT8HV (WB5OOE)
 TU2GK (K9KXA)
 VE8RCS (WA7OBH)
 VP2AG (WB2TSL)
 VP2KT (WB2TSL)

VP2MBB (VE3ECP)
 VP2VDH (K65DR)
 VP5DM (WB4RRK)
 VP8ML (W4MWT)
 VP8NY (W4MWT)
 YY0CA (WA4SSU)
 WA4UAZ/HCI
 (WA4QMQ)
 YB0PG (WA2DWE)
 YJ8KM (VK3OT)
 YJ8ZV (VK2ZZV)
 YNH (WA4ZXC)
 YN1Z (WA4ZXC)
 YSIRVE (WA0JYJ)
 ZD8MG (K4KBL)
 ZD8MM (K4ILX)
 ZK1DR (W0WP)
 ZL4LR/A (N4NX)
 ZP5YV (WA3HUP)
 ZS1XR (W7YRO)
 4S7EA (WB9OQU)
 4X4GD (K2UVV)
 4Z4MB (K2UVV)
 5W1AX (WA7VGV)
 7P8BC (K9RD)
 8P6GN (WB4RRK)
 8P6JB, JC (WB4RRK)
 9H1FF (K9DID)
 9V1TE (WA0TKJ)
 9Y4VT (W3DJZ)

To the following givers, a big 18-wheeler load of thanks: OZ3PE, PY3CB, SM5AHK KZUVV, K4ILX, K4WSB, K5CO, K8PYD, KM6FC, WA2ZGR, WB2AMU, WA3ZAS, WB4RRK, WD4PWA, WB6YDT, WD6CZR, W7NO, WB7PSP, WB7PTZ, WA0TKJ and WDX2MS. May your towers stand tall and sturdy and your beams turn smoothly.

6037080Y (0682D) NN0ZZ #1
 JOE HAMM
 1234 FIRST AVE
 MINNEAPOLIS MN 55400

1927123X (0977H) NN2YY #2
 JOHN Q. APPET
 66 PARK PL
 NEW YORK NY 10021

2137091Y (1299C) WA9XYZ #3
 I M LIFER
 29 CENTRAL ROW
 EVANSVILLE IN 47711

Users of the ARRL Overseas QSL Service must include with their cards an address label from a current issue of QST. Those labels simulated in the photo show the date that membership expires. The code for Life Members is "1299," as shown in no. 3. The letter following the expiration date is the division indicator. If you cannot for some reason use the current QST label, send one that shows that you are a current member.

Strays

I would like to get in touch with . . .

hams who heard Amelia Earhart during her last flight in 1937. Robert H. Myers, 1964 N. Main St., Box 45, Salinas, CA 93901.

antique wireless collectors. The ARCS (Antique Radio Collectors of Schenectady) hold meetings every other month at the Schenectady Museum. Contact Jack Nelson, W2FW, 915 Sherman Street, Schenectady, NY 12303.

DX Century Club Awards

Administered By Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from June 1 through June 30, 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

DL7HZ/337	JH2CJW/153	W5JG/113	WB7TLE/109	WB90TX/104	WB1CCH/101
JH6HPL/268	WA75SCH/150	DM2DOD/112	DF3FJ/108	K1EGD/103	W40YI/101
W1XS/202	W6BL/147	EA8DE/112	K0AX/DU2/108	K7CPG/103	C21NI/100
W6TFO/193	KH6LW/144	JH6RY/112	OZ6QV/108	W6QL/VP2A/103	F6CCI/100
KD3VO/190	WB7BES/144	N4YI/111	OH8JV/107	DL0PP/102	K7EG/100
YU2CDL/188	ZE4JH/136	WA6TOO/111	VE3CEF/107	N4MW/102	K0CY/100
JABDNZ/180	WB8ZRL/124	N9JG/110	VE7CML/107	W1HZU/102	K0PPO/100
G3VKW/178	WA1VYF/122	VE1AJ/110	VP2VDJ/106	WA4PRU/102	N6HI/100
K4CTD/175	SM7BOL/121	WA4OBO/110	WD9AJH/106	WD6CAS/102	PJ8KG/100
N6LK/175	WA1TXI/119	WB9FRF/110	K2PFL/105	DJ4BC/101	VE7DDF/100
YU10CC/163	K7GLL/116	JA7FPC/109	K8S7/105	K2BL/101	W1GH/H/100
N4ZJ/162	OK1KRS/114	WB2HPP/109	WB5SCF/105	SP7EJS/101	WA4SKE/100
W6RZ/160	W1BSG/114	WA3WIX/109	W3XN/104	VE2BHK/101	W6FWK/100
ON6OS/156	K2TGE/113	WA4MOQ/109	W3ZDF/104	VE7BYP/101	

Radiotelephone

SM6GKS/328	JE1HPM/126	N6LK/113	JH2CJW/110	EL80/105	F6DPE/101
EA1FD/250	NA4J/126	WB4QYF/113	WB6RG/110	K2TGE/105	K8ZA/101
EA3AL/205	KH6ABF/123	DM2DOD/112	ZP5CD/110	#EKM/104	WD6CAS/101
VE3EGS/202	K2TV/121	EA8DE/112	IBH/G/109	WB8VZX/104	WB8BAU/101
G3VKW/175	K6AXC/121	JH6RY/112	K1LA/109	W0PSH/104	F0BDP/100
9Y4SF/152	SM7BOL/120	WB5G/112	WB2HPP/109	TU2GF/103	K5BKG/100
F2RO/139	K4SE/119	W6S/112	WB7FO/109	WA2WJL/103	K9JBL/100
9H1FF/134	3D2DM/119	K5TGE/111	WB8ZRL/109	K5RCC/102	WB2CJ/100
ON6OS/131	DA1GF/118	N4YI/111	WB7TLE/108	K8SD/102	W4GKI/100
W1XS/131	K7GLL/116	WA4FDE/111	KL7JL/106	N9JG/102	WA4OBC/100
ZE4JH/129	VE7IX/115	G13FUM/110	W2HEO/106	WD4AFA/102	W9ZS/100
DK5ADW/3127	YV5TK/115	I0BS/110	WA0HHI/106	WB9VDX/102	

CW

JA1JRK/223	DL7BQ/113	N4TJ/107	EP2VW/103	W6IA/102	K8YQ/100
D4CBS/164	W1XS/112	DF3FJ/106	W6RUV/102	K9CIV/100	K9CIV/100
W6TFO/137	I3HDH/110	OH6JW/105	VE1AJ/101	N4EY/100	N4EY/100
N4OI/120	JH2CJW/110	K0SVX/104	W1LQ/102	W1HZU/100	W1HZU/100
JA7GLB/116	DL7AR/108	VE2AH/104	W5SVZ/102	JH2JBT/100	WA4LOF/100
PY2BW/115	DK5VO/107				

5BDXCC

K3JLI	W8TWA	W0NAR	CT1FL	K8KI	OZ7BW
N3AA	SP9PT	W3NKM	K4SMX	W9NA	OH6JW
N4WX	W6KG	I6PLN	WALVM	EA1FD	K7RI

Endorsements

Mixed

DL7AP/339	W2IYX/287	N8BB/250	I1ANP/205	W5ISF/180	H8BBC/142
W1YAK/334	W3NNK/283	W9MNT/180	W9MNT/180	K2GM/150	WA1FQJ/142
W4KFC/333	K4JEE/280	WA3KCY/247	WA7SLC/204	WA2AOG/179	W7FOF/142
W3EVL/332	K8ZR/280	WA7ZLC/245	#B8BG/202	VE3WV/178	W8SSBH/142
VK3YL/323	WB2RBG/3280	OE2VEL/244	K4KBL/201	W6SI/173	W8TL/141
SM6CVX/321	WB2VFT/280	YU3DJK/244	YU1NFR/201	W3EV/170	K2OPJ/140
K6XP/319	W8AL/280	N4TJ/243	ZL3BK/201	W2GND/168	DK3QE/140
K9PPY/319	IT9PUG/279	W8II/243	AA4US/200	WB8UJ/168	N8FB/140
W4EEU/318	WB4S/JG/273	W2HAZ/239	K2OP/200	WB4RFZ/161	N9BT/140
W4FLA/317	VE3II/280	K0SVX/238	K4ZYS/200	KH6DL/160	WA3WNU/140
OE7III/313	EA1FD/270	K4JYS/235	K6SK/200	KH6GI/160	WB4IWW/140
ZE4JS/313	YU2CBM/270	KA6RR/230	K8TM/K200	W2XL/160	VE7CHK/139
K5LM/306	IT9WGI/270	YU2OH/228	N8VL/200	WB4FOT/160	K4CYJ/132
W2QKJ/305	K4XSD/270	W0NB/226	N9AT/200	WB9AAQ/159	W86J/129
W5QLT/305	W3XJ/268	W8KI/225	WA1AHC/200	K4EIQ/157	W0EJ/128
W7ETZ/305	K2PP/263	JA1BA/222	W3UJ/200	W8MOL/154	W8NAA/125
WA9VOL/303	DK5WS/261	WB8KNZ/222	W3YV/200	K3MIE/153	K1LA/124
K4GFI/300	JE1BSD/281	H89HT/220	K4SE/200	K2TV/153	W9WU/122
PY2BW/300	K6AG/260	N4YO/220	WA4LOF/200	DK5ADW/3127	K4YKZ/121
W6SN/297	K6ELX/260	K5VT/3/217	N3US/194	W8AKME/152	I9GTT/120
9H4G/294	N4RB/260	K2SP/216	W1JHU/188	WA1YX/147	K5MH/120
K6XT/293	JA1FNA/258	WA7GVM/214	W1BMR/187	W8BAHS/147	W2YWK/120
K5GH/290	K4JPD/255	WA4HY/212	WB8T/182	AA4TP/144	W4CEB/120
W1GDQ/290	WA3EPT/255	K6VE/210	K2BAG/180	W2K1/143	WB4FMJ/120
W4TK/290	K9BWQ/253	W8KI/210	VE3ECP/180	WA4EGP/143	W6RPK/120

Radiotelephone

W1MMV/337	W8COG/301	DL9CQ/251	K2SP/213	VE4AT/180	W7HX/143
K4SM/333	K4GFI/300	K4NJS/250	W8KI/210	W4LCL/180	K5GKI/142
KH6OR/332	K5LM/300	JE1BSD/245	W4HY/209	WA4LOF/180	K9KV/142
DL7AA/331	K2BK/294	OE2VEL/243	WA7GVM/208	WB8CA/180	W1K5Z/140
W4DRK/325	9H4G/294	N8BB/242	K4FA/205	PA0NB/179	K2OPJ/140
W5SZ/325	PY4AKL/290	OZ5EV/242	I1ANP/202	W8TE/179	OE2BL/140
PY2CYK/323	W2IYX/287	IF2NV/241	VE2YU/202	DK5VO/175	VP2SV/140
8W8DY/320	W2QKJ/282	JA1FNA/241	W8CY/201	VE3ECP/169	W2NCL/140
EA8JJ/318	PY2BW/280	WA3KCY/241	K8TM/K200	W9NB/182	WB4IWW/140
FBRU/317	DL7FP/270	K5GZ/240	N6VL/200	WB9AAQ/159	WA2AOG/132
W6KZS/316	K8ZR/270	K0IUC/240	W3YV/200	WA4AKU/165	WA1AHC/127
JA6GDG/315	VE3II/270	IBKNT/232	WB4QVM/200	N7OK/183	ZP5WU/126
N4MM/315	WA3EPR/270	W2LEJ/227	A9XB/159	W8AKT/160	W4JTC/124
W4EEU/312	ZE1BP/269	ZL1AJL/227	N4TJ/195	K5IH/159	K0CKX/123
DJ5DA/309	W3GL/264	JA1BA/221	N6AT/194	W2PQZ/158	K1TO/121
N6AR/309	W7BKR/262	K6KII/220	WA4JDI/189	WB5PGF/148	WB8KL/121
DJ6VM/304	DK5WS/261	N4YO/220	N3US/186	CT1OZ/147	WA1HMC/120
W5QLT/304	W1GKN/259	W4LUN/220	H89BG/183	WA2FCW/146	VK3OT/120
DJ7CX/301	K4KC/256	K0SVX/219	ZL3BK/183	WA4EGP/143	WB2VGJ/120
JA1DM/301					

CW

K4PI/251	WA4FDR/229	K5VT/3/205	JA1BN/180	OH2BN/160	KH6HC/140
OZ1VY/250	K4EX/220	DL1HH/201	K8KI/180	W3GL/144	DJ5DA/139
W8AH/242	DL7AA/206	WB6JEY/181	K4SE/165	K4FJ/140	WB4RUA/120

Corrections

July listing: New Member Radiotelephone. H18DPJW2 should have appeared as H13DJPAW2/101
 August Listing: New Member Radiotelephone. WA6LHK/100

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



Dilemma in the Amateur Space Program

Last month I attempted to answer the few who had been critical of the 2-meter band plan proposed by VUAC Chairman WIJR. In this column, I will continue, concentrating on the questions raised with respect to the proposed expanded satellite frequencies. The plan published in the June column included 200 kHz from 144.3 to 144.5 to be set aside for amateur satellites. This is in addition to 145.8 to 146.0 MHz. The few who questioned this new reservation expressed the opinion that no more satellite frequencies are needed in the 2-meter band with plenty of space going begging in the microwaves but if they are, they should be placed in some other part of the band so as not to take such a large chunk of the only segment now designated for ssb operation, a mode currently sweeping the country.

This column will look at the whole picture including the situation with respect to use of our microwave assignments and then the complex problem which 2 meters presents for those seeking frequencies for amateur satellites.

Before I get into that, however, let me outline what is coming up in the near future in the amateur space program. OSCARs 7 and 8, our presently operating satellites, are far from the last word in amateur spacecraft. AMSAT does not intend to spend the rest of the century merely replenishing satellites of this type. The Phase III spacecraft, which will link the entire Northern Hemisphere for hours each day, is only a little more than a year away. It is presently slated for launch aboard the Ariane European launch vehicle near the end of 1979. A second Phase III unit being built along with the first is expected to be launched on an early shuttle mission sometime in 1980 or 1981. In addition, the Canadian wing of AMSAT is actively working on a transponder package for placement on a large synchronous satellite which may be launched as early as 1980. The satellite is to be positioned for Western Hemisphere coverage, providing amateurs with 24 hour per day wide-area coverage. In addition, the Russians plan a series of several satellites containing 2- to 10-meter transponders. They have referred to these as the "RS" system of amateur sputniks.

Where will the frequencies for all of these satellites come from? What about the microwave bands? Isn't there lots of room up there and isn't the exploitation of these frequencies one of the objectives of AMSAT and other satellite organizations? The answer to both questions is yes but unfortunately the legal way has not yet been cleared for utilization of the amateur microwave bands for amateur satellite communication. At present, the only frequencies authorized for the Amateur Satellite Service consist of those bands which are allocated to amateurs on an exclusive worldwide basis, plus 435 to 438

MHz. Our exclusive allocations comprise only 7.0 to 7.1, 14.0 to 14.25, 21.0 to 21.45, 28.0 to 29.7, 144 to 146, and 24,000 to 24,050 MHz. Note that none of our microwave bands for which there is much possibility of the average amateur constructing equipment are included nor are bands such as 50 to 54 and 220 to 225 MHz.

To most of us, frequencies on which amateur satellites are authorized means frequencies on which amateur satellites are authorized to transmit. They can certainly receive anywhere, can't they? Unfortunately not, according to officials in many countries. They think in terms of a "system" in which the ground station is a part, and reach, to them, the logical conclusion that authorized frequencies include those transmitted by ground stations as well as by satellites. OSCAR 7's transponder was already built when this attitude became known to AMSAT, so it was too late to change the uplink frequency to the 435- to 438-MHz segment. Because of this "system" viewpoint, the satellite's use of 432.125 to 432.175 for its uplink has caused difficulties to amateurs in some countries.

An attempt to use one of our microwave bands in an amateur satellite has already been made. Many may recall that a 2304.1-MHz beacon is aboard OSCAR 7. AMSAT hoped it could be turned on for short tests, but, despite many pleas, our government has steadfastly refused to allow activation of this beacon because of the allocation situation.

Assignments in the microwave bands for amateur satellites are being sought in the WARC to be held next year. Success in this quest is by no means certain, however. There has even been some opposition registered from quarters within our own government to the use of some amateur bands for satellites. Remember, we share these bands with government. How other countries will view these requests is unknown. In any case, even if we are successful in getting reasonable microwave satellite assignments, they will not come soon enough for the amateur space equipment now being designed and fabricated. It must be based on the present useful authorized satellite frequencies, i.e. 28.0 to 29.7, 144 to 146 and 435 to 438 MHz. Ten meters is useful only for relatively low orbits such as those of OSCARs 7 and 8 and the upcoming Russian RS satellites. That leaves the 2-meter and 70-cm assignments. The use of a single band for both uplink and downlink has been proved impractical from both the spacecraft and ground station standpoints. Thus both 2 meters and 435 to 438 MHz must be employed in any new high-altitude amateur satellites.

That brings me to the situation faced in the 144- to 146-MHz band. With the FCC order making 144.5 to 145.5 MHz available for repeaters, and new "machines" in that segment blossoming forth across the country, the only other space left is 144.0 to 144.5 and 145.5 to 146 MHz. The lower of these two is now our only preserve for cw and ssb operation. In

Europe, since they cannot operate above 146, the band from 145.0 to 145.8 is heavily used for fm simplex and repeaters.

Should the new generation of exciting amateur satellites be built at all in the light of the present frequency problems or can a way be found to provide space for them in the bands currently available while retaining adequate room for our other activities? Bear in mind that satellite launch opportunities are not easy to come by. If a halt should be called in the pace of the amateur space program, it might not be easy to obtain launches later on.

That's the dilemma facing the amateur satellite community.

What do you think?

MID-ATLANTIC VHF CONFERENCE SET FOR SEPTEMBER 30

The second annual Mid-Atlantic VHF Conference sponsored by the Mt. Airy VHF Radio Club, otherwise known as the "Pack Rats" will be held this year at Fiesta Motor Lodge, Route 611, Willow Grove, PA. This is the same place the conference was held last year but the name of the establishment has been changed. The motel can be reached by taking PA Turnpike Exit 27 South. The program is due to get underway at 9 A.M. with the vhf fm forum conducted by W3HKZ, followed at 10:30 by W3RZU and others from the staff of Solid State Scientific discussing solid-state technology. At 1 P.M. Paul Wade, WA2ZZF, will give the lowdown on the latest techniques in low-noise amplifiers. Propagation and ionospheric phenomena will be the subject of a talk by Mel Wilson, W2BOC, beginning at 2:30. An attitude-adjustment hour and dinner will follow the program at 6:30. After dinner, the Pack Rats' hospitality suite will be the scene of merriment and a general vhf bull session.

The following day, the club's Hamarama will be held a few miles up the road. This event is always the scene of one of the biggest and best flea markets on the East Coast.

Contact W3ZD or WA3AXV for further details.

ON THE BANDS

6 Meters — As of mid-July, the 1978 Es season continues to receive mixed reviews. Some complain of fewer and shorter-lived openings while others rave about the exotic calls quite plentiful this year. Some of these that have been worked widely from various parts

23-Cm Standings

Figures are states, call areas and best DX in miles.

K1PXE	13	5	448	K1FJM/4	2	2	300
W1XP	7	3	300	W4VHH	2	1	350
K1FO	6	3	172	W4LDV	1	1	290
W1JR	4	1	—	K5LLL	2	2	847
WA2LTM	17	6	770	W5LDV	2	2	838
K2UYH	14	4	520	K5PUF	1	1	290
W2VC	13	5	537	W5HN	1	1	235
K2JNG	10	4	305	W5HPT	1	1	235
W2DWJ	10	4	200	K6ZMW	2	2	250
K2YGO	7	5	520	N6NB/6	2	2	250
WA2VTR	6	4	320	N6TX	1	1	112
K2EVJ	5	3	247	K8WWW	6	4	448
WA2EUS	4	5	320	W8YIO	5	4	351
K2OVS	3	2	135	W9HUW	5	3	525
W3HMU	11	5	300	W9JIY	5	3	300
K3IUV	9	4	250	W9WCD	3	3	770
WA3JUF	7	4	300	W9JTP	3	2	165
K4QIF	12	5	551	VE3HW	1	1	260
K4SUM	5	3	220				
K4NTD	3*	2	847				

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730 or call 301-384-6736 and record your message.

of the country include WB2RLK/VP9, VP9WB, VP2MX (operated by WB2RLK), W4UWH/KP2 (new prefix for KV4), H18WPC, several FP0s, PJ2DW, KZ3NW and FY7AS. WB2RLK's VP9 and VP2M operations netted some 700 stations in 28 states and nine countries from Bermuda and 400 stations in 38 states and six countries from Montserrat. Included in these were nine 6s and eleven 7s most of which were in OR. The distances involved amounts to about 4000 miles, almost as far as the Pacific Northwest to Japan.

Although not productive of a contact, reception, on June 4, by a number of East Coast stations of the ZB2VHF beacon (50.003) which was reported in the August column, was one of the events which has made this season exciting. It was not a fluke. VE1ASJ, not able to hear it the first time, reported the beacon June 24 between 1330 and 1400 UTC. Andy says that the signal was only about S2.

At the time the ZB2VHF beacon was in at VE1ASJ, KITOL, ME, was hearing the 6Y3RC beacon but could not hear the Gibraltar beacon. We may have a chance for something besides listening to a beacon. According to ZB2BL several inhabitants of "The Rock" are now equipped for 50-MHz ssb.

There is not enough space in the allotted two pages to describe all of the Es sessions experienced this season, although they were more scarce than in other years. However, the evening of June 20-21 must be mentioned as a standout from the standpoints of the strength and number of signals. Skip became very short at times with stations as close as Long Island, NY, worked from the Washington, DC, area. Thunderous signals from many New England stations as well as lots of loud 8s, 9s and 0s were received at this conductor's QTH. In addition, double hop of exceptional strength was evidenced by S9+ signals from CO, AZ and NM stations.

Some rather strange propagation took place on several days. On Saturday, July 8, VE1ASJ, St. John, NB, worked a string of southern CA stations with very strong signals, while WA1EXN only about 250 miles away could barely hear one of the 6s. The next day a similar thing happened here in the mid-Atlantic states area. While this conductor sat eagerly listening, many eastern PA, southern NJ and DE stations were easily working 6s which I was unable to hear less than 100 miles away. Because of the fact that he was receiving Midwest stations, and from the strength of the signals, up to 40 dB over S9, VE1ASJ believes that the propagation mode might have been F2. Many would argue, however, that F2 is not too likely this time of year.

Es wasn't all 6 meters had to offer. There were several good auroras. Ones that occurred in the wee hours of July 5 and July 14 are the most notable. Details are not yet in but, either by the aurora itself or by an auroral-induced Es, a number of Eastern stations worked KL7s on both occasions.

In the QRP department, K6PHE has been having a ball with his IC-502. Bob uses it with a four-element beam at home and on its internal whip antenna from the roof at his place of work. From the home QTH, he has come up with such goodies as WA8GUB/KH6 and W4UWH/KP2. From work he has snagged seven states and VE7. Sounds like fun.

A letter from JA1VOK makes interesting reading. Hatsuo lists the June openings to the U.S. with particular emphasis on the 16th. Between 0400 and 0545 UTC that day he worked K6HCP, K7KV and WA7BJU all on ssb with K7KV running S8 in Japan. On various other days WA6BYA, WB6NMT and K7TUO have been worked in addition. In May, the action was with WA4TNN/KL7 and KL7FBI on Shemya Island in the Aleutians.

2 Meters — Propagation fare on this band has been varied to say the least. Aurora, E skip, m.s. and tropo have all been present in many parts of the country.

The evening of June 19 local time marked somewhat of an event for vhf men in south FL and Puerto Rico as these two locations were linked on 2 meters. W4WD, Miami, who was one of the few lucky ones to make the grade to KP4EOR, believed the propagation mode to be tropo rather than Es or some other type of ionospheric phenomenon despite the fact that 6 meters was open to the area at the time. Russ noted that the signals from KP4EOR did not travel very far inland from the coast and were not particularly strong.

One of the big Es openings occurred the evening of June 20. WB4NMA near Atlanta worked 1s, 2s and 3s between 0127 and 0140 UTC June 21. WA4LYS, Jacksonville, FL, reports hooking up with VE2DFO, VE2SH, WB1BZR and WB1CNE, VT, as well as WA2VNS, NY. VE1ASJ QSOed some 30 stations in VA, KY, TN, GA, NC, SC, AL and MD. Another reporting this opening was WA2HBZ, Flushing, NY. Bill was able to work only a single station, W4FBI, AL, but heard W5FF, NM, for about one minute. Unfortunately, local QRM prevented a contact. This is a distance of 1800 miles! K4GL, Pickens, SC, characterized the opening as "best one yet." Jack

snagged nine New England stations, two 2s as well as VE1 and 2, between 0043 and 0124 UTC. Between 0028 and 0147 UTC, WA1OUB worked 34 stations in the South some putting S9 +40-dB signals into NH. Stations as close as VA were contacted. Bob was thankful for high activity and is happy that we're finally all together on 2 meters. Earlier in the day from 1705 to 1825 UTC June 20, WB0SBG, Ames, IA, QSOed W5TNY and K5FF, NM, in addition to W6DQJ, 120 miles east of Los Angeles, who was running 10 watts to a 10-element beam. Sean says that this station stayed in for 20 minutes. K1ZZ, near Hartford, CT, caught his first 2-meter Es ever the morning of Field Day, June 24. As he usually does, Dave had his receiver parked on 144.2. At 1430 UTC he heard WA4OWC, Plantation, FL. K1ZZ worked him with 10 watts and then switched to the big rig to land three other FL stations: WB4KGY, WA4ZCB and AA4N, who was using an IC-211 barefoot and an indoor five-element quagi. Dave also mentions that RSGB General Manager G3OUF, who was visiting this country at the time, managed a mobile contact with WA4OWC using his barefoot IC-211E.

The other big Es day was the evening of July 11 (July 12 UTC). WA4MMP/1 came up with 15 QSOs between 0138 and 0158 UTC. Shows what good operating can do! Bill worked seven IL stations, six in IA and one each in NE and IN. This brings his state total to 24 with only three weeks of operation from RI. In the same session, K0SE, Rochester, MN, worked stations in NY, NJ and eastern PA.

Aurora shared the spotlight with Es during the period covered by this report. Several excellent buzz sessions and a number of lesser ones provided plenty of action. WA2HBZ provides a detailed report on aurora on June 26 and 29 as well as July 4 and 5. By far the best of these was the opening which occurred during the wee hours of July 5. Both W8IDU, MI, and W0RRY, IA, were very strong. Note that this is the same time that KL7 stations were coming into the Eastern states on 6 meters. The June 26 aurora was the baptism of fire for VE2JR, St-Sauveur des Monts, PQ, 40 miles northwest of Montreal. When Fraser listened to his Multi-2700, he didn't know what to make of those buzzy signals, but he had the curiosity to turn on his 40-watt amplifier and see what he could raise. The bottom line is five states on his first outing. Don't stop now, OM.

K0SE reports some experiments with polarization on aurora he has been running. One might expect that the signals would not retain their original polarization in such a medium as aurora but Glenn found just the opposite. His antenna is arranged so that he can rotate the boom to change polarization. When he selects vertical, most signals all but disappear. He has also been able to make a few aurora contacts with stations using vertical which he would not otherwise have completed.

The "bread and butter" mode of 2-meter propagation, tropo, was also very prevalent during late June and early July. Just one example is reported by WB4EYP, VA, near Washington. Bob says that the evening of July 12 (the 13th UTC) from 0300 to 0400 UTC he, along with a number of other DC-area 2-meter operators, worked KY stations WA4JUW, WB4GZK and WB4YAB. Attesting to the intensity of the opening is the fact that N4AJ0 operating mobile near Centerville, VA, was able to work WA4JUW.

June 20 was the first day of operation of the W3VD beacon constructed by the members of the Johns Hopkins Applied Physics Laboratory Radio Club. The station, located halfway between Baltimore and Washington, runs 30 watts to a halo at 30 feet above ground. A Special Temporary Authority has been issued by FCC to permit unattended operation of the beacon. The frequency was 144.026 at the time but, by the time this appears in print, the station should be on 144.040 to be in line with the proposed VUAC hand plan. During its first evening of operation W3VD was heard via Es by VE2DFO near Montreal and VE1ASJ, St. John, NB. A good start! Others hearing the beacon are requested to send a report to the club at Johns Hopkins Rd., Laurel, MD 20810.

70 Cm — The general level of activity on this band is increasing monthly. The availability of good commercial equipment is helping as is the large number of people who have become interested in vhf via exposure to 2 meters and have decided to try another band. In addition, many have gotten equipment for use on OSCAR and are finding that there are other interesting things they can do with it. The relatively good tropo conditions over the early summer have given many of these people their first taste of 70-cm DX.

The evening of July 7 (July 8 UTC) was one of those very good tropo nights. A number of stations, including K3HCE in the Washington-Baltimore area, worked K1WHS, ME, and other New England stations. Bill is running only 10 watts so it was a real thrill for him.

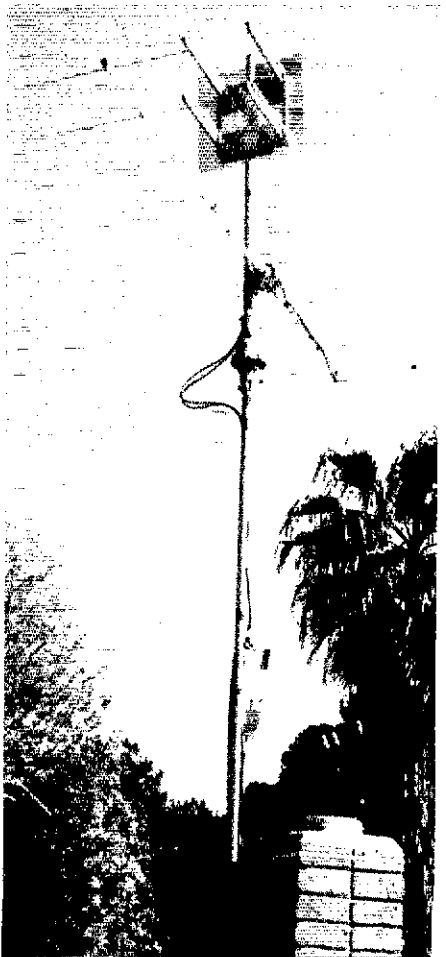
WB5QQG, Natchitoches, LA, 60 miles southeast of

Shreveport, is loaded for bear on 70 cm. Mike is running a pair of 4CX250s to four 21-element F9FTs. He recently worked K5SW, OK, and W0OHU/5, AR, to bring his state total to seven. He invites those wishing schedules to call his shack number, 318-352-8598. Mike says that the 2100 to 2200 local Wednesday evening activity night is really helping to promote activity in the TX-LA area.

The K2UYH EME jaunt to ND, SD and MT netted a total of 24 QSOs off the moon as well as some tropo contacts using the moonbounce antenna. All of the EME contacts accounted for new states for the fortunate stations. Most important of all, enthusiasm has been stirred up for further EME operation among the stations visited as well as other locals. Beginning June 11, Al's equipment, including an eight-bay I9FT array was set up as WA0CSL in ND. There they were able to work K2UYH (operated by WA2LTM), VE7BBG, K5JL, W1JR, W0YZS, K0TLM and W5FF. WB0SBG, IA, was worked on tropo over a 450-mile path as was W0PHD, MN, and VE4MA, Winnipeg. Al left the gear at W7JF's QTH in MT while attending to other business. Whereupon, Ken proceeded to contact K2UYH, W4WD, K3NSS, WB5LUA, VE7BBG, K5JL, W0YZS and K0TLM. Unfortunately, a few skeds were missed due to bad weather. In SD, the location of K0VXM was the scene of action. Chuck made good use of Al's equipment to latch on to W4WD, KH6IHP, K2UYH, F9FT, W5FF, K5JL, VE7BBG and W6ABN.

Al expresses thanks to all who helped in this project including K2UBC, who loaned an Echo 70, which was all that would work in the radar environment at WA0CSL; F9FT for supplying antennas; and the Pack Rats for general equipment assistance. I am sure that all of those who got new states out of it are also very appreciative.

The 1296-MHz antenna at K6ZMW. With this setup Joe has worked N6CA/7, NV, as well as XE2BC. Note that the 2-meter beam can be rotated in polarization.



A Great Idea

Back in 1947 or so, someone (don't remember who) had a great idea. Why not start a National Emergency Net of handpicked stations to monitor certain frequencies for the express purpose of relaying traffic during emergencies? The station with traffic would just bring it to that frequency, where he could put it in the hands of an expert who would know precisely how best to handle it. The idea was popular — for a while. Then it fizzled for lack of support.

Then came an even greater idea. Commercials have 600 meters and a few other spots for calling and for emergencies; why not establish something similar for the amateur bands? 'Twas done, using the recently vacated NEN frequencies plus a few more. Again the idea was popular, but again it lacked that essential ingredient — support. Headquarters tried hard to perpetuate it and make it work — for 20 years. Everybody seemed to agree that it was a great idea, but when an emergency came along, hardly anybody used the frequencies. They weren't situated in the right places, they were too hard to remember, the program wasn't publicized wide enough, they were too often occupied by casual ragchewers, they weren't occupied enough — and on and on. Yep, it was a great idea, but it didn't work. Monitoring an emergency frequency was something that amateurs didn't do. The box, with the frequencies and how to use them, ran in *QST* more than 170 times and was the partial or sole subject of 30 *QST* articles. But in an emergency,

hams used their local or state net frequencies, and the National Calling and Emergency Frequencies were vacant. So, in 1967, they were quietly dropped overboard.

Since then, every so often someone comes up with a Great Idea. Why not have some kind of emergency calling frequencies for amateur radio as the commercials do? Why not a special ARRL calling frequency? How about a gentlemen's agreement that strict quiet shall be observed on a certain frequency for the first five minutes of each hour, to accommodate any weak emergency calls? These and various others have come down the spout in recent years.

Are you ready? That's right, we have another proposal, this time for repeater vhf calling. How about, suggests K4GVW, a "National Emergency Repeater Frequency" (NERF — does it grab you?) "Local repeaters," he says, "especially in populated areas, could have a standard emergency frequency on which to change over in an emergency in order that portable units coming into the area . . . could use the local repeater."

We'd like to remind all and sundry that we have already proposed that 146.34/94 MHz be used as the national emergency repeater frequency and that 146.52 MHz be used as the national simplex emergency frequency (SNEF, eh?). See October 1974 *QST*, pages 113 and 115 and the *Public Service Communications Manual*, page 9.

Well, what do you think? Will it work, this time? The idea is for each and every amateur who operates 2 meters to equip himself with the 34/94 pair, even if there is no repeater on that channel in range — and also with 52/52 for simplex. This will enable everybody to use the channels that are nationally designated for emergency use. But now comes the difficult part. Wherever a 34/94 repeater exists, that repeater will be designated as the National Emergency Repeater for the coverage area. When an emergency occurs, it will be withdrawn from casual use and devoted to emergency use. Where no such repeater is in range, one of the repeaters that is in range will be equipped to make switching over to 34/94 possible — or, if more feasible, a separate repeater will be kept on hand that can be activated on 34/94 in an emergency. Eventually, if 34/94 can cover almost any place in the U.S. or Canada on an emergency basis, and every operator is equipped with both this pair and the 52/52 simplex pair, we should have the most versatile and flexible system yet, using 34/94 and 52/52 for primary emergency frequencies (mostly calling and establishing contact) and whatever other frequencies are available for conducting communications.

Why won't it work? We'd be particularly interested to know what the present 34/94 repeater licensees think of the idea. — WINJM

PUBLIC SERVICE DIARY

□ Mount Washington, NH — March 11. K1OIQ joined in the rescue of a student who fell 500 feet while descending from the summit of the highest mountain in New England. Carrying his 2-meter transceiver along with first-aid gear, he passed messages through the Mount Washington repeater during the rescue. (K1BCS)

□ Vicksburg, MS — April 17. Local hams participated in the search for a three-year-old lost in a wooded area. The WR5AFN repeaters were used to coordinate the operation. (WB5SXX)

□ Miami County, KS — May 11. Minutes after a tornado cut a path of destruction through the northern part of the county, WA6SOF drove his radio-equipped van to the scene and acted as the focal point of the Amateur Radio operation that backed up the sheriff's department during the relief effort. (WB0UYB)

□ El Segundo, CA — May 16. Six members of the Amateur Club of El Segundo, responding to an explosion and fire at a local refinery, set up base stations at the disaster control center near the fire and at the police station. (WA6LOD)

□ Daytona Beach, FL — May 20. Over 100 Orlando area hams participated in and provided communications for the search of two youths missing for three weeks. (W4MGO)

□ Yucca Valley, CA — May 28. Teamwork by hams and the FAA resulted in locating the parents of a young man severely injured in an accident. The parents, private pilots, had taken off for a remote destination and only the Flying Taco Network was able to relay the urgent news to them. (W6NAZ)

□ Abitibi Camp, ON — May 30. After three men on

a fishing trip were lost in rugged and heavily wooded terrain, a search was conducted with VE3s EEW, EFZ and HTM assisting with communications. Later the same day, VE3HFS joined EEW and HTM in the search for two children in the Cascade area of the Current River. (VE3AYZ)

□ Repeater Log. According to reports received to date, repeaters were used in conjunction with 187 vehicular emergencies, 13 fires, three crime reports, three medical emergencies, one search and rescue and 10 miscellaneous incidents. Repeaters involved were WR2s ADM ADZ AFD AIX, WR4s ACY AGA AMN, WR5s ABA ABY AIB AJG AMX, WD6HFR, WR6s ACJ AZX, WR7AEL, WR8s ABC ADC AGA AHM ANT, WR9ABY.

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Fallbrook, CA — March 5. The North County ARES and other local hams provided communications for the Red Cross during the evacuation of a mobile home park which was threatened by a possible dam failure. (N6AT, WD6DIU, WB6TBA)

□ Oakville, ON — April 25. Local hams coordinated Salvation Army and Red Cross relief operations after a major fire destroyed seven warehouses. (VE3APK, EC Oakville)

□ San Jacinto Mountains, CA — May 7. W6LKN and local hams answered the call of the Riverside Mountain Rescue Unit for communications support in the search for a woman hiker lost in the mountainous terrain. (W6LKN, EC Riverside Co.)

□ San Clemente, CA — May 8. The South Orange Amateur Radio Association ARES net provided communications between the general public and the fire

and police departments after the city's telephone system was completely shut down by a bulldozer which cut the telephone system's main cable. (WA6TFS)

The ARRL Ham Radio Newslines: 203-667-0138

Our Public Information Office's 24-hour Newslines 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

*Asst. Communications Mgr., ARRL

□ Hopkinsville, KY — May 12-13. Area hams spotted and tracked a tornado via the District II Weather and Pennyroyal Amateur Radio Emergency Nets and assisted the relief operations after the storm had subsided. (WA4ZVL, EC District 2)

□ St. Catharines, ON — May 31-June 1. Local hams assisted the Regional Niagara Police in the search for a missing five-year-old boy. VE3DVE set up a base station at the search command post and coordinated the effort via repeater VE3NRS. (VE3DVE, EC St. Catharines)

□ Flint, MI — June 1. A fire at a chemical storage building broke out and local ARES members assisted the Salvation Army at the site by providing auto-patches via WR8AGR. (W8WN, Asst. EC Flint)

□ Tornado Watch — June 18-19. Hams in central Kentucky and Lancaster County, Nebraska, responded to the tornado watch issued by the National Weather Service and reported weather conditions to the authorities throughout the alert. (WA4YPO, EC KY 5th District and K0GND, EC Lancaster Co.)

□ SEC Report. For June, 32 SEC reports were received denoting a total ARES membership of 15,614. This represents a 3-percent increase over reports received one year ago (31) and a 40-percent increase in ARES membership (11,177). Sections reporting were Alta, Ariz, Ark, Colo, Conn, Del, EBay, EMass, EPA, Ga, Ind, Iowa, Kans, Mar/Nfld, Mich, NC, NFla, NTex, Ohio, Okla, Ont, Oreg, SDgo, SF, SJV, SCV, Sask, SNJ, Va, Wash, WV, WMass.

□ The half-year summary of SEC reports, including late reports, follows: 215 reports were received from 46 different sections. During the first half of last year, 214 reports from 50 sections had been received. At press time, the following sections have a 100-percent reporting record: Alta, Ariz, Ark, Colo, Conn, Del, EMass, Ga, Ind, Kans, Mich, NC, NFla, NTex, Ohio, Okla, Ont, Oreg, SDgo, SCV, SJV, Sask, Va, Wash, WV, WMass.

NATIONAL TRAFFIC SYSTEM

On May 27, 1978, James D. Dunn, WA5YEA, died at his home in Georgetown, TX. He was 52 years old. With his death, Amateur Radio lost a great supporter and worker and the hams of TX lost a great friend.

James contributed so much to Amateur Radio in TX, despite poor health, that it is hard to list all of it. An accomplished traffic handler, both on voice and cw, he was a long-time net control station on the Texas Traffic Net, the 7290 Net, and the Texas CW Net. He also served as liaison at the region and area levels of NTS and had received the Brass Pounders League award. He served with distinction as manager of the Texas Traffic Net and was a driving force in keeping the Texas CW Traffic Net going through its lean years. Many more activities could be listed, but they do not describe the most important way WA5YEA contributed to Amateur Radio. His major contribution was a result of his personal character attributes of warmth, optimism and all-out friendliness. No one ever heard James say an unkind word on the air. Countless numbers of amateurs learned how to handle traffic by associating with him. Many stayed with it because of his encouragement and help. An indication of the admiration and love his fellow hams had for him is the fact that almost 200 amateurs checked into the memorial sessions of TTN and 7290 to pay their last respects.

James Dunn has left a void which cannot be filled. The 80- and 40-meter bands will never again be the same. Many of us will be forever sad that we will never again hear that warm friendly voice or work that superb cw signal. WA5YEA had a great impact on the lives of many people and he will be sorely missed by the amateur fraternity. — N5TC

3RN*	30	104	3.5	.473	100.0	97.8
4RN	120	925	7.7	.340	70.6	100.0
FIN5*	30	296	9.8	.295	86.6	99.2
FIN6	90	707	7.8	.337	94.2	96.7
FIN7*	60	384	6.4	.479	95.5	98.9
8RN	81	385	4.8	.349	74.4	94.4
9RN	115	481	4.1	.333	89.0	89.2
TEN	81	389	4.8	.258	46.6	91.7
ECN	59	199	3.3	.319	78.3	100.0
TWN	88	572	6.5	.329	88.0	96.7

TCC

TCC Eastern	135'	585
TCC Central	111'	444
TCC Pacific	110'	614

Sections*	4644	15626	3.4
Summary	5834	27373	4.7
Record	5402	27574	15.9

*Incomplete report

*TCC functions not counted as net sessions.

*Section and local nets reporting (142): BCEN (BC), MTN (MB), CMN GBN GBSSN LN ODN OLN OPN OSN (ON), WQV/UHF (PQ), SATN (SK), AENB AENB AENM AENS AENW (AL), ASN (AK), HARG (AZ), ARN OZK (AR), NCN SDNN (CA), CN HN (CO), CN CPN NVN (CT), DEN DEPN (DE), FAST FMNT FPN GN NFPN PBTN SPARC TPTN (FL), CGVHN CVEN no. 1 GARES GCN GSSBN GSN GTN NGSN WGN (GA), IMN MTN (IL/MT), ILN (IL), ION ITN QIN (IN), IA75mN TLOC (IA), KPN K5BN QKS (KS), KNTN KSN KTN KYN SEKEN (KY), LAN LRN LTN (LA), CMEN PTN SGN (ME), MDCTN MDD (MD/DC), EMRI EMRIPN EMRISS HHTN NENN RIEM2m (MA/RI), MACS MTN QMN (MI), MSN MSPN-E MSSN (MN), MLWN MTN (MS), MEOW NEMO (MO), WNN (NE), NHVTN (NH/VT), MGN NJCN NJPN (NJ), NMRRN (NM), NLI NLIPN NLIVHF WDN (NY), CN NCSSBN SCSSBN (NC/SO), BN BNR ONN OSN OSSBN O6mN (OH), PLZ OPEN OTWN STN (OK), BSN OARES 1676 OSN PAARES WCN (OR), EPA EPAETN PPN PTTN WPA WPAP&TN (PA), SDN (SD), TPN (TN), HCN TEX TTN (TX), BUN CUN (UT), SVSN VFN VN VNTN VBSN VSN (VA), WVN WVPN (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

The first daytime TCC sked ever took place on Wednesday, June 7, 1978, between W9NXG and WA1VEI on 14035 kHz at 1845 UTC.

K1PAD received his first TCC-E certificate and K1GN received his first annual.

1	2	3	4	5
Eastern	158	85.4	1674	585
Central	165	67.3	876	444
Pacific	120	91.7	1247	614
Summary	443	81.5	3797	1643

1 — AREA	4 — TRAFFIC
2 — FUNCTIONS	5 — OUT-OF-NET TRAFFIC
3 — % SUCCESSFUL	

TCC Roster

The TCC Roster (June): Eastern Area (VE3SB/N2YL, Directors) — W1s KJ NJM JD, WA1s UNC UJWF ZAZ, WB1AJU, K1s BA EIR GN PAD SDH XA, W2s CS FR GKZ MTA RQ, WA2s ERT/1 ICB SPL, K2NY, N2YL, W3s FAF PO YQ, K3s KW NGN, N3HR, W4s MEE SQO UQ, WA4CKK, WB4PNY, K4s BKX KNP, N4KB, W8PMJ, K8KMQ, VE3s GOL SB, Central Area (W5GHP/W9NXG, Directors) — AA4KB, W4ZJY, WB4SKI, W5RB, WA5s HNN IQU RKU, WB5s FDP SDD, K5s GM MC, N5s TC TS YL YX/0, W9s CXY DND JIJ NXG, N9TN, W9s AM HI, WA9TNM, Pacific Area (K5MAT, Director) — N5s MR NG, W5s JOV KH, K5MAT, N6s GW PZ WP, W6s EOT OA VZT, K6OE, W7s DZX EP GHT VSE, K7s IWD, W9s ETT KON LQ, K9s BN CI DJ, WB9TAQ, VE7ZK.

Independent Nets (June)

1	2	3	4
Central Gulf Coast Hurricane Clearing House	30	117	1994
Empire Slow Speed	28	77	252
Hit & Bounce	47	623	436
IMRA	26	389	896
North American SSB	24	255	204
North American Traffic and Awards	29	46	528
Southwest Traffic	30	63	1061
Washington Region PON	16	18	224
20 Meter ISSB	26	398	500
75 Meter ISSB	30	404	965
7290 Traffic	43	395	2319

1 — NET	3 — TRAFFIC
2 — SESSIONS	4 — CHECK-INS

Public Service Honor Roll June 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.

70	WB5NKD.	N8CW	WB5VWM
WA2JKG	W6OA	K0PVI	WA8WPW
64	WB8MTD	WA0TNM	W9NXG
W7VSE	WB8YDZ	48	43
WB0ZAL	K0EZ	WB6FTY	WB4DHC
63	55	47	K4EV
WA1ZXB	K5OWK	WB1CPF	WB4OXT
W5KLV	N5RB	K3HI	WB5LBR
61	54	WD5AHH	K0DJ
K1BA	WB5MMI	K5TL	42
WA1UWF	53	K6SZI	VE4IZ
WA1YMN	WD9CQC	W0FT	VE4QU
WA1ZAZ	52	46	K2VX
AA2H	W1RWG	WB4TEK	WD4IFG
N5ES	WA3NAZ4	W8YIQ	WD4LUG
W5GHP	WD4COL	45	K5DG
WA6UJZ	N4SS	K3NGN	W8AUC
K8LGA/4	W8DIL	W5BGE	41
W8SOP	WB8WTS	WAS8VT	WA2YUS
59	W0OTF	WD8DIB	WA4JK
WA4JDH	W0OYH	44	AA4NC
WB5NKC	51	VE1ST	W5JOV
N5TC	WA4CNY	VE3FGU	K7NTG
N5TS	WB6PVH	VE3FHZ	WD8MFC
58	50	VE3GOL	40
W6RFF	WN4KKN	WB1DXR	K3JL
W7GHT	WB5LAT	K1ES	K3ORW
57	49	N1RI	WA3YDC
WB5SDD	VE1WF	WATVAB	WB5RPU
56	VE3DPO	W3PQ	27
VE3GT	VE4AAE	WA4CKK	WA2MKQ/T
VE4PG	WB4KDC	WB4FAS	WDBJYM/N
W1KX	WA2YEI	K4JGW	22
WA2MSO	W4FMN	WA4LGT	WD4BAJ/T
K4BKX	W4MEE	WB4PNY	WA4MJJ/T
N4NK	N5YL	WD5GNR	WA4QGV/T
W4OGG	WB6UZX	WB6SHD	WA4KDI/N
WB4QBB	K7GXZ	WB7JRC	WB4ZNL/T
WA4LYD	WA7MEL	WB8DMX	WD8JYN/N
N4WA	N8ABA	WB8NYN	

Brass Pounders League June 1978

BPL Medallions (see December 1973 QST, page 59) have been awarded to the following amateurs since last month's listing: WB2KIH, K5OWK.

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	428	1263	1499	61	3451
W0WYX	56	1215	468	747	2485
K3NSN	400	900	900	105	2305
WA4JDH	2	613	619	14	1248
WD4COL	28	447	456	87	1018
K0YFK		466		466	932
W8ZGQ		662	252		914
W3VR	227	203	379	10	819
K1BCS	91	229	388	24	730
WA2SPL	1	314	327	27	679
WA3ZRY	47	255	291		593
WD4NSG	246	45	265	22	578
WB5SDD	20	260		27	577
WA4GYR		230		336	566
W5KLV	1	311		22	555
WA0AUX	11	167	364	1	543
WA3WQP	53	214	255	8	530
W7VSE	7	268	223	14	512
K3NSN (May)	827	696	599	97	2219
WA0HJZ (May)	27	457	54	309	847

BPL for 100 or more originations-plus-deliveries

K1DFS	312	W0FQB	136
WA3ATQ	287	WB0ZAL	126
W9JLJ	196	K7NTS	102
W7TZK	142		

1 — CALL	4 — SENT
2 — ORIG.	5 — DEL.
3 — RCVD.	6 — TOTAL

June Reports

Area Nets						
(evening sessions)						
(daytime sessions)						
1	2	3	4	5	6	7
EAN	30	1405	46.8	1.128	97.8	
EAN	60	638	10.6	.567	92.0	
CAN	30	925	30.8	.773	96.7	
CAN	60	304	5.1	.232	88.3	
PAN	30	976	32.5	.889	97.8	
PAN	30	277	9.2	.241	96.7	
Region Nets						
1RN	87	533	6.1	.443	89.6	92.2
2RN	109	604	5.5	.397	79.5	84.4

Results, First Annual ARRL EME Competition

Sheer lunarcy!

By Tom Frenaye, K1KI*

The first ARRL EME Competition is now history. A gratifying 65 logs were received from a total of almost 100 participating stations!

A number of stations logged their first-ever EME QSOs. G3SEK, using a single 16-element Yagi, polar mounted, managed a QSO with K1WHS, while YV5ZZ completed 26 QSOs for the best single-operator score. Interestingly, it was the two band capability that netted the top spot for YV5ZZ. While he had the best 432 single-operator score, six others had bigger scores on 144 MHz. Multioperator honors go to K2UYH with 39 QSOs using an 8.6-meter dish and to K3NSS with 38 QSOs using the 23.7-meter dish owned by the Naval Research Lab in Washington, DC (both groups working all continents!).

The G3OUR group (Oxford University) reported K3NSS was 8-9 dB over the noise using a single loop Yagi. The N6NB/7 traveling roadshow provided K9HMB and N0JA with state number 50 from the Nevada/Utah border. This was a portable EME station carried in a camper with trailer. LU3AAT and K3NSS completed the first LU/W EME contact and also provided K2UYH with EME country no. 22.

If you're just getting started in EME, send an s.a.s.e. to Hq. for a bibliography of past *QST* articles. Once you are sure that EME is for you, write to Varian, Eimac Division, 301 Industrial Way, San Carlos, CA 94070, for their excellent package of information.

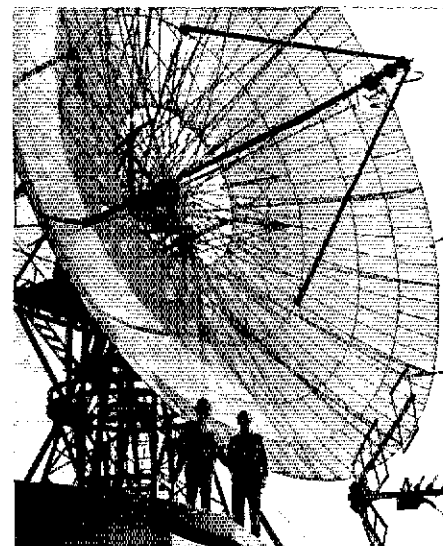
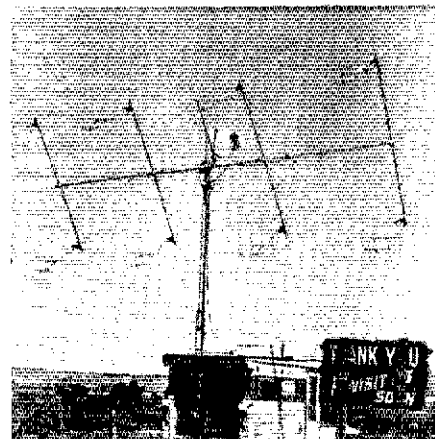
Soapbox

As usual, the most interesting comments are those made by the participants. Variable conditions — my schedule efficiency only 35 percent. Think you did right using one apogee and one perigee weekend. (YV5ZZ) Never heard so much

*Asst. Communications Mgr., ARRL

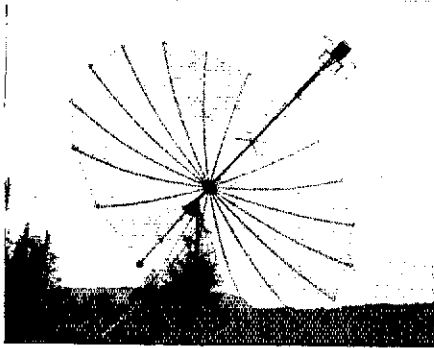
QRM on EME before. (K1WHS) The main difficulty came from polarization rotation (Faraday effect). Signals from K3NSS far better than others. (F9FT) The S meter was actually moving up to S9 from lightning crashes the second weekend. (K5JL) High sun activity and aurora made for very bad conditions. (SM7BAE) N6NB/7 certainly demonstrated the advantages of having polarization rotation capability by coming out of the noise to RST 439. (K4GL) Winds peaked at about 50 mi/h, and EMEing during short calms were very risky the second weekend. (W7UBI) Things can be worked with four antennas — but one needs a lot of time and patience, and a prayer to the Faraday god. (WB0SEG) Not enough of the gang called CQ. This made it difficult to find contacts. (W2AZL) New array, mast-mount preamp, etc., all went up the afternoon of April 15. Sked that night with K1WHS was successful! Talk about beginners luck! (W5UWB) Amazed to make a QSO on *one* Yagi. On weak signals ± 30

N6NB/7 8 eight-element quagls.

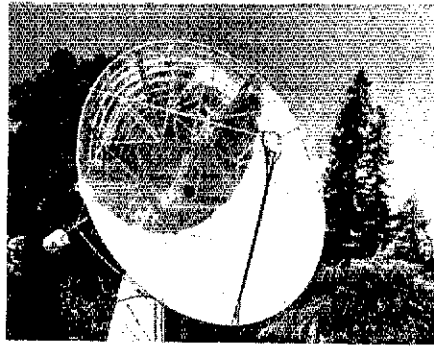


I5MSH and I5TDJ 11-meter dish.

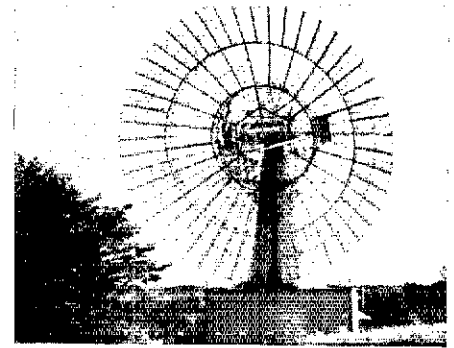
degrees on polarization is all the difference between T and O copy. (G3SEK) Did not expect signals to be as good on 144 MHz as they were. (W5FF) During the first weekend of the contest, our main problem was QRM! As many as six stations would answer our CQ. (K3NSS) My array was fixed in azimuth, which gives me about one hour of moon time each night. So it was then or never! (K4GFG) Due to the moon being in a low declination (second weekend), it meant that stations in Europe were penalized. (G4DZU) Rather than using call areas as multipliers, use U.S. states, Canadian provinces and DXCC countries. (K3NSS) Contests should be scheduled to avoid vhf/uhf conferences! (K1FO) If it's going to be a contest, there should not have been any skeds. (SM6CKU) Next time please choose weekends which give optimum operating time between Europe and North America. (SM3AKW) Run the contest for a week — particularly when the moon is moving towards southern declination (+18 to 0). There should be separate scores for each band. (WA4GPM) Have both weekends where more stations could use the universal window. (K5JL) There is a certain disadvantage for non-U.S. stations because many skeds were made by telephone. (YV5ZZ) I worked three guys while taking a shower after the contest ended Sunday. My wife turned on a fan in the kitchen on Monday and I heard SM7BAE calling CQ in it!!! The 432 system was a flop. (K1WHS) Started with my Technician license last year. (WB0ZXU) Nothing at all failed in the equipment but a huge kidney stone crisis struck down the operator (surgery required). (F9FT) Is a Yagi used for EME work called a "moon beam"? (anonymous) I'm working diligently on bouncing a much modified SSTV signal off the moon. (K4TWJ)



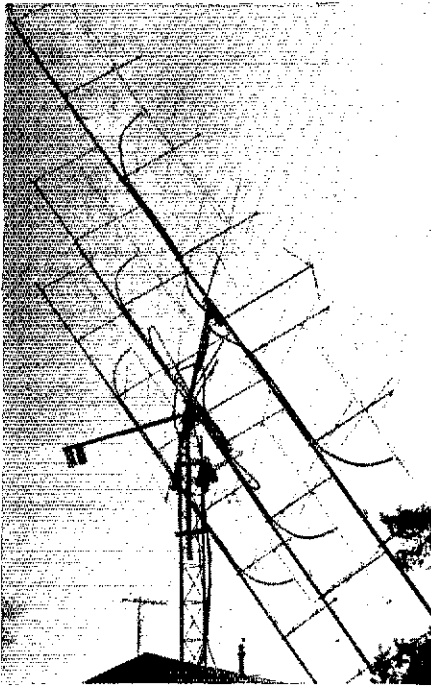
F2TU 6.1-meter dish.



W6YFK 5.5-meter dish.



K3NSS 23.7-meter dish.



WA4GPM 120-element colinear.

Line scores list: Call, score, stations heard, stations worked, multipliers, band (A-144 MHz, B-432 MHz).

Single Operator	Score	Stations Heard	Stations Worked	Multipliers	Band	Antenna
YV5Z2	54,600	11-11	9-A	15-15	12-B	16 9-el Yagis 16 21-el Yagis
K1WHS	27,300	21-21	13-A	2-2	2-B	160-el colinear 8 15-el Yagis
W7FN	26,000	22-20	13-A			16 7-el Yagis
F2TU	18,200	14-14	13-B			6.1 meter dish
DK1FGA	13,000	15-13	10-A			8 15-el Yagis
W9WZ XU	11,700	21-13	4-A			8 9-el Yagis
GJLTT	11,000	21-11	10-B			6.1 meter dish
K7NH	10,800	15-17	9-A			16 8-el Yagis
E9FT	10,800	15-12	9-B			16 21-el Yagis
ZF5JJ	10,800	12-12	9-B			9.9 meter dish
K9CM	10,400	13-13	8-A			8 14-el Yagis
K5JL	10,000	10-10	10-B			16 15-el Yagis
VE7BBG	9,900	12-11	9-B			6.1 meter dish
Y1WD	8,100	3-2	2-A	7-2	2-B	
J46CZD	8,000	13-10	8-A			7.0 meter dish
N8JA	8,000	10-10	6-A			160-el colinear
W1XP	7,200	9-9	8-R			16 13-el Yagis
N6NB/7	6,000	10-10	6-A			8 8-el Quags
LX1DB	5,600	10-8	7-B			9.0 meter dish
KH8HP	5,600	9-8	7-B			8 21-el Yagis
PA95SB	4,900	7-7	7-B			6.0 meter dish
K4GL	4,200	8-7	6-A			
SM7BAE	3,600	7-6	6-A			16 10-el Yagis
W6ABN	3,600	6-6	6-R			7.3 meter dish
W7GBI	3,600	7-6	6-B			128-el colinear
DL9KR	3,000	16-6	9-B			16 10-el Quags
K9RMG	2,500	5-5	5-A			8 8-el Quags
DJ8QL	2,500	8-5	8-B			7.0 meter dish
K9HMB	2,000	5-5	4-A			160-el colinear
WA4GPM	1,600	4-4	4-A			120-el colinear
W7UBI	1,600	4-4	4-A			8 9-el L-P Yagis
K1MNS	900	3-3	4-A			8 14-el Yagis
SM3AKW	900	4-3	4-A			32-el ext. exp. colinear
K9ZZH	900	4-3	4-B			5.3 meter dish
SM6CKU	900	3-3	3-B			8 16-el Yagis
WA4MVI	400	12-2	2-A			160-el colinear
14EAT	400	4-3	2-A			4 14-el Log-Yagi
VK5MC	400	2-2	2-A			
WA1UHA	400	2-2	2-B			128-el colinear
K8WV	400	2-2	2-B			16 13-el Yagis
WB9SBG	400	11-2	2-B			4 16-el Yagis
JA9BOH	400	6-2	2-B			8 13-el Yagis
LJ3AAT	400	2-2	2-B			8 13-el Yagis
W81GU	200	7-2	2-A			160-el colinear
K1FO	100	1-1	1-A			4 16-el Yagis
W2AZL	100	13-1	1-A			4 16-el Yagis
K4GFG	100	1-1	1-A			4 14-el Yagis
N4FZ	100	3-1	1-A			4 13-el Yagis
W5UWB	100	1-1	1-A			4 14-el Yagis
G3SEK	100	1-1	1-A			1 16-el Yagi
WA9LPH/KL7	100	2-1	1-A			4 16-el Yagis

Multi-Operator

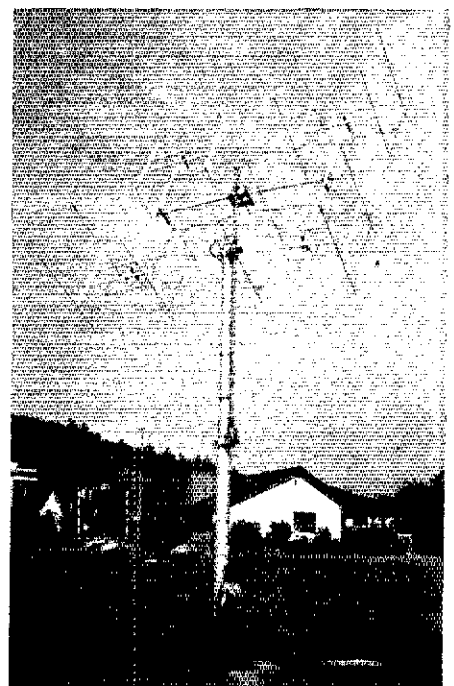
K2UYH(+K3BPP, W3s HMU HQT)	109,200	8-7	4-A	33-32	23-B	8.6 meter dish 8.6 meter dish
I5MSH(+I5TDJ)	28,500	20-19	15-B			11 meter dish
W8FF(+K5FF)	13,200	3-3	3-A	9-9	8-B	9.9 meter dish 9.9 meter dish
W6YFK(+K6GJM, K7CAD)	10,000	14-10	10-B			5.5 meter dish
WB9QMN(+W9OZY, W9s NLS QLR)	400	9-2	2-A			8 14-el Yagis
WA4AIY(+N4SA)	400	9-2	2-B			6.1 meter dish
K9IMM(+WA9s ACI KQJ)	100	1-1	1-A			5 14-el Yagis

Non-amateur Equipment

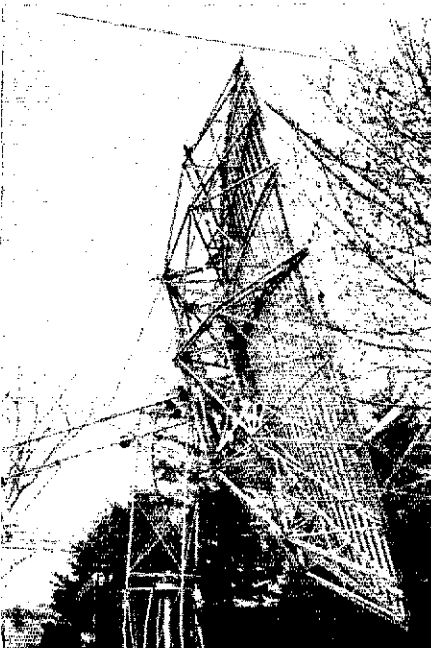
K3NSS(W1ZX, K3s AGR JYD LFD, W3s HE PGM, WA3s TAI UPH, WA9J, W04s BZ, W2CQ, KP4EBH, oprs)	57,400	38-38	2-B			23.7 meter dish
G3JURIG(3s WDC, YGF, G4CNV, G8HDR, oprs)	500	5-5	5-R			4 27-el loop Yagis
SWL						
HB9QQ (144 - 4 stations heard)						4 9-el Yagis
W1JXN (144 - 3 stations heard)						4 16-el Yagis
K4UD (432 - 3 stations heard)						4 16-el Yagis
G4DZU (144 - 1 station heard)						4 14-el Yagis
K4TWJ (144 - 1 station heard)						

Other Active Stations

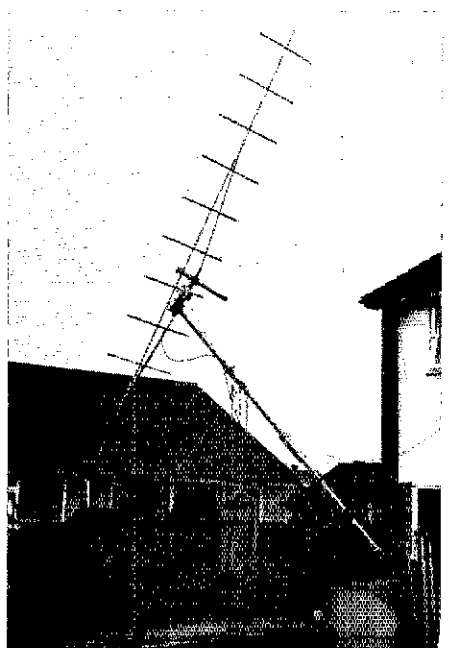
W1FZ, W82BYT, WA2WVL, K3PQP, K5CW, W8SI, UA
WB9MT, W8PO, WA7BU, WA7KZ, WATTY, K9CA,
W9WQ, K8E1/9, K8TLM, W8Y7S, DKGLA, GW4CQ,
18CVS, JA1VDV, O79CR, SK6AB, SM2AID, SM3BPK, VE4JX,
XE1RY



DL9KR 16 10-element quags.



K2UYH 8.6-meter dish.



G3SEK single 16-element Yagi.

Results, FMT

By Jean DeMaw,* W1CKK and Jim La Porta,** N1CC

The May 13th FMT ran smoothly (for a change!) with the umpire furnishing measurements on all runs. Early runs were clocked at 14140.712, 7074.160 and 3562.238 kHz. Late runs measured at 14089.494, 7018.285 and 3519.536 kHz.

There were 136 participants who made a total of 1809 readings from W1AW during the FMT. Of the 100 who qualified for Official Observer standards (measuring within 100 hertz) for the May run, 58 met the present Honor Roll criteria of 5 Hz. These entries have asterisks in the tabular listings.

All participants did so well in the change from parts per million to metric

standards during the February and May FMT that we've decided to "fatten the pot" and create an even greater challenge to perk up the interest. Commencing with the September 17 FMT (rules in August "Operating Events"), the standard for the HR status is that participants who fall into the top 10 percent of those who qualify will be shown as Honor Roll members.

*Communications Assistant, ARRL
 **Deputy Communications Manager in training, ARRL

Deviation in Hertz from Umpire

Call Sign	Early Run			Late Run			Average	Call Sign	Early Run			Late Run			Average
	20	40	80	20	40	80			20	40	80	20	40	80	
N1AS	012	113	010				047	*N6EN	002	001	001	003	000	000	001
W1AYG				056	084	030	038	K6HI				037	016		026
*W1BGW			003		003	001	002	*K6MZN	001	004		000	002	000	001
W1DDO	008	019	004				010	*N6MW	001	005					003
*W1JH		001			011	000	004	*W6OQI	001	000		001	000	000	000
K1MKP	101	058	103				087	*W6RQ	001	001		000	001	001	001
N1NH	003	029	011				014	W6SSB	009	031		054	058	070	044
*W1PLJ	001	000	002				001	W6WL	007	037					022
WA1QOI	022	007					014	*W7ANF	001	000	001	002	001	001	001
W1SPP			032			009	020	WA7EYZ		013	012				012
W1TS		065	049				057	WA7HGB	112			019			065
*K1VHO	000	000	001				000	*ex-7HM	004	001	000				001
W2DW					021	024	022	WA7IJN					000		000
*K2LM		001	001				001	*W7SC		001		003	007	005	004
K2OPJ				056	065	064	061	W7SK		015		001	357	062	038
WB2WPA					095		095	K7ST	007	001			001	001	073
W3BFF			000				000	*W8CUJ	001	001	001	000	001	001	000
WB3ERE	071	006	030		084	027	043	*W8CXO			001			004	002
*W3FSV	000	001	001	003	001	001	001	*W8HZA		002	003				002
K3JL		018	015		020	023	019	W8LX		075	055				065
*K3LPP		003	000				001	*WA8NOI		004	004	005	000	000	002
N3MA	062	010	002				024	*W8NWU		002	003		001	001	001
W4AWS		010	062				036	*W8OK	001	001	001	000	000	001	000
*WA4AXA		002			001		001	*WA8QBJ	001	001					001
N4DC		080	009				044	WA8SQL	104	058	003				055
W4DGF		016	001				008	*WB8STQ	002	001	001				001
W4DRF	021	002	009				010	*W8YZ		000	001				000
W4HU		023	001				012	Greathouse			007				007
*W4IBU		002			001		001	W9FN		000	001	068	005	004	015
K4JQY	060	030	011				033	*WD9INP		002	001	000	000	001	000
WB4KCL		040	048				044	*W9TJ	008	001	001		001	001	002
W4MLR			007				007	WB9VUO		058			077		067
*W4NTO		001	000				000	K9WMP		008			025		017
*K4NWE		001	001				001	*K9WGN	001	000	001	000	001	001	000
*W4RHZ		000	000				000	*W9ZTK		000	001				000
*WB4RLW	001	001	000	001	001	000	000	*W0BJ	000	000			001	001	000
W4QN	104	042	028				058	WA0DEM				044	035	086	055
W4UCL	088	060	013				053	K0FFC	098	010	038				048
*N4VM		006	002				004	*WA0NXD	002	000	001				001
AA4WF	008	040	012				020	*W0KL	009	002	002				004
*K5DL	000	001	002				001	*K0KPJ		003			001	003	002
*N5DZ		002	003		003	001	002	*K0PVG	002	006			009	003	005
*WB5EPI	008			005	004		005	*W0RUR		001	001		003	000	001
*W5FMO	003			000	001	001	001	W0SS	058	022	027				035
*W5IJW	001	001		000	001	001	000	WB0UFQ	008	008	008	030	031	017	017
*K5JW	001	003		000		000	001	*K0VM	001	001	002				001
*WASNOM	001	002	002	007	001	002	002	WA0YCY	050	038	005				031
K5OA	025	018		044	031	035	030	*VE2WQ	003	004	003				003
*W5OS		005	000		002	000	001	*VE3AC					001	002	001
*W5QIV	000	000	001		003	002	001	VE3GIV	002	027	006				011
*K5RY	006	003					004	VE6MJ	062	010		056	135	086	069
*WB6AAL	002	001		000	002	003	001	*VE6QM	003	004			001	002	002
*W6CBX	002	002					002								
*W6CDF	005	004		001	001	000	002								

*Stations are Honor Roll.

Operating News

Conducted By George Hart,* W1NJM

WAS Endorsements

Perhaps next to DXCC, WAS (Worked All States) has been one of our most sought-after awards. Unlike DXCC, however, it has seldom been the subject of controversy or litigation (see "What Price Integrity?" June 1978 QST). In DXCC, each step in its evolution has been beset with strife, often the subject of Board action. Not so, WAS. Endorsements for this award are available for practically anything, but all cards must clearly indicate what the endorsement is for.

This seems simple and straightforward enough, but like most rules it leaves a lot of loopholes and even a few inconsistencies. For one thing, it doesn't specify *who* puts the information on the card; it is just assumed that the operator of the card-sending station does so, not the recipient. If we grant that this assumption is a valid one, there is no problem, as there has not been all these years. The trouble is that in our modern legal loophole-seeking society, you can't really take anything for granted. The wording must be complete and precise. If it isn't, word sharpies will crawl all through it. Even if it is, the sharpies can often find ambiguities through interpretation. The wording is changed to cover such contingencies, becomes complicated, sentences get longer, and use more modifiers and appositions. Soon the original thought becomes lost in provisos, exceptions and side passages. All documents written in legalese, insuranceese, governmentese have this problem as writers seek to cover all facets — not to make them understandable to the lay reader, but to try to make them

*Communications Manager, ARRL

foolproof to the loophole seeker. And almost invariably, the result is simply to obfuscate the original intent, give the sharpies a challenge which they greatly enjoy, and make it impossible for anyone else to understand.

Then there is the problem of an original rule that makes sense when first devised but flunking a subsequent test to which it was not originally intended to apply. Sure, we'll endorse WAS for anything, provided the cards show it. But what if the specialty for which endorsement is sought is something only the recipient can verify — or at least, one for which the card-sender is no more qualified to verify than the recipient? What, then, is the point to requiring the sender to state the specialty?

Not so long ago we had an application for WAS endorsement by an amateur who claimed to have made contact with all 50 states using a soldering gun for an antenna. Why a soldering gun? Don't ask us; everyone is entitled to his own idiosyncrasies, and if we apply Rule 7 all that is required is that each card state that the contacted station was using a soldering gun for an antenna. But how does the card-sender know that this was the case? Merely because the recipient told him so. Does this make sense? Not a bit. If the applicant wants to cheat, he could tell the card-sender anything to put on the card and, given 50 cards (one from each state) that so state, we would issue the endorsement.

How else could it be done? Oh, in lots of ways, say correspondents, and quite a few have been proposed. Each one assumes that Headquarters has unlimited time, unlimited person-

nel and unlimited funds to verify the legitimacy of all claims, not to mention punishing those found to have obtained awards or endorsements on false premises and handling the resulting reaction of those (most) who feel falsely accused.

The soldering-gun application is an unusual one, mentioned just for that reason. The most usual is an application for a special QRP WAS. Say you work stations in all 50 states, using under 10 watts input for all 50. It is a tough job, takes you a long time, many calls, midnight oil, early rising. Once you make the contacts, it is often an even tougher job to get the cards. You send stamps, s.a.s.e.s, pleading letters, even cards all made out that the guy at the other end has only to sign. But at last the job is done, you have the 50 cards. You send them to Headquarters, with return postage, and wait breathlessly.

Then what happens? Either you get back a plain WAS certificate with a typed endorsement on the bottom (when you expected, maybe, after all that work, at least a gold-embossed special certificate); or you get back a card from the Awards Branch of the CD saying that some of your cards did not specify the low-power operating condition and are therefore invalid. In the former case, at least disappointment; in the latter, a feeling of frustration or even rage. You know you were using low power, you told the guy you worked that you were and requested that he put it on his card, and here is Headquarters calling you a liar. Why can't they take your word for it? What difference does it make anyway if the card says

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 ¹	Slow ¹		
7	9	10	1400 *			Cw Bulletins ¹				
8	10	11	1500 *			RTTY Bulletins ¹				
1 P.M.	3 P.M.	4 P.M.	2000 *	Fast ¹	Slow ¹	Fast ¹	Slow ¹	Fast ¹	Slow ¹	Slow ¹
2	4	5	2100			Cw Bulletins ¹				
3	5	6	2200			RTTY Bulletins ¹				
4	6	7	2300	Slow ¹	Fast ¹	Slow ¹	Fast ¹	Slow ¹	Fast ¹	Fast ¹
5	7	8	0100			Cw Bulletins ¹				
6	8	9	0200			RTTY Bulletins ¹				
6:30	8:30	9:30	0130			Phone Bulletins ¹				
7	9	10	0200	Fast ¹	Slow ¹	Fast ¹	Slow ¹	Fast ¹	Slow ¹	Slow ¹
8	10	11	0300			Cw Bulletins ¹				
9	11	12	0400			RTTY Bulletins ¹				
9:30 P.M.	11:30 P.M.	12:30 A.M.	0430			Phone Bulletins ¹				

¹Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 6, 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, 21.39, 28.59, 50.19, 147.555 MHz.

Please note that all footnoted frequencies are approximate.

*W1AW will beam 45° for these transmissions on Mondays, Wednesdays and Fridays during September 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. 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: September 11, It Seems to Us; September 14, World Above; September 20, League Lines; September 26, Public Service; September 27, Happenings; September 29, Operating News.

so; why is the contacted station qualified any better than you to verify the special condition? Or even as well? You conclude that there is something basically illogical with the rule; that a change is needed. You never realized this until your special WAS endorsement was turned down, of course. You write to Headquarters, venting your wrath, with maybe a copy to your director.

Okay, we admit that the rule has a logic flaw in this and similar applications. What's the alternative? Setting up some sort of procedure which would make it possible for the applicant to prove he did the job, without benefit of QSL card verifications? Investigation of claims by Headquarters without the applicant's knowledge? Discontinuance of all endorsements for specialties which cannot be ascertained by the card-sending station?

In our lead for this column in a previous issue referenced above, we pointed out that three full-time employees issue awards (not counting the DXCC family) and are hard-pressed to keep up with the demand under present procedures. Expanding the branch to meet the demand is unthinkable, for reasons stated. Discontinuing some awards so that more attention can be devoted to others is also unthinkable. No doubt there are certain awards you feel could be dispensed with, but holders of these awards or those trying for them most certainly would not agree. Of course we could revert completely to the honor system, applicants just sending in a statement affirming their achievement. This would save everyone a lot of trouble and grief, but how much integrity would an award achieved in this manner have? The easier you make cheating, the more cheaters you will have. The harder you make it, the more difficult, time consuming and expensive its administration. The rules of necessity are devised to hit somewhere in the middle. Is it impossible to get an ARRL award by cheating? Certainly not. But you have to go to some trouble to do so, and if you are found out there is usually some sort of prosecution.

This does not even address the philosophy of cheating. If building your image in the eyes of others is your objective (unfortunately, this is the majority objective), the temptation to cheat is great. If you are interested only in proving to yourself that you can accomplish the achievement, there is no temptation to cheat, because in that case you aren't "getting away" with anything.


So what do we do about the QRP WAS and similar endorsements? You tell us. There are only two practical alternatives: continue as at present, or move further toward the honor system; that is, take the applicant's word that he used under 10 watts and no longer require that it be indicated on the card. Other solutions involve additional cost in processing or decrease in integrity. It's your decision, fellers and gals. What's your pleasure?

SCM ELECTION RESULTS

The following were elected for two-year terms of office beginning October 1, 1978:

<i>Uncontested</i>	
West Indies	Jose R. Lebron, KP4JL
Oklahoma	Leonard R. Hollar, WA5FSN
Minnesota	Helen Haynes, WB0HOX
Idaho	Lemuel H. Allen, Jr. W7JMH
Western New York	Lonnie J. Keller, WA2AOG
Ohio	Harold C. Chapman, WB8JGW
South Dakota	Lydia S. Johnson, W0KJZ

Appointments

In the Western Pennsylvania Section, Otto L. Schuler, K3SMB was appointed to complete the term of Donald Myslewski, K3CHD (resigned). 

OSCAR 7

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
17355B	1 Sept.	0012	61.9
17368B	2 Sept.	0106	75.5
17380A	3 Sept.	0005	80.3
17393B	4 Sept.	0100	73.9
17406B	5 Sept.	0154	87.5
17418A	6 Sept.	0053	72.3
17431B	7 Sept.	0148	85.9
17443B	8 Sept.	0047	70.8
17456A	9 Sept.	0141	84.4
17468B	10 Sept.	0040	69.2
17481B	11 Sept.	0135	82.8
17493A	12 Sept.	0034	67.7
17506B	13 Sept.	0128	81.3
17518B	14 Sept.	0028	66.1
17531A	15 Sept.	0122	79.7
17543B	16 Sept.	0021	64.5
17556B	17 Sept.	0116	78.1
17568A	18 Sept.	0015	63.0
17581B	19 Sept.	0109	76.6
17593B	20 Sept.	0009	61.4
17606A	21 Sept.	0103	75.0
17618B	22 Sept.	0002	59.9
17631B	23 Sept.	0057	73.4
17644A	24 Sept.	0151	87.0
17656B	25 Sept.	0050	71.9
17669B	26 Sept.	0144	85.5
17681A	27 Sept.	0044	70.3
17694B	28 Sept.	0138	83.9
17706B	29 Sept.	0037	68.8
17719A	30 Sept.	0132	82.4
17731B	1 Oct.	0031	67.2
17744B	2 Oct.	0125	80.8
17756A	3 Oct.	0025	65.6
17769B	4 Oct.	0119	79.2
17781B	5 Oct.	0018	64.1
17794A	6 Oct.	0113	77.7
17806B	7 Oct.	0012	62.5

OSCAR 8

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
2501A	1 Sept.	0016	44.6
2515J	2 Sept.	0020	46.0
2529J	3 Sept.	0025	47.2
2543A	4 Sept.	0031	48.6
2557A	5 Sept.	0037	50.0
2571X	6 Sept.	0041	51.2
2585A	7 Sept.	0046	52.5
2599A	8 Sept.	0052	53.8
2613J	9 Sept.	0058	55.2
2627J	10 Sept.	0103	56.5
2641A	11 Sept.	0107	57.8
2655A	12 Sept.	0112	59.1
2669X	13 Sept.	0118	60.4
2683A	14 Sept.	0124	61.8
2697A	15 Sept.	0128	63.1
2711J	16 Sept.	0133	64.4
2725J	17 Sept.	0139	65.7
2738A	18 Sept.	0001	41.2
2752A	19 Sept.	0006	42.6
2766X	20 Sept.	0011	43.9
2780A	21 Sept.	0016	45.2
2794A	22 Sept.	0021	46.5
2808J	23 Sept.	0027	47.8
2822J	24 Sept.	0033	49.2
2836A	25 Sept.	0037	50.5
2850A	26 Sept.	0042	51.8
2864X	27 Sept.	0047	53.1
2878A	28 Sept.	0053	54.4
2892A	29 Sept.	0059	55.8
2906J	30 Sept.	0103	57.1
2920J	1 Oct.	0108	58.4
2934A	2 Oct.	0114	59.7
2948A	3 Oct.	0119	61.1
2962X	4 Oct.	0124	62.4
2976A	5 Oct.	0129	63.7
2990A	6 Oct.	0134	65.0
3004J	7 Oct.	0140	66.3

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 Isb; 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 (September 3 is day number 246, 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 28.737548 degrees west per orbit in a period of 114.945227 minutes. O 8 progresses 25.808088 west in a period of 103.228748 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

SEPTEMBER

1-10: Miss America Pageant (K2BR)

1-30: Grand Prix Award

2-4: Four-land QSO Party

3: LZ DX Contest

6: West Coast Qualifying Run (W6OWP prime, W6ZRJ alternate), 10-40 wpm at 0400Z (Universal Coordinated Time, abbreviated UTC with Z shown as a time designator). The run will take place at 9 P.M. PDST local clock time the night of September 5. Frequencies are approximately 3590/7090 kHz. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A large, stamped, addressed envelope will help to expedite your award/endorsements.

9-10: VHF QSO Party, page 65, August; Pennsylvania QSO Party, WAE Phone, page 74, August.

10: North American CW Sprint, page 77, July (under July 2 listing).

12: WIAW Qualifying Run, 10-35 wpm at 0200Z, 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 September 11. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send to ARRL per the instructions under the September 6 listing.

13-15: YLRL Howdy Days, page 74, August.

16-17: Scandinavian Activity Contest (SAC) cw, Washington State QSO Party, Maryland-District of Columbia QSO Party, page 74, August.

17: Frequency Measuring Test, page 74, August.

19: WIAW Qualifying Run, 10-35 wpm, at 1300Z. This is 0900 EDST (9 A.M. local Eastern time) on the 19th. All other details per the September 12 listing.

23-24: Scandinavian Activity Contest (SAC) phone, Delta QSO Party, page 74, August.

24-25: Fall Classic Radio Exchange, page 74, August.

30-October 2: Rocky Mountain Division QSO Party, page 74, August.

OCTOBER

5: West Coast Qualifying Run. (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0400Z. The run will take place at 9 P.M. PDST local clock time the night of October 4. Frequencies 3590/7090 kHz, approximately. Other details under the September 6 listing.

7-8: VK/ZL/Oceania DX Contest phone and RTTY, sponsored by the Wireless Institute of Australia and the New Zealand Amateur Radio Transmitting Society, 1000Z October 7 through 1000Z October 8 (cw October 14-15). Non-VK/ZL/O stations score 2 points for each QSO on a specific band with ZK/ZL; 1 point with Oceania stations other than VK/ZL. Final score: Multiply total QSO points by the sum of VK/ZL call areas worked on all bands. (The same area worked on different bands counts as a separate multiplier.) Send RS(T) plus serial starting with 001. Usual log info, underline each new ZK/ZL area worked. Log each band separately. Separate summary to include call, name, address, equipment details and band breakdown delineating QSOs and areas worked on each band. All-band score uses the sum of multipliers worked on all bands. Usual signed declaration. Certificates and plaques will be awarded. Logs should be posted to reach the committee before January 31, 1979. Logs go to Contest Mgr., Jock White, ZL2GX, 152 Lytton Road, Gisborne, NZ. QRP QSO Party, sponsored by the QRP ARC international, starts 2000Z October 7, ends 0200Z October 9; open to all. Members send RS(T) and state (or province or country) plus QRP number. In lieu of QRP number nonmembers send power input. Stations may be worked once per band for QSO and multiplier credit. Member QSOs count 3 points, others 2 points. Stations other than W/VE count four points. Final score equals QSO points times number of multipliers per band times power multiplier. (Over 100 watts input times one, 25-100 watts times 1.5, 5-25 watts times 2, 1-5 watts times 3, less than 1 watt times 5.) Suggested frequencies: cw, 1810 3560 7060 14060 21060

28060; ssb, 1810 3985 7285 14285 21385 28885; Novice, 3710 7110 21110 28110 (all plus/minus 5 kHz). Certificates. Send full log data including name, address, bands, equipment, power to QRP ARC Contest Chairman N5BE, E. V. Sandy Blaize, 417 Ridgewood Drive, Metairie, LA 70001. Logs must be received by November 30. California QSO Party, 1800Z October 7 through 2359Z October 8. Single-operator stations may operate 24 of the 30 hours, multioperator stations may operate the full 30 hours. Times on and off must be clearly marked in the log. Stations may be worked once on each band and mode simplex only. CA stations that change counties may be worked as a new station. Exchange: CA stations send consecutive QSO number and county. Stations outside CA will send QSO number and state, province or ARRL country. Scoring: Each contact is worth 2 points; CA stations count the 50 states and VE/VO 1-8 for a maximum of 58 multipliers and non-CA stations will use the CA counties, a maximum of 58. Total QSO points times the multiplier will give final score. Suggested frequencies: 1805 3560 7060 14060 21060 28060 on cw, 1815 3895 7230 14280 21355 28560 on ssb and 3725 7125 21125 28125 for Novice cw. Summary sheet and logs must be sent to NCCC c/o George Varvitsiotis, WB6DSV, 801 Inverness Way, Sunnyvale, CA 94087 not later than October 31. Please send a business-size self-addressed, stamped envelope with your logs. Awards for individuals and clubs.

11-12: YL Anniversary Party, cw, sponsored by the Young Ladies' Radio League, from 1800Z October 11 through 1800Z October 12; open to all licensed women operators (phone session November 1-2). YLRL members only are eligible for the cup awards. OM contacts will not count. Call CQ YL. All bands, no crossband. Only one contact with each station, regardless of bands used. Exchange call, QSO number, report and ARRL section or country. Usual signed log info. Note that phone and cw are separate, requiring separate logs. All YLs within a section score one point for a YL QSO in a section, 2 points for a YL not within an ARRL section (i.e. DX). Contestants running 150-watts input or less on cw multiply score (contact points X sections/countries) by 1.25; ssb contestants running 30-watts PEP or less may multiply the score by the same 1.25 factor. Signed logs must be postmarked by November 24 and received by December 18. Logs go to Phyllis Shanks, W2GLB, 3 Honey La. West, Miller Place, NY 11764.

14-15: CD Party cw, open to all appointees and officials, notified separately by bulletin. (Eligibles operate any 20 hours out of the 30-hour period; times off 15 minutes or more. Party starts 2300Z October 14 and ends 0500Z October 16.) RSGB 21/28-MHz Telephony Contest, open to all. A station, whether fixed, portable or mobile may be worked only once on each band, single op only. Each complete QSO with a British Isles station earns 3 points. Final score is the no. of points times the total no. of British Isles prefixes worked on each band. Pertinent prefixes: G/GD/GI/GJ/GM/GU/GW 2, 3, 4, 5, 6, 8. Contacts with GB stations do not earn points or multiplier credit. Entries should be sent to P. A. Miles, G3KDB, 28 Scotch Orchard, Litchfield, Staffs WS13 6DE, England. They should be posted to arrive not later than December 4, 1978. VK/ZL/Oceania DX Contest cw. Rules as shown under phone 7-8 October. Manitoba QSO Party, from 2200Z October 14 through 0200Z October 16, sponsored by the Amateur Radio Clubs of Manitoba commemorating the 26th anniversary of the Amateur Radio League of Manitoba, ARLM. The same station may be worked on each band and mode. VE4 to VE4 and 2-meter simplex QSOs are permitted. VE4 mobiles can be worked each time they change municipalities. Exchange RST, name and QTH (municipality). Each QSO counts 3 points for cw to cw or 1 point for phone to cw or phone two way. VE4s multiply the number of QSOs times the number of states, VE provinces and DX countries worked. All others multiply the number of QSOs times the number of Manitoba municipalities, local government districts, provincial parks and forest reserves (maximum of 134), times the number of bands used. Suggested frequencies: ssb, 1810 3770 3895 7190 7230 14190 14290 21245 21395 28590; cw, 3705 7105 14060 21105 28105. Awards. Mailing deadline November 13. Send log data and usual signed declaration to Doug Bowles, VE4QZ, 1104 First St., Brandon, MB R7A 2Y4, Canada. 9-Land QSO Party, from 1800Z October 14 through 2359Z October 15. A

maximum of 24 hours may be worked. The same station may be worked once per band and mode. If any station changes counties, it may be worked again. 9-Land stations send RS(T), county and state; all others send RS(T), state, province or ARRL country. Each QSO is worth 2 points. 9-Land stations compute score by multiplying number of contacts times all multipliers times two and others multiply QSOs by 9-Land counties times two. Suggested frequencies are 1805 plus 60 kHz from the bottom edge of each hf band for cw, 1815 3895 7230 14280 21355 28600 on ssb and on 3725 7125 21125 and 28125 for Novice cw. Summary sheet and log accompanied by a large self-addressed, stamped envelope to Ill Wind Contesters, c/o John W. Sikora, WB9IWN, 8155 Woodlawn St., Munster IN 46321.

18: WIAW Qualifying Run, 10-35 wpm at 0200Z. This is 2200 EDST (10 P.M. local Eastern time) on the 17th. All other details per the September 12 listing.

21-22: CD Party phone, see October 14-15 listing. RSGB 7-MHz DX Contest, phone, from 1800Z October 21 to 1800Z October 22 (cw next month). Exchange report and serial (starting with 001). Non-British Isles stations score 5 points for each contact with the British Isles (those outside EU 50 points). All may claim a bonus of 20 points for each British Isles numerical prefix worked (i.e. G/GD/GI/GJ/GM/GU/GW 2, 3, 4, 5, 6, 8). GB contacts invalid. (Non-EUs must have at least 10 QSOs to qualify for an award. (Entries must be addressed to the HF Contests Committee, c/o J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, West Midlands, England, to arrive no later than December 12 for the cw contest and December 24 for the phone event. WADM Contest, celebrating the anniversary of the foundation of the German Democratic Republic from 1500Z October 21 to 1500Z October 22. Cw operation only, all bands from 80 through 10. Call CQ WADM. Send RST, plus consecutive serial starting with 001. Work only DMs. Each station may be worked once per band. A complete QSO 3 points, incomplete contacts or logging errors make the contact worth 1 point. Each DM district per band counts one multiplier. The final multiplier is determined by the sum of all districts worked on all bands. The special stations DM7, DM8 and DM count for a multiplier only on the band on which the station is worked for any missing district. The DM districts are the last letter of calls (A through O). Maximum multiplier of 73. Categories are single operator all band, multioperator stations all band and SWLs. Please use separate logs for each band and include the usual summary and declaration. Mail logs within 30 days to Radio Club of the GDR, DM Contest Manager DM2ATL, DDR 1055 Berlin, P. O. Box 30, German Democratic Republic. (Applications for all DM awards may be sent with the logs but please use separate application sheets for each award.) Canadian Amateur Radio Teletype Group (CARTG, VE3RTT) 18th Annual RTTY DX Sweepstakes, details next month. Jamboree-on-the-air (JOTA), details next month.

22: WIAW Qualifying Run, 10-35 wpm at 2300Z. This is 1900 EDST (7 P.M. local Eastern time) on the 22nd. All other details per the September 12 listing.

28-29: CQ WE Contest, details next month. CQWW Contest, details next month.

NOVEMBER

1: YL/AP phone

3-4: Trilliums QSO Party

4: Frequency Measuring Test

4-5: Sweepstakes cw, RSGB 7 MHz cw

8: West Coast Qualifying Run (0500Z)

11-12: IPA Contest

16: WIAW Qualifying Run (0300Z)

18-19: Sweepstakes phone

20: WIAW Qualifying Run (2100Z)

25-26: CQ WW cw

DECEMBER

2-3: 160-Meter contest

9-10: 10-Meter contest



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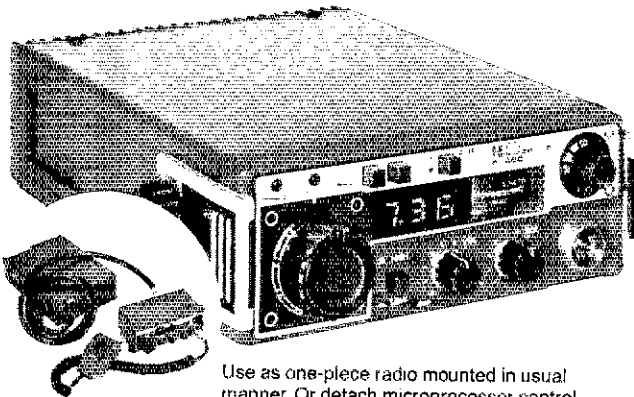
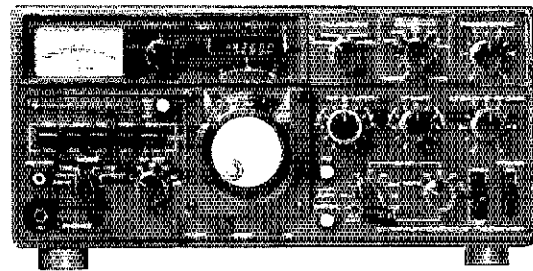
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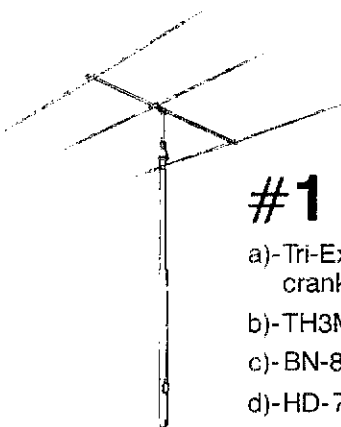
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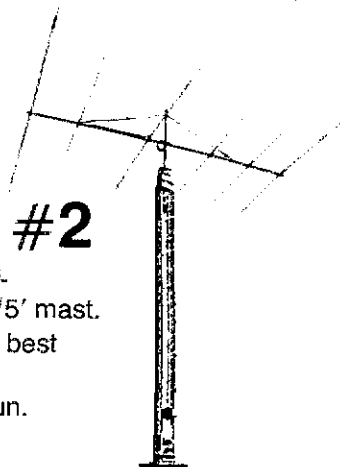
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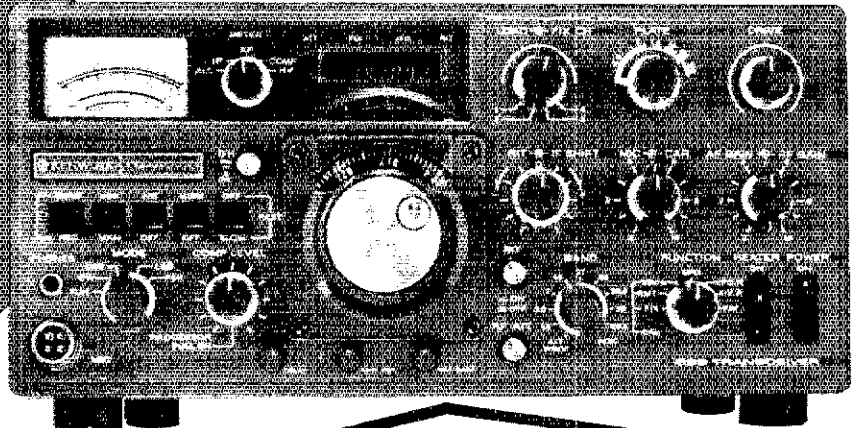
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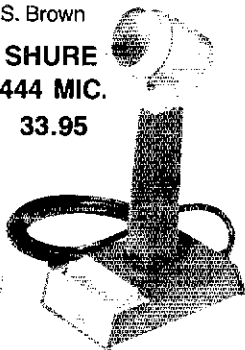
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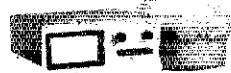


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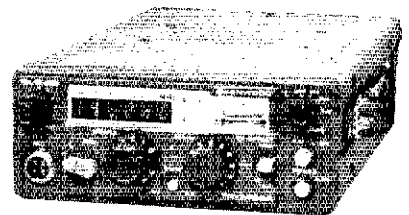
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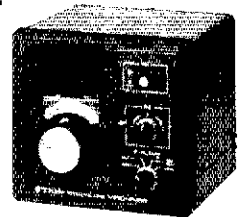
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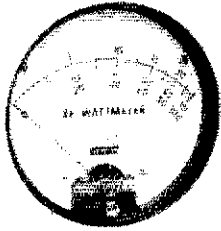
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CANADIAN DIVISION

ALBERTA: SCM, S. T. Jones, VE6MJ — SEC: VE6XC. PAM: VE6AFO. The Northern Alberta Radio Club is embarking on a new concept for training classes this fall. VE6VF has resigned as a net control station on the APSN. VE6TD has ordered a transmitter for 432 MHz. VE6MJ also picked one up on a recent visit to Vancouver and Victoria where he made contact with some old friends. Traffic: VE6HO 76, VE6ABC 6, VE6MJ 2.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — It is nice to see members of the BCEN taking an active part, in RN-7 and other trunks. The net has proved that 10-15 wpm is bringing more new members into the fold, and enjoying themselves. We are sorry to report VE7CN isn't doing too good. He had a stroke and not improving. VE7MP was rushed to the hospital — heart attack. QCWA's general annual meeting and banquet was well attended and new pres. is VE7DZ and vice-pres. is VE7AVW. There has been many parties and picnics amongst the VE7s but we never hear any reports. Not even the events that amateur radio played a part of. So it goes not reported. Traffic: VE7ZK 145, VE7COA 75, VE7FB 25.

MANITOBA: SCM, Peter Guenther, VE4PG — SEC: VE4TR. NMs: VE4JP VE4TE VE4DJ VE4ADS VE4GJ. ARES was activated in June during a tornado and came through with flying colors, good work fellows. Indications are that all FD were well attended and some with near or record contacts. Activity on all nets good despite summer conditions. Look for special mention in a future QST on ARES activity, 2-meter activity on the upsurge and the upcoming repeater VE4MAN will be a welcome addition. WRIN — 4 sess., QNI 72, QTC nil, MSTN — 15 sess., QNI 60, QTC 7, MPPN — 30 sess., QNI 328, QTC 15, MEPN — 30 sess., QNI 835, QTC 20, MTN — 14 sess., QNI 85, QTC 29. Traffic: VE4PG 46, VE4IX 28, VE4QJ 17, VE4ID 12, VE4NE 12, VE4CR 11, VE4QU 8, VE4AAD 5, VE4JP 5, VE4ACT 4, VE4ADS 4, VE4FK 4, VE4HA 4, VE4AAU 3, VE4TR 3.

MARITIME-NFLD: SCM, Aaron D. Solomon, VE1OC — Asst. SCM: VO1FG. SEC: VE1DI. PAM: VO1JN. APN Mgr.: VE1WF. Silent Keys: VE1ARN; VE1BLP ex-VE1ABA; VE1XF; XYL: VE1RU. Several exceptional VHF openings enabled working from the Carolinas to Nfld. Field Day condx reported fair to good, with more FD act. than ever. SCM rec'd 8 messages from seven clubs. WA2MT WB2DST WB2SH spent weekend at Dartmouth working 50, 144, 432 MHz, making 353 contacts. HARC Bulletin contains acct of St. Paul's Isl. DX-pedition. VE3HNW now signing VE1PT, VE1AAAC NCS WX Net operating from CBC radio studios. VO1LX operating from Ismailia as VO1LXSU. KIDZG signing por. VO1. VO1GW closed down NTN, lack of activity. APN sess. 30, QNI 98, QTC 534/45. Traffic: (June) VE1WF 69, VE1ASW 56, VE1ST 37, VE1LCP/RO 23, VE1ABJ 19, VE1HJ 17, VE1BGA 15, VE1OC 14, VE1LJ 10, VE1AMR 5. (May) VO1GW 7, VE1KR 4.

ONTARIO: SCM, Larry Thivierge, VE3GT — Asst. SCM: VE3GOL. Excellent weather, favorable band conditions and plenty of activity were the main ingredients for a successful 1978 Field Day. Sat. evening the hf bands were alive with exceptionally strong signals. 26 FD messages from clubs and groups were sent to me this year compared with 11 last year. I hope the scores reflect the activity. New club presidents elected are: Thornhill, VE3FDI; Nottown, VE3FVO and Guelph, VE3DGA. VE3BMG and VE3ZH returning for another year as pres. of Scarborough and Metro ARCs respectively. With the addition of new amateurs VE3s KFA KBU and KBX the Bancroft ARC was formed with VE3KFA, pres., VE3EY, vice-pres., VE3AI2, secy-treas. OTS VE3CDK now VE3KK and PRA Windsor VE3ETM now VE3KO. Recently appointed OPS VE3FGU was the last station appointment issued in Ont. under the old CD structure. VE3JLN, back from visiting friends in Boston and the Maritimes, has returned to the club and reports better signals. The ARC set up a display of amateur radio equipment, under the call of VE3BPC, at Kemptonville's annual Trade Fair. Despite a coax run of 400 ft., several contacts were made with South America, much to the delight of interested onlookers. Participating were: VE3s GNV AJN CAP ICI EEH IDM JMS and JRH. Welland Co. ARC's fall picnic scheduled for the 10th of Sept. New calls from the Georgian Bay area are VE3s KPT KPK KPI KPV and KPX while VE3s IY IHV and IDS received their Advanced. VE3AST and ASZ have moved to their farm in the Millbrook area. Don't forget the 10th Annual RSO Convention, hosted by the London ARC on Oct. 13, 14 and 15. See you there. Lakeshore amateurs assisted the Search and Rescue unit in a successful search for three lost fishermen. As our fall amateur activities begin to pick up, whether you're a DXer, contester, ragchewer, traffic handler and whatever mode you prefer, let's all try and put the fun back into amateur radio. Traffic: (June) VE3GOL 310, VE3GT 179, VE3KK 161, VE3ISW 136, VE3SB 131, VE3DPO 111, VE3HGJ 109, VE3JIR 83, VE3FN 72, VE3GJG 65, VE3EWD 48, VE3GNW 47, VE3DVE 35, VE3ATR 28, VE3FGU 24, VE3FHZ 17, VE3JLP 15, VE3JRT 14, VE3AWE 13, VE3IFP 13, VE3FZG 11, WB3XVE3 8. (May) VE3FHQ 15, VE3APK 11.

QUEBEC: SCM, Ed Sieb, VE2BAQ — VE2YU is new pres. of the West Island ARC. Congrats. VE2DSV has put up his new Monie 40-meter beam; all his neighbors are moving out. VE2CEP club station on the air with kw and beam. VE2CYB, CFB Bagotville ARC will be using CF2CYB from July 1, to Dec. 31. VE2CYB recently gave a Demo on ham radio at the Canadian Air-Force Show. The Ottawa Valley gang were very active on FD, 3 stations and 17 ops; 4 members of ARES also participated. MARC was also active — 2 stations, 6 ops, 12 cases of beer, and "a zillion mosquitoes." VE3FRX is a new call; Mike is active 20 meters CW, and also VHF. Traffic: VE2BP 42, VE2EC 42, VE2UN 33, VE2YU 10, WB1E2I/VE2 2.

SASKATCHEWAN: SCM, Percy Crosthwaite, VE5RP — The Moose Jaw Air Show is one of the largest of its kind. Our local amateurs supplied the Air Force with communications. In case of an emergency VE5WV was on standby at the Plains Hospital in Regina. SATN training turned out to be very successful thanks to VE5AAE. I have been elected president of the Saskatchewan Amateur Radio League, so I expect to have a very busy year helping amateur radio in Saskatchewan. Traffic: VE5AAE 58, VE5WV 31, VE5RP 10.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PO. PAM: W3WD. RM: W3QQ. June PSHR W3PO 44, K3JL 40. The DARC presented WA3WPY with a plaque for outstanding service to the Club at Field Day. Dan has moved to a new job at Seattle, WA. WA3LMY/N2UT is now AA5B. N3DR gave an outstanding program at the 1st State Club showing what can be done with Ham Radio in Jr. H.S. Science programs. WB5MBS moved to DE from OK and is an FAA Electronics Inspector at Greater Wilmington Airport. WB3EOD made Advanced and WB3GXQ is an Extra. 1978 Del. QSO Party will be Nov. 11-12. Details later. DFN QNI 306, Trc 91; DEPN QNI 61, Trc 3. Traffic: (June) W3QP 168, WB3KPK 47, W3QC 43, W3WX 24, N3ND 12, WB3DJG 11, WA3WV 10, WA3UDM 2. (May) W3QP 101, WA3DDM 6.

EASTERN PENNSYLVANIA: SCM, George S. Van Dyke, Jr. W3HK. SEC: WA3PZO. NM: K3KW K3NGN W3VA W3IAZ. Net repr: PFN QNI 262, QTC 419; PTTN QNI 273, QTC 103; EPA QNI 504, QTC 268; EPAEPAETN QNI 332, QTC 87; AREC (2) QNI 18, QVS repts: W3CL WA3BJG K3YD W3GOA. OBS repts: K3NSN W3VA WB3CPZ W3ID K3EBZ W3GL. OO repts: W3CL WA3TMP. BPL: W3CUL W3VR K3NSN WA3WQP WA3ZRY WA3ATQ. PSHR: K3NGN W3BI AA3B WA3JGP W3DP WB3CPZ WA3YDC. Murphy beate! W3VR remodeled all gear and it still works! NMs report NCS reports are late, lets mark the calendar. WA3QVZ now AA3B! WA3YOE looking for ARC members, give him a buzz if interested. W3ADE going to desert long wire for a beam! All you OPS and ORS remember you are now OTS! New certificates at renewal time. I hope the nets on the VHF bands move to new spots out of the repeated bands, and by doing so you might gain some members for your nets! New officers: Mt Airy VHF Club (Pack Rats) W3HQT, pres.; WA3NFV, vice-pres.; WB3HHD, corr. secy.; K3IGX, rec. secy.; (permanent appointment!) K3GAS, treas.; W3JIT & WA3JUF, board members. PITN welcomes WB3CAI & WA3WQP. K3RDT hasn't quit he's been busy! WA3BGN now AA1K in Conn. FD msgs rec'd in W3AA's Beacon RA, W2AI's HF Hill ARC, K5CQ's non club, K3ONW's non club, W3UUJ's Harrisburg RA, W3OUJ's LVARC. K3CSG's Abbington ARC, N3IK's Carbon ARC, K3YTL's MURGASS ARC, K3EWB's York ARC, K3SSC's Delmont ARC, W2MMD's GCARC, WA3ZKL's non club, Pack Rats HAMARAMA 78 Buck, Co Drivain, Rt 611, Warrington, PA Sun. Oct. 1, 1978 8 AM to 4 PM! Traffic: (June) W3CUL 3451, K3NSN 2379, W3VR 819, WA3ZRY 593, WA3WQP 530, WA3ATQ 443, WA3THT 306, K3KW 260, K3NGN 226, W3BI 113, W3IPX 111, AA3B 101, WB3JGP 99, W3FAP 91, W3DP 83, W3VA 55, WB3GZV 53, W3BKV 42, WA3YO 39, WB3CPZ 34, N3CD 25, WA3YDC 24, W3PD 16, N3GE 11, K3NB 11, W3ADE 10, W3ID 9, K3EBZ 8, WA3RP 6, W3CL 5, WA3TMP 4, W3HK 3, WA3BKQ 3, W3EU 1, K3YD 1, WA3VOD 1, W3KEK 1, W3GOA 1, W3GMK 1. (May) K3NSN 2219, K3YD 3. (Apr.) K3YD 4.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — W3FVZ reported early to take an early vacation. W3BHE sez the Mt ARC battled chiggers this FD. FD messages from N3IC's K3EF/3 N3SB/3 W3NN/3 W3FA/3 W3ZH/3 W3VPR/3. Congrats to you all. With the nets: CW on 3643 daily at 7 and 10 PM local. Fone PON's on 3905 at 5:15 PM daily, and Section on 3920 daily at 5 PM. Net/Manager Sessions/TFCQNI/AM. MDDW/Q3Q 50/130/6. Top Brass W3QC N3QA W3FA. MEPN/W3PRV. 235/215. No topper, but others AA3A W3WV W3FA. MDR/N3G3R/W3ZP/4. Top Honor to WA3ZRY K3ORW. W3DKX W3BCE W3FA. WFR PON/W3DFW 16/16/14. MDC PON/W3Q9Y 5/22/17. Lots club news from the Ham Arundel, FAR, BARC and Nat. Capitol ARC. WA3JLR is a movie celebrity! Congrats to WA3KZV W3BKEI WA3SSV to Advanced; WB3JMX WB3AA WB3DJU General and WA3RVR to Extra. It was WA3HNV to Advanced the father of WA3SOR. Goddard ARC has K3ON, pres.; WA3MIK, vp.; WB3JKE, secy.; WB3ANV, activities with WB2NC W3ABC W3FA N3GN and W3INR, comm. chmn. The Frederick ARC held their first annual Hamfest. A good one and promises for many more. OO reports by WA3KQ W4MLR/3 and W3I/N3GMSN spent a month in Europe. A meteor spotted 2 beams and went thru 155 tunnels in 400 miles in the mountains. WB3FTN is prepared for the summer fun. WA3HEW now lives in Damascus. N3RC plans the summer on a sailboat. W3CDD looks to the July do. WA3RSK put up a good antenna on the car. N3RL worked a bunch from HV3SJ. WB3CGG got reacquainted with Murphy this FD. N3IT is in the summer doldrums. K3HPG kept summer alive at Columbia. K3TNM is expecting to be a father again. K3ORW keeps resoldering the ground plane. WB3CE likes to hike and camp. N3CS can be a speed merchant. WA3PRV 2644. He had a busy summer. WA3ZAS takes a new ob. Traffic: (June) W3FA 81, N3QA 43, K3ORW 33, W3FVZ 31, WA3PRV 12, WB3CGG 8, K3HPG 8, N3RL 8, WB3CES 5, N3IT 5, N3RC 4.

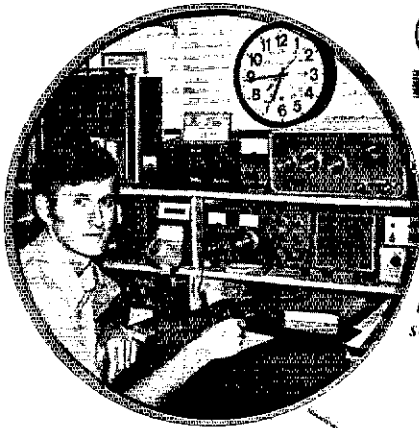
SOUTHERN NEW JERSEY: SCM, Raymond F. Clancy, W2JTE — Section Net Certs to AA2H WB2NC W2IJ W2J WA2KNW W2OK W2SWE K2SB K2UL WA2UNJ. Congrats and tnx to W2XZ RM. W2JA's WB2LCC reports FD with 23 ops. Old Barney ARC's N200 reports 20 ops, 7 ARES active. DVRA's WA2YA sez 20 ops, 7 ARES as Howe Farm for FD. Fusion ARC W2FD sez 100% ORP FD with 11 ops 3N at Forestal center location. Gloucester Co. ARC's WA2GSK sez 8 Tx, 18 ops at Glo. Co. College. Salem Co. ARC FD at Riverview Park.

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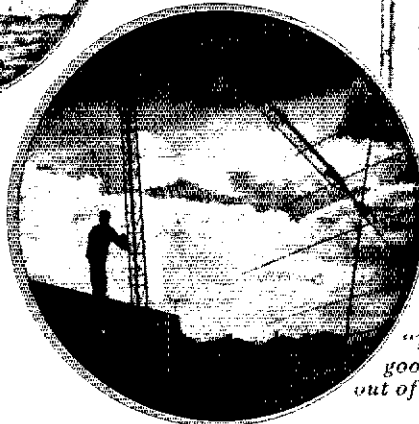


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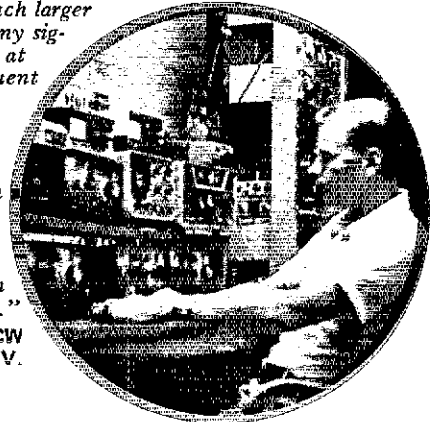
... RICK-WB9AZN
FT. WAYNE, IN.



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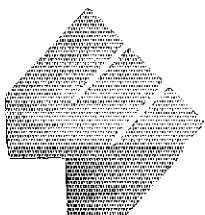
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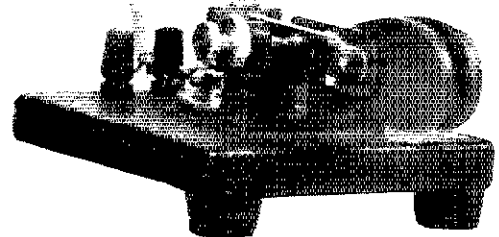
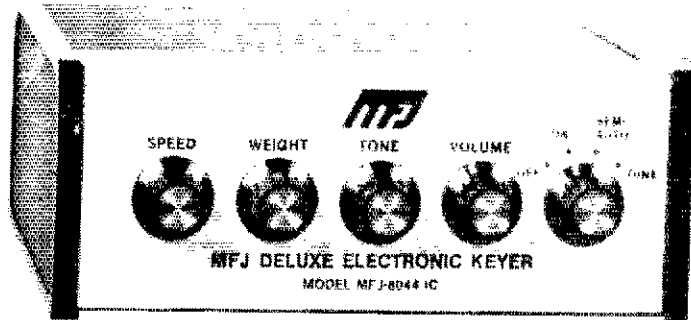
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Small enough to slip in your hip pocket!

Only MFJ offers you a keyer this size with this much versatility at this price.

Paddle has adjustable contact travel.

Rear Panel: Speed control (8 to 50 WPM), 4 position switch for TUNE, OFF, ON, SIDETONE OFF. Phono jacks for external key and keying outputs.

Weight control gives distinctive signal for QRM penetration. Internal tone and volume controls.

MFJ-402 8044 ECONO KEYS HAS BUILT-IN PADDLE, WEIGHT CONTROL.



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BRAND NEW

For those with sidetone built into their rig.

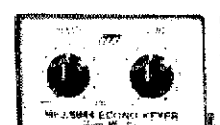
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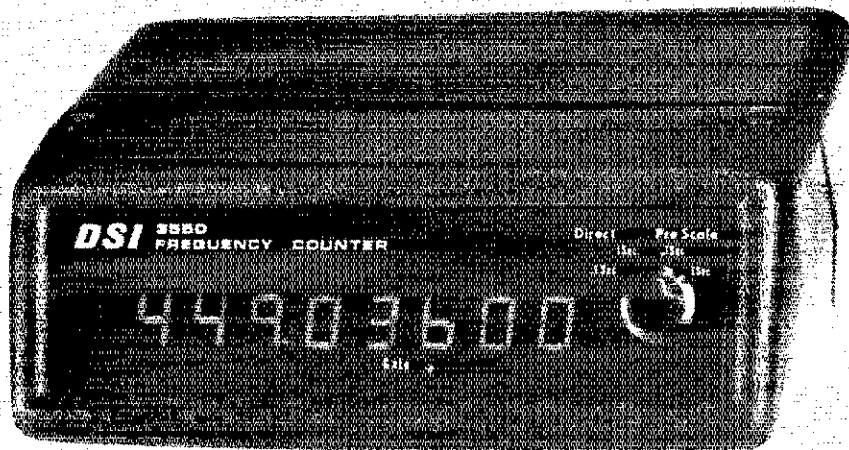
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- Time Base** TCXO 1PPM 65° to 85°F
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- Display** Eight 1/2-inch LEDs
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SJRA's WA2VYA reports 45 ops & Tx. over 4000 QSOs on FD. RCA's Astro Elec. ARC's WB2PKG reports 14 passed Novice class. W2ORA retires fm RCA. WA2CAK hopes to enter Georgia Tech. WB2KSS new General. WB2USI nw N2AAS. W2FWX nw K2VT. Jersey Shore ARC Ka-Chunker pres. WA2KWW on page one. WB2RNY reports in the Princeton Packet Paper. CBers and Hams cooperate to save five on 19-ft. boat off Elliot Key nr FL. Windsor Heights RC member WB2NCO 2 metered the emergency msg to WA2ERF who phoned the US Coast Guard at Barnegat via Lawrenceville repeater. They rescued Florida Coast Guard who found and towed the disabled boat to safety. SJRA reports Hamfest Date Sept. 10 at Ellisburg Circle on rte. 70. Troop 44 BSA led by AA2F were AT DVRA FD site and helped logging stations. N2VW reports K2BX out of hospital. NJPN — session. 30, 4; QNI 478, 54; GTC 180, 16; QSP 139, 15; Mins. 608, 85; NJN — sess. 30, 30; QNI 455, 274; QTC 257, 155; QSP 306, 108; Mins. 630, 685. Traffic: (June) AA2H 151, K2UK 103, W2IU 89, WB2UBQ 59, WB2LCC 26, WA2TRJ 20, W2UJ 17, WA2UNJ 10, W2HOB 3.

WESTERN NEW YORK: SCM, Joseph M. Hood, K2YA — Late report for May. ASCM: W2MTA. SEC: N2JC. Attendance at the Rochester Hamfest was a record at near 8000. K3CT with the help of the FCC Buffalo Field Office administered about 620 exams with about 350 leaving as upgraded or new amateurs. This explains the sudden influx in traffic PA calls in late May. The Hamburg International Hamfest will be held at the Erie County fairgrounds on Sept. 16, 1978. W2FR is resuming his duties as EAN NCS on Fri. (GMT). K2FJ was ZBZG on Gibraltar recently and worked many WNY stations. He also operated from CN8-Land. The new Niagara County AREAS net, CONARES, meets at 1 PM Sun. on WR2ACJ. Regret to report that K2QIV and W2XX are Silent Keys. Welcome to the Genesee Repeater Assn and the Massena ARC as ARRL affiliated clubs. WA2SIS is now N2MF. K2GWN is Mgr. of the Hit and Bounce Traffic Net. ARATG reports record membership of 92. New Ham officers for '78-'79 are: WA2ZNC, pres. WB2ZFM, vp. WB2RJB, secy.; K2RJ, treas.; N2JC, W2NVZ, K2MP; N2EH, K2EAW, K2NC and K2HC, dir. RRRA officers for '78-'79 are: WB2KAO, chmn.; W2TR, vice chmn.; K2UW, secy. treas.; WB2KIW, pro. chmn. The antenna on the WR2AEI repeater was repaired in early June with resulting improvement in repeater operation and coverage. Traffic: WA2ELD 219, WA2HSB 164, W2OE 138, W2MTA 131, WB2PJU 108, W2RUF 74, K2GWN 72, KN2MDQ 50, WB2WCE 45, WB2KHT 42, WA2MFV 42, W2TZ 41, WA2ZJP 40, W2FR 38, W2PZL 30, WB2LMS 22, WA2AIV 18, W2CQJ 17, WB2FXJ 17, WB2KOS 12, K2VR 12, WB2FFI 10, W2AET 2, WA2UAR 2.

WESTERN PENNSYLVANIA: SCM, Otto L. Schuler, K3SME — SEC: W3VUP, Asst. SEC: WA3LJW, NMs: K3SMB W3MML K3AT W3NEM W3KUN.

Net	kHz	Time/Day
WPA CW Traffic	3585.0	7:00 PM Dy
WPA Phone & Traffic	3983.0	8:30 PM Dy
PA Traffic Training	3610.0	8:30 PM Dy
WPA RACES	3990.5	9:00 AM Su

Because of W3QJ's sudden transfer to Detroit I have taken over the SCM's duties. I will try to do the job as well as K3CHD would, not an easy task. My home address is 3732 Colby St., Pittsburgh, PA 15214. I would appreciate receiving club news letters and items pertaining to amateur radio, know who with W3CQJ WA3YKJ (Tacoma, Wash.), and WA3WBO (Grand Rapids) good luck in their new locations. Latrobe has a new ATV repeater 439.25 MHz in, 427.25 MHz out. Congrats to W3ZDF and K3NQT new Extras, K3BIE now Advanced, WB3LFA and WB3LFB Tech's and a new Novice KA3AKP. WPA Phone & Traffic Net had 292 sess., 229 QNI, 70 QTC, WPA CW Net had 30 sess., 372 QNI, 113 QTC, WPA Two Meter Net had 30 sess., 492 QNI, 88 QTC. PSHR credits K3HI 47, WB8PAV/3 35, WB3DKT 32, WB3EML 22 and WB3GZR 17. Traffic: N3FM 115, WB3IGL 94, W3NEM 92, W3YQ 91, W3EJG 55, K3HI 51, WB3DMV 48, W3SMV 41, WB8PAV/3 38, W3RUL 28, N3WS 28, WA3ONT 28, W3KUN 25, K3CHD 19, WB3EUM 18, WA3UNX 15, W3ATO 14, WB3GWJ 11, WB3EML 10, W3SN 8, W3TTN 4, WB3GZR 4, N4DR/3 1.

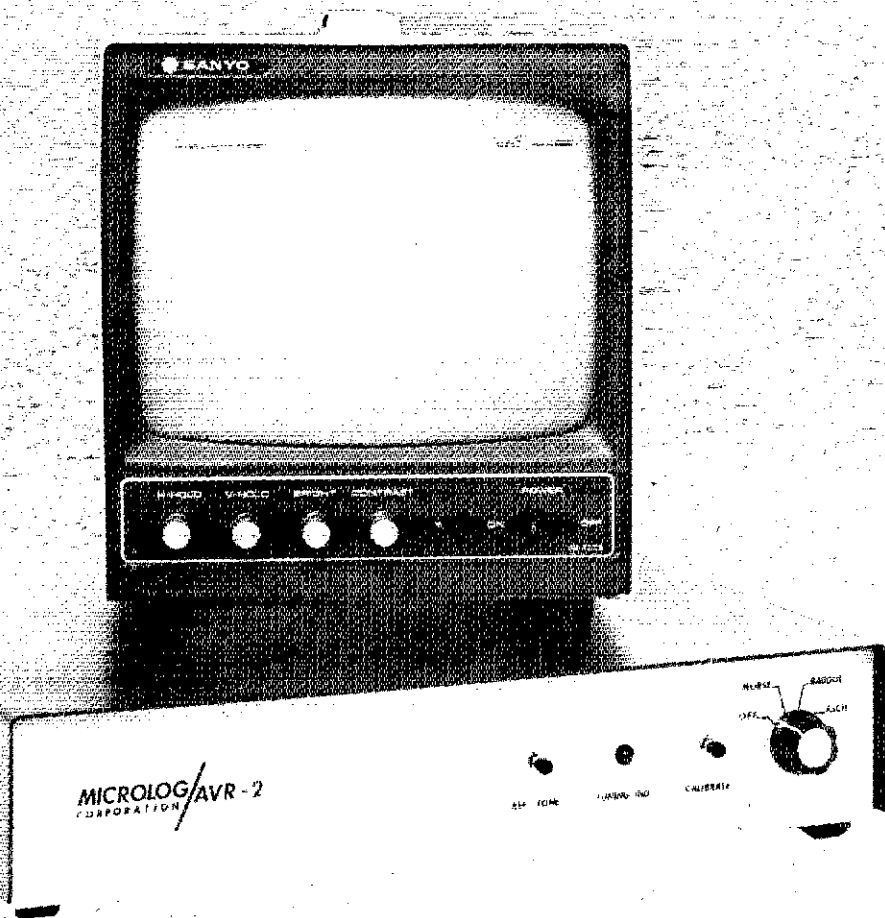
CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES, PAM: WA9KFK. RM: W9NJP. Cook County EC: W9HPG.

Net	Freq.	Times/Day	Tfc.	Sess.
ILN	3690	2330/0300 Dy	238	80
Ill Phone	3915	2245 Dy	122	30
NCPN	3915	1200/1700	159	48
ILN	3940	1400 Su	6	0

WB9AKB has a new antenna farm. WB9KTY is a new two meter SSBander. WB9YUJ now AA9R. W9PVD retiring from Ill. Bell Telephone after 38 years of active service. WB9UHQ and WD9IUT have been appointed asst. ECs for DeWitt County by EC WA9LHU. Effective July 1, WB9JSR will be the new Net Mgr. of the ILN. W9MTT's new call is K9FD. The W9VEV memorial Station handled 5 pieces of traffic on their two meter net. FB reports have been received with high scores for Field Day. Weather conditions were not right for the annual test. K9DMV passed his Advanced Class exam. WB9CEB made the Dean's list at Lincoln Land Junior College. David Sumner, Asst. General Mgr. of the League was guest of honor at the Starved Rock Radio Club's annual hamfest. Perry Williams also of the headquarter's gang along with your SCM, W9PRN visited the Egyptian Radio Club on June 5th. The Central Division Convention was held June 15 and 16 in the Milwaukee area. It was sponsored by the West Allis Radio Amateur Club, Inc. The Wheaton Community Radio Amateurs are sporting new club jackets of powder blue and white lettering. New Novice in the Sterling-Rock Falls area is KA9ANU. The Danville Radio Club Hamfest will be held on Sun. Sept. 3rd at a new location at the Drive-In Theatre on North Vermillion Street. WD9CVJ is now AA9C. WA9IMB has moved to DuSoyne. Our sympathy to the family and friends of WD9FUH who recently passed away. WD9HBQ has upgraded to Advanced. W9HBJ reports his traffic count for May was 83 and it was not listed in the traffic reports. Sorry about the omission. W9FKC visited SM0FY and operated portable SM0, with two meter gear. The Central area daytime net handled 305 pieces of traffic in 80 sessions and the 9th region representation was 81.7 percent. Ill. stations W9HOT W9NXG WB9NVN and WD9GLG reporting. The ninth area region daytime net had 55 sessions and 65 messages with Ill. participation of 96 percent and W9YUJ another W9IQC representing the gang. W9YUJ is the only EPL recipient for the month. Traffic: (June) W9JH 364, W9NXC 128, WA9KFK 123, W9OK 114, WD9BEX 110, K9BVE 105, N9TN 94, W9KFR

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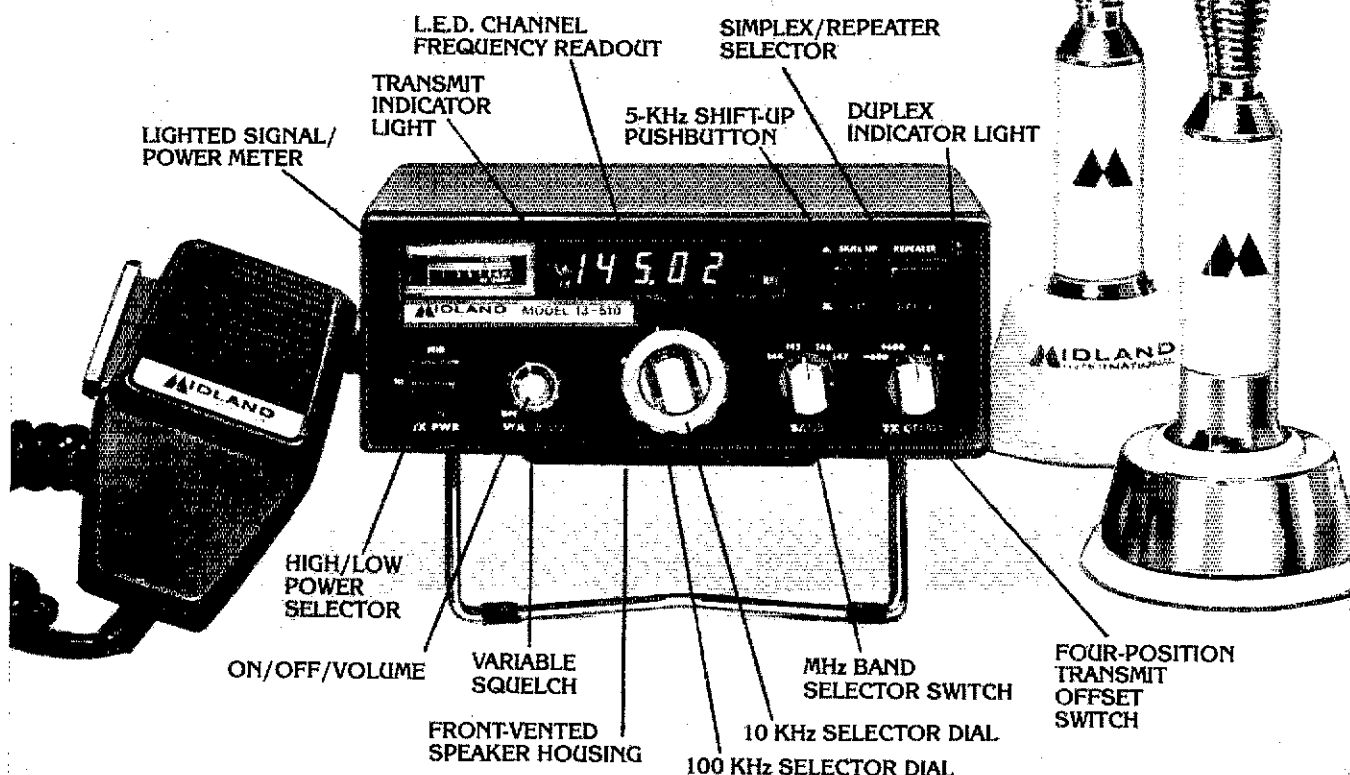
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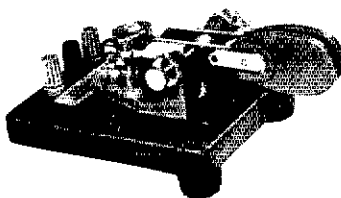
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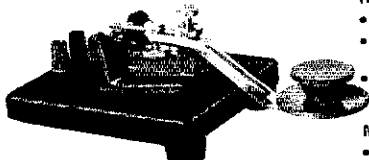
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Model HK-2

- Same as HK-1 less base for incorporation in own keyer

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Model HK-3

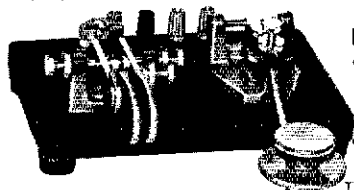
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Dear Mr. Kahn,

It is my heartfelt desire to mail this letter. Some months ago, I imported a Century/21 plus key. I guess that so far this is the only one in Germany. This transceiver was earmarked for my second QTH, which is hidden in a large complex of a university hospital.

A fortnight ago, the set-up was complete, that is a tribander was mounted on top of a seven floor building, 200 ft. of antenna and rotor cables were installed, and the Century/21 was connected to a variable transformer delivering 110 volts a.c.

The first station heard was a UK8 just finishing a contact. I gave a break, and this led the dance to a series of contacts, which, within a few days, gave me the exciting view into the world of "low-power DX." I could work down-under ZL and VK with ease via the long path. KH6IJ and HI3PC were contacted within 10 minutes on 14 MHz, and all continents were reached in five sessions.

The operator himself felt put back 30 years, when he began hunting DX for WAC, DXCC and WAZ. I confess that the Century/21 owns the qualities of a fountain of youth. In times of bone and ethics breaking high power madness, the value of QRP work cannot be overemphasized.

I thank you for making available the Century/21. It turns hard-boiled radio operators into radio operators who anew feel the mystery of short wave propagation, a basic feeling which keeps ham radio alive.

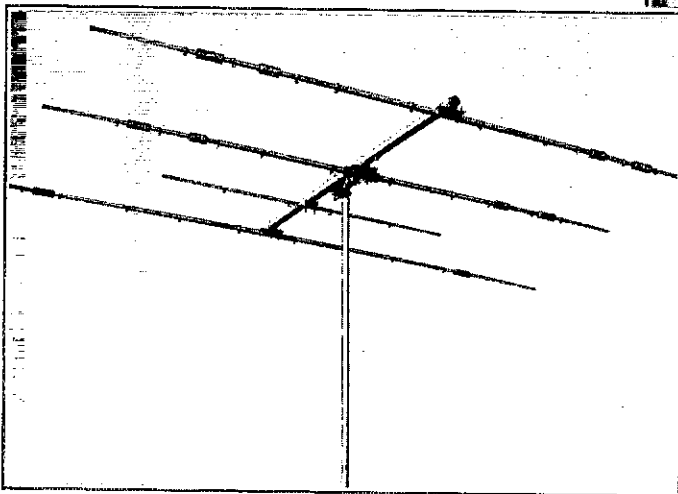
Sincerely,

Dr. Karl Gehard Lickfeld, DL3FMA

Number 9 of a Series



CUSHCRAFT IS THE HF MULTIBAND ANTENNA COMPANY.

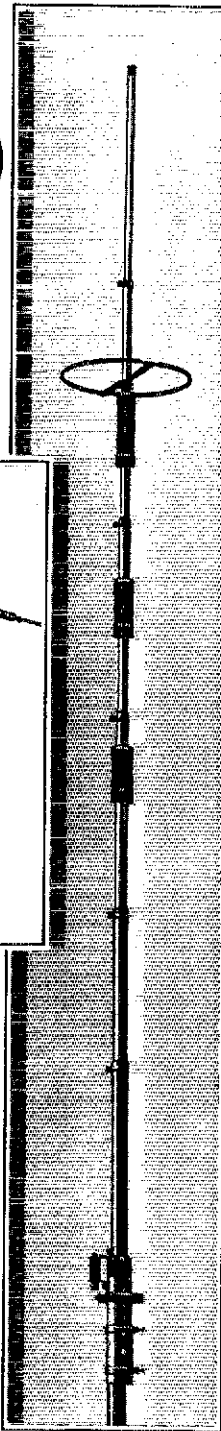


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85, K9PNG 82, WB9JSR 75, W9NJP 75, W9HOT 69, WD9DMV 60, W9OBS 62, WB9ZED 53, K9EEA 48, W9OYL 32, W9HBI 29, W9PRN 28, W9YCE 16, N9DR 15, N9MX 7, WA9VLK 6, K9BK 4. (May) K9PNG 159, WD9BEX 71.

INDIANA: SCM, J. M. Kell, W9LTV — SEC: W9UMH, NM(QIN): W9JUU, VHF Pam: W9PMT

Net	Freq.	Time/Day	QNI	QTC	Sess.
ITN	3910	1330/2130/2300	Dy 2810	316	90
IPON	3910	1300 Su	94	4	4
QIN	3656	0000/0300 Dy	689	382	58
ICN	3737	2315 Dy	12	27	28

Times are UTC and freq in kHz. 1978 EC appointments: W9AMH, Dekalb Co.; K9UJK Delaware Co.; WD9EIR Dubois Co.; W9JGE Elkhart Co.; W9BAGK Floyd Co.; W9SSH Hendricks Co.; W9DO Howard Co.; W9RTH Jackson Co.; W9RVM Knox Co.; W9YOW Lake Co.; K9TJ Madison Co.; K9KTH Monroe Co.; WD9BKA Owen Co.; WD9BHR Pulaski Co.; K9VMG Putnam Co.; K9LMH Parke Co.; N9WW Steuben Co.; WA9OHX Tipton Co.; WA9QCF Vanderburgh Co.; K9UT Wayne Co. '78 OPS appointment, WA9OHX. '78 DTS appointments W9BDP, W9ZLV. '78 OO appointment GL I W9TG. It is with sorrow we note the passing of W9LW of Richmond, Ft. Wayne Radio Club had quite a Field Day. Three tribanders at 50-ft, four inverted vees at 50 ft, and a full size 40-meter quad. Add 55 operators and get 3500 contacts. Activity on 2-meter SSB during June VHF QSO Party was lively. Take a listen around 144.2 during the Sept. VHF QSO Party. You'll be surprised. K9HI (ex-WB9EAY) married WD9ERI in May. Both are seniors at Purdue. The Valparaiso Tech Hamfest will be Sept. 24 at VTI in Valparaiso. Talk in 146.94. WB9UMB now A9BT. WB9SKA now A9SS. May Net Tlc ITN 297. IPON Q QIN 344. Traffic: (June) W9JUU 485, WB9YXN 312, W9FC 263, W9QLW 119, W9HUF 102, W99PR 92, W9E 81, W9ZLV 81, W9JUV 72, K9FZX 57, K9TKE 56, WA9QCF 53, W9LTV 50, W9IGM 39, WD9XYW 32, W9DLF 25, K9RFP 18, W9CMT 15, W9RTH 14, W9DKP 12, W9K 11, W9DZC 10, WA9OHX 10, K9FG 8, W9ENU 6, K9HI 5, W9BDP 4 (May) W9HUF 116, WB9SKA 73, W9TG 60, K9G 29, WB9VJE 27, WA9ZKN 23, K9RFP 14, K9TKE 10. (Apr.) W9HUF 141.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: W9ZFC. PAMS: W9AYK K9UTQ W9IEM. RMs: W9SICH K9KSA WB9KPX K9LGU K9EN. Nets, freq, time, QNI, QTC. Mgr.: BWN 3985, 1145Z M-S, 711, 645, W9AYK; BEN 3985, 1700Z Dy, 572, 94, W9IEM; W9EN, 3985, 2230Z Dy, 1063, 243, K9UTQ; WNN, 3725, 2215Z Dy, 14, 1, W9SICH; WIN-E, 3682, 0000Z Dy, 33, 70, WB9KPX; WIN-L, 3682, 0300Z Dy, 201, 57, K9LGU; WRN, 3682, 0030Z Sat., K9EN, W9 EAO, 3925, 1701Z M-F, 569, 38, WA9NIX. WB9IFG is now N9IB. W9BN certificates to WB9ZRE WD9BKT. WD9CQC made Advanced. New Novices Beaver Dam area KA9BAA KA9BA3 KA9BAD KA9BAF KA9BAG KA9BIK KA9BAH, KA9BAC and KA9BAE. XYL and son of K9FHI. Oshkosh ARC officers N9BL, pres.; W9BKZ, vice-pres.; W9GMF, secy.; W9SSZO, treas. W9BG is in hospital, we wish him a speedy recovery. K9DID AMSAT coordinator for the state. New Novices Stevens Point area KA9AGJ KA9AJB KA9AJA KA9ACE. Hope everyone had fun on Field Day despite the weather. Sheboygan county ARC now has 100 members current officers are W9CXY, pres.; K9GM, vice-pres.; W99RWS, treas.; W99CO, secy.; WD9ED WA9DOR WD9NRM WB9ZBE, board of dir. W9IGG now member DXCC with 125 confirmed (14 years old). WD9ELM passed Extra. BPL to W9ZGQ. KA9BGS new Novice Oconomoc area. News items taken from Intercom, Watts Snoo, Sheboygan ARC. Traffic: (June) W9ZGQ 914, W9SFL 160, W9IEM 113, K9FHI 102, W9DMD 90, W9IHW 63, WD9CQC 62, W9AYK 57, K9UTQ 52, WB9RRU 50, WB9KPX 49, W9FDY 45, WB9JSW 44, WD9DHF 47, K9LGU 36, K9AKG 35, WB9ESM 29, K9ANV 27, K9CPM 27, WB9MFF 27, WB9BRE 26, K9KSA 25, WA9DXW 24, W9JUV 24, W9SICH 20, WB9PY 18, WD9EAO 17, W9SQU 14, WB9YPZ 14, WD9AJA 14, N9CP 11, WA9LWJ 9, WD9ELM 8, WD9ATX 8, WB9CFC 8, K9SAO 4. (May) WB9PY 78, W9SQU 24, WB9YPZ 23, K9ASC 2.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, WB9HOX — SEC: W9SA. Minn. Nets.

Net	Freq.	Time	QNI	QTC	Mpr.
MSN 1	3685	6:30 P	189	79	N9HY
MSN 2	3689	10:00 P			K9PIZ
MSPN N	3945	12:05 P	523	105	WB9JVT
MSPN E	3929	5:54 P	510	109	WD9UW
MW	3925	9:15 P	260	171	WB9UKI
PAW	3925	9:12/5 P			WB9YV
MSSN	3710	5:30 P	130	17	WB9ZAL

Please take note MSN 1 will QNY to 7070 kHz whenever heavy ONU sets in, at the decision of the Net Control. Congratulations to the Atlanta Radio Club on an excellent Hamfest in June. I was able to attend and had a great time working with W4YHF and greeting friends of long standing and making new ones. Although I was unable to attend the MSN picnic in Edina on June 11 at the home of W9RQT, I have reports that it was fantastic. Congratulations to K9JTA and WB9QOB on their recent EC appts. and we are still looking for people to fill in the rest of the section EC appts. Anyone who is interested please contact K9SE or myself. WB9QEU now has phone patch capabilities. WB9CPC is now K9FAE. WB9UIR is now AA9 and WB9VYN is now K9KB. By the time this reaches you K9SXQ will be moved to Mountain Home, Ark. We'll miss you George but Ark.'s gain is our loss. Looking forward to a new season in radio. Traffic: WB9ZAL 377, WB9QEU 160, WA9TFC 140, WD9UW 113, WB9YV 84, WB9UKI 81, W9RQJ 66, N9HY 56, WB9NZB 37, WB9YUA 32, K9CSE 30, W9HZU 27, W9SSB 26, W9HKF 25, W9RQJ 25, W9OPX 24, K9JTW 20, WB9SYT 15, K9ZBI 14, W9PNE 13, WD9PSL 6, N9JP 6, K9FLT 5.

SOUTH DAKOTA: SCM, Lydia S. Johnson, W9KJZ — Asst. SCM: W9DVB; SEC/IRM: WA9TNM. Net Mgrs: Morning — W9TOJ; W9MZI, Evening — K9TVJ, N9JO — K9TVJ, PERC — WA9EJ. Received five FD msgs.; Lake Area FC from treas. WB9MVIJ with 10 members active; SFARC 35 ops 18 AREC members; Chmn. W9SMV; Signal Hill ARC 15 ops 9 AREC, pres. K9JV, oldest FD op W9IG age 87 his XYL 84; Prairie Dog ARC 22 ops, Chmn. WB9MVX; Huron ARC 15 members 10 AREC, Chmn. WB9JYB. The annual SD Hamfest at Rapid high success, 425 registered. Guest ARRL speakers Div. Dir. K9GA, former Div. Dir. W9BUO. Also present was former Div. Dir. W9PHR/W9LX. KA9AZX won the TS-520S 6 Band Transx; WB9PVZ won the TR-7500 2mtr rig. "WAP WHOOOP" accepted 33 new members, elected new officers as follows: Chmn. W9NEO, Princess WA9VRE, Secy/Treas. W9JEN. N9JEN calls WA9NRE/AA9F; WB9TLK is N9JS. Nets: SDN 19 sess. YTC 22, QNS 63. Morning 26 sess., QTC 50, QNS 522. PSHR: WA9TNM 49.



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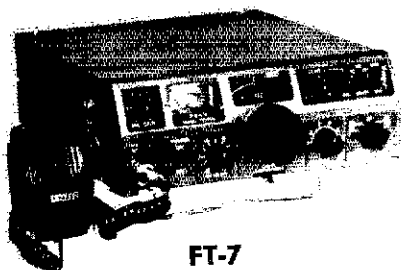
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At times the solution to your RFI problem may be as simple as adjusting the fine tune control of the TV set. Or it may involve a modification to the stereo equipment. But whatever the cause, there is an answer to every type of RFI problem. You'll find it all in the new ARRL publication *Radio Frequency Interference*. Also contains the FCC's booklet, *Radio-TV Interference Problems*.

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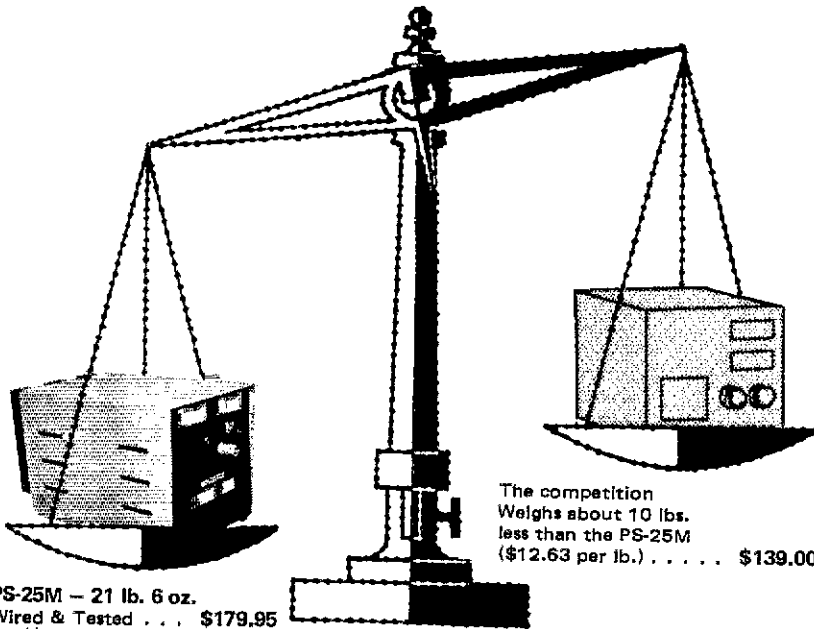
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25 Amp regulated power supply with fold back current limiting, over voltage and transient protection. Also, output voltage and current meters

You might find a cheaper power supply, but you can't find one as well built with top quality components. Other power supplies with lighter weight transformers and components are no match for the VHF engineering PS-25M. It is rated at 20 amps continuous duty (not 10 amps). This power means extra dependability and versatility when you need it.

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Evening 26 sess. QTC 30, QNS 960. Traffic: (June) W6HOJ 77, W6DVB 75, WA6TMM 66, KA6IE 59, W6KJZ 35, W6MZI 20, W6BEVQ 7, W6IG 2, W6URC 2.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5JAU - SEC: W5AVNV, NMs: K5MEA W5MYZ W5POH WA5WZ, Nets, kHz, Time/Day, QNI, QTC, Mgr.: OZK, 3/60, 0000/Dy, 133, 19, W5MYZ, APN, 3937, 1100/M-S, 872, 45, W5POH, M-Bird, 3928, 2130/M-F, 624, 22, WA5WZ, ARN 3995, 2330/Dy, 793, 86, K5MEA, NEAWXN, 28/88, 0030/M, 209, 66, W5SWJH, Congrats to KA5s ARE AHH AOK AOL, W5SIN, WDSs HOD HSX IKO QFO now Gen. WDSURF now NSGZ, W5SPY, Extra. WDSBWZ WBSFWE WBSGGN WBSDKA WBSIGZ have formed an all ham Bowling Team, visited the Jacksonville ARC (LRAFB) and presented them their ARRL affiliation Certificate on June 15. W5KL had second eye surgery, may be able to see again no guarantee. June 24/25 made FD sites tour stopping at Camp Robinson Benton Hot Springs Fort Smith. NWAARC had closed down before we could get there. Obs K5MEA 9, WBSWWA 4, W5JAU 2, PSHR W5POH 39, Traffic: K5MEA 46, WBSWJH 29, W5JAU 25, W5POH 22, WBSGWU 13, W5KL 6, WBSPSD 2, WBSWWA 2, WBSGQH 1.

LOUISIANA: SCM, S. T. "Tom" Losey, Jr., K5TL - Asst. SCM: K5DPG, SEC: WBSIYH, Net Mgrs.: N5TS N5ES N5RB WBSOOM, GNOARC, Lafayette ARC, SARA, New Iberia ARC, BARAC, Union Parish Contesters, Thibodaux ARC and Opelousas ARC all active on FD 1978. Shreveport Hamfest was very good for first one in twenty five years. Leesville has new 2-meter repeater on 147.9636. WBSRPY, pres. of West LARC. Congrats to WBSLBR on upgrading to Extra. K5BLV active on DRNS. WBSEMU active on LAN. SELARC officers are WDSFOG, Pres.; W5BAV, vice-pres.; WBSVRO, secy-treas. K5SL working on drilling rig during break from La. Tech. WDSDAU K5MOJ now Extra Class. WDSDBV Advanced and WDSFDD Tech. K5SVD, General Convention Chmn. for next year's National in Baton Rouge will appoint WBSIYH as special asst. and advises that the Committee will get in full gear as of now. New Orleans hamfest to offer awards in a Home-brew contest for both radio and computer entries. Alexandria Hamfest was in Aug.

Net	Freq.	Time/Dy	QNI	QTC	Mgr.
LAN	3615	7:10 PM Dy	399	202	N5TS
LTN	3910	8:30 PM Dy	468	88	N5ES
LSN	3703	7:30 PM M-F	67	10	WBSOOM
	7110	2:30 PM S			

LRN 3587.5 6:30 PM Su&W 5 9 N5RB
Traffic: (June) W5GHP 231, N5YL 217, W5MI 130, N5TB 121, N5ES 80, WBSLBR 70, K5BLV 68, K5TL 41, N5RB 35, WBSUSS 14, W5YN 12, WBSEMU 9. (May) N5RB 35.

MISSISSIPPI: SCM, E. Ed Robinson, III, W5XT - SEC: W5FXA, Tupelo ARC continues good growth and new licenses: N5ADS (ex-W5ROB) KA5AHF KASBME. Also upgrades: General W5BWW, W5DSIJ WBSNAY WBSOBH, Tech. W5JOD W5SGXC (Tx WBSWQI). W5NGF and XYL have new baby girl - congrats. W5VFS now Advanced, Miss. Slow Mo Certs to W5s. JBO W5GDA. Also new NCS (Tx WASIDF). K5OAF new net mgr. for MTN and K5QNE new net mgr. for MSBN. Good luck to both and many thanks to outgoing mgrs. W5FHA (MTN) and WBSNB (MSBN). Hattiesburg 2-meter repeater 146.0767 now on new site and providing better coverage. If your call is not in this column don't blame Dasenex - send me some new! CGCHN-W5SDC 31 sess., QNI 1910, QTC 120, MSBN-WBSNB 30 sess., QNI 2067, QTC 81, MTN-WBSFHA 30 sess., QNI 152, QTC 42, MN-W5CSU 26 sess., QNI 318, QTC 13, MSN-WASIDF 12 sess., QNI 51, QTC 3 Ms-Lou Wx Net-K5VXV 4 sess., QNI 118, Capital Area Emergency Net-K5QNE 4 sess., QNI 59, QTC 2, Traffic: WBSNFR 91, WA5JWD 68, W5EDT 64, WBSFHA 61, K5OAF 58, WBSNB 52, W5XZ 23, WA5GIT 12, W5WZ 11, WA5OKI 11, K5MK 6, W5XX 4, WBSNGF 2, WBSVFS 2.

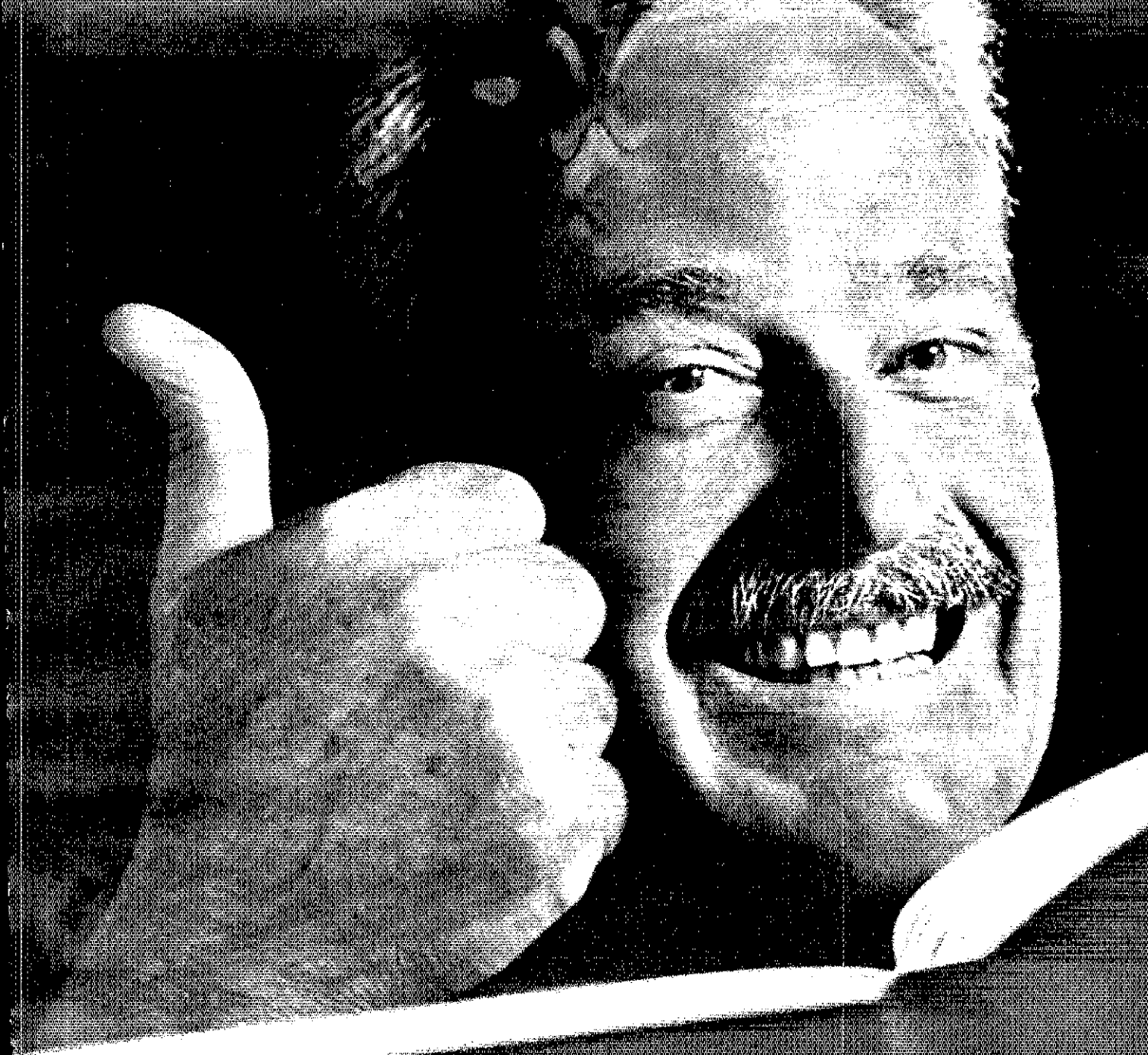
TENNESSEE: SCM, O. D. Keaton, WA4GLS - Asst. SCM: WB4PRF, SEC: WB4DYJ, The Tenn. Civil Defense ARC elected 1978 officers as follows: WB4ZOO, pres.; WA4WJD, v. pres.; Kathy Chadwick, secy-treas. K4YOL has been appointed OBS. Endorsements: WB4ANX, OBS & OTS; WASGI, OBS & OTS; W4PFP, OBS OTS & NM. K4YOL has been appointed OTS. W4YU's OIC cancelled for non-activity and WB4DJU's RM cancelled because of deletion of position. Everyone plan to attend the Music City Hamfest in Nashville on the 16th & 17th. Will be at Lock 2 Park. PSHR for May 2. K4WV should have been 44. Phone nets report 130 sess. 4774 QNI, 271 QNI; CW nets report 39 sess., QNI 315, QTC 99. Other appointments are: WA4CNY NM of TNN and OTS. WA4EWW NM of Early Morning sess. of TPN & OTS. WB4YPO NM of Evening sess. of TPN & OTS. WA4WZJ NM of 8-meter section of ETVHFN. WA4BOC NM of TCDARC. WA4VXV NM WTVHFN. WB4DZG NM 2-meter section ETVHFN. Other appointments and endorsements will be forthcoming. Traffic: W4OGG 441, K4JGW 175, WA4CNY 152, K4CNY 134, WB4PRF 111, WA4NIF 107, AA4KB 105, K4CNY 75, WB4BKF 64, K4YFC 49, WB4ZSZ 32, WB4MYZ 18, WA4GLS 22, WB4DJU 20, W4PNS 18, WB4YPO 18, W4PFP 12, K4E 16, N4AEO 12, WA4TYN 12, W4VJW 12, WA4EDZ 10, W4RUW 10, N4ZZ 10, KA4MC 4, W4EWR 2, K4WOP 2, W4YBL 1.

GRANT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID - SEC: WB4ZML, June Net

NET	QNI	QTC	NET	QNI	QTC
KRF	383	34	KYN	158	76
MKPN	917	92	KSN	152	98
KTN	1055	384	KNTN	252	98
KPON	58	3	DARES	303	12
SEKEN	30	1	DARES	108	2

KY is losing a good ORS and amateur in N8ZO. Active in many phases of KY amateur radio, we wish Pat good luck in his new overseas job. WA4IGS operated hot air balloon mobile during Field Day. EC K4AVX reports that District 10 now has a new 10 KW generator. Sorry to report K4PMY as Silent Key. Fourteen Ashland area amateurs provided coordination for the "world's longest parade" in the Tri-State Fair and Regatta in Ashland. Two meters was used for all coordinating activities. Traffic: (June) WB4NWS 275, WA4VY 132, WA4IGS 72, WA4JTE 70, WB4NPD 65, WA4NWS 63, WA4EFG 16, WD4KJP 15, WA4YPO 15, KA4HOF 11, WA4JAV 11, K4UMN 7, WB4AUN 7, K4AVX 5, WA4AGH 2 (May) WB4NPD 100, WA4AVV 92, WB4NWS 88, WA4IGS 65, WD4IT 55, WB4AUN 52, WD4LXX 50, W4CID 47, W4BZ 47, WD4CGF 27, WA4YPO 21, WA4FAF 19, WB4KJP 11,



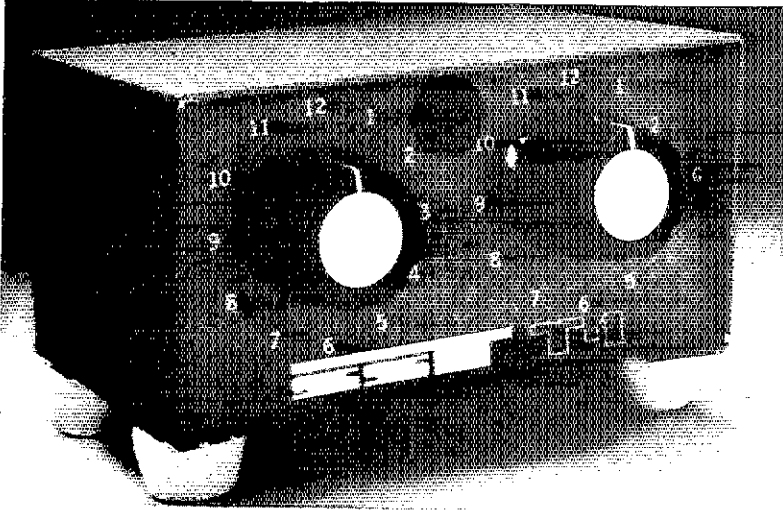
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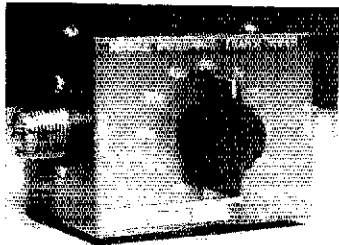
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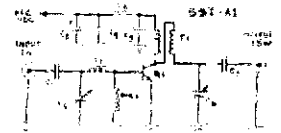
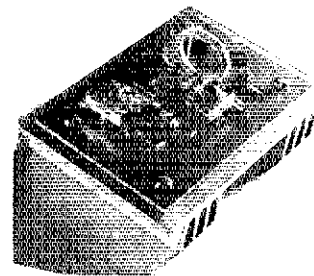
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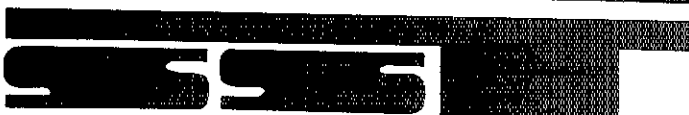
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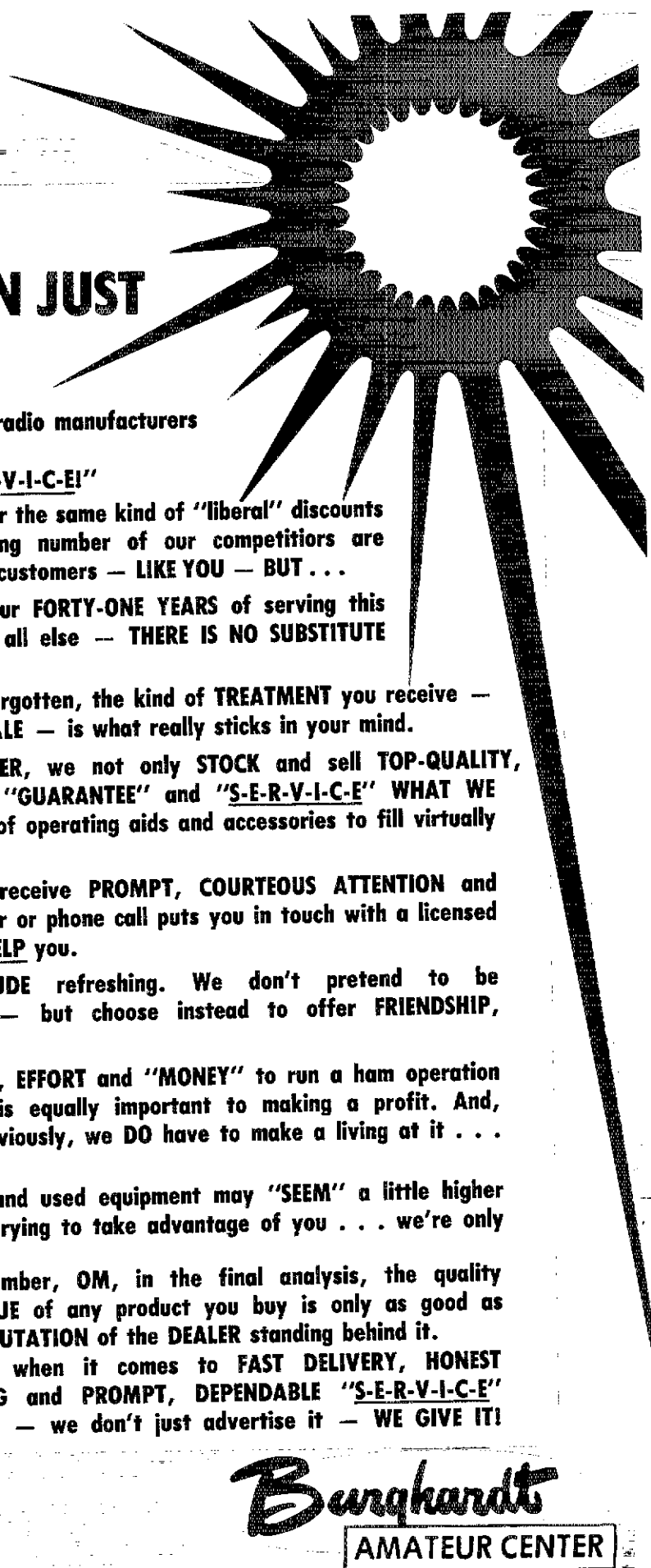


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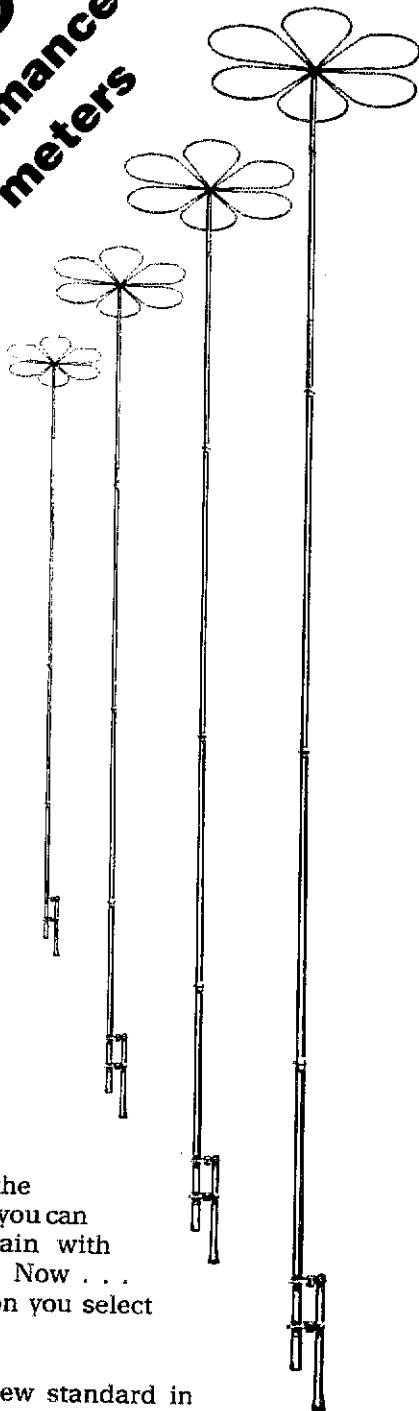
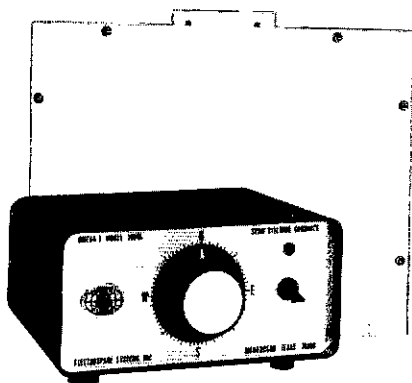
Remember, OM, in the final analysis, the quality or **VALUE** of any product you buy is only as good as the **REPUTATION** of the **DEALER** standing behind it.

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THE AMERICAN RADIO RELAY LEAGUE



WA4JAV 10, WA4RCD 8, K4HOE 6 (Apr.) WA4NWS 123, W4BAZ 36.

MICHIGAN: SCM, Stanley J. Briggs, WBMPD/K8SB — Asst. SCM: WA8DHB, SEC: WABEFK, NMs: KBKMO K8LNE WB8NCD K8RY WB8OP WA8WVW WB8YDZ.

Net	Freq.	Time/Days*	QNI	QTC	Sess.
MACS	3953	1500 Dy	812	335	30
MITN	3953	2230 Dy	613	320	30
OMN	3663	2200/0200 Dy	646	240	30
GLEN	3932	0130 Dy	804	134	30
UPEN	3922	2100 Dy	728	60	34
WSSBN	3925	2300 Dy	757	56	30
MNN	3722	2130 Dy	193	46	30
SEMTN	146.69	2200/0215 Dy	212	42	38
BR	3930	2130 Dy	535	32	26
MEN	3930	1300 Su	144	3	4
M6M	50.7	2300 Dy	101	7	19
VHF PAM	rpt.		786	20	45

*UTC Summer Schedule. 25 years ago the Genesee County Radio Club was asked to provide communications for the Buick Motors 50th Anniversary celebration. They did such a good job that they were asked again this year for the 75th Anniversary. WD8AXB was awarded the Eagle Scout award. WBGFZ received the Wolverine Award for all 23 counties. The Copper Country Simulated Emergency Test score was missed by the July QST. It was 1158 points. A very good job. I am sorry to report the following Silent Keys: WB8ADT WB8CVI ex-W8JLQ WB8TRM and WB8TTH. Club elections: Sawyer ARA WB8YIG, pres.; WA8UPL/WB8AAE, vice. pres.; WB8RMW, secy.; WB8NTZ, treas. Mich-A-Con ARC: WB8TNG, pres.; K8TL, vice-pres.; WB8SYA, secy.; WB8SHQ, treas. First batch of the new QTC appointments: WB8AXI WA8AXF WA8FCN WB8CS WB8HIN WB8JVP WB8LCU WB8LRM WB8QSV K8QBZ WB8POK WB8SUR WB8UJZM WB8VPM WB8QYU WB8YIG. OVS report from WB8POK. OO reports from: K8AIT WB8KJ K8H OBS reports from: NBAG K8BAI WB8DIB WB8DJS WB8EAC K8NKB WB8POK WB8VPM. Upgrades: Extra: K8CJF to AA8N, WB8EUN, WB8JET to K8UE, WB8JWQ to AA8D, WB8MJW WB8MQJ WB8MN. Advanced: WB8BQT WB8EJC WB8EIX K8GXV WB8HYD WB8IXV WB8JEP WB8LJT. Traffic: (June) K8KMO 200, WB8OP 197, K8LNE 191, WB8MTD 180, K8KG 179, WB8YDZ 148, WB8LSV 107, WB8MPD 102, WB8NKA 96, WB8NYN 88, NBABA 85, WB8DHB 82, WB8MFC 70, WB8JEW 74, K8ZJU 72, WB8HYR 63, K8BAI 59, WB8YI 59, WB8DIB 57, WB8BK 53, WA8CAF, WB8DMX 50, WB8ZNS 48, K8DD 42, WB8VW 42, K8DYI 38, WB8YR 38, WB8DJS 35, WB8NOH 34, WB8SE 31, WB8HX 28, WB8CSA 26, WB8YWO 25, K8DTG 24, K8AIT 22, WB8UJZM 21, K8QBZ 20, WB8SE 18, WB8VIZ 17, WA8WVW 17, WB8ZF 16, WB8DQR 15, K8CN 13, WB8YIG 13, WB8SD 12, K8JED 11, WB8NIK 11, K8UPE 11, WB8UP 10, WB8JRX 10, WB8JUP 9, WB8TTA 9, NBAG 8, WA8AXF 8, WB8CSZ 8, K8GXV 8, WB8RNQ 8, WB8SCW 8, WB8EAC 7, WB8NII 7, WB8JIX 7, K8AXL 6, WB8JES 6, WB8TP 6, WB8IT 5, WB8VW 4, WA8JF 3, WB8JYT 3, WB8LOU 3, WB8BE 3, WB8GKB 2, WB8HYD 2. (May) WA8WVW 14, WB8LDS 5. (Apr.) WB8YR 29.

OHIO: SCM, Hank Greeb, N8XX — Asst. SCMs: WB8FU WB8MCR WB8TP N4VY, SEC: K8AN, WB8TIN, WB8JGW. NMs: N8CW WB8DL WB8KWD K8OZ WA8SSI WB8WTS. Remember hamfest in Cleveland, Cincinnati and Findlay in Sept. Net Reports (lines).

Net	Freq.	Time	Sess.	QNI	QTC
OSN	3573	2210	29	272	73
O8mN	50.160	0100	30	327	45
OSSBN	3972.5	1430/2000/2245	30	2091	519
BN	3577	0200/2245	49	393	167
ONN	3708	2230	28	96	94
BNR	3605	2300	25	69	42

Congratulations to K8OZ, new Buckeye Net Mgr. and thanks to WB8KJI, retiring BN Mgr. The Ohio Council of Amateur Radio Clubs is a section-wide affiliation of clubs with the purpose of discussing club problems, gaining the consensus of clubs throughout the section on FCC and ARRL matters and as a means of informing the Great Lakes Division Dir. of the pulse of amateur radio within the section. Next meeting Oct. 14, Red Cross Headquarters, East Broad Street, Columbus, at 10 A.M. Contact WA8STX pres. or WB8VLR, secy. for more information. The Ohio Area Repeater Council is a section-wide affiliation of repeater groups for the purpose of coordinating repeater frequencies, discussion and the solution of interference problems and the dissemination of information of importance to repeater users. Next meeting Oct. 14, Historical Society, Delaware, Ohio, at 9:30 A.M. Contact OARC, Box 251, Delaware, OH for more details. Traffic: WB8PJ 291, WB8WTS 282, WA8MCR 202, WB8DL 167, WB8KJI 148, WB8KWD 128, K8BYR 122, WB8HGH 120, K8AAZ 110, WB8QZK 105, N8CW 98, WB8GGF 97, WB8JGW 71, WB8QHV 69, WB8VWM 61, WB8SIQ 59, K8IKD 54, WA8SI 54, WB8RG 48, WB8TP 46, WB8XM 42, NB8TM 41, WB8WT 38, WB8OMQ 35, WB8DIP 34, WB8WG 34, WB8BGX 32, WB8PN 31, WB8CDA 30, N4VY 30, WB8UFB 28, N8XX 27, WB8GX 26, WB8VWH 26, WD8TG 25, WB8MR 24, WB8OFR 24, WB8TRK 24, WB8BBQ 22, K8CYX 22, WB8VLR 22, WB8DJ 20, WB8MGP 20, K8DL 18, WB8PIY 18, WB8VLR 22, WB8DJ 20, WB8MGP 20, K8CKY 14, WB8ZNC 14, WB8SSR 12, WB8YWG 12, WB8MLN 10, WB8LIU 9, WB8LZE 9, WB8HMI 8, K8ND 8, WB8BBN 7, WB8LWY 7, WB8MGA 7, WB8TCZ 7, K8JOW 6, WA8TSX 6, WB8UQ 5, WB8UBR 4, WA8MH 3, WB8OU 3, WB8WNH 3, WB8M 2, NB8J 2, K8ONA 2.

HUDSON DIVISION

EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV — SEC/ASCM: WB2VJK STM: WA2SPL, ASEC: K2AYO. NMs: W2CS W2WSS. Nets: NYPON 5PM 3917, ESS (slow) 6PM 3590, NYSPTM 6PM 3925, NYS 710 3677. Can tell it's summer by slim pickings in the mail box. Hope all have enjoyed summer vacations, etc. Have enjoyed all the FD stories. K2AV/D FD crew somehow managed to destroy 2 ohmmeters on SB400, an FT101, and two generators, luckily one repaired on site. Maybe I should stick to administration. Warm best wishes to K2OYG departing to FL. WECA gave Shyr! a surprise farewell roast, certificate of merit, and an owl pin. WECA newsletter sez Shyr! was speechless! Overlook Harmonics report a resurgence of the ancient sport of transmitter hunting. Only now the fox is on 2M FM. You old timers remember the 80M DF loops? Congrats to WB2KDC on appointment as asst. mgr. for 2ND. Congrats to WA2MKQ on first PSHR. And a welcome home to WB2TGL. Congrats to upgrades: WA2RXF (G), WA2KPF (A), FD messages received from W2FSL/2 N2CF/2 W2UJ/2 K2AE/2 W2XV/2 W2C/G/2 June PSHR: WB2KDC WA2SPL. Traffic: WA2SPL 679, WB2KDC 119, W2YJR 78, WA2EQW 52, WA2QO 47, WA2FFX 47, N2EF

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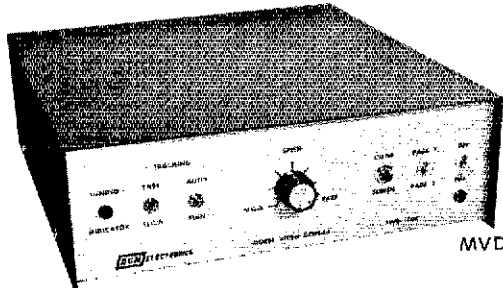
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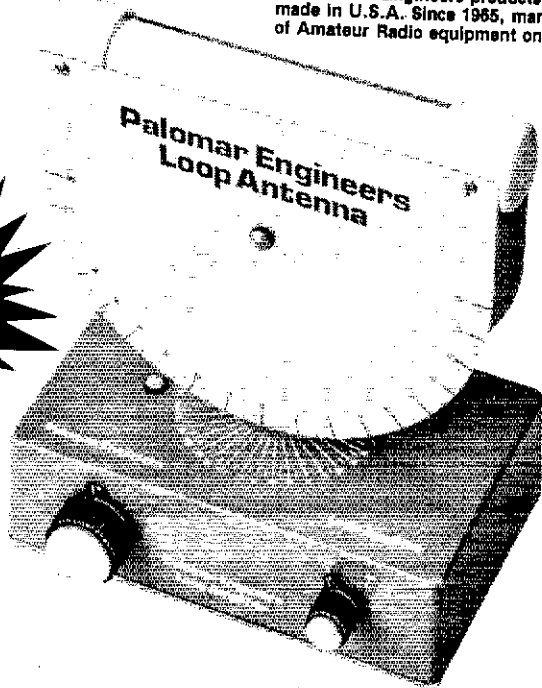
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Loop Antenna

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Here is an exciting new device to improve your reception on 160, 80, the broadcast band, and on VLF.

It is well known that loops pick up far less noise than most other antennas. And they can null out interference. Now Palomar Engineers brings you these features and more in a compact, carefully engineered, attractive desktop package.

Unlike ordinary direction-finder loops, it tilts to match the incoming wave front. The result: Deep nulls up to 70 db. You have to listen to believe it!

Does the Loran on 160 give you a headache? The loop practically eliminates it. Broadcast station 2nd harmonic ruining your DX? Turn and tilt the loop and it's gone. Does your friend in the next block with his kilowatt block those weak ones? Use the loop and hear him fade out.

Loop nulls are very sharp on local and ground wave signals but usually are broad or nonexistent on distant skywave signals. This allows local interference to be eliminated while DX stations can still be heard from all directions.

The loops are Litz-wire wound on RF ferrite rods. They plug into the Loop Amplifier which boosts the loop signal 20 db and isolates and preserves the high Q of the loop. The tuning control peaks the loop and gives extra preselection to your receiver.

Plug-in loops are available for these bands:

- 150-550 KHz (VLF)
- 540-1600 KHz (Broadcast)
- 1600-5000 KHz (160 & 80 meters)

Send for free descriptive brochure.

Order direct. Loop Amplifier \$67.50; Plug-in Loop Antennas \$47.50 each [specify frequency band]. Add \$2 packing/shipping. Calif. residents add sales tax.

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26, WA2OTC 25, WA2CJY 22, WA2MKQ 21.

NEW YORK CITY-LONG ISLAND: SCM, John H. Smaile K2IZ — SEC: K2HTX, PAM; WA2UWA, RM; WB2EUF. The following are major AREC/RACES nets in this Section (join one, please): Bronx 28.64 MHz, 50.35 MHz, 146.88 fm, Richmond: 146.88 fm, New York: 29.5 MHz, 146.88 fm, Queens: 29.5 MHz, 50.52 MHz, 145.62 am/fm, Nassau: 28.72 MHz, 145.68 am, Suffolk (West) Hunt: 28.73 MHz, 145.58 am, Smith: 28.65 MHz, 147.21 fm, Babylon: 21.43 MHz, 146.08/68 fm, Islip: 28.65 MHz, Suffolk (East): 146.82 fm, Brookhaven: 146.11 MHz, 146.88 fm, Riverhead: 37.3 kHz cw, Kings: 28.64 MHz, 50.35 MHz, 146.88 fm. Note: Net times between 2000 and 2100 Local on Mon. It is now Sept., have you made your reservations for the Hudson Division Convention? The dates to remember are Nov. 10-12, at the Playboy Resort and Country Club at Great Gorge, NJ. K2GCE returned from TX, where he helped move his son who will be teaching at Texas A&M this fall as an Asst. Prof in the Spanish Dept. Again we bid farewell to another traffic station — WB2JAY reports he will have moved to VA by the end of June. At the request of Nassau County Police and the "Two Massapequas," LIMARC provided complete communications coverage of the Mini Marathon on June 17. Organization was handled by WB2MIY. Communications were handled by WB2BON and about 30 LIMARC members. Radio Central ARC hopes to hold a Flea Market some time in Sept. WB2FHN has been appointed to the Board of Directors of the Hudson Amateur Radio Council (HARC). Congrats to: WB2PZX on upgrading to General, WD2AGS to Tech, WA2MIO to Extra, WB2IBQ and WA2MTM to General, WA2HCS WB2ZCY to Tech. WA2AIR (Coast Guard ARC, Governors Island) now has a new beam up. K2MPY plans to teach a General Class ham radio course in the Adult Ed. program at Bethpage HS., registration will be 9/26 and 9/27 at the school with a start date of 10/18, further details can be had by calling 931-2900. Many thanks to WA2YEI for the job he did as PAM, due to personal business he has resigned. WA2UWA has taken over, please give him all your support. The Hall of Science now has a cw net at 2030 local on Mon. on 21.365. WA2MUL now K2QH, WA2ISY now a General. Traffic: (June) WA2JKG 124, WB2JAY 103, W2MLC 77, WB2EUF 65, WA2YEI 32, W2DBQ 18, WA2YUS 16, K2GCE 14, K2IZ 10, W2AIR 8, WA2CZY 8, K2IFE 8, WB2DP 3. (May) WA2CZY 36, K2GCE 23.

NORTHERN NEW JERSEY: SCM, Bob Neukomm, WA2MVC — SEC: WB2VUF, RM: W2XD, PAMs: WB2LCC, WA2OPY (VHF), RM RTTY: W2PSU, RM NJSN: N2MW, RM NJNYN: WA2LHV

Net	Mgr.	Freq.	Time/days	Sess.	QNI	QSP
NJN	W2XD	3695	7:00P Dy	30	455	206
NJN	W2XD	3695	10:00P Dy	30	274	108
NJSN	N2MW	3730	8:15P Dy			
NJPN	WB2LCC	3950	6:00P Dy	30	478	139
NJPN	WB2LCC	3950	9:00A Su	4	54	15
RTTY	W2PSU	147.51	7:00P Dy			

NJ2MTR
TFC, WA2OPY 145.5 8:30P Dy
NJNYN WA2LHV 3735 4:00P Dy

All above times Eastern Daylight Savings Time. Don't forget to get your registrations in for the Hudson Division meeting at Great Gorge, New Jersey for the Nov. meeting. See previous issues for details. I regret to announce that W2ING formerly WA2S51 is now a Silent Key. WB2MSO has been appointed Asst. PAM for NJNJ and has been doing a superb job. WD2AIU now N2ACT and on the air with a new TS520S. WB2RMI is now Advanced. Field Day messages received from the following: Tri-County Radio Association operating at Colonial Park, Franklin Twp.; Cherryville Repeater Association, Penn ARC operating Field Day from Valley Forge. K2NJ2 and one other operator operating QRP. Other Field Day messages received. Morris Radio Club, Morris and Passaic Field Day from Tuson ARC and the Irvington ARC. Morris Radio Club reports the following upgrades: to Technician: WB2QLC; General: WA2S2O WB2KHA; Advanced: WA2TQQ WA2TVQ WB2YJQ; Extra: K2AIO. Additional Field Day reports received from the following: Penn ARC Valley Forge, PA., Cherryville Rptr Assn, Flemington, NJ and Tri-County Radio Assn Hunterdon County Civil Defense and Disaster Control Center worked Field Day from Schooleys Mt. working QRP with 2 operators. Jersey Shore Amateur Radio Society Newsletter the "Ka-Chunker" has an outstanding newsletter and gleaned from it were following news items: 3 members are on 2 meters SSB K2CMB WA2DKB and K2SBG. K2SBG and his XYL are back on 6 meters after a long dry spell with a new Kenwood TV508 with a race on to see who can get WAS on 6 meters first! Traffic: (June) W2CQ 160, WB2MSO 156, K2VX 97, W2XD 82, WA2MVO 77, WA2LHV 74, WB2NSU 71, WB2RMI 53, W2ZEP 49, WA2EPK 44, N2GJ 44, WA2PIP 35, WA2KLS 29, W2LTP 26, W2SWE 17, K2ZFI 17, W2SO 14, W2SU 14, WA2CQJ 12, WB2KLF 11, W2UHF 8, N2TM 7, W2CC 5, W2CVW 5, WA2WXN 1. (May) W2CQB 146, WA2IXB 10, W2CVW 4. (Apr.) W2CVW 5.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF — Iowa had a successful Field Day operation. The following let me know they were in the field: K0WX W0MG W0GC W0BU1 WA0TAQ K0PNZ W0GN N0AN K0YH W0B0W W0ZQ W091TH W0CVJ W0SJ W0JV W0IC and K0GP. Congrats to W0AXF on being presented the "Fern Koskovich Award" at the Sioux City Area Hambore. WA0ZJK moving to Arkansas. Congrats to the following upgrading: WB0WJ to General, WD0HMA WD0GTE W0GUS and KA0BIS to Tech, W0EIT building a time-delayed tone decoder, and W0BCHP building a 2M converter. W0MLRP at Newton doing well on 147.66/08 and will change to 147.83/08. Iowa Code Net (ICN) has changed time to 7:00 P.M. G.D.T. M.V.F. WB0CDD/RPT has good coverage on RTTY 6, 100/700. NTS: N reports W0SS N0SM W0YLS N5YX WA0CZA K0FLY W0PYD and W0YRH gave Iowa 95 percent, and WA0AUX and W0TGO gave Iowa 83 percent on DTRN. Iowa 75M Net officers gave service awards to: W0SRR W0SVS K0GUF K0MR W0RJZ WA0YGV WA0VZH W0LFF K0KAQ W0AVW K0JVO W0BJFF WA0MIT K0KQJ WA0QNI K0RN K0B0W WA0LKM W0YLS W0IKT and WA0TNI. Nets: Ia. 75M: 3970, 1730Z M-S, QNI 1363, QTC 63, sess. 26. Mgr. WA0VZ 2300Z M-S, QNI 784, QTC 35, sess. 26. Mgr. W0YLS. TLGN: 9500, 2330/300 Dy, QNI 450, QTC 137, sess. 80. Mgr. W0YLS. Traffic: (June) WA0AUX 543, W0SS 200, N5YX 98, W0YLS 85, W0BKHO 43, W0PFCI 42, W0LFF 30, W0GDI 24, W0BRWN 14, K0PFI 6, K0IR 4, W0BW 4. (May) W0PYD 18.

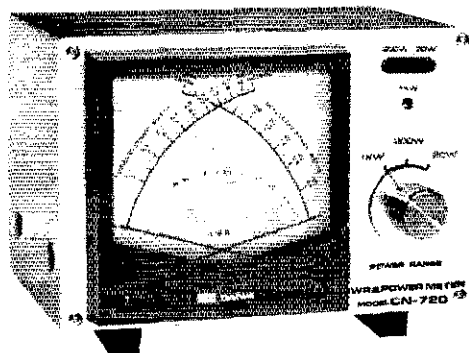
KANSAS: SCM, Robert M. Sumers, K0BFX — SEC: W0KL PAMs: W0YH W0S2S, RM: W0FT, W0S2S reports the Mid States Mobile Monitor Service is now

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Four Unique Communications Essentials



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Simultaneous direct reading SWR, Forward Power and Reflected Power.

Frequency Range: 1.8-150 MHz
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RF Speech Processor/Model RF-440

Increases talk power with splatter free operation. RF clipping assures low distortion. Simply install between microphone and transmitter.

Talk Power: Better than 6 dB

Clipping Threshold: Less than 2 mV at 1 KHz

Bandwidth: 2200 Hz at 6 dB down

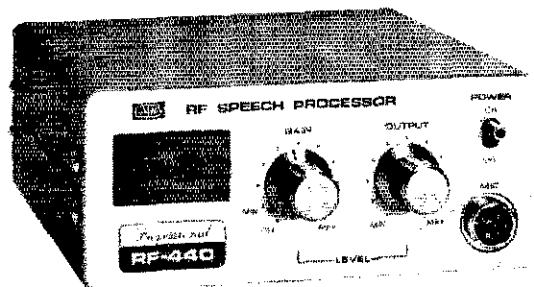
Frequency Response: 300-3000 Hz at 12 dB down

Distortion: Less than 3% at 1 KHz, 20 dB clipping

Output Level: More than 50 mV at 1 KHz

Power Requirement: 115 VAC, 60 Hz, 1.4 W; or 13.5 VDC, 55 mA

Dimensions: 150 x 70 x 150 mm; 5 x 2.5 x 5 in.



Coaxial Switches

2 Position/Model CS-201 4 Position/Model CS-401

Professionally engineered cavity

Construction: High isolation

Power Rating: 2.5 kW PEP, 1 kW CW

Impedance: 50 Ohm

Insertion Loss: Less than .2 dB

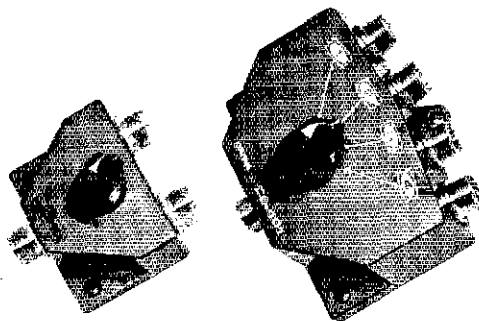
VSWR: 1:1.2

Maximum Frequency: 500 MHz

Isolation: Better than 50 dB at 300 MHz;

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Connectors: SO-239



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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.*
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features which are found in only the most sophisticated and expensive aircraft and commercial transceivers.

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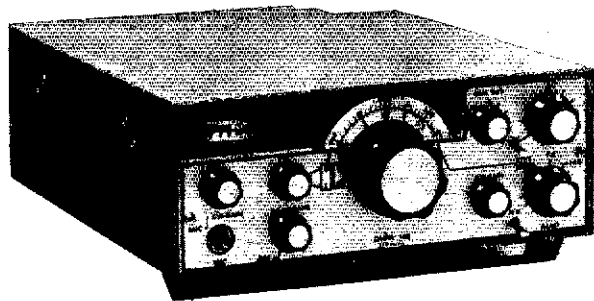
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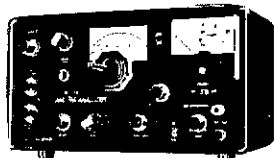
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- Superior Audio Quality!
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NEW! SIGMA MODEL AF250L DEVIATION/MODULATION METER

Introductory Price

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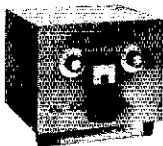


FEATURES: Extremely stable local oscillator for easy measurement of HF, VHF, and UHF bands employing negative feedback, to insure extremely high stability ● Easy to read, accurate linear scale ● Direct off the air signal measurement capability. **OPTIONAL 12v DC Power Kit - \$12. FULLY CERTIFIABLE FOR COMMERCIAL USE.**

SPECIFICATIONS: Frequency: 1.8MHZ-520MHZ/3 range select (A,B,C,EXT), A range: 26.5 MHZ-40MHZ, B range: 48MHZ-60MHZ, C range: 140MHZ-156MHZ (generous overranges), EXT. range: 1.8 MHZ-520MHZ (Need Signal Generator) ● Input level: (1) Through type input level: 1W-200W (RF Input Terminal), (2) Direct input level: More than 80db/50ohm impedance ● Amplitude modulation: 0-100% ● Frequency deviation: 0-20KHZ ● Accuracy: +/- 3% of full scale ● Intermediate frequency: 10.7MHZ ● RF Attenuator: 0-60db variable ● Audio Signal oscillator: (1) Audio Frequency—1,000HZ (1 KHZ), (2) Output level—More than 1V RMS (variable) ● Power Source: AC117 ● Dimensions: H-5½" (140mm), W-10¼" (260mm), D-7¼" (184mm) ● Wt.: 7 lbs.

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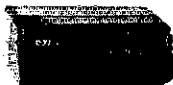
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- 160-10 Meters
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600 MHZ FREQUENCY COUNTER WITH CRYSTAL OVEN TIMEBASE

- Sensitive—No Direct RF Connection Required
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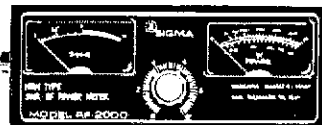


SIGMA RF-2000 SWR & POWER METER

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Cal PWR Scales 200W-2000W Freq Range 3.5-150 MHz. Please do not confuse the RF2000 with similar appearing lower priced units. RF2000 is an individually calibrated professional quality instrument. Unequaled at many times the price. Size 7" (w) x 2 1/3" (d).

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NEW CDE HAM III ROTATORS—
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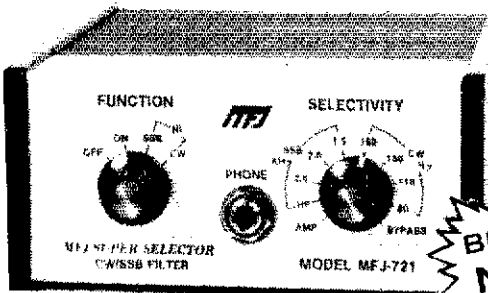
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MFJ INTRODUCES NEW SUPER CW/SSB FILTERS

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 cut-off 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.

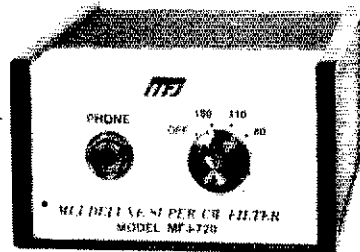
For Simulated Stereo, the raw signal goes to one ear and the filtered signal to the other. The signal appears in both ears and the QRM in only one. The ears and brain reject QRM yet off-frequency calls can be heard. Requires stereo phones.

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. max. 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 in. Requires 9-18 VDC, 300 ma. max. Optional AC adapter, \$7.95.

BRAND NEW \$44⁹⁵



These MFJ active filters are the most copied in industry.

CWF-28X MFJ SUPER CW FILTER

SBF-28X MFJ SSB FILTER

\$29⁹⁵ each



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-28X and the SBF-28X are the same CW and SSB filter as in the MFJ-721 but less speaker amplifier and noise limiter. Plugs in rig to drive phones or connect between audio stage for full speaker operation. Uses 9 V battery. 2x3x4 inches.

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back in full swing. June QNI 273, QTC 18 serving 9 mobiles. The wheat harvest is also in full swing keeping the QNI at a low for another month or so. KSEN QNI 912, QTC 84. KPN QNI 245, QTC 18. OKS QNI 406, QTC 152. CSTN QNI 966, QTC 64. KWN QNI 529, QTC 245. Zone ARES in the Topeka area beefing up the communications system with the weather bureau among the other agencies they serve. Another Field Day is over and the weary operators now rested up. Reports of the activity were fewer than last year, or at least the amount I received indicated lower participation. Congratulations to the Hiawatha APS, having six married couples as licensed amateurs within the club. Can any other club match or top it??? Last but not with great sorrow we report the passing of WA0NSD Topeka. Our sympathy is with his family in our thoughts and prayers. Traffic: WB0BH 208, W4OYH 146, W4AM 101, W4CHJ 87, K4EZ 67, W4IFR 68, W4HI 85, W4FT 47, W4PB 23, W4BSZS 23, W4BLLI 22, W4FDJ 19, W4DFB 13, W4RBO 13, N4IN 11, W4WJX 9, W4KLB 6, W4ERQ 3.

MISSOURI: SCM, L. G. Wilson, K0RWL — Asst. SCM: Joe Flowers, W0OTF. SEC: W0PFKY. At the writing of this report, my wife and I are setting pool-side in Cocoa Beach, FL visiting with WA4GZB, a retired Biologist from the U.S. Public Health Service. It's a small world. This is the time of year for vacationing, but I would have thought W0OCW and W0VHZ could have found better places to visit than the hospital. Here's hoping they cut their "vacations" real short. Field Day reports were received from the following stations: W0BBM K0BBM W0BRN K0EJ W0UGU K0FA and W0RR.

Net	QNI	QTC	Net	QNI	QTC
HBN	309	23	MEOU (May)	304	122
NEOMOE	110	0	MEOU (June)	316	46

Congratulations to W0GUPU on winning the OARS Spring contest. The Kansas City DX Club just recently received its ARRL affiliation. Congratulations. Anyone needing information about or wishing to help with the Midwest ARRL Convention should contact WA9KUH. The Hospital Hill run went smoothly again this year and all those who participated deserve a thank you for all their help and a congratulations on their success. Traffic: (June) W0BMA 258, W0BH 1213, W0OTF 106, W0VHN 89, K0SI 80, K0ONK 61, W0UD 46, W0BVL 26, W0CAU 22, W0JL 16, K0RWL 10, W4MOP 2. (May) N4JL 1. (Apr.) N4JL 15.

NEBRASKA: SCM, Ed O'Donnell, W0GWR — WA0AGH and W0OKG are now Silent Keys. W0EXP received 50-year award from QCWVA North Platte and Ogallala repeaters which are linked, now give coverage from Cozad, Nebr. to Ovid, Colo. A new YL 2Mtr net is operating in the Omaha area. Net Reports: Cornhusker net, QNI 1380, QTC 39; Mid-Nebr ARES 2 Mtr Net, QNI 182, QTC 7; Nebr. ARES 75 Mtr Net, QNI 149, QTC 1; Nebr. Storm Net, QNI 701 QTC 53; Pawnee ARC 2Mtr FT net, QNI 124, QTC 6; QCWVA net, QNI 43, QTC 9; Western Nebr. Net, QNI 372, QTC 8; Nebr. Morning Phone Net, QNI 1278, QTC 55. Traffic: W0FQB 136, W0VEA 98, W4GCB 51, W0HOP 29, W0VYX 19, W4PCC 18, W0BSY 18, W0ZNI 16, W0EUT 14, W0NKK 11, K0P8S 8, W0GWR 8, W0NFG 8, W4GQE 8, W0HTA 4, W0IXB 1.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, John Mc Nassor, W1GVT — SEC: W1XX. RM: K1EIR. PAM: K1EIC. VHF: WA1ELA.

Net	Freq	Time/Days	Sess.	QNI	QTC
CN	3640	1900/2200	55	225	137
CPN	3965	1800 M-S	30	414	143

VHF-2	28/88	2130 Su	30	287	48
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High QNI: CN — W1VK K1EIR & K1GF. CPN — W1NQQ W1JA W1HMM K1BCB. SEC W1XX notes complete '78 SET results in July QST. Conn. Section did very well and cooperation of all who supported this is appreciated. Director W1HHR requests Clubs send him schedule of Fall/Winter activities. Clubs are asked to promote traffic handling as a Public Service provided only by amateur radio. W1CPC Tiers NE Novice Net 3720 at 830 local. Manchester RC held amateur radio demonstration at Sears Store. New officers installed by W1BDN at Shoreline ARC include: WA1FOK, pres.; K1CJ & WA1WOM, vice-pres.; N1JA, secy.; WA1CPB, treas. Stamford ARA notes with regret the addition of W1HJJ to the list of Silent Keys. Tri-City "Feedback" notes Simulated Emergency in Waterford testing skills and equipment of amateurs involved. W1EJL on 14.268 from W4-Land. Southington ARA showed Field Day Movies taken 25 years ago! Congratulations to: K1DFS for June BPL; W1ARD & AAK Extra Class; and W1DBV, W1CPC, W1CCK Advanced Class. Planning was the key to successful Field Day — hope you did and hope you enjoyed it!! Traffic: K1DFS 317, W1B1 170, K1GF 182, W1CPC 101, K1XA 88, WA1CU 74, W1EYV 65, WA1RLV 63, W1GVT 58, W1KV 50, WA1HYN 48, W1BDN 36, K1MLJ 34, W1JA 31, W1JTD 21, K1AQE 15, W1QV 10, W1VS 4, W1BDI 3, WA1BER 2, W1CUH 2.

EASTERN MASSACHUSETTS: SCM, Frank Baker, W1ALP — Asst. SCM: WA1OWG. SEC: WA1OG. Appointments endorsed: As ECs: W1s FDPST/ASA RPF MNK ZUP REP EC II TC AYG LE WA1QA; OBSs: W1s ALP LKI BJZ WA1QAA; OO: W1DMH; K1TR as OVS; OTS: W1s BB FJ DA AAR; WA1s UGJ TBYEYY. New officers of Lexington ARC: K1QLA, pres.; WA1WZJ, vice-pres.; WA1VBV, treas.; WA1TTV, secy.; K1CE, act. mgr. The Club wants to thank WA1YGJ for his help in Field Day. I also want to acknowledge many FD messages. WA1GRE now C.D. Director of Townsend, has Yaesu FT820B for 8. K1CPC now reur. WA1CPC back to Cape Cod. WA1SI is WA1SIG. NEEPn had 65 QNIs, 14 QTC. Ex-K1CLV now in Halifax. WA1OQV attended C. D. management seminar at Topfield. WA1ZBX new 10-X CW contest Mgr. W1BHJT new Novice in Danvers. KA1AEF new Tech. in Haverhill. W1BGKU new in Weston. KA1AEB in Reading. New Generals: N1AAG W1CUB W1DMZ WA1VDP. W1DMP new beam. K1YWW has new 1A-33. K1EUE new mobile from Malden. W1CGLK's father may be on air soon. K1PZU has Yaesu memorizer WA1VKB at camp for 2 months. WA1YGJ wrkd D40K on 20. W1JR sends in quite a report on all his activities. K1JUN our Needham EC, says they have a 220 repeater. W1UQ a big help for them. WA1UJ visited Marconi site on the Cape. Wellfleet RC on Long Island in Boston for FD. EM2MM has 38 QNIs, 25 QTC, 17 sess. K4EIK in Quincy is active in Net. HHTN had 324 QNIs, 64 QTC. W1BDXR has FRG-7 RX. Chelmsford ARA new officers: WA9NEW, pres.; K1AYZ, vice-pres.; W0DHSO, secy.; K1PD, treas.; WA1GSF, off-at-large; W1HH, trustee. SEC WA1OG received reports from: W1BK WA1BLC WA1HPS W1BHD W1YD K1FWF WA1ZLO. Marblehead WA on Childrens Island for FD. Medford CD group helped out for graduation exercises.

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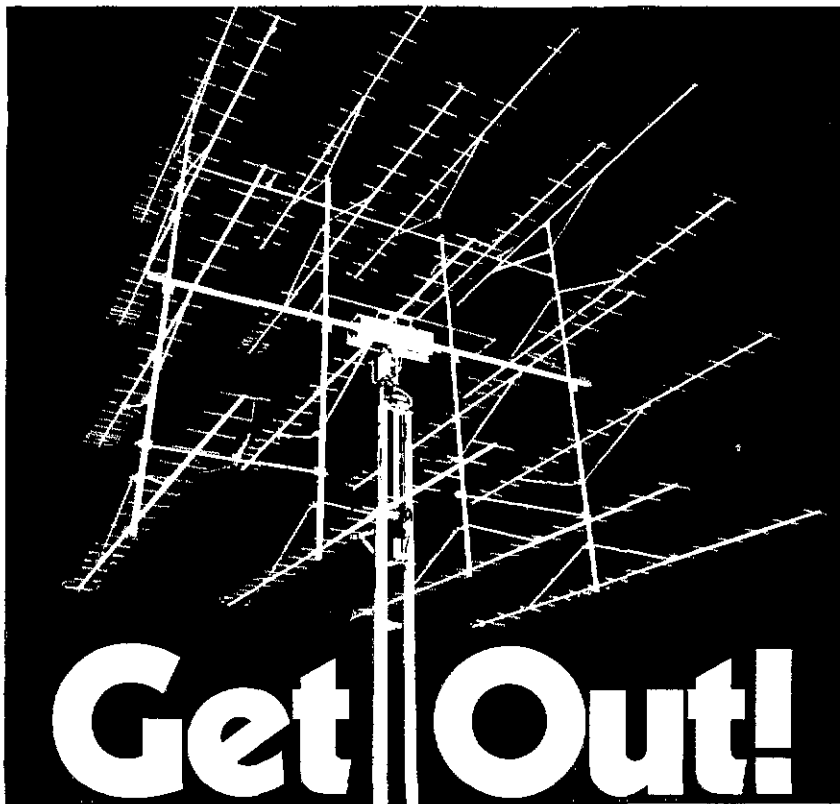


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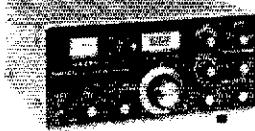
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W1AOG WA1BLG. Capeway RC met at K1KNM's QTH. W1AAI is now AA1A. W1NF wonders who is the oldest ham, he is 85. Massachusetts ARA had a meeting and K1PJ showed pictures of previous FD. W1MPP & K4RO visited the hams in Halifax. Framingham RC had their election of officers. EMRIPN had 335 QNIs, 181 QTC. K1TR moving to Dover, MA. W1HZU applied for CW DXCC. EMRIS had 61 QNIs, 29 QTC. EMRIS had 469 QNIs, 295 QTC. W1BDU active on 20 & 40. W1B3 still active on 160 and puts out a nice bulletin about 160. Traffic: (June) WA1ZAZ 344, K1BA 234, WA1YMN 204, WB1DXR 198, WA1VAB 175, WA1UWF 157, WA1EY 144, W1FJI 124, K1ES 110, W1DMS 104, K1PAD 102, K1GN 74, WA1LAD 57, W1PEX 40, WA9NEW 34, W1EMG 30, W1DMH 28, WA1ZXB 20, K1BZD 19, K1PZU 19, WA1OWQ 15, WA1ZGX 14, W1HL 13, WA1IFE 13, WA1VKB 10, W1CZB 6, WB1FGD 6, WA1OAJ 6, WA1YGG 6, W1DGD 5, K1LCQ 5, WA1ATX 2, K1TR 2. (May) K1LCQ 5.

MAINE: SCM, Bill Mann, W1KX — SEC: WA1YUW. New NM (CMEN) WA1SMY. W1BFA provided vital link between girl suffering from lethal bee sting in South Seas and Augusta Gen. Hosp. for life-saving advice to her father. Eleven hams assisted in Lawiston/Auburn river search for missing body July 8. List of ME rpters available at Tourist Info Center, Kittery, courtesy Yankee ARIC. Many groups active in Maine FD with Portland AWA making Evening News on WCSH-TV, Windsor Hamfest Sept. 16-17. Please support your section nets: Sea Gull Net, 3940 kHz, 1700 local M-S; Pine Tree Net, 3596 kHz, 1900 Dy; Maine Public Service Net, 3940 kHz, 0900 Sun. June rpts: Sess. QTC/QNL. PTN 30/141/258. SGN 26/82/1098. CMEN 13/13/174. BYN 30/37/959. Traffic: (June) W1KX 209, WA2ERT/1 84, WA1QFX 63, W1RWG 59, W1HDC 48, W1BJ 39, N1RP 39, K1TVT 25, WA1FCM 17, WB1AOD 16, WA1SMY 13, W1AHM 10, W1JTH 10, K1TZH 10, W1CTR 6, N1PL 5, WA1JCN 2, WB3HYD/1 2. (May) W1BJ 48, W1WCI 3.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1SWXW1NH — SEC: K1RSC. NMs: W1TN & N1NH. New EG for Rockingham Co. is WA1VKM. New OO is WB1FUR/K1XR. When not chasing YLs, N1HO is after his MSEE at Northwestern. FD messages received from N1OH, WA1SO, WA1BTA, WA1BTA/1. Night work keeps K1NH from the NHVTN. The GSPN had 408 check-ins and 204 traffic. W1ZML W1HVA W2LGF WB2OME WB2JLT W1LHV W1RRN WB3DCL W1JLI W1OZ & W7LID/1 vacationed in NH. WB1ELP now Advanced. WA2CAU has a summer place in NH. New ham N1AAI is in Nottingham. W1BYS is listed in Men of Achievement & Notable Americans. W1IAHO the Keene Machine group held Field Day in conjunction with the fire department and their antenna raising aerial ladder. W1OST rides a Puch submini bike. N1HO has the drake line. WB1CII moving back to NH from TX. WA2DEW vacationing in Sutton, K1PJJ visited K1PCY & K1PCZ. WA1GIB from rare ID to rare NH. N1CB says don't forget the Sept. 24th hamfest at King Ridge Ski Area in Sutton, NH. Sponsor — Conn Valley FM Assn. Tickets from WA1WEY. Traffic: (June) WB1ELP 62, W1UB 10, W1BYS 4, N1AAI 4, W1SWX 3. (May) K1BCS 730, N1HO 37, WA1VKM 24, K1NH 3.

RHODE ISLAND: SCM, J. Titterington, W1EOF — Most RL clubs participated in Field Day. All enjoyed it immensely. WA1TMZ reports new Ocean State Chapter of 10-10 Club growing fast. NCRC has a new licensed member KA1AVG. He was a ham back in 1935 and says it's never too late to learn! WB1HJK now a General with call N1ABG. Visited new Apple Valley Club & their enthusiasm is great. All who know W1CMG, drop in on him, if you can. Bill is confined to wheel chair and years for company. WA1CSO reports totals for RLEM 2-Mtr Trc Net, QNI 195, Tc 55. This net can give you almost instant service to anywhere in RI — 148.36 at 1830 local time, any evening but Sat. Traffic: N1RI 47, W1EOF 25.

VERMONT: SCM, Bob Scott, W1RNA — SEC: W1VSA. BARC operated Field Day from top of Mt. Philo with 4 members and 1 SEC as W1KOO. They claim it is the only dry Field Day in VT in 20 years. I assume wx-wise, not 807-wise. WB1AFY now AA1E. By golly, these days one can't be sure of rare DX or just local — hi! Father/son team, W1UXK & WB1GTO were on Hogback Mt. Field Day, making 28 contacts in 24 hours with HW-8 on 40. KA1ASQ is new ham in Bennington. Tnx to those passing along info. With deep regret we report the passing of K1QKY on 8/22/78. He will be long remembered by the GHN & Carrier net mbrs, as well as others. Carrier 2648832; VTSR 3046970; G1MN 2645502; VT Fone 41497; VTRFD 458/15. Traffic: K1QBQ 123, AA1E 28, W1RNA 13.

WESTERN MASSACHUSETTS: SCM, Bill Lowe, W1TM — SEC: WA1DNB. PAM: WA1MJE. Field Day reports via NTS: N1AV WB1IM W1IS W1JP W1NY W1TM. W1BJJ back on after being silent several years. New officers at W1YK: WA1YUR, pres.; WA1NDJ, vice-pres.; WB3GSX, secy-treas. K1UR (former pres. W1YK) now at new QTH in East Mass. after graduation. June endorsements: OO K1RQ, OTS W1BVR W1KZS WA1LPJ WA1OUZ. Welcome new ops WB1S: HKE HKN HLH HLL HLN HLO and KA1ARR. SEC WA1DNB temporarily QRT while changing QTH. Traffic: (June) W1KK 111, W1TTM 109, K1SSH 75, W1ZPB 59, W1BVR 33, W1DOY 24, K1UR 21, K1JNV 16, WA1OPN 4. (May) W1KK 110, WA1RLP 21.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davis, KL7CYK — Field Day activities despite the rain was enjoyed by the many who participated all over the state. We have a new CW net entitled "Alaskan Golden Net." It meets every day on 3730 kHz at 0430 GMT. Its mgr. is KL7JHD. Give it a whirl! I know Scott would like to have you on board. KL7JG reports that now they have 12 active stations on Adec with a recent reorganized club out there, FB gang. The SCM visited the Kodiak Club and met with them at the home of KL7HX. They sure have a very active group. KL7HOV Net Mgr. for ASN reports over 1000 ck-ins for this month. Hope you sent in your reservations for the ARRL Alaska Convention which was held in Anchorage on Aug. 26 and 27th. Traffic: KL7JDI 70, KL7JDH 38, KL7JG 14, KL7AF 8, KL7COK 6, KL7HDS 6.

IDAHO: SCM, Ed Hamlin, W7KDE This report prepared by SCM-elect Lem Allen, W7JMH. EC W7JSM reports 9 active members in Canyon Co. AREC. WB7OCO now N7ACA. EC WATNRP reports 9 AREC members for Cassia Co. with 8 participating in Minidoka Dam Field Day activities. W7LQT reports Kootenai Club had 24 ops on Couer D'Alene Mountain for FD with only 6 AREC members. Payette Club sponsored CPR course for hams and families. Members of the Payette Club spent FD at Middle Fork of Weiser river. W7TYG building

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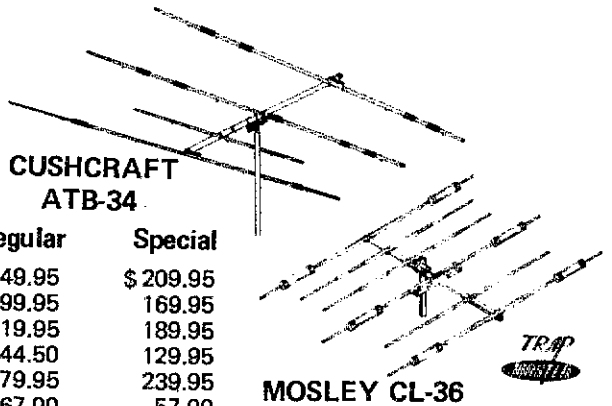
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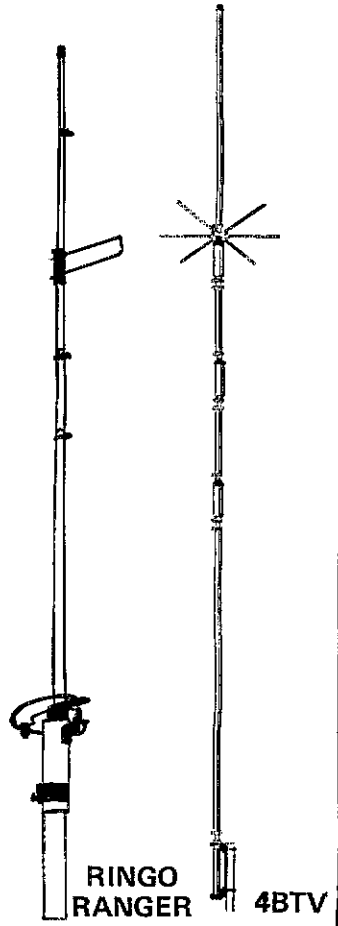
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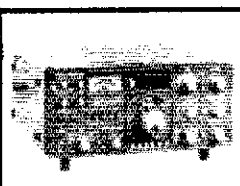
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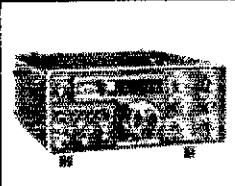
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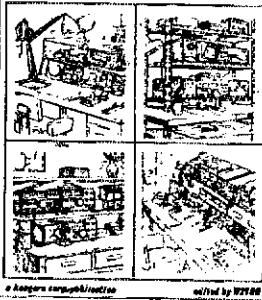
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HW-101 kit, WTGBO completed his SB-104-A kit. Congrats to KA7ASX and KA7ASY, new VL ham. W7BDL says Pocatello Club will meet Thur. Sept. 7 at the Public Library. WIMU hamfest at Mac's Inn Aug. 4-5-6. Bolso Club potluck at Municipal Park Aug. 20 reports WB7-QET. [dado] now has 19 active ECs, with more to follow. W7HZZL has WAC certificate.

Net	Freq.	Time	QNI	QTC	Sess.	Mgr.
IMN	3635	0300	221	50	22	WA7BDD
RACES	3990	1410	243	8	22	WA7WXI
FARM	3935	0200	760	21	28	W7CJC

W7FHQ and WA7JFC are back in new Meadows from Desert Hot Springs. W7HPH, K7CXG, K7OJD are portable. [front Donald] [Emm] [RFS] [EARS] participated in FD at QTH of [M. Tra] [GHT 182, W7JMH 37, W7GBO 8.

MONTANA: SCM, Robert Leo, W7LR — The new VHF group is: RACOM, or Repeater Advisory Committee of MT. Any new repeater should submit a sanction form to W7TYN. Get forms from W7TYN or W7LR. Present MTN control stns are W7DEO & W7BPCZ. Send me news of MARS activity. I have these listed: W7XD, NAVY MARS; WA7YYW, AF MARS; W7NEG, Army MARS. Montana has 19 ECs. At the Region 6 CD Livingston meeting amateur radio had a 2 hour demo & presentation. Thanks WB7AZJ, K7LTV, WA7KKP, W7LR & others. Sorry to report W7MQI a Silent Key. Many clubs and cities report good FD effort. Ft Falls 147,9030 repeater in test phase. Maifa had good hamfest. Livingston has 7 new Novices. 147,933 Billing. [K7W] [JN] continues good OO work. WB7EQU hardin operates tractor mobile. WA7OBH provides emergency contact on 2 meters. Write W7RZY for OSCAR info. W7TGU reports MTN 814 QNI, 110 QTC. W7LKB active in OO work. W8II San Diego reports reading this section. K7ABV in Bozeman this summer. W7LR busy with DX. Traffic: W7XLD 74, W7NEG 8, W7LKB 5, W7LR 5, W7HAH 2, W7LYR 2.

OREGON: SCM, Dale T. Justice, K7WW — SEC: W7LBH. Section nets:

Net	Time	Freq.	Mgr.	QTC
OSN	6:17 PM	3980	W7VJF	
OARES	7:30 PM	3983.5	WA7NEQ	9
PDXARES	7:30 PM	147.33	K7WJ	80
OSN	6:45 PM	3585	N7NO	
WGN			WA7YPU	76
1876	7 PM	148.76	K7KVV	31
BSN	5:45 PM	3908	WA7GFE	39
JCARES		147.06	W7VSE	16

Glad to be back as SCM after a four-year absence. Field Day reports were received from K7AUQ/7, Tektronix club: K7CBP/7, K-BAR-A; Cent. Ore. RA: W7TAH So. Ore.; W7LNEY; Umpqua Valley ARC; and W7QMU/7, Rogue Valley ARC. They originated 13 messages for visitors to Trater Lake Park while operating FD there. During the June VHF QSO party, the Tek. club worked Japan on six meters for the first time in 20 years. Six meters is alive and well! Many stations are upgrading and new ones getting licenses. New N3x and K4 calls are much in evidence on the bands. When planning club meeting programs for the Fall and Winter, don't forget your League officials are available. Invite them. Traffic: W7VSE 512, K7NTS 302, WA7HS 173, W7HLF 118, K7IWD 105, N7NZ 78, K7JUF 78, WA7GFE 62, K7WW 24, WA4HRG/7 19, W7LT 12.

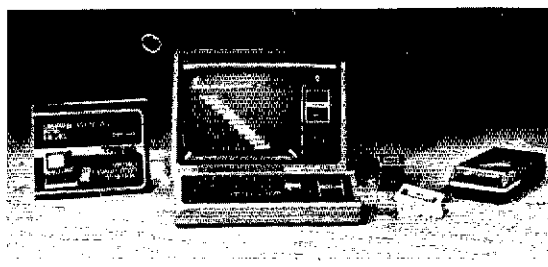
WASHINGTON: SCM, Bob Klepper, W7IEU — NTN, 1329 QNI, 53 QTC; NVSSBN, 680 QNI, 38 QTC; WSN, 298 QNI, 94 QTC. Washington State "Amateur Radio Week" will be Sept. 1-17. At this time we are waiting for a meeting date with the Governor to sign the proclamation. Look for me from the Jefferson County during the BEARS QSO party on the 16th and 17th. Hope to see many of you at the Walla Walla Hamfest on Sept. 23 and 24. K7V5Z back on with new antenna system. W7UMX (Whidbey island NAS club station) back in operation after a long inactive period: N7XX doubled his previous QSO total in the All Asia Phone contest. N7CT busy with FD reports for West Seattle ARC. WB7EBP did an FB job in her first FD. W7PGY busy traveling to club meetings and working on 8th NOI and WARC. WB7BLU had smoke damage to his equipment but lost his home to a fire. W7AIB enjoying the decent wx and summer activities. W7IXF spending the summer traveling to the East Coast. Watch for power surges when hooking into strange sources. BEARS members on a S&R had 2 pieces of equipment wiped out due to a surge. WB7CWO now complete battery powered 75-10 and 2. Some club bulletins have interesting tid-bits, but names without calls don't mean a thing to people outside the club. WB7EOK doing well with 400 ft. long wire. Interested in Intruder Watch? Contact W7JIE for info. N7AM adding more to his vertical array for the winter contest season. WB7FGC and 24 ARES members out for FD with the Spokane Dial Twisters. W7GWO and K7NFH have joined Silent Keys. WA7YCM, now QN7 Wed. W7LG moved into the new ham shack and getting the antenna system in order. W7FEL/RPT testing new site at Striped Peak (1300 ft. and 80 ft. tower). West Seattle ARC put on an Amateur Radio exhibit in Westwood Village. WA7ZNB upgraded. WA7TWB is getting much support from San Juan County officials on his emergency communications plan. W7ZEV and others on NAMS involved in medical relief into Holden Village. Traffic: (June) W7DZX 492, W7GIF 354, K7GXZ 147, N7AM 84, N7AJ 81, WA7BDD 64, W7IEU 43, WA7OJ 40, WA7YCM 33, W7EJU 32, WA7LO 31, W7APS 24, N7CT 13, WB7EOK 7, WB7OHC 7, W7ZEV 4, W7AXT 2. (May) N7AM 92, WB7OHC 6.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallio, W6RGG — SEC: K6LWR. PSHR for June: W6OA & W6BUZ. New OTS: NSMR/B. The East Bay Section continues to dominate the NCN Honor Roll with 20 star performers in June. W6JXK feels that things are straightening up. K6OE busy as always. N6NE almost made PSRR. WA6JVZ entertained VK3UB and OH8UT & XYL for eyeball QSOs at his home. K6XO motored to SCV for FD with K6Y7/B. Section clubs active for FD: W6OX/B, MDARC, K6EAG/B, HRC; W6OJA/B, LARC; N6KB/B, ACRC. The "RELAY" bulletin of NCN is an excellent publication. Hats off to editor, K6TP. Dir. W6ZM spoke at SBAR which has these new officers: WA6SV, pres; W6TML, vice-pres.; WA6HW, secy.; WA6YCD, treas. W6DEXS from the same busy club recently constructed an antenna from "used wire" and then worked W5FG from the Science Club room of Fremont's High for an audience of 30 very impressed students. MDARC has 272 members! CCRC officers for 1978: W6URA, pres.; W6JJK, vice-pres.; W6AAJ, secy.; K6RTU, treas. Traffic: W6JXK 199, K6OE 193, W6OA 186, W6BUZ 40, N6NE 4, W6BVEW 4, W6BXM 3.

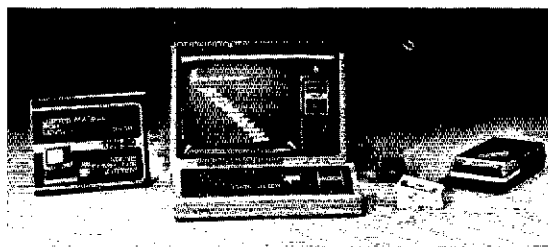
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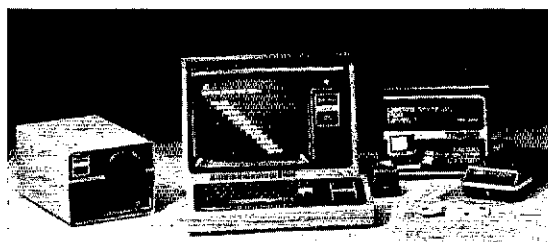
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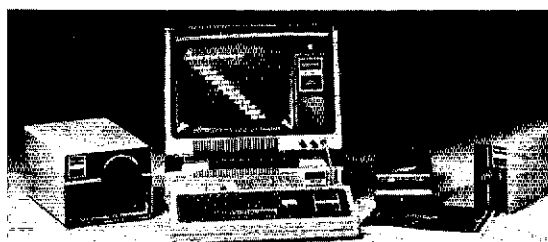
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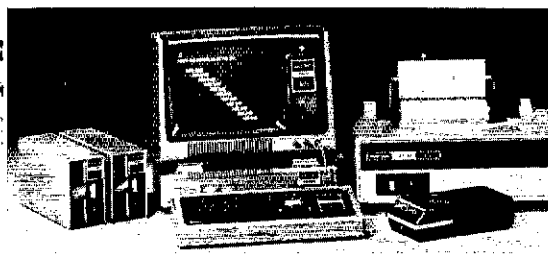
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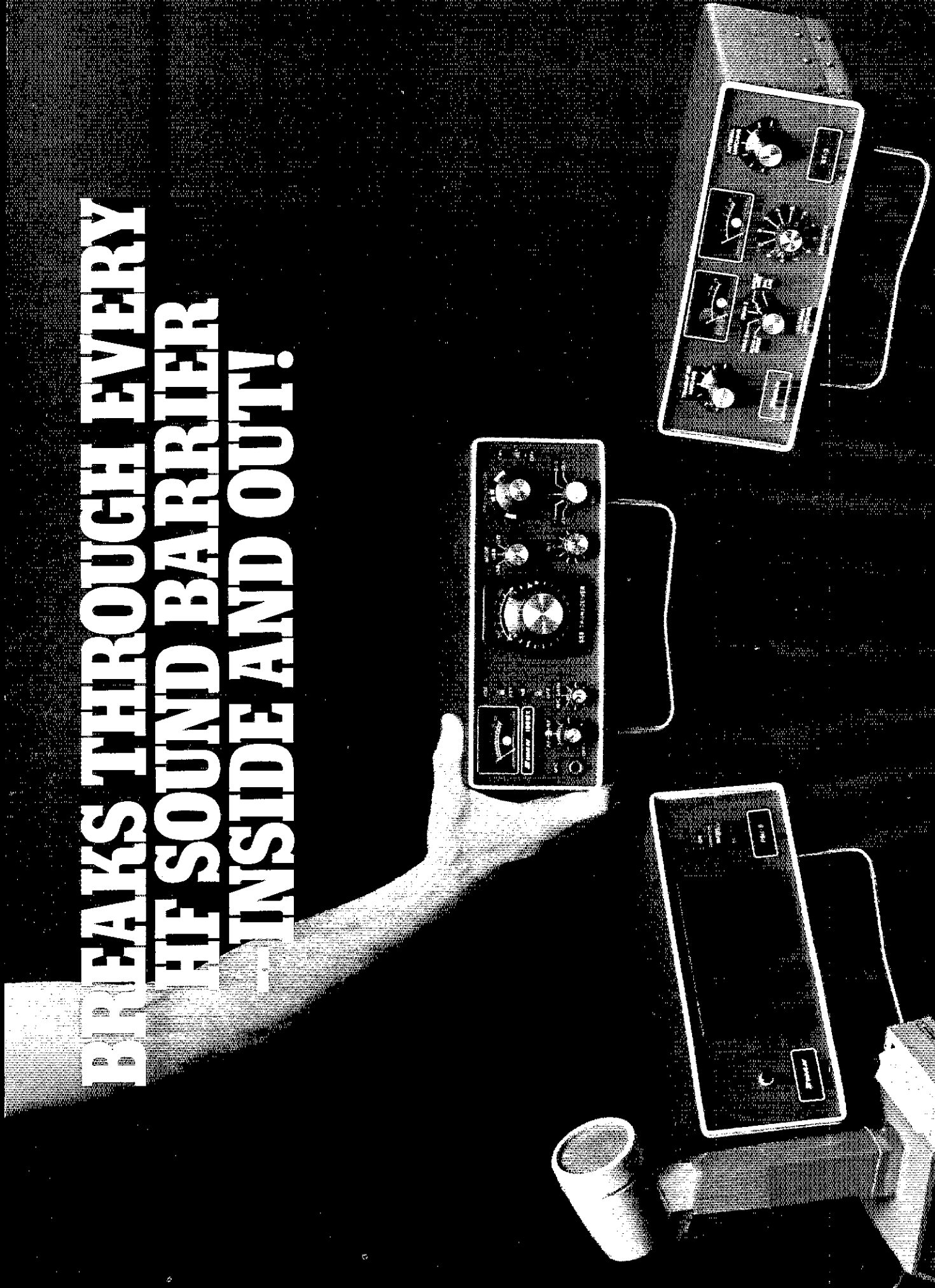


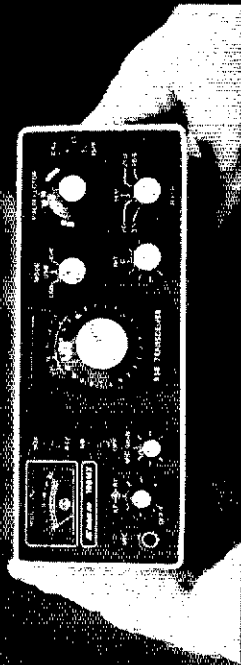
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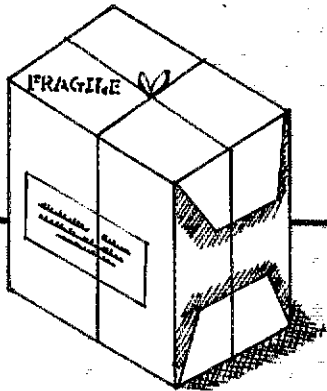


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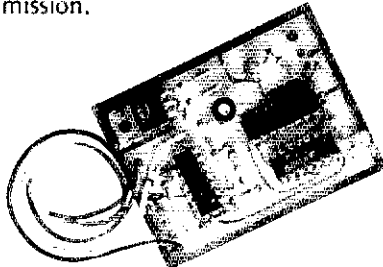
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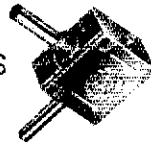
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NEVADA: SCM, Leonard M. Norman, W7PBV — SEC: K7ZAU, Wide Area Data Group, "WADG" for Promoting Universal Concepts of Amateur Radio, has filed the Articles of Incorporation and affiliation papers with the ARRL. WADG has their repeater 147.630/147.03 approved for high or level site in the Reno area. WADG officers: K7RH, chmn.; WA7SIA, vice-chmn.; W7DDK, secy-treas. Nevada Silver Dollar Chapter of the International 10-10 chapter has their 777 certificates printed, QSO on 28.777 or QSL to W7OK for details. W7ABX is active on 6m in Reno area. K7NU and K7ZOK on 6m in Las Vegas. W7JUG still chasing DX from Boulder City. K6MQX7 on the air QRP. WB7AD new Novice. W7ILX has a frequency counter. Traffic: W7ILX 198.

PACIFIC: SCM, George Morton, N7HR/KH6 — KH6BZF is custodian for ARRL films, "Ham's Wide World" and "Moving up to Amateur Radio" for the Pacific Section. Contact Lee at 808-247-0587, or write call book GTH. Reserve well in advance. Watch local TV/Cable for ARRL PSA. FD activity vy high! KH6USA (KH6JMK, SEC & JKP, EC Oahu were chief OPs) ran wind pwr QRP! SCM visited many sites & recd many FD msgs. Pacific Council slow catching on, but several clubs now on board, am looking for all clubs to send copies of their meeting minutes to each other & a copy to SCM too please. Pac Sect Emergency Notebook in the draft; names, numbers, freqs, etc. QRP. SCM Tel: 808-499-1149. Traffic: KH6JJP 14. KH6BZF 10. Aloha!

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SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — Asst. SCM: W6NJJU, W6RFS — the new secy. of the River City ARCS. W6PBC has converted to all solid state gear on 8, 2, 220 and 432 on ssb and fm on 2 and 220. W6BHI has a new 2-meter transceiver, while across town, W6FAA had his stoien. K6RLY has a new 90 foot tower up. The GEARS held their Field Day at Campbellville Lookout. The Sierra Foothill ARC were at Blue Canyon. The El Dorado ARC camped at the Pollock Pines Elementary School and the Foothill ARC of Yuba City/Marysville set up along the Sac. River for their efforts. W6BLXT hosted the North Hills club at his ranch near Somerset while the RAMS went mobilizing. The River City ARCS first Field Day effort was tried from near Rancho Marieta. Don't lose that portable gear as the Calif. QSO party will be the 7th of Oct. We have lots of rare counties. Traffic: W6RSP 104, W6DEF 20, W6PBC 3, K6CBP/8 1, W6HIR/6 1.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — Asst. SCM: WA6YAK, W6TRP, WA6JIN, SEC: WA6YAB. New officers of the Fresno ARC are: W6BSHI, pres.; W6GYAR, vice-pres.; W6GITM, secy.; K6CZO, treas. The club meets the 2nd Fri. at Wawona Junior High in Fresno. The club starts another Novice class Sept. 13. The Sierra ARC contacted 72 of 75 sections and made 800 points during FD. The SJV was well represented at the Santa Maria Swapfest. The XYL of W6BJW won the Swan 350A, and K6JGJ won an antenna. is my sad duty to report W6JLL, K6HEZ and W6GNU are gone. W6JIM, now W6JLJ, LB/pt. Congrats to the following who recently upgraded: Extra WA6YMO; Advanced WA6VFC and W6BDM; General WA6VNS, W6BYVG, W6BYDE, W6BZCJ, W6BSP; Tech WA6SKR, W6BCBO, KA6BVT a new Novice in Kings Co. Many SJV amateurs won prizes at the Fresno Hamfest. WA6PJN won the TS520S 1st prize. W6XP and K6XJ won 2nd and 3rd prizes. W6MRP has a FT227R, W6XK K6PE and WA6VIS have KDK2015Rs. W6SALC has an IC211. Don't forget the CA QSO Party Oct. 7-8. All QRS and OPS are now OTS. Traffic: (June) W6DPD 21, WA6IQZ 15, WA6JDB 11, K6PSJ 5, WA6GJV 2. (May) WA6KMW 4.

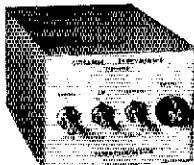
SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: W6BZJ, RM: W6RFF, W6KZJ's XYL reports Larry in hospital for operation. K2J is reporting on NCN for many years, get well soon! OO NEFN is busy on all bands per a 4 month report. SEC W6BZJF gave a talk on ham radio communications capabilities to the Red Cross Disaster Institute in Sacramento. WA6NIL resigned as Publisher of the CCRRC Circle. CCRRC officers: W6BURA, pres.; W6JKY, vice-pres.; W6BAAJ, secy.; K6RTU, treas. June CCRRC Circle reports 47 new hams in SCV. Welcome. W6ZRJ is redoing his shack this summer, as well as checking into NCN to handle traffic. W6BYV is busy, as usual, with traffic on NCN and RN6 and working 2-meter FM on NCN/VHF. Lee on phone — its unbelievable! W6ALC reports phone traffic activity as usual and makes PSRR. WA6UO, ex-W6BUCG, is active on NCN and WPSS, and went mobile for Field Day. PAARA auction and flea market is Oct. 7, 8AM to 3PM at the AMPLEX cafeteria. PAARA reports a successful Field Day operation with lots of participants, a new generator trailer is finished and the station trailer at SRI is next for repairs. KA6BEU made his first contact during FD. As of July first W6IPL takes over as Northern Calif. Net Mgr. from W6RFF. On NCN Honor Roll for SCV were W6GQZ, W6ICU, WA6JWK, W6KZJ, WA6NMG, W6RFF, W6RQY, W6BESH, N6VE, W6BYD and K6YKG. W6BESH very DRL with final exams at school. Traffic: (June) W6BYV 182, W6RFF 107, W6AUC 75, W6BESH 34, A66UO 14, W6ZRJ 5. (May) W6UAC 87.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, AA4R — SEC: W4EHF, PAM: W4OFO, RM: K4MC. June ends the reign of the PAM and RM as the new appointment structure takes over. Thanks to W4OFO & K4MC for serving in these key jobs in NC, both having done an outstanding job. Field day again a top Field event in NC with the following clubs active: Azalea ARC; Rockingham Co ARC, Cary ARC, Raleigh ARS, Charlotte ARC, Mecklenburg, Cedar, Co. ARS, Co. Ants, Morganton ARC, Onslow ARC, Forsyth ARC, & Central Carolina ARC. Great turnout for the June VHF Contest too with the Mecklenburg ARS (W4BFB), Charlotte ARC (W4CO), NC State University ARC (W4ATC), Healing Spr Mtn. VHF Soc (W4PAR), & groups from Greensboro (K4CAW), Morganton (W4WZQ) active during the weekend. Let's see that same activity in Sept. VHF Nets are springing

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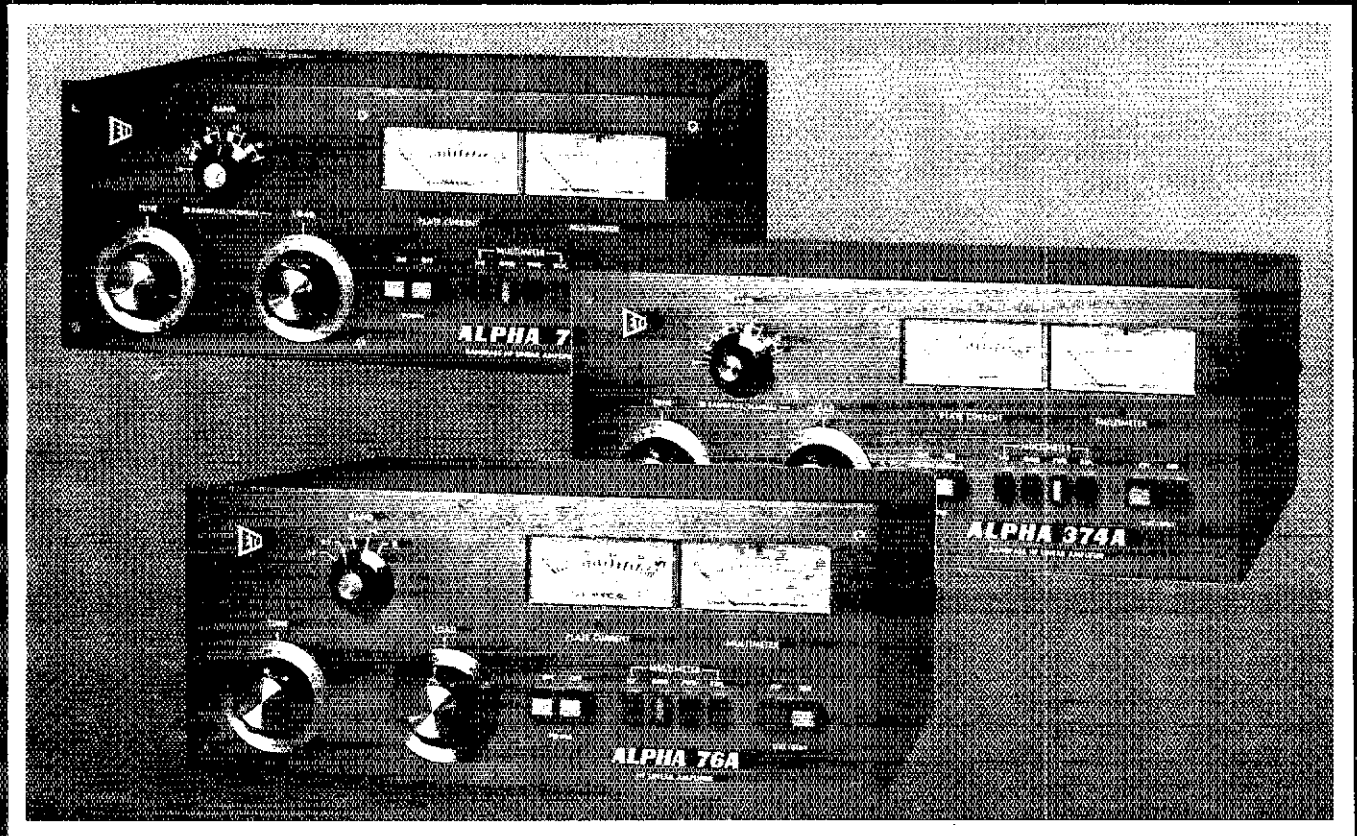
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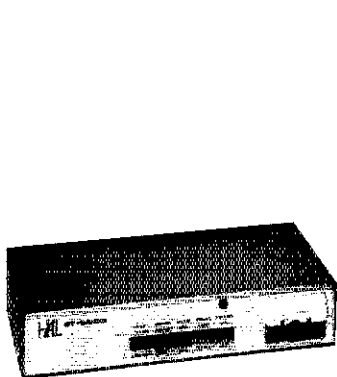
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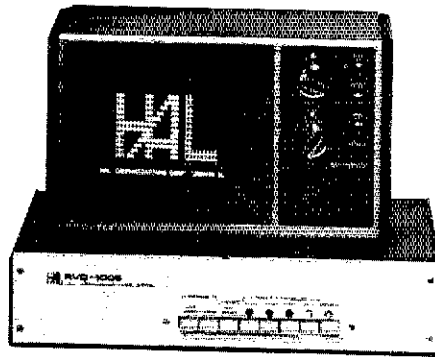
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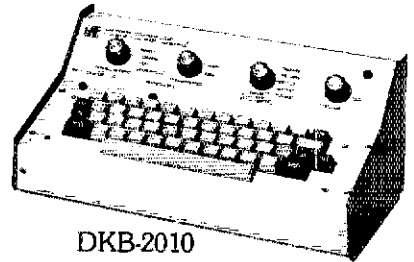
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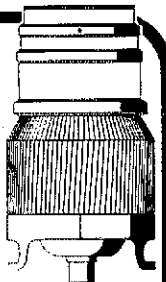
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up all over the section with a good "52" Net on in the Greenville area each Tue. at 9 PM. Join up with them. New appointees in June include: WD4AAM(OES) & WD4KSI(OTS). AA4NC now spreading himself in the DX bands taking a little rest from the traffic handling. Many fine reports on OBS activity especially with the work being done by W4EAT W4BUZ & WA4ACP. Welcome to NC W4TY moving down from VA. WA4WRQ now Extra. Congrats. New club in NC is the Rockingham Co. ARC with K4PTB, pres.; WA4ULA, vp; WD4NSB, secy. Look forward to seeing everyone at Shelby Hamfest Sept. 2-3. Traffic: WB4MX 192, W4FMN 136, K4VHT 134, K4FTB 117, WD4JM 116, WA4CA 78, W4DFO 74, WA4TA 60, WB4ZIO 52, WA4SRD 49, AA4NC 48, W4R 47, WA4ROR 40, AA4RW 30, WB4YMW 30, WB4TOP 27, WA4CY 23, WA4WY 22, WD4KSI 19, WB4OXT 18, WA4UTC 16, WD4EMK 14, WB4CYN 11, W4WXZ 10, WD4BXS 6, WB4DZO 2.

VIRGINIA: SCM, Richard L. Genter, K4BKX -- Asst. SCM: W4YE. SEC: WB4ZNB. NMs: WB4DQZ/VB, WB4FLT/VN, W4JK/SVSN, WB4PNY/ARN-D, W4SHJ/ARN-E, W4SUS/VNTN, WA4YIU/VN. Many thanks to Ann, K8LGA/A, for her fine job with the Virginia Net. WB4FLT takes over as mgr. onn July 1. WA4RDI is moving to NJ and W4TY is moving to NC. K9EF4 reports he is really enjoying VA hospitality. Woody is an ex-RM, BP, CP-30, DXCC and will be with us for at least 6 mos. WA4NTP met with OZ2BC, OH2BH, OH2BBD, and OH2MM in Helsinki. Walks back on VNI on Sat after 3 wks. in Europe. OVS W4WVQ, met with 3DBAX and 3D6BM in Africa. W4YE had visits from EP2IA and EP2VW and will visit his dad, W5KL, ex-W4YE, later this summer. Buddy has sent over 10,000 QSLs for EP2IA. Music teacher, WA4NYZ, is active on the VNTN with new Kenwood Twins now that school is out. WB4DBK was elected Vice Pres. of Phi Theta Kappa. K4DHB is enjoying all aspects of hot summer hamming. WA4LJ is hoping to get his rig from the factory soon. K4GR reports, "slow month." K4VVK has been busy moving his shack to new family room. WD4OVR is enjoying increased traffic activity. WA4AN reports his local newspaper is doing feature articles on QSLs back on VNI. W4SHJ visited NN3SI (Smithsonian Institution) and saw W4ZM. W4AJN, W4ZM's son, is now NA4GS. K3WRY4 reports good 6 & 2 meter band openings for June VHF contest. K4MSG lost his 6-meter quad to 80+ MPH winds and is replacing it with a Yaqui. OBS report received from WA4SBC. New ECs: WA4FTJ/Va. Beach, N4LE/Henrico, WA4NYZ/Norhampton, WA4RYX/Rockingham, WD4BPP is new OES under EC, WD4KUK. Club papers received from: Arlington ARC, Central VA Contest Club, Crater ARS, Lynchburg ARC, Pentagon ARC, Richmond ARC, Roanoke Valley ARC, VA ARC, VA Century Club, and Williamsburg ARC. Traffic: (June) WB4NY 423, N4NK 381, WA4CCK 298, WB4DBK 295, K4BKX 235, K4KNP 223, W4SOQ 202, WD4IQF 184, W4UO 148, K8LGA/A 118, W4JK 114, WB4FLT 100, W44UYD 95, K4KDJ 93, WB4DOZ 89, K4GR 76, WB4ZNB 67, N4RF 57, K4JM 53, W4SUS 51, AA4CK 50, K4EJ 50, WA4FDV 50, WA4QW 46, WA4STO 45, WA4YIU 45, WB4ODZ 44, W4OKN 34, WB4FNW 31, W4NWM 29, N4LE 28, K4ISW 23, W4YE 22, K9EF4 21, N4FI 20, WB4KIT 20, WD4OVR 20, WB4ZVT 20, W4SHJ 18, WD4CYX 15, WB4KGG 13, K4ITV 12, WA4QI 12, WA4RDI 12, K4DHB 11, W4OOL 11, W4LTO 10, WA4NLS 10, W4FTJ 9, K4KA 9, WA4ITZ 8, W4HFT 8, W4OT 8, K3WRY4 8, K4VVK 6, WA4ANN 4, WD4KUK 4, W4KXE 4, WA4PBG 4, W4DM 2 (May) W4LXB 165, AA4CK 79, WD4OVR 49, W44ONR 23, WA4NTP 17, N4UY 10, WD4KUK 6, N4DW 3. (Apr. WA4CCK 317.

WEST VIRGINIA: SCM, Donald B. Morris, W8JM -- Asst. SCM: K8KT. SEC: WA8NDY. Net Mgrs.: WBYP WA8WPW W8BJM. K8WMX Outstanding Amateur of the Year. Logan County ARC FD winner, awards presented at State ARRL Convention. WA8YTP now WBYP elected Phone Net mgr, replacing K8BT. WA8WPW new CW Mgr, WB8II having moved to VA and W8BJM reelected Novice Net Mgr. Fall State Radio Council meeting in Oct. at Jackson's Mill. Successful hamfests held at Bliley and Blumfield. Aug. Meritfest Sept. 2-3rd at Westover Park. 10 ARRL affiliated clubs reported active in 78 Field Day. W8WVA active from State Convention at Jackson's Mill.

ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Clyde O. Penney, WA8HLO -- SEC: K8FLQ. RM: K8TER. PAMS: K8CNV WB4ZQG. K8DJ reports terrific 6-meter "E" skip all thru June. K8CI reports much improved operation after raising his double-inverted Vee (80/40 meters) from 20' to 50'. W5HRS utilized WR8APJ to direct W8SJS to Logan County Hospital for medical attention because of torn off finger nail at local motel. Congratulations to W8BYU WA8MFI & W4KCP who recently passed exam for Advanced ticket, and also to WD8OS who passed General Class exam, and is enjoying phone operation on his NCX-3. WD8DNM has a new home brew tri-band beam, and WA8KHN is proud owner of new Kenwood 400A. K8SPR is still fighting the Shingles after 3 months. W8GW enjoyed 5 weeks in Hawaii, all 6 islands, and reports 45 QSOs on 2-meters from that QTH. Net Tfc. for June: Hi-Noon QNI 1059, QTC 31, informals 126, QNF 1182; Columbine QNI 799, QTC 109, Informals 153, 30 sess. QNF 1164. Traffic: (June) W8WYX 2485, K9YFK 932, K8DJ 280, K8C 175, WB8MCL 173, W5HRS 133, WD8AT 103, W8FLQ 75, W8YTP 67, W8YU 42, W8WYK 40, WD8CWX 38, W8MDT 13, W8RE 12, W8GO 11, WD8DNM 7. (May) WA8HJZ 847, WB8MCL 124, W8RE 40. (Apr.) K8SPR 4.

NEW MEXICO: SCM, Joe T. Knight, W5PDY -- SEC: W5ALR. PAM: W5JOV. RM: K5KPS. Southwest Net (SWN) meets daily on 385 kHz, at 2000 local time and handled 184 mspg with 192 stations reporting in. New Mexico Roadrunner Net (NMRRN) meets daily on 3940 kHz at 1800 local and handled 92 mspg with 833 stations reporting in. New Mexico Breakfast Club meets daily on 3940 kHz at 0700 local, handled 108 mspg with 560 check-ins. Pecos Valley ARC enjoyed picnic at WBSUWD's. A big welcome to W5IQO. W7FDH now W5LWR & W5PZ Welcome K5XL W5JOV, W5WJW and

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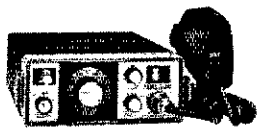
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Test Equipment Bargains

Boonton "O" Meter	\$295
Tektronix 5140	249
Tektronix 545A	950
5 3/54A Plug-in wide band preamp	75
Hickok 695 Generator	69
Bendix BC221 Freq Meter	39
Polarad Spectrum Analyzers A84T	1695
Hewlett Packard 400C	75
Precision E-400 Signal Generator	125
Electro Impulse Spectrum Analyzer	395
Dyna/Sciences Model 330 Digital Multimeter	195
Hewlett Packard 4905A Ultra Sonic Detector	550
Hewlett Packard 120A Scope	250
TS-323/JR Frequency Meter	175
Hewlett Packard 4910B Open Fault Locator	650
Bird Mod 43	80
General Radio 650A	150
Measurements Mod 80	195
Nems Clark 1400	495
Ballantine 300H	175
PACO Scope Mod-S-50	75
Singer FM-10C	3495
Simpson 260 V.O.M.	49.50

The inventory quantities of the items shown in this list vary. There may be one or several of any item. Some items may be sold by the time you read this ad. It is also likely that we have items in stock that are not listed, as a result of the many trades we make each day. We reserve the right to sell accessories and power supplies with matching transceivers and transmitters. Please allow up to 10 working days to ship your order so that we may check and service the gear you purchase.



DRAKE TR-33C

Regular \$229, save \$30; buy a Drake TR-33C for \$229 (no trades) and take a \$30 credit for another purchase.



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Regular \$399, save \$50; buy a Midland 13-510 for \$399 (no trades) and take a \$50 credit for another purchase.



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TS820S — \$1098.00



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FT101EX — \$699.00



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TR4CW — \$799.00

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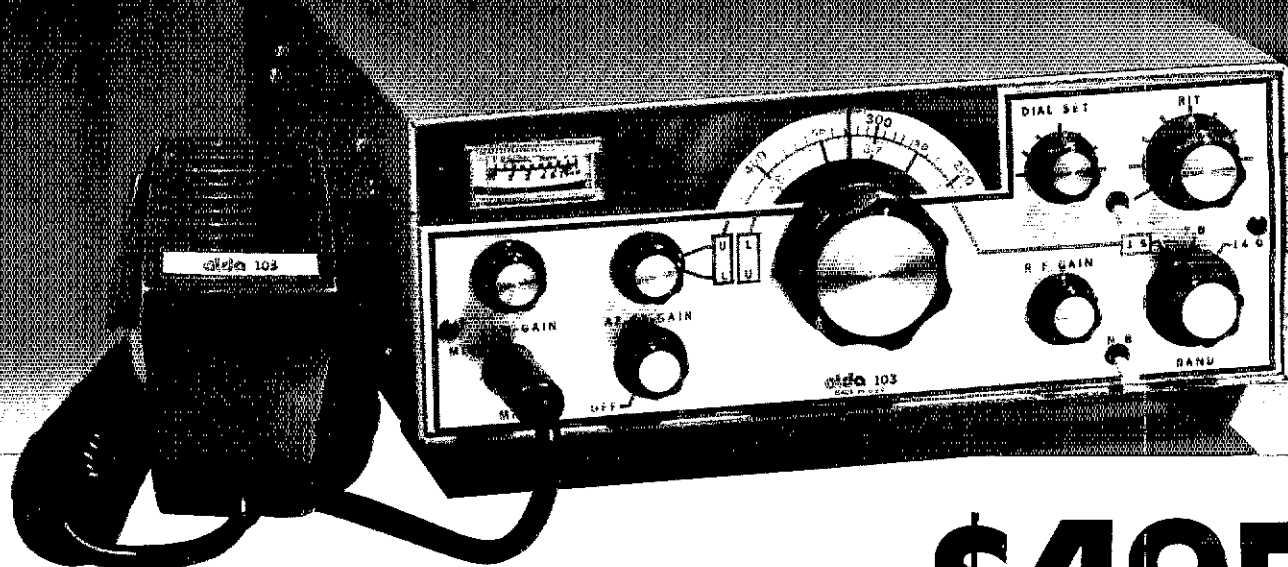
the super-compact alda 103

only 3 1/4" high x 9" wide x 12 1/2" deep • less than 8 1/4 pounds

ALDA 103, the trim little powerhouse with incredible performance for the price! ALDA 103 provides a full 250 watts PEP input for SSB operation, and 250 watts DC input for CW. And when it comes to performance, ALDA 103 is the hottest little transceiver going — all solid state, totally broadbanded and super-stable VFO.

Ideal first transceiver for brand new novices! You'll want a full-capability CW/USB/LSB unit with all the power and performance you can use. ALDA 103 gives you 250 watts DC input for CW, the maximum allowable power for your novice license. When you upgrade to technician, you've got 2 bands

for CW operation. And with your general license, just plug your mic and use the ALDA 103's full 250 watts PEP on SSB. Perfect second or mobile unit for seasoned hams! If you're looking for a super-sharp, compact unit to use in your car or boat, ALDA 103 will live up to your expectations. Absolute worst case sensitivity 0.5 μ V for 10 dB S+N/N — a must for mobile operation. Receiver audio output of 3 watts minimum — another must. Also, very low receiver power drain of only 5.5 watts — that's 0.4 amps at nominal 13.8 VDC, including power for dial and meter lamps!



GENERAL SPECIFICATIONS

Semiconductors: 39 diodes, 23 transistors; 11 integrated circuits
Power Requirements: Nominal 13.8 VDC input at 15 amps, negative ground only
Power Consumption: Receive — 5.5 watts (includes dial and meter lamps); Transmit — 280 watts
Dimensions: 3-1/4" high x 9" wide x 12-1/2" deep (82.55 mm x 228.6 mm x 317.5 mm)
Weight: 8-1/4 lbs. (3.66 kg)

PERFORMANCE SPECIFICATIONS

Frequency Range: 80 meter band — 3.5 to 4.0 MHz
 40 meter band — 7.0 to 7.5 MHz
 20 meter band — 14.0 to 14.5 MHz
Modes: CW; USB; LSB
RF Input Power: SSB — 250 watts PEP nominal
 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)
Microphone: High impedance 3000 ohm
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
Selectivity: 2.5 kHz — 6 dB; 5.0 kHz — 60 dB
Audio Output Power: More than 3 watts
Audio Distortion: Less than 5% at 3 watts

\$495

OPTIONS & ACCESSORIES

Microphone \$14.95
 Mobile Mount..... \$39.95
 Noise Blanker ---
 Model No. PC 701 \$39.95
 100 kHz and 25 kHz
 Dual Crystal Calibrator ---
 Model No. PC 801 \$19.95
 Portable Power Supply — Model
 No. ALDA PS 115: average duty
 15 amp unregulated; input —
 115/230 VAC, 50/60 Hz; output —
 13.8 V nominal at 15 amps... \$84.95
 Heavy Duty Power Supply — Model
 No. ALDA PS 130: output —
 regulated 30 amp at 13.8 VDC; input —
 115 or 230 VAC, 50/60 Hz... \$149.95

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ALDA 103 is completely manufactured in the U.S.A.

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 Ultra-light undercush. Acoustic delay of 1 millisecond enhances intelligibility on CW or SSB. Low impedance 8-20 ohms. Stepped response—100 - 3,000 Hz. 1.5 ounces.
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HMC-2
 Featherweight—Undercush rugged aluminum frame. Arms direct signals into the ear—great for concerts. 1.2 ounces. 100 - 3,000 Hz. Low impedance. 8-20 ohms.
 Order by Catalog No. 18183-002 \$13.85



HTC-2
 Lightest Dual eardrum headset. Choice of the pros who must wear them for hours. 1.6 ounces. 100 - 3,000 Hz. Low impedance. 8-20 ohms.
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Mobile Microphones

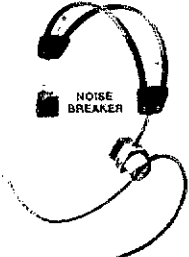


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 Broadcast quality—clarity and crispness. Use the the choice of the electrets. 1.4 V battery provides bias to the electret in the ProCom I. In the ProCom II the 1.4 volt battery also powers the 10dB amplifier.
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 ProCom II, Usable in low or high impedance
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 High Line audio quality and performance for that FM transmitter. Triggered selectable noise cancelling. 43 dB sensitivity variable gain shaping amplifier. Use on high or low Z applications. Available in grey, black, or clear. Tote it.
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 VHF House of Mobile—high performance audio on transmit and receive. Full amplifier, low Z microphone. Earphone 8 ohms—in line P11.
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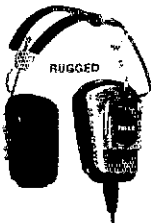
Dual Muff Headphones/Headsets



C-1320 Headphone
 Top of the line. Fully cushioned, audiometric type drivers are ultra-sensitive—DA 60's choice. 20 - 20,000 Hz. Low impedance 8-20 ohms.
 Order by Catalog No. 61320-012
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CM-1320 Headset
 Top of the line with a boom microphone—ceramic high impedance. The choice of Expeditions.
 \$71.70
 Order by Catalog No. 61320-013



C-1210 Headphone
 Ultimate comfort and performance—nylon diaphragms assure continued sensitivity for digging out the weak ones. 20 - 20,000 Hz. Low impedance 8-20 ohms.
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CM-1210 Headset with microphone
 Ceramic, 50,000 ohms. Ideal for trailer nets.
 Order by Catalog No. 61200-052
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C-610 Headphone
 Lightweight, 8 ounces. An ideal headphone for code courses, code practice or actual operating. Low impedance. 50 - 12,000 Hz.
 \$9.95
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CM-610 Headset
 with high impedance, ceramic microphone. 50,000 ohms. Exceptional price—professional construction.
 Order by Catalog No. 61630-064
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PC-100 Headphone
 Full cushion comfort—performance and long life make these dynamic phones ideal for novice to extra. 50 - 12,000 Hz. Low impedance. 8 - 200 ohms. Weight 12 ounces.
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Headphone Jack Box
 Ham Clubs, field day, contest operation. No more jury rigs for multiple headphones. Six 1/4" phone jacks with individual volume controls. 4 foot cord with 1/4" phone plug.
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the indispensable BIRD 43



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 WATTMETER

Power Range	Frequency Bands (MHz)			
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10 watts	✓	✓	✓	✓
100 watts	✓	✓	✓	✓
1000 watts	✓	✓	✓	✓
10000 watts	✓	✓	✓	✓
100000 watts	✓	✓	✓	✓
1000000 watts	✓	✓	✓	✓

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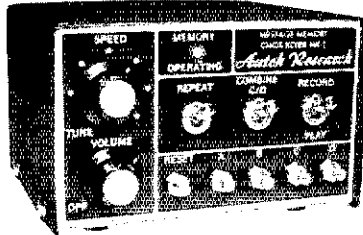
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WHILE YOU RELAX!**
Also remembers name, QTH,
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YOU WANT**

- ADVANCED "MOS" MEMORY:**
- Designed for daily QSO's, not just contests.
 - Records as fast as you can send! Change instantly by simply recording over old message.
 - Just tap button to start any of 4 messages. Each is about 25 characters long. For example, 1 message will hold "CQ CQ CQ DX DE W6DYD W6DYD K". Total memory approx. 100 chars.
 - Handy "repeat" switch repeats message forever until reset. Use for longer CQ's, or leave a listening pause at end of CQ. If no answer, keyer automatically repeats CQ until answered. YOU SIT BACK AND WAIT FOR A CALL!
 - Another switch combines 2 of the 4 messages for extra length (approx. 50 chars.), e.g. "QTH IS LA LA NAME IS BILL BILL RIG HR IS KW ES BEAM ES NEW MEMORY KEYS"
 - "Memory-Saver" feature standard.

- PLUS A GREAT AUTOMATICKEYER:**
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Model MK-1 ppd. U.S.A.

Now that we've broken the \$100 price barrier, why settle for an ordinary keyer? Get the one that REMEMBERS!

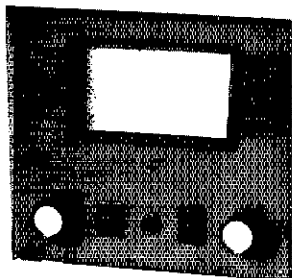
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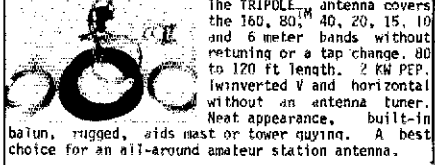


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others to the MUDDLE award. Congrats to KA5BEM on new Novice ticket and to many others upgrading. W6JDC and his code instructors doing FB on W7SAEQ. Traffic: W5DA 203, W5JCV 291, W5UW 288, NSNG 282, W5SAHH 125, K5KPS 116, W5AMWY 22, W5IGO 15, W5LWR 6.

UTAH: SCM, Carl R. Ruthstrom, W7GPN - The Utah Hamfest, June 17 a great success. A highlight of this event was a presentation on search and rescue by W5ALR, SEC of the New Mexico Section. Amateur Radio Week was proclaimed by Utah's Governor, 18-24 June. WA7ARK and WA7UJ did fine job of publicizing amateur radio on KSL "Public Pulse" program. It is with feeling of much loss to report W7ZC a Silent Key June 10. W7RQT moving to Washington state. He will be active on 40 and 75 to keep in touch with old friends. WA7ADK worked 5 south Texas stations on 145.1 MHz, SSB, June 19. It appears that these contacts were influenced by the Air Force manmade ionization experiments conducted in CO. On June 24, en way to FD site, WB7CFJ and W7GPN found a woman unconscious in her auto and in serious condition. Being a remote mountainous location about 40 miles east of Ogden posed a challenge to get help. WB7TFZ responded via W7RAKO, relaying to W7YFC who contacted Highway patrol for timely aid. Traffic: K7HLR 109, WA7JRC 53, WA7MEL 49, WB7DMI 19, W7OCX 19, W7UTM 5.

WYOMING: SCM, Tom Graham, W7KHH - New Novices: KA7AT Hyattville WB7WVO Manderson, WB7DHZ and WB7DJA formerly of Laramie have purchased the Rawhide Ranch in the Sunlight Basin area. Hams moved to Cody W7FV and WB7RMZ. Had a good turnout for Field Day over the state. Torrington reported 6 operators. Casper reported 10 operators. W7IOI of Sheridan reported 10 operators and W7PT of Cody reported 16 operators in the field. The Cowboy Net reports 583 QNI and 10 QTC. Traffic: W7TZK 312, W7VWA 239, W7SQT 220, WA7SGG 68.

SOUTHEASTERN DIVISION

ALABAMA: SCM, Frank S. Brown, W4LNN - SEC: K4WYI. NM: N4MD WA4RNN. New appointments EC: WA4YCM K4HJX. OTS: N4AJJ WN4KKN. 11 stations reported from FD sites at speedway, YMCA, parks, beach and in the bush using a total of 192 operators of which 154 were ARS members. Need to know the number of Xmits used and the location for FD. WA4RND viewed on TV operating Novice. FD station. AC4X operated FD using QRP and batteries. W4MHO thru Cheaha repeater assists in getting emergency treatment to a 11-year-old boy. WA4VKD WB4NWS WD4IOI WD4LUG WN4KKN meeting daily on 3745 kHz to accept traffic from anyone for the NTS, time 10 PM. WA4HP received his ARRL 50 year pin and passed the Extra exam. WA4AXA now operating two. WA4SBA reports Dad now N4AXX. New Extras: AA4C AC4C AA4F. WB4RIU WA4LAF received HARC Ham of the year awards. BARC election results: WD4EJL, pres.; WA4VAC, 1st vip; WA4UGI, 2nd vip; WD4EJL, 3rd vip; WB4RZN, secy.; WD4KOY, treas.; WB4AYO, dir. emerg. comm.; N4KC, pt officer; K4TOR WA4GIY WA4JWZ WB4JGX, board of dir. W4RTI operates two mtr mobile in England as G5CGH. WA4RNN succeeds K4JIE as AENM net mgr. Muscle Shoals ARC reports they had a station set up for OSCAR during FD. Traffic: (June) WA4JDH 1248, WN4KKN 423, WA4VKD 286, K4QOZ 104, W4LNN 56, WA4FYO 52, WB4RCF 37, WB4EKJ 13, WB4TVY 12, WA4RMP 10, WB4ZNL 10, W4IBU 6. (May) K4AOZ 96, W4ZPZ 22.

GEORGIA: SCM, A. H. Stakely, K4WC - SEC: K4SWJ. PAM: K4JNL. Congrats to WA3NAZ WB4TEK WB4FAS WB4DHC and K4EV making P5HR. Sadly we report W4YQ as a Silent Key. K4YFL given a plaque at Atlanta Hamfest for his service as SEC. K4SWJ working hard as new SEC and doing a great job. Please give him your support. GTN for May QNI 35, QTC 2. June reports: QVEN No. 1 QNI 25, QTC 0. WGN cw QNI 4, QTC 0 fm QNI 73, QTC 4. NGA Skywarn QNI 43. Cntrl GA VHF QNI 105, QTC 5. GSN QNI 390, QTC 148. WB4FAS thrilled about getting JD1YAH. WA3NAS looking to set up weekly RTTY net. W4PIM has new TenTec 544. W4JMJ says conndx improving! WB4FFE has joined Army MARS. W4LRR says 432 activity good during June VHF contest. K4SWJ trying to get some 220 activity going with two rpters in Atlanta area. WB4HXE joined MARS and getting on 220. Alford Judd had picnic. WA4LEK won TH 7 at Atlanta Hamfest. W4MNF put out great bulletin for GSN. Old timers with Eastern Air Line club have found on GSN. Americus ARA new officers are: WAUFD, pres.; WA4HDO, 1st veep; WA4RWY, 2nd veep; KA4ARB, secy.; WD4EIK, treas. Albany ARC "fox" out of service til cool wx. Chehaw Council Chapter of 10-X chartered at Albany. Costs for postage should encourage more radio messages, join a net and save money, hi! Traffic: (June) W4FOE 119, W4GKH 93, WA3NAZ 92, W4PIM 88, K4NM 61, WB4DHC 46, K4EV 38, NAUZ 27, W4HON 22, W4BIA 20, WB4TEK 18, WB4ZQJ 19, K4VHC 16, K4SWJ 13, K4WIC 12, WA4MOC 12, WA4FAS 8, W4JMJ 6, WB4HXE 3. (May) K4YFL 28, W4OMQ 21.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr. W4RH - SEC: AA4FC. RM: W4GHU. PAM: WB4GB/73; WA4FKE/40; WB4BSZVHF.

Net Freq. Time/Days QNI QTC Manager
NFPN 3950 2230 Dy 1021 189 WB4PGB
QFN 3651 2300/0200 Dy W4AJPV

New appts: WA4VLX as EC for Seminole Co. WD4LUG as OTS. WA4RLV new net. mgr. of TPTN; WD4LUG is NM for QFNs; WA4JVP for QFN; N4KF for CFRA. SNGs earned by K4JLG and WD4PDK on NFPN; by W4MVG on FAST; and by WD4LUG on AEND. New calls: WB4GEM now AA4W; WN4UFI now KB4AA; WD4DDS now KB4AR. WD4LIA, WD4LUG & WA4VLT active on QFNs from Pensacola. WA4WME gave FB movie/slide presentation on Clipped in Dixie during in Fort Walton. The Panama City ARC manned a 3-day radio exhibit city's largest Mall. A DX'er's cookout was held by N. Fla. DX Assn; chefs were WB4EYX and WA4QHV. CFRA activated a severe weather alerting system. W4MGO's radio column in Daytona Beach paper has a new logo and doing much for amateur radio PR. The DBRA 75/15 repeater was struck by lightning right in the middle of an emergency autopatch! WB4HKP and WB4EQT later made repairs. Condolences to WA4QQQ and family, who lost their home in a forest fire. New Florida officers: WB4FCX 193, W4KZT and WB4ZPU. WB4TZR reworking disaster plan for Pasco County. WD4PJO upgraded to Extra; WA4JTY, WD4BMF and WA4TUU to Advanced. WA4AOY received WAS award, all on cw. K4FFM had nice article on test equipment in Gulf Coast ARC Newsletter. Watch Florida Skip for details of a new Florida Amateur of the Year award. Traffic: (June) N4PL 342, WD4LUG 228, WB4QBB 205, WD4HIF 136, N4WA 133, WA4FKE 122.

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AMPLIDYNE	SC-35 Speaker	12	80 Camera	239
621 VHF transmitter	SC-550A Speaker	15	61 Viewfinder	189
ATLAS	GONSET		SBE	
215X/NB Xcvr	GC-105 2m AM Xcvr	\$ 69	SB-34 Xcvr	\$239
AR-200 AC supply	HALLCRAFTERS		SB-450TRC 450 Xcvt	149
10XB Xtal osc	HT-40 Transmitter	\$ 49	SPECOM	
MT-1 Matching Xlfr	SR-160 80-20m Xcvr	169	2m FM synth Xcvr	\$295
B & W	PS-150-12 DC ps	49	SPECTRONICS	
361 Codax keyer	MR-150 Rack mit	15	DD-1 Dig (Yaesu)	\$119
BRIMSTONE	SR-400 Cyclone II	450	DD-1T Dig (Tempo)	119
144 2m FM Xcvr	SR-400 Cyclone III	599	DD-1K Dig (Kenwood)	119
AR-200 AC supply	P-500AC AC ps	75	DFD/K Dig (Kenwood)	119
10XB Xtal osc	PPM-300 Xcvr	349	SC-250 Counter	149
MT-1 Matching Xlfr	SR-46 6m AM Xcvt	49	STANDARD	
B & W	HAMMARLUND		14U 2m FM Xcvt	\$249
361 Codax keyer	HQ-160 SW Rcvr	\$159	146A 2m FM HT	189
BRIMSTONE	HQ-170A Ham Rcvr	189	Desk charger	34
144 2m FM Xcvt	HQ-215 Ham Rcvr	199	SWAN	
AR-200 AC supply	S-200 Speaker	15	117B AC supply	\$ 69
10XB Xtal osc	HK-1B Keyer	29	P-1215 AC supply	49
MT-1 Matching Xlfr	HEATHKIT		PS-20 AC supply	95
B & W	SB-301 Ham Rcvr	\$229	270 Cygnat Xcvt	329
361 Codax keyer	SB-600 Speaker	15	14A DC converter	39
BRIMSTONE	DX-60A Transmitter	64	350 Xcvt	249
144 2m FM Xcvt	HW-22A 40m Xcvt	85	400 Xcvt/410 VFO	199
AR-200 AC supply	HW-100 Xcvt	249	500 Xcvt	309
10XB Xtal osc	HW-101 Xcvt	269	500CX Xcvt	339
MT-1 Matching Xlfr	HP-23 AC supply	45	700CX Xcvt	459
B & W	HP-23A AC supply	49	117XC AC supply/spkr	95
361 Codax keyer	HP-23B AC supply	54	512 DC supply	59
BRIMSTONE	HP-13 DC supply	45	51X MARS osc	39
144 2m FM Xcvt	SB-104 Xcvt	575	600T Transmitter	359
AR-200 AC supply	HP-1144 AC/spkr	89	600R Custom Rcvr	399
10XB Xtal osc	SB-614 Signal monitor	15	600R Custom/SS16	449
MT-1 Matching Xlfr	SB-634 Console	159	600SP Spkr/patch	59
B & W	SB-650 Dig display	149	250 6m Xcvt	189
361 Codax keyer	HD-19 Phone patch	19	210 Remote VFO	75
BRIMSTONE	HD-1250 Grid dip	49	TV-2C 2m Xcvt 6m ft	275
144 2m FM Xcvt	HW-102 SWR/watt	29	FM-1210A 2m FM, ps	129
AR-200 AC supply	HWA-17-1 DC supply	9	FP-1 Phone patch	39
10XB Xtal osc	HW-202 2m FM Xcvt	99	WM-1500 Wattmeter	49
MT-1 Matching Xlfr	ICOM		DD-76 Digital disp	119
B & W	IC-202 2m SSB Xcvt	\$199	TPL	
361 Codax keyer	IC-230 2m synth Xcvt	229	502B 2m 1/30w amp	\$ 99
BRIMSTONE	IC-245 2m synth Xcvt	349	802B 2m 1/50w amp	149
144 2m FM Xcvt	IC-21 2m FM Xcvt	149	L202C 2m 20/80w amp	139
AR-200 AC supply	IC-21A 2m FM Xcvt	175	TEMPO	
10XB Xtal osc	DV-21 Digital VFO	149	VF/One Ext VFO	\$ 75
MT-1 Matching Xlfr	IC-3PA Power supply	59	FMH-42 450 HT/TTP	299
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361 Codax keyer	Multi-11 2m FM Xcvt	\$179	SSB-One SSB adapt	139
BRIMSTONE	Multi-2000 2m Xcvt	369	TEN-TEC	
144 2m FM Xcvt	Multi-2700 2m Xcvt	499	Triton II Xcvt	\$399
AR-200 AC supply	PA2-12B 2m FM amp	39	252 AC supply	75
10XB Xtal osc	PA10-40B 2m FM amp	139	262G AC supply	99
MT-1 Matching Xlfr	KENWOOD		240 160m conv	79
B & W	VFO-520 Remote VFO	\$ 89	244 Dig display	139
361 Codax keyer	TR-2200A 2m FM Xcvt	149	KR-5A Keyer	24
BRIMSTONE	TR-8300 450 FM Xcvt	229	KR-40 Keyer	75
144 2m FM Xcvt	MIDLAND		KR-50 Keyer	89
AR-200 AC supply	13-500 2m FM Xcvt	\$129	S-30 Signalizer	29
10XB Xtal osc	13-505 2m FM Xcvt	159	210 AC supply	19
MT-1 Matching Xlfr	13-510 2m FM Xcvt	299	WILSON	
B & W	MOSLEY		WE-800 2m FM Xcvt	\$349
361 Codax keyer	CM-L Ham Rcvr	\$ 99	L405 2m FM HT	229
BRIMSTONE	NATIONAL		YAESU	
144 2m FM Xcvt	NCX-5 Xcvt	\$279	FT-101 Xcvt	\$489
AR-200 AC supply	NCXA AC supply	69	FT-101E Xcvt	599
10XB Xtal osc	NYE		FT-101EX Xcvt	529
MT-1 Matching Xlfr	250-30 Kw tuner/SWR	\$199	FTV-250 2m Xcvt	189
B & W	PEARCE SIMPSON		FIV-650 6m Xcvt	129
361 Codax keyer	Gladning 25 2m Xcvt	\$ 69	FTV-650B 6m Xcvt	169
BRIMSTONE	REGENCY		FT-301 DIG Xcvt	699
144 2m FM Xcvt	HR-2B 2m FM Xcvt	\$129	FP-301 AC supply	99
AR-200 AC supply	HR-212 2m FM Xcvt	119	Y0-100 Scope	149
10XB Xtal osc	HR-2S 2m FM Xcvt, ac	149	YC-35SD Counter	169
MT-1 Matching Xlfr	HR-2MS 2m FM Xcvt	149	200R 2m FM Xcvt	239
B & W	ROBOT		FT-2 Auto 2m Xcvt	199
361 Codax keyer	70A Monitor	\$249		
BRIMSTONE	70 Monitor	239		

(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) A&S 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.

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AMCOM	reg. NOW	REGENCY	reg. NOW
S-225 2m FM Xcvt	\$399 299	HR-212-2m FM Xcvt DEMO	\$259 149
ATLAS	reg. NOW	ACT-W-10 Whamo scanner	\$299 149
350 XL/DD6-XL Xcvt	1424 1199	DFS-5K Dig freq selector	199 99
350-PS AC supply	229 199	ACT-T-16K touch selector	329 249
BIRD	reg. NOW	HR-6 6m FM Xcvt	239 149
4352 VHF Ham-Mate	\$ 94 59	HR-2B 2m FM Xcvt	229 139
CDE	reg. NOW	AR-2 2m FM amp	119 99
HAM-II Rotor	\$164 119	HR-312 2m FM Xcvt	269 169
HAM-III Rotor	169 139	HRT-2 2m HT (no batt)	179 99
TX Tailwinder rotor	299 239	HRT-2 Deluxe HT package	295 195
QT-1 3A 12vdc supply	49 19	HR-220 220 FM Xcvt	239 149
CES	reg. NOW	HR-440 440 FM Xcvt	349 249
100 Digital display	\$299 149	ROBOT	reg. NOW
200V Touch tone pad	59 39	F/1.4 lens	\$ 47 19
COMCRAFT	reg. NOW	SBE	reg. NOW
CPS-6 AC supply, 6A	\$139 59	Head for Scartvision	1
DENTRON	reg. NOW	SILTRONIX	reg. NOW
MLA-2500 Linear (with 10m)	\$899 799	FC-1 5 KHz-40 MHz counter	\$169 99
4V 40-10m vertical	84 69	SONAR	reg. NOW
160-10AT Antenna tuner	129 119	D-1020 Depth indicator	\$160 79
DRAKE	reg. NOW	STANDARD	reg. NOW
TR-40W Xcvt w/RT	\$799 599	146A 2m FM hand-held	\$314 229
RV-4C Remote VFO/spkr	170 149	SWAN	reg. NOW
R-4C Receiver	699 549	PS-20 AC supply	179 129
T-4XC Transmitter	699 549	P-1215A AC ps for monoband	75 39
AC-4 AC supply	150 119	ST-1 Antenna tuner	189 159
MS-4 Speaker	33 27	WM-6200 6 & 2m wattmeter	87 59
20Q Speaker/Q-mult	49 45	WM-3000 SSB PEP wattmeter	87 69
7075 Desk microphone	39 35	TPL	reg. NOW
7072 Hand microphone	19 17	502B 2m 1-4/30-45w amp	\$149 119
DSR-2 Receiver DEMO	3200 2495	702B 2m 1-4/45-70w amp	169 149
WV-4 VHF wattmeter	89 75	802B 2m 1-4/50-80w amp	259 219
AC-10 12vdc supply	49 45	1202 2m 5-15/20-40w amp	239 199
AN-5 Shortwave ant	8 5	350 450 5-15/20-40w amp	189 149
ELECTRA	reg. NOW	PS3-A12D 12v 20A supply	136 119
BC-210 Synthesized scanner	\$349 249	TEN-TEC	reg. NOW
ELECTROLERT	reg. NOW	544 Digital Xcvt	\$869 769
Fuzzbuster II Radar detector	\$129 99	282G Power supply	139 129
GALAXY	reg. NOW	509 Argonaut Xcvt	369 319
ZZM Mobile floor mount	\$ 6 2	570 Century/21 Xcvt	299 269
R-1530 General cov Rcvr	1550 995	VENUS	reg. NOW
SC-1530 Speaker	60 39	SS2 Slow scan monitor DEMO	\$285 199
FL-5306 6 KHz filter	80 60	YAESU	reg. NOW
RPA-1530 Rack adaptor	170 50	FT-901DM 160-10m Xcvt	1459 1313
GENTEC	reg. NOW	FT-301S 20w PEP Xcvt (Fla)	559 459
PM50U 500w dummy load	\$ 48 24	FT-301S DIG Digital 20w (Fla)	750 599
ITC	reg. NOW	FT-301 200w PEP Xcvt	769 599
Multi-2000 2m Xcvt	\$695 399	FT-301 DIG 200w PEP digital	935 749
ICOM	reg. NOW	FT-101 Transmitter	649 575
IC-230 Synthesized 2m FM	\$489 289	FL-2100B Linear (with 10m)	529 479
IC-21 VFO Receive VFO	119 69	FT-227R 2m FM synth Xcvt	349 315
IC-21A 2m FM Xcvt	139 299		
DV-21 Digital VFO	299 249		
IC-245 (early) 2m Xcvt	499 369		
IC-3PA Power supply/spkr	99 79		
IC-245/SSB 2m FM/SSB	639 539		
KLM	reg. NOW		
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Multi-U11 450 FM Xcvt	379 299		
KLM AMPLIFIERS	reg. NOW		
PA2-70B 2m 2/70w FM	\$159 139		
PA2-70BL 2m 2/70w FM/SSB	169 149		
PA2-140B 2m 2/140w FM	229 204		
PA10-40B 2m 10/40w FM	83 74		
PA10-35C 450 10/35w FM	119 109		
KENWOOD	reg. NOW		
TS-820 Xcvt	\$919 799		
TS-820 w/DG-1 digital	1098 899		
TS-820S Digital Xcvt	1098 988		
TS-520S Xcvt	739 659		
IV-502 2m Xcvt DEMO	249 225		
TR-2200A 2m FM Xcvt DEMO	229 199		
TR-7200A 2m FM Xcvt	249 199		
TR-7500 2m synth Xcvt	299 249		
PS-5 Power supply/clock	79 59		
TR-7400A 2m FM synth Xcvt	399 359		
MIDLAND	reg. NOW		
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13-510 2m FM synth Xcvt	399 349		
13-509 220 FM Xcvt	179 149		
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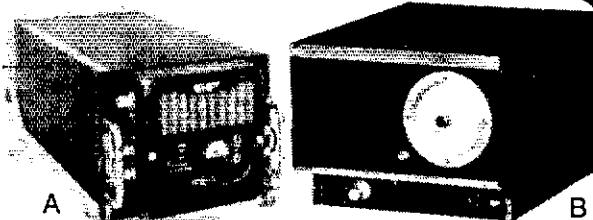
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2SC2029	4.75	LA1201	4.25	TA7055P	5.50	UPC575C	4.10
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AN208	4.75	LA4051P	4.65	TA7063P	2.25	UPC1008C	6.00
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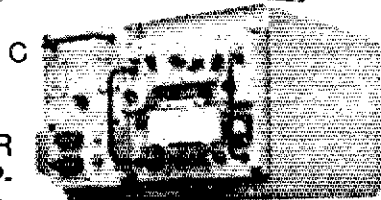
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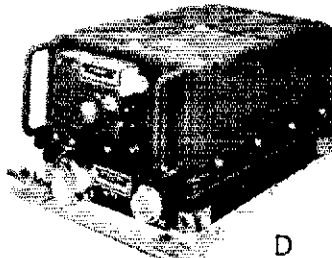
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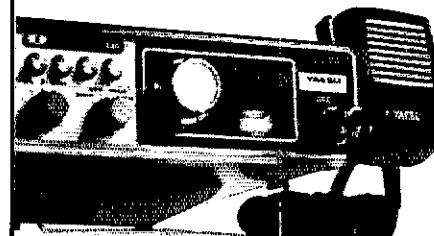


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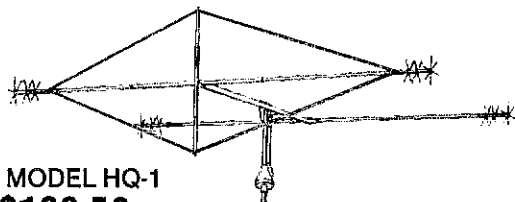
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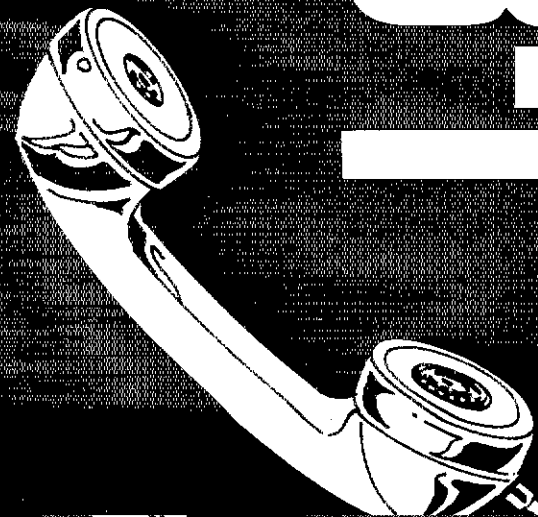
WB4TZR 105, WD4IO 91, AA4FG 76, W4FZX 75, W4KIX 57, WA4VLT 53, WB4FJY 51, WD4NYU 50, N4SS 50, WA4EYU 41, W4RH 34, WB4VAP 26, WB4DTS 17, WB4NJI 15, W4DFU 10, WA4BZV 4, K4RNS 4. (May) WB4YKV 19.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst. SCMS: WB4AID W4KGGJ, SEC: AA4WJ, Net Mgrs: WB4AID WB4GCK WA4JPV WB4KYE W4MEE WA4NB WB4NJU WB4PIB WA4RLV K4SCL AA4WJ WB4WYG K4WYN OBS and OBS are a thing of the past July 1st. New OTS are: WB4AID WA4TAR W4K K4BLM WA4BPE N4BU WD4COL W4DVO W4ESH N4EJ WB4FVV WA4GBC W4GDK K4GFV N8GGIA W4AGNI W4GOG W4GPL K4GRM WA4HDH W4IYT WA4JPV N4KB K4KE W4KGJ WA4KKE W4KMN WD4KPG WA4LGT W4LK W4MEE W4MML WA4NBE WB4NJU W4NTE W4OGX WA4PFK WA4QGV W4QM WA4SCK K4SCL K4SJA NATW WA4UQQ AA4WJ WB4WYG W4WYR N4XR W4ZJ. We also issued OTS appointment to K4TH, but he refused to accept it in protest of CB restructuring. Technicians should note that they are eligible for OTS if their interest and activity runs to traffic handling. Also OTS will be available to Novices. Our congrats to WD4COL and WD4NSG making BPL this month as well as WA4GYR a late-reported BPL last month. Remember, fellows, I have to get your reports by the 5th. New Net Mgrs. July 1: OFN WA4JPV, OFNS WD4LUG (NFLA), TPTN WA4RLV, SPARC K4WYN. FD June 24-25 had a good turn out with reports from WB4BIM Brandon ARS, N4BP Hollywoos ARC, W4AB Broward ARC, W4MUV Metro Rptr Assn, W4DUG Tampa ARC, W4QM Indian River ARC, WB4ZEI Collier Co. ARC, W4WJU Dade Radio Club, WD4CHP Ft. Myers ARC, W4HAW West Palm Beach ARC, WA4LV Homestead/Everglades ARC and W4OO West Palm Beach non-club group. N4KB travelled to Conn. for FD with his brother W1NJM and Conn. Wireless Assn. WB4AID vacationing about 3 weeks in IL. Section Net Certs issued to W4BJ for PBTN, WA4FKE and WB4FVV for FAST Net. Congrats to W4ROA for new CP-15 cert. W4IYT reports Dade ARES has 26 emergency generators ready. W4ESH reports very fine simulated hurricane drill with county officials, CD, Red Cross, ARES and RACES. Also W4ESH upgraded to Extra while his XYL WB4HUQ upgraded to General. WD4NOZ upgraded to tech. We are getting used to hearing AA4G, ex-W4CSTH, and AA4WJ ex-W4BLI, active in Pinellas Co. ARES is DJ1YV. Our SEC AA4WJ has issued a revised Section Emergency Plan, mailed to all ECs and others. The new Southern Florida Emergency Net (SFEN) has been activated on 3940 kHz 7:30 PM Wed. evenings in the slot vacated by now defunct Florida Sidebanders Emergency Net. Pinellas Emergency Net had especially big month with 28 sessions, including 6 specials for Tornado Watches, 465 check-ins and 1000 minutes in session. Our leading OBS continues to be W4DL, reporting 33 bulletin transmissions in June. We currently have 12 OB stations. I wish they would all report their activity each month. Also I wish they would all take the trouble to receive bullet by radio, direct from W4AW or from another OBS who gets them promptly. An OBS who is not active would be doing the Leader a favor by resigning. Florida Skip is seeking nominations for Florida Amateur of the Year Award. Any club or group of 5 individuals can nominate. How about getting together and sending W4IYT your nomination? Traffic: (June) WD4COL 1018, WD4NSG 578, K4SCL 428, W4MEE 420, WA4LGT 408, WB4WYG 297, WA4JPV 267, WA4PFK 184, K4EUK 158, W4NTE 104, K4SJIH 104, WA4NBE 102, WB4AID 83, WA4EIO 80, WB4NJU 80, W4YCL 80, W4GPL 78, WD4DV 67, WA4SCK 64, WB4PIB 60, WB4KYE 50, WB4FVV 48, WA4WJ 46, WA4RLV 45, K4BLM 42, N4KB 40, WA4MJT 38, W4IRA 37, W4AKMN 27, W4ESH 28, WB4GVS 28, WA4MNX 27, WA4UQQ 27, W4IYT 21, W4KGI 21, W4WYR 21, WA4HXU 18, W4MML 12, WA4CGV 12, W4MPV 8, W4SNK 8, WD4BAJ 7, WA4BY 5, WB4DWU 2, WB4PSI 2. (May) WA4GYR 566, WD4NSG 61, W4DVO 58, W4IYT 29, W4ESH 27, K4GRM 21, W4MML 7, W4ROA 2.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DQS — RM: W7EP, PAMs: W7UQC WA7KQE, W7KSO has been graduated with honors (Trophy \$100 (BPL)) and received a \$3000 scholarship to Harvey Mudd College Claremont, CA. W7ZC, former major contributor to the AARC-Scottsdale newsletter, has been reported (by HR Report) to be a Silent Key in Utah. He was AMSAT coordinator for UT. The Ariz. Amateur RC is having an Extra Class license class. The Club also is looking for public service projects for the fall. K7NA is the Scottsdale ARC PR chairman and WB7PXE is education committee chairman. KA7AGZ is a new ham in Yarnell. With regret, WA7ISY is reported as a Silent Key. K7RAC won the AZ Rptr Assn. achievement award for June. W7EDO reports numerous "contact patch" awards have been presented this year to amateurs working the number of stations. Nets: (June) Cactus 158, ATEN 74, SWN 184. Traffic: W7EP 241, K7UXB 93, WA7KQE 45, K7NTG 35, WB7ORT 28, WB7CAG 14, N7EH 14, WA7WEB 14, W7DQS 12, W7RQ 6.

LOS ANGELES: SCM, Perry Masterson, W8RHS — A nice active month for the Section OOs. Received a nice report from WB8YID K8CL K8KA and N8HE. The OOs are doing a good job in this section and deserve a lot of credit. With the end of the school year, most of the adult education programs involved with amateur programs have come to a summer break. This SCM has had good reports on the successful efforts. We congratulate them and hope that they will all return in the fall. I am sorry to report that W8WKO is a Silent Key. Ralph will be missed by his many friends. W6INH reports that he is having antenna problems. However, he is still working new countries. Gene didn't say what his current score is, but by adding BV2B VK8YS and 3B9BA has added three new ones to his list. K8GDW is still overhauling his antenna system. This is the season for that type of work. W8OED is really pounding brass these days. I had a nice chat with Joe this month relative to traffic. N8HE has completed his 5BWAS now. Next 5BDXCC Ray? K8KA has been in Europe for the past few weeks. Even though he has been away, his Oo report shows plenty of activity and interest in the interest of amateur radio. Field Day was a pleasant day in this section. Lots of activity. W8KA operated from the San Rafael Tower in Glendale. K8AA/B operated from San Pedro, WD8DAT/6, Murphree Alumni had an impressive turn-out and K8HD was heard from also. Next year, there will be more. K5DY8 has been bitten by the DX bug since the bands are on the mend. He reports that the Aerospace Employees Association (AEA) has been training new hams, with



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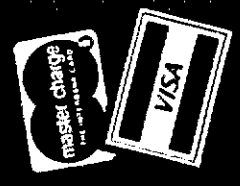
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9M7428	25	26	9M7471	15	30	9M74151	1.25	1.30
9M7429	25	26	9M7472	15	30	9M74152	1.25	1.30
9M7430	25	26	9M7473	15	30	9M74153	1.25	1.30
9M7431	25	26	9M7474	15	30	9M74154	1.25	1.30
9M7432	25	26	9M7475	15	30	9M74155	1.25	1.30
9M7433	25	26	9M7476	15	30	9M74156	1.25	1.30
9M7434	25	26	9M7477	15	30	9M74157	1.25	1.30
9M7435	25	26	9M7478	15	30	9M74158	1.25	1.30
9M7436	25	26	9M7479	15	30	9M74159	1.25	1.30
9M7437	25	26	9M7480	15	30	9M74160	1.25	1.30
9M7438	25	26	9M7481	15	30	9M74161	1.25	1.30
9M7439	25	26	9M7482	15	30	9M74162	1.25	1.30
9M7440	25	26	9M7483	15	30	9M74163	1.25	1.30
9M7441	25	26	9M7484	15	30	9M74164	1.25	1.30
9M7442	25	26	9M7485	15	30	9M74165	1.25	1.30
9M7443	25	26	9M7486	15	30	9M74166	1.25	1.30
9M7444	25	26	9M7487	15	30	9M74167	1.25	1.30
9M7445	25	26	9M7488	15	30	9M74168	1.25	1.30
9M7446	25	26	9M7489	15	30	9M74169	1.25	1.30
9M7447	25	26	9M7490	15	30	9M74170	1.25	1.30
9M7448	25	26	9M7491	15	30	9M74171	1.25	1.30
9M7449	25	26	9M7492	15	30	9M74172	1.25	1.30
9M7450	25	26	9M7493	15	30	9M74173	1.25	1.30
9M7451	25	26	9M7494	15	30	9M74174	1.25	1.30
9M7452	25	26	9M7495	15	30	9M74175	1.25	1.30
9M7453	25	26	9M7496	15	30	9M74176	1.25	1.30
9M7454	25	26	9M7497	15	30	9M74177	1.25	1.30
9M7455	25	26	9M7498	15	30	9M74178	1.25	1.30
9M7456	25	26	9M7499	15	30	9M74179	1.25	1.30
9M7457	25	26	9M7500	15	30	9M74180	1.25	1.30
9M7458	25	26	9M7501	15	30	9M74181	1.25	1.30
9M7459	25	26	9M7502	15	30	9M74182	1.25	1.30
9M7460	25	26	9M7503	15	30	9M74183	1.25	1.30
9M7461	25	26	9M7504	15	30	9M74184	1.25	1.30
9M7462	25	26	9M7505	15	30	9M74185	1.25	1.30
9M7463	25	26	9M7506	15	30	9M74186	1.25	1.30
9M7464	25	26	9M7507	15	30	9M74187	1.25	1.30

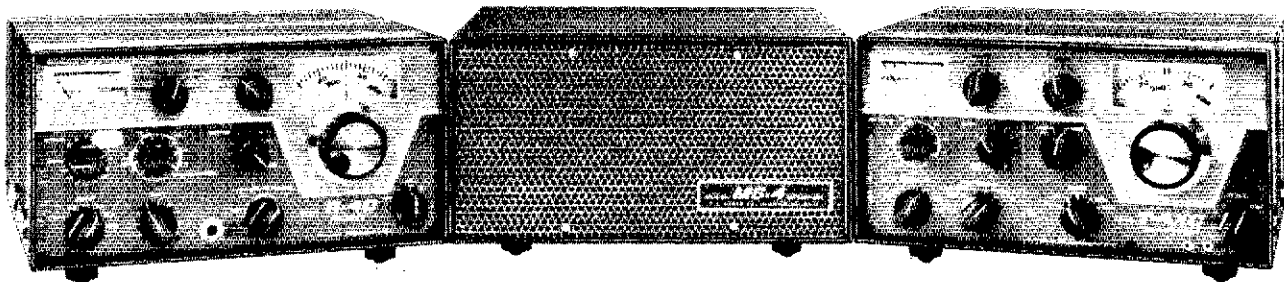
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LM300H	79	80	LM300H	1.49	1.50	LM704H	.59	.60
LM301V	45	46	LM340T-8	1.49	1.50	LM705H	.59	.60
LM301H	45	46	LM340T-12	1.49	1.50	LM709N	.49	.50
LM307V	45	46	LM340T-15	1.49	1.50	LM733N	.79	.80
LM307H	45	46	LM340T-18	1.49	1.50	LM741V	.25	.26
LM308H	69	70	LM340T-24	1.49	1.50	LM741H	.39	.40
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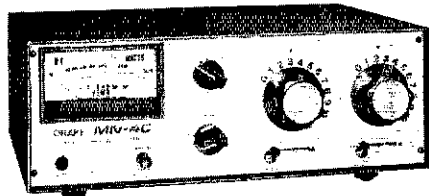
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success. Thanks to the members of the section who continue to furnish me with reports of their activity. I appreciate it. Please keep up the good work. Traffic: W6INH 164, W6OEO 161, K5DY/898, W6CAE 76, W6BYD 44, N6HE 37, K6CL 27, K6EA 22, W6BWG 16, W6BRO 10, W6BAIT 4.

SAN DIEGO: SCM, Arthur R. Smith, W6INI — Last chance to make plans to attend the ARRL National Convention, Sept. 22-24, 1978, at the Town & Country Convention Center, 500 Hotel Cir., San Diego. N6AT has retired as EC for Northern S. D. County. Newly appointed EC for Northern S. D. County is W6BHE. Welcome aboard. W6INI represented ARES at Santa Barbara meeting of the Southern Chapter, Calif. Emergency Services Assn. W6VSA has been appointed asst. EC for ARES 220 MHz activities. W6VON is asst. EC for law enforcement liaison. W6KBD is new treas. of So. Calif. Repeater Assn. 220 MHz band coordination now in the hands of newly formed 220 MHz Spectrum Management Assn. of So. Calif. W6AJUJ WA8HGX W5TET provided communication support for Baja Nacional off-road races. Upgraded: W6OZS to Extra, W6CFC to Advanced, W6DCM, W6DCSS, W6BDNW to General. K6HAV has moved back to special class. Vista Club is now an ARES Affiliated Club by signing an agreement to support ARES. More clubs in this program are needed. ARES will support Calif. Dept of Forestry's Red Flag Alert program by manning seven patrol routes during extremely high fire hazard periods. Traffic: (June) W6PVH 271, W6BFTY 124, WA6UAZ 101, N6AT 65, W6HUJ 28, W67SUA 13, WA6UFY 11, W6UQF 8, K6LKW 6, WA6HJJ 4, (May) W6DEY 21, W6UQF 2.

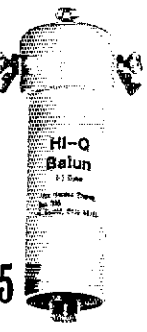
SANTA BARBARA: SCM, D. Paul Gagnon, N8MA — RM: N6WP. VHF PAM: W6KPS. ECs: W6RIC WA6TUO WA8KAC W6B6WZ. WA6ARU spoke at Poinsettia ARC on MARS Nets. FD reports received from Ventura Co., Santa Barbara, Conejo Valley, Mike and key, Poinsettia and Bunker Ramo Clubs. N6NB operated from the section with the So. Cal Contest Club using low power and set a new 2A record. WA6WLD spoke at Summit Settlers on how to market new products. Over 700 attended the Satellite Club Santa Maria BBC. Poinsettia ARC originated 300 msgs and generated great PR at a booth during Ventura July 4th celebration. K6CAB is new newsletter publisher for Conejo Valley Club. W6ASW back on 220 tnx to W6KPS. W6ASW W6AWM W6AHZ W6AEL WA6ZSU W6AVI and WA6ABS repeaters are in process of linking. WA6TLP is new asst. EC for RTTY in Santa Maria. W6KON has skeds at all levels of traffic nets including NCS on Pacific Area Net. SCN net cards were issued to K6VI N5MR N6YH and W6KON. W6ZFR sent 4 Q51s and W6B/KM sent 64 during June. N6WP reports that N6YH now handling net reports for SCN. SCN meets on 3598 daily at 1830. It is our link to NTS. N5MR moving to NOCAL and K6WI moving to San Berdo. They will be hard to replace on traffic nets. W6BQLY W6AG and K6SZ5 are recovering from visits to the hospital. The Section net meets Wed. at 1930 on 3935 in addition to Sun. at noon. New Novices: KA6BGA KA6BPF KA6BPG KA6BPH. Traffic: W6KON 278, WA6MBZ 133, N5MR 54, N6MA 24, K6WI 13, N6YH 3, N6PB 2.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Ted Heithecker, W5EJ. Asst. SCM/SEC: K5PC. RM: W5GN. PAM: W5GSN. FD a huge success, with 15 mtrs. About as hot as the wx, here in N-Tex. FD traffic from Heart-O-Texas ARC, East Texas VHF-FM Soc., and Bell Amateur Contest Club. W5LAT reports big FD at Graham. New EC WA5UTA reports Wichita ARES assisted local PD in search for two missing boys, with WA5BHO actually finding the young lads along a busy expressway! Abilene area FD report from W5SSVS. W55DUQ, Lubbock area EC, reports new 161.76 repeater on the air, and new ARES emergency plan in works. K5HSZ, Rusk Co. EC reports RCARES Net on 52 with 6 active mobiles, and 3 emergency powered fixed stns. W5RPU sez good FD and much planned PR activity for ARES down Lampasas way. W5LST reports Van Zandt/Rains FD and ARES net on 52. W5TI sez KC Club had good score FD, has new rotatable dipoles at home QTH now. W5GBR new EC for Dallas/Ellis Co's. passed Extra at Ham-Com. W5AAT just made WAS-CW. W5ZNZ has discovered the fun of HF mobile on vacation trip out West. W55DD made BPL AND PSHR in June! Congrats. June PSHR: W55DD W55LAT W55RPU. Only 3 North Texas counties remain without active ARES organization. (Odessa-Midland-Big Spring area). We need your help in getting this vital Public Service going, contact K5PC, 1313 Applegate Lane, Lewisville, TX 75067 for details and application. Traffic: (June) W55DD 577, W5TI 215, K5MC 98, W5GBR 95, W5LAT 91, AA5J 77, W5GSN 48, W5BDD 40, K5PC 40, W5BKM 33, W5RPU 33, W5AAT 19, WA5INJ 14, W5YK 12, W5CTZ 7, W5CUI 6, W5JLF 6, W5ZNZ 2. (May) W5TI 225, W5GBR 46, W5RPU 19, N5BT 15.

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P9-HI	88-172 MHz
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P8-HI	83-190 MHz
P8-220	220-230 MHz
P16 Wired	Give exact band

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 P35 Wired \$34.95

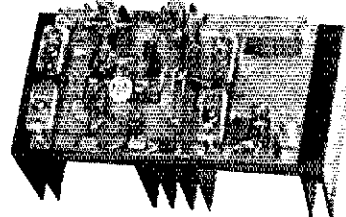


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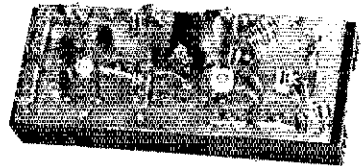
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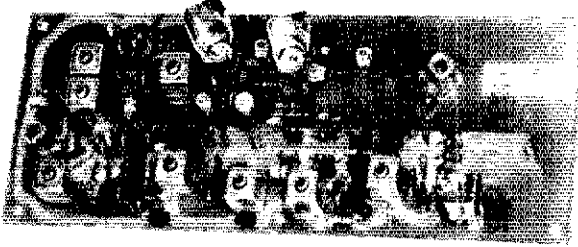


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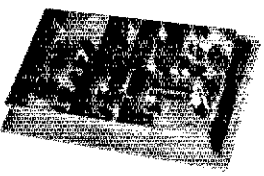
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XV2-6	26-28 MHz =	144-146 MHz

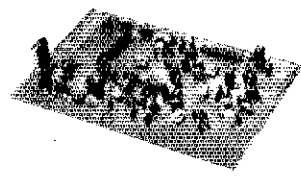
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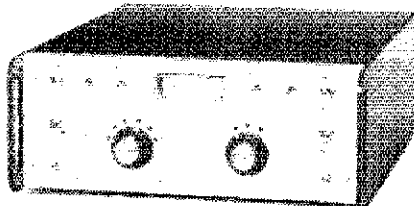
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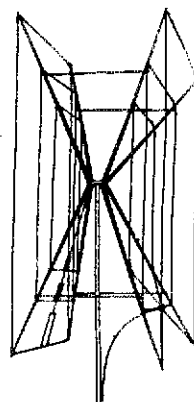
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OKLAHOMA: SCM, Leonard Hollar, WA5FSN — Monthly reports from Net Mgrs. look very good for a summer month except that the cw nets could use some help. OAN was very low and I don't believe it is due to band conditions. Come on, Novices help your code speed and learn tic handling at the same time. Weather Net averaging 8 wx reports daily, can still use more. I have a report that some of our "gager" amateurs were erecting a tower at 2:00 A.M. the other morning to get a 220 MHz repeater on the air. I call that dedication. Have some very FB QVS reports looks like 2 and 6 both were open most of the month with some good skip worked. Have had some copies of some fine Newspaper reports on FD. Also received quite a bit of traffic and mail concerning FD. We have made up a complete new file of LOs and have sent out new certs to all. 79 appointees, many of our people wear more than one "hat" and received several "pieces of wallpaper." My thanks to all for their FB help in the past, and hope they will continue in the future. Traffic: WB5NKC 427, WB5NVD 318, K5OWK 208, W5REC 128, W5RB 125, W5LYH 97, W5BYC 62, W5A50V 53, W55ETB 35, W5SUG 31, W55ETD 22, K5CAY 20, WA5FSN 18, K5MBK 18, W5VOR 18, W5FKL 18, W5BTZZ 6, W55A0H 5, W5JJ 1.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR — Asst. SCMPAM: N5TC, SEC: WB5LHK, RM: WA5RKU OOs reporting this month: K5DL WB5CIT. OVS reporting this month: WB5CIT W55HJB, OO/OVS WB5CIT has new HW-8 for QPR and new FT227R for 2 meters. N5AQ reports W55LCW and W55IZJ upgraded to Technician. ORS K5PE (ex-WA5JYH) finished new accu-memory in time for Field Day and enjoyed first push button FDI EC N5FN reports W55JAV upgraded to Advanced, W55IPQ to General, W55DQR completed Novice WAS then upgraded to General; WB5UER going up with 87-ft breaker tower, looks only Alaska for WAS via satellite, wants KL7 sked; N5FN also going up with new 60-ft tower and tri-bander. Sun City ARC (El Paso) has nine new Novices, all but two having KA5 calls. Summer doldrums hit with a bang; started last month and nearly dropped out like poor propagation this month. Vacations will soon be over and station activity reports will begin coming in again. Traffic: W5KLY 555, K5HZR 294, N5TC 175, K5ZSI 60, W5BGE 57, W55MMI 56, W55BW 37, N5FN 18, K5PE 28, K6GD 24, W5KR 17, WA5RVT 9, W55HJB 3.

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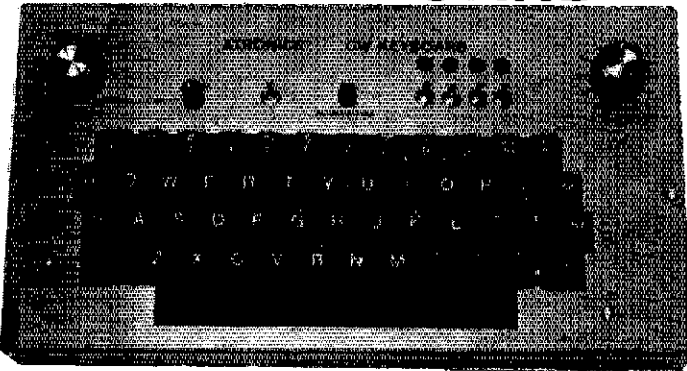
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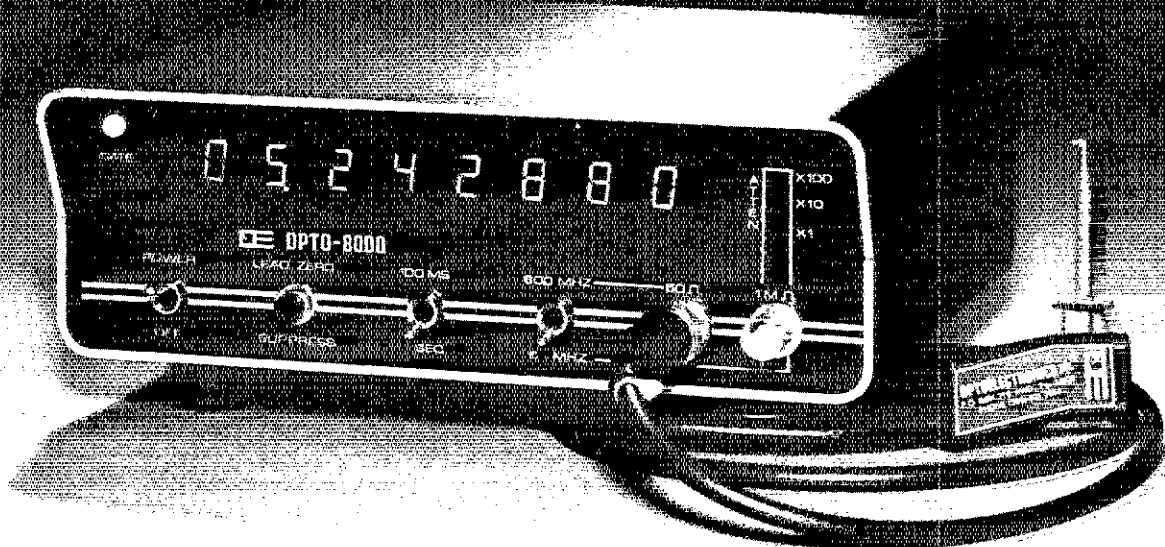
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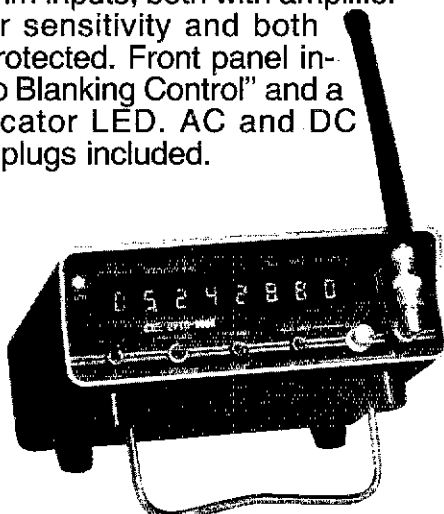
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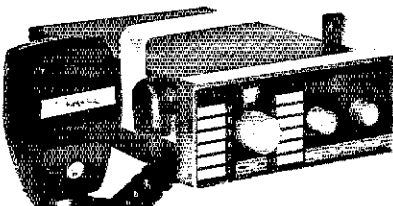
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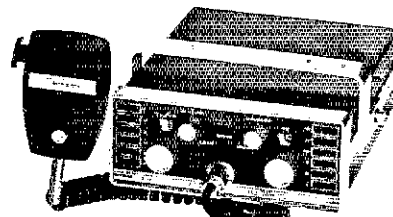
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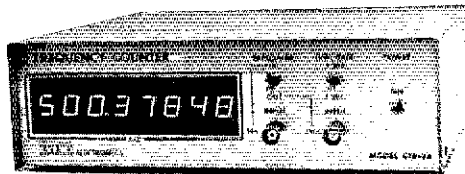
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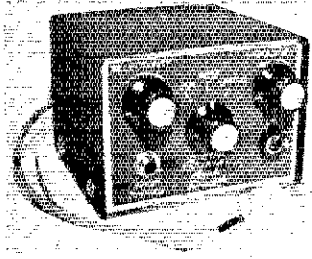
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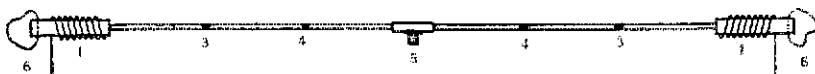
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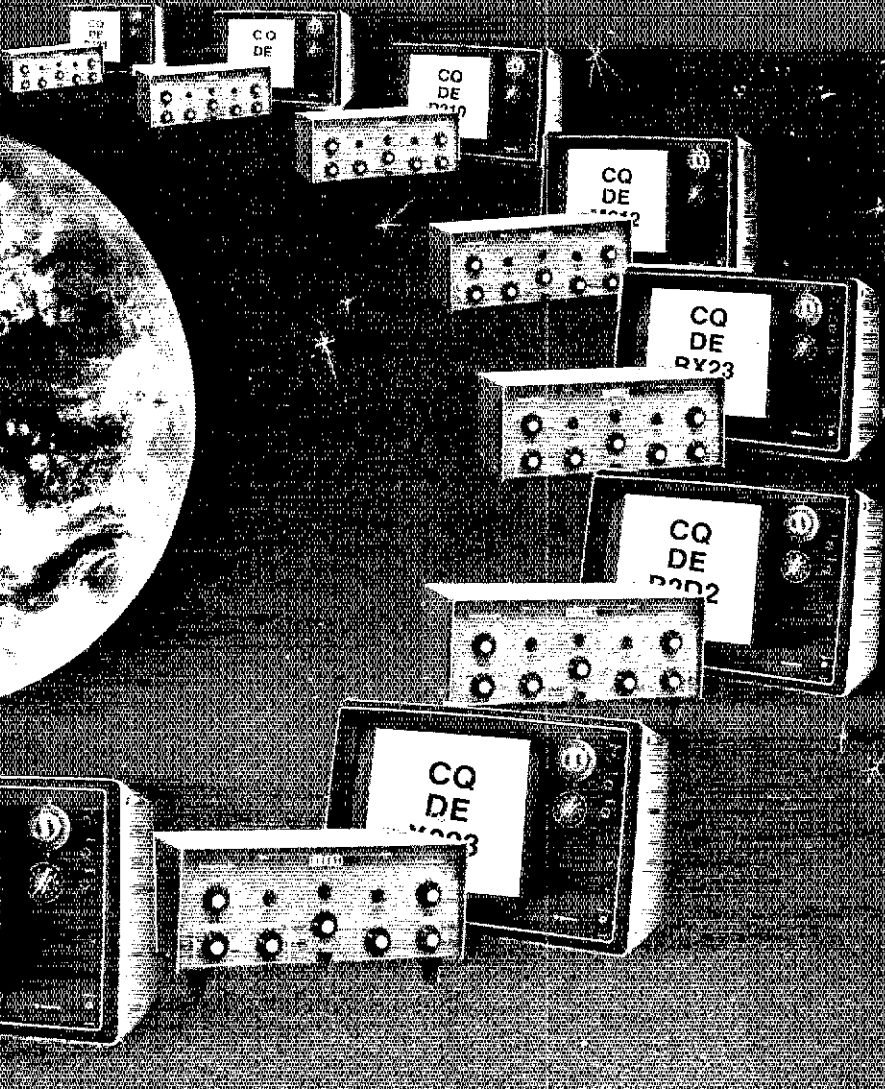
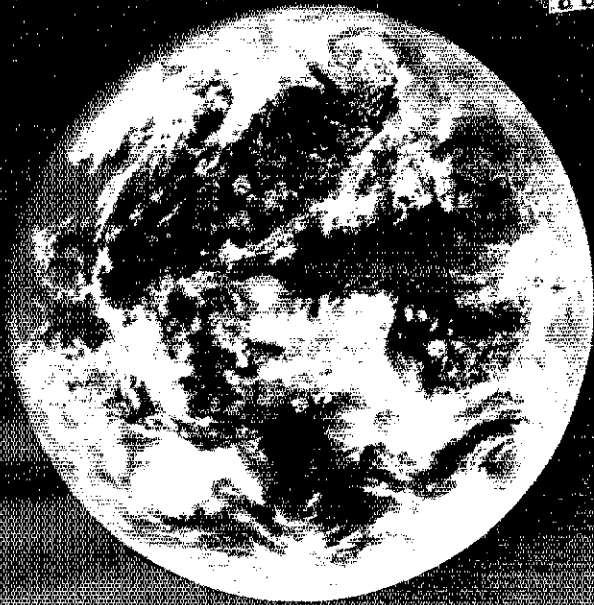


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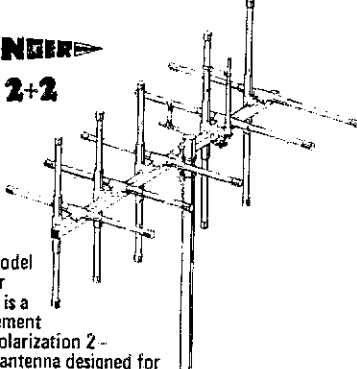
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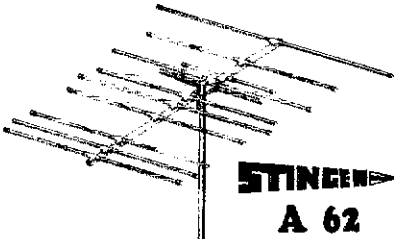
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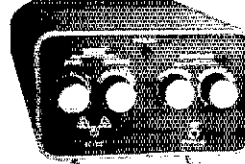
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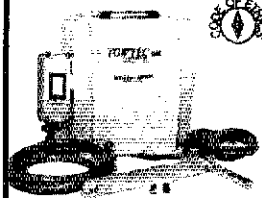
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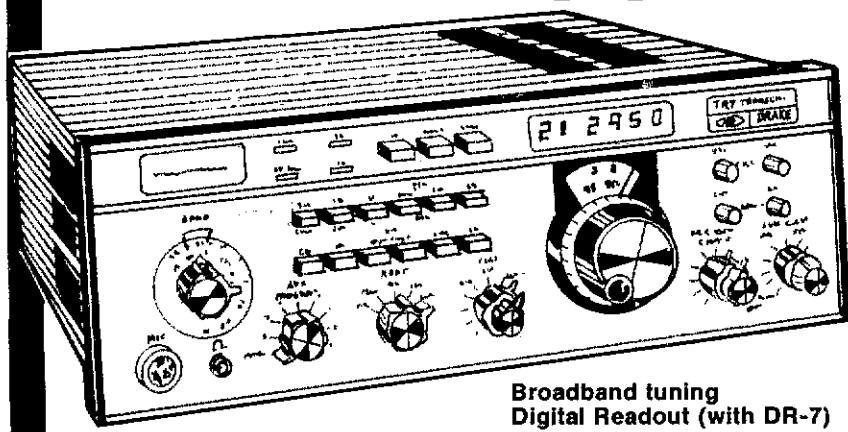
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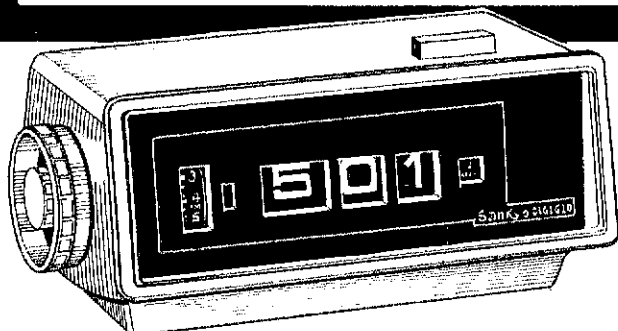


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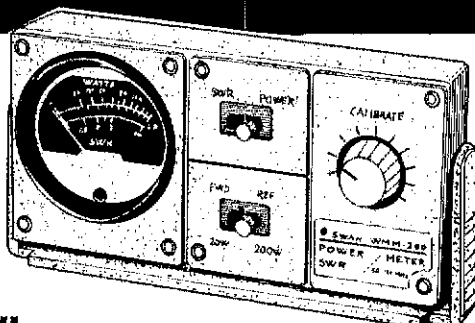
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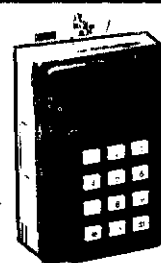
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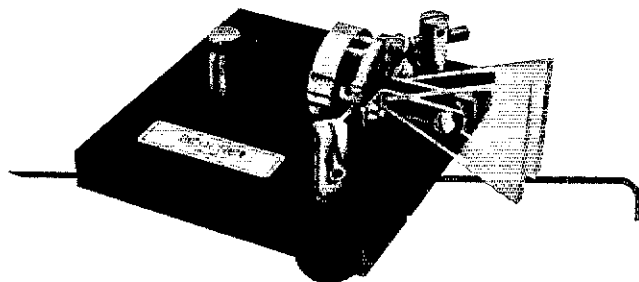
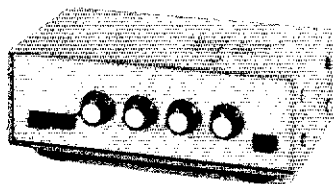
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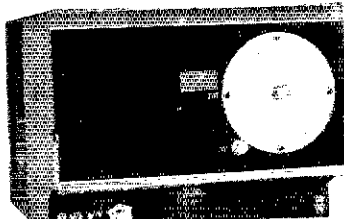


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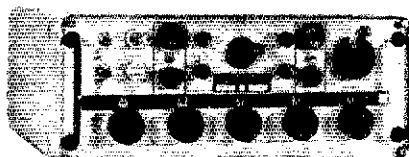
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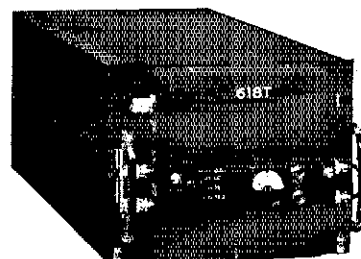
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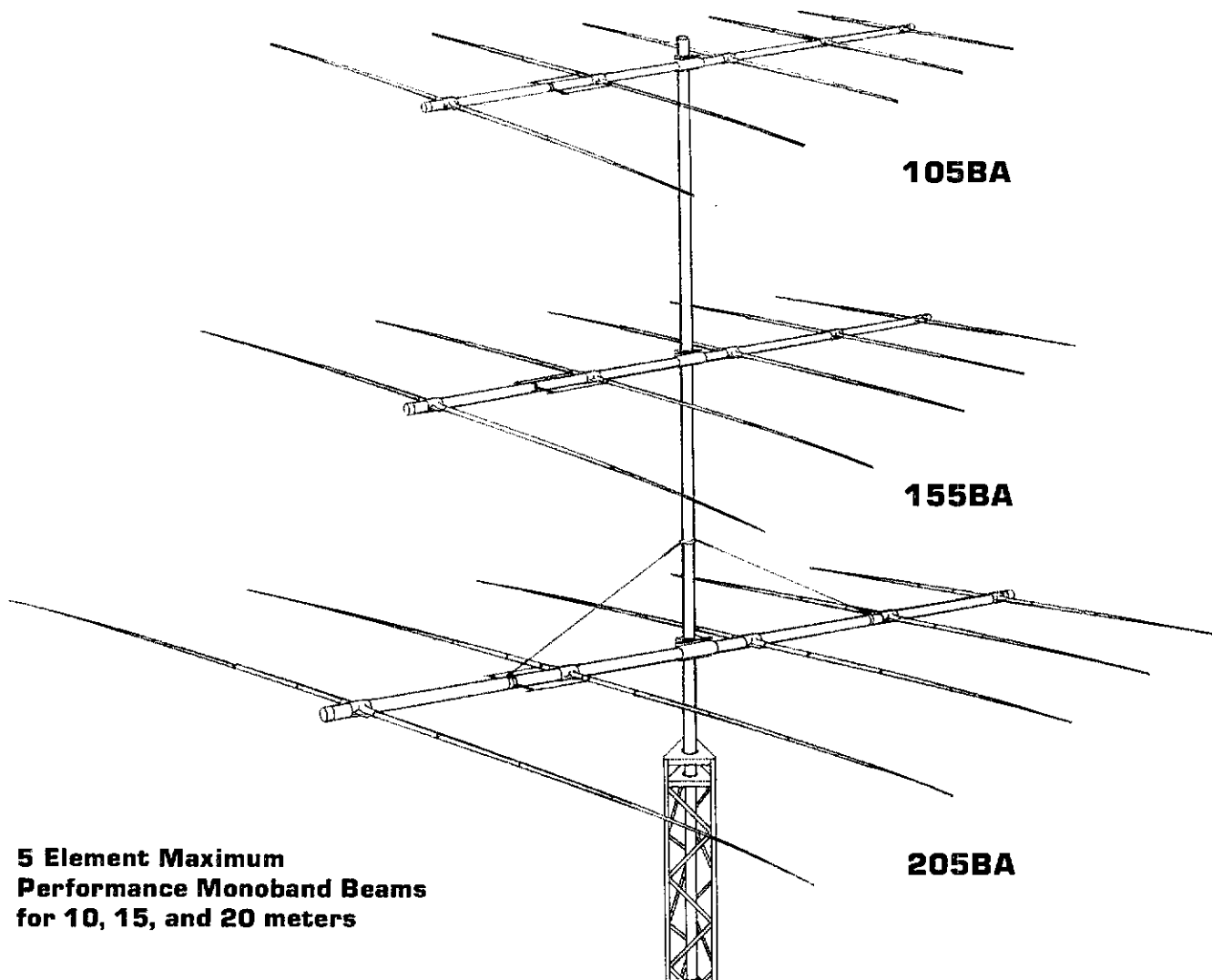
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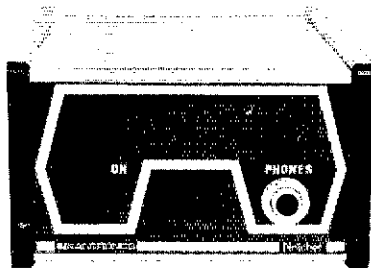
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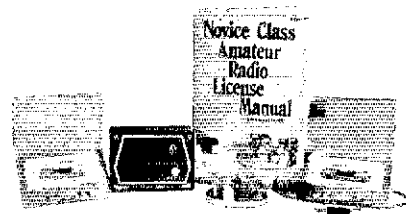
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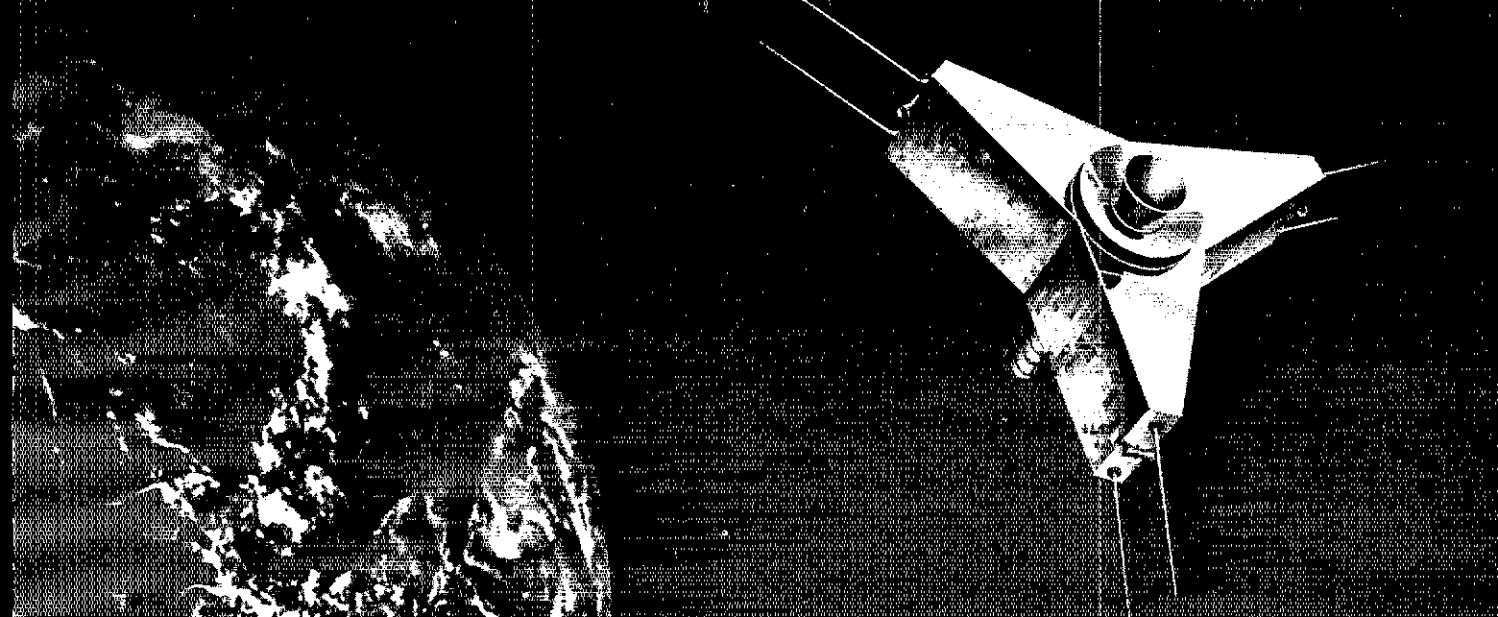
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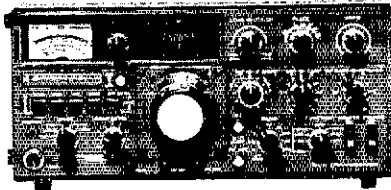
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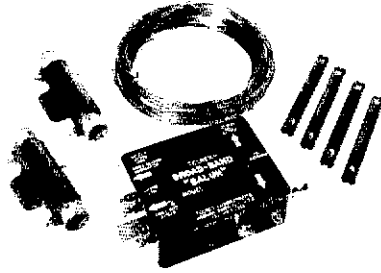
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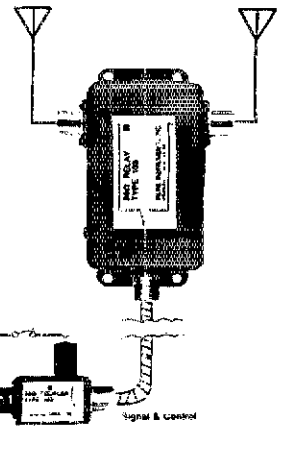
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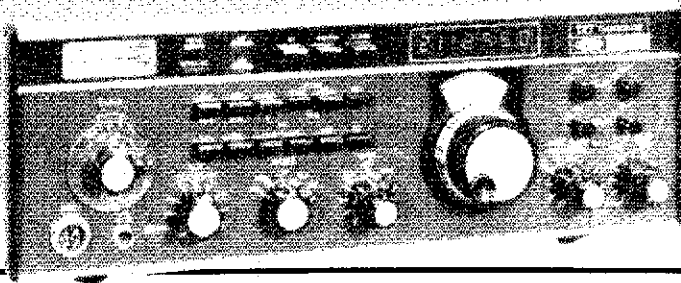
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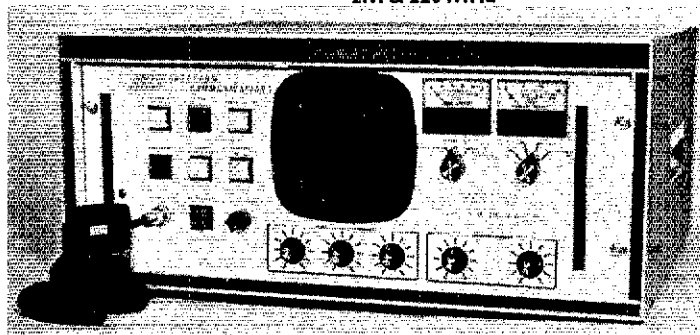
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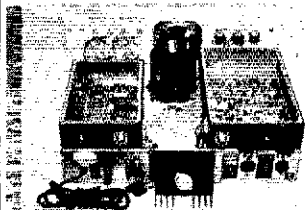
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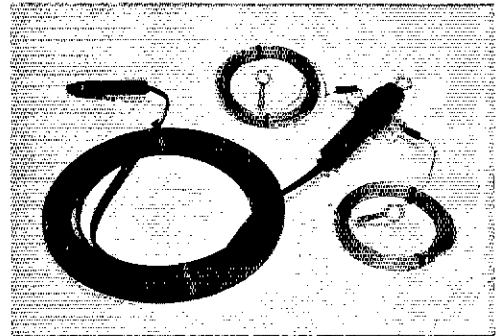
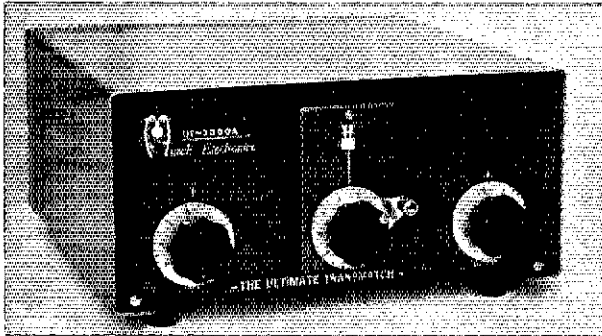
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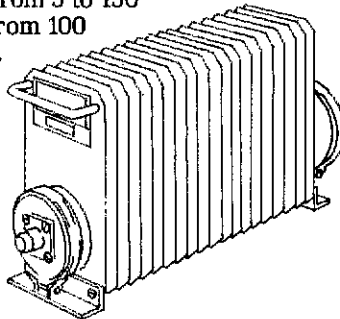
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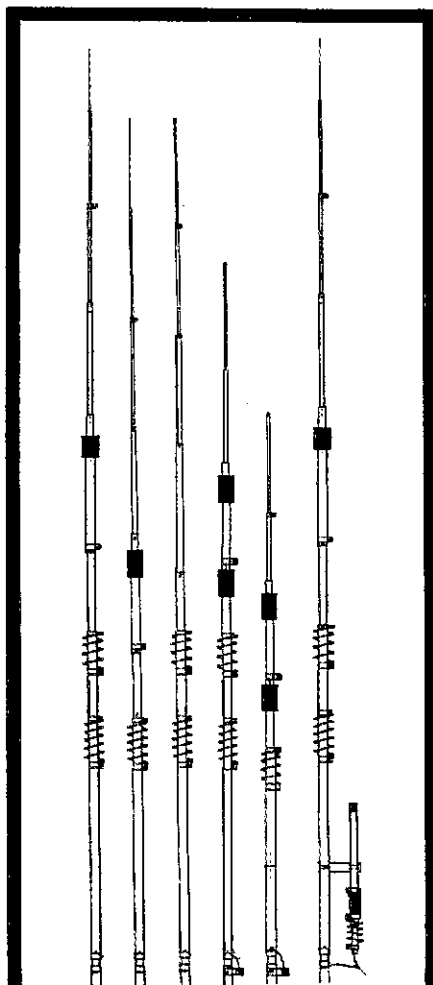
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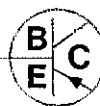
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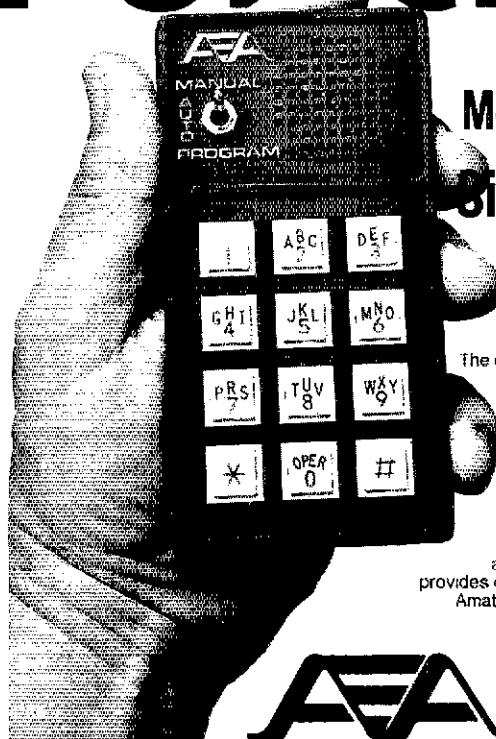


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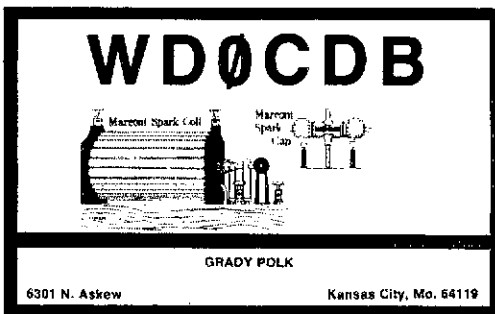
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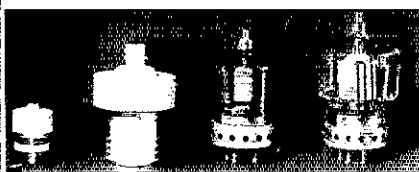
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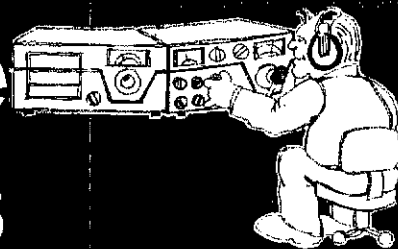
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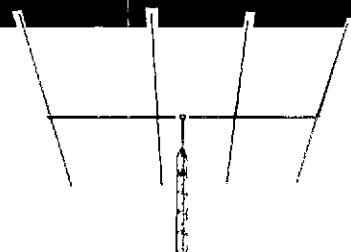
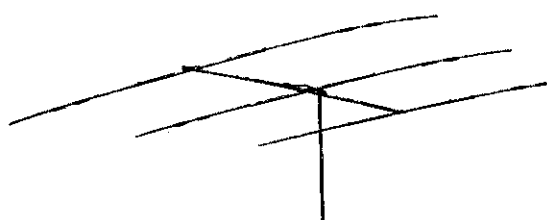
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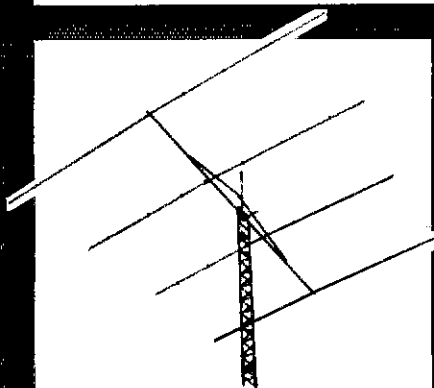
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- Power: max. legal limit
- Longest element 27 ft.
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- Wind load at 80 mph 131 lbs.
- Surface area 5.10 sq. ft.

219.95 list. Call for quote.

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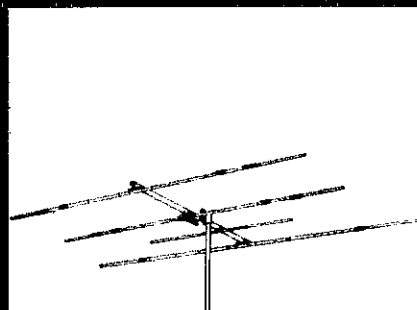
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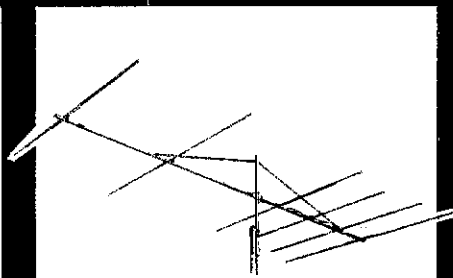
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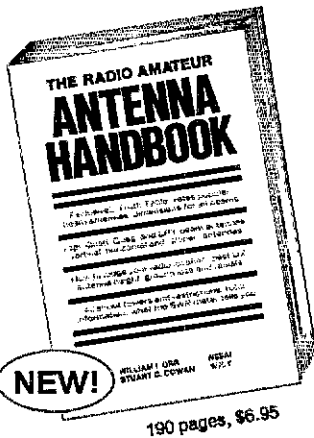
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ELMIRA, New York Hamfest — September 30th, from 9-5, free flea market, tech talks and more! For tickets and info, contact WA2FJM, John Breese, 340 West Avenue, Horseheads, New York 14854.

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, KBCKI, 1424 Main Street, Cincinnati OH 45210.

FINDLAY Hamfest — 36th Annual, Sunday, Sept. 10 — Riverside Park, Findlay, Ohio. One of Ohio's finest hamfests, giant flea market, 2-meter xmmitter hunt, MRS. P.O.N., Buckeye Belles, sabb. 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.s. to Clark Foltz, W8UN, 122 W. Hobart, Findlay, OH 45840.

MELBOURNE, FL Sept. 9-10. The 13th Annual Melbourne, Florida Hamfest will be held Saturday and Sunday, September 9-10, 1978, from 9 A.M. to 5 P.M. each day in the air-conditioned Melbourne Civic Auditorium located on Hibiscus Boulevard. Donation is \$3.50 per family. Full program includes forums, meetings, swap tables, commercial exhibits, awards, etc. Talk in on 25/85 and 52. Sponsored by the Platinum Coast Amateur Radio Society. For more info write P. O. Box 1004, Melbourne, FL 32901.

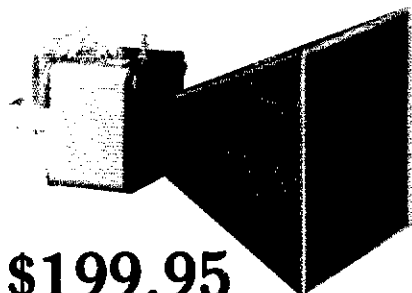
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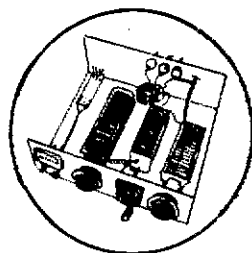
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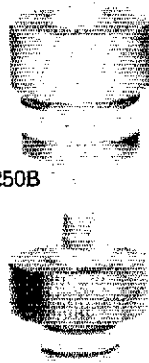
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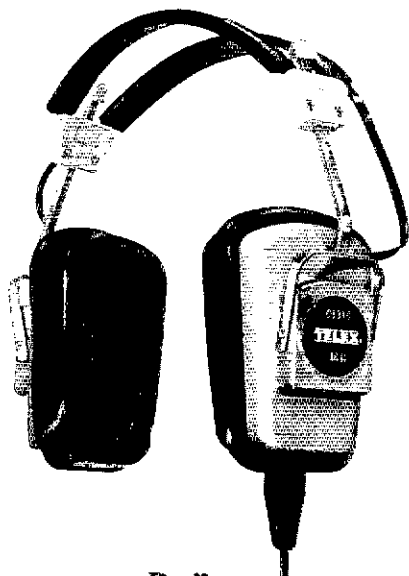
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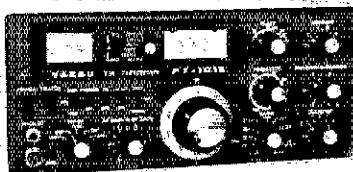
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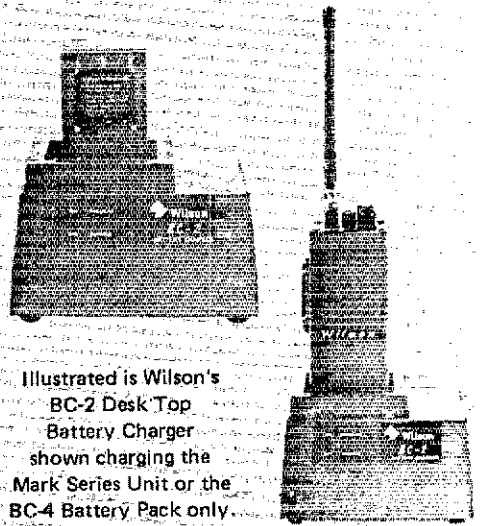
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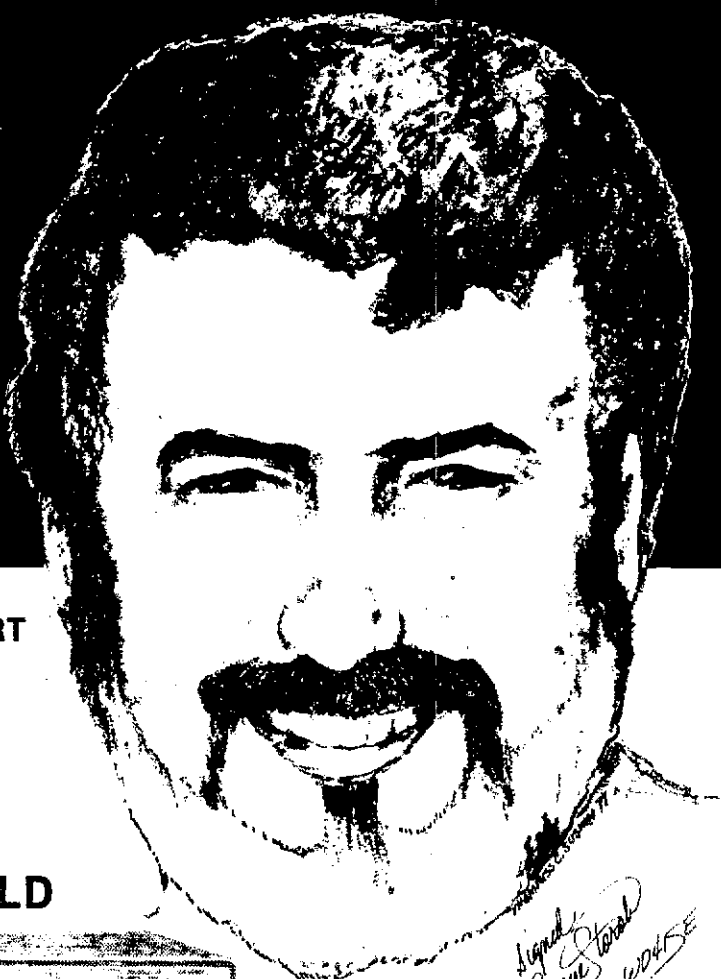
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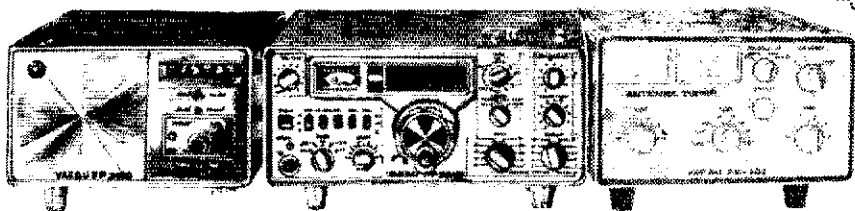


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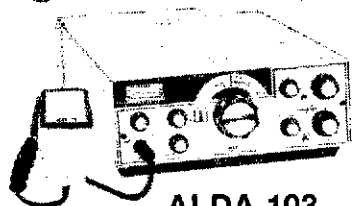
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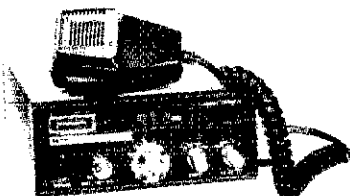
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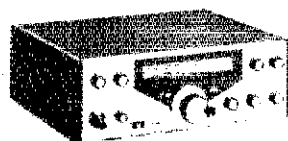
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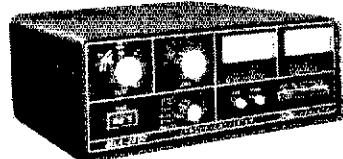
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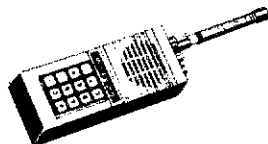
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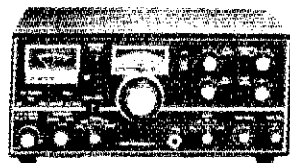
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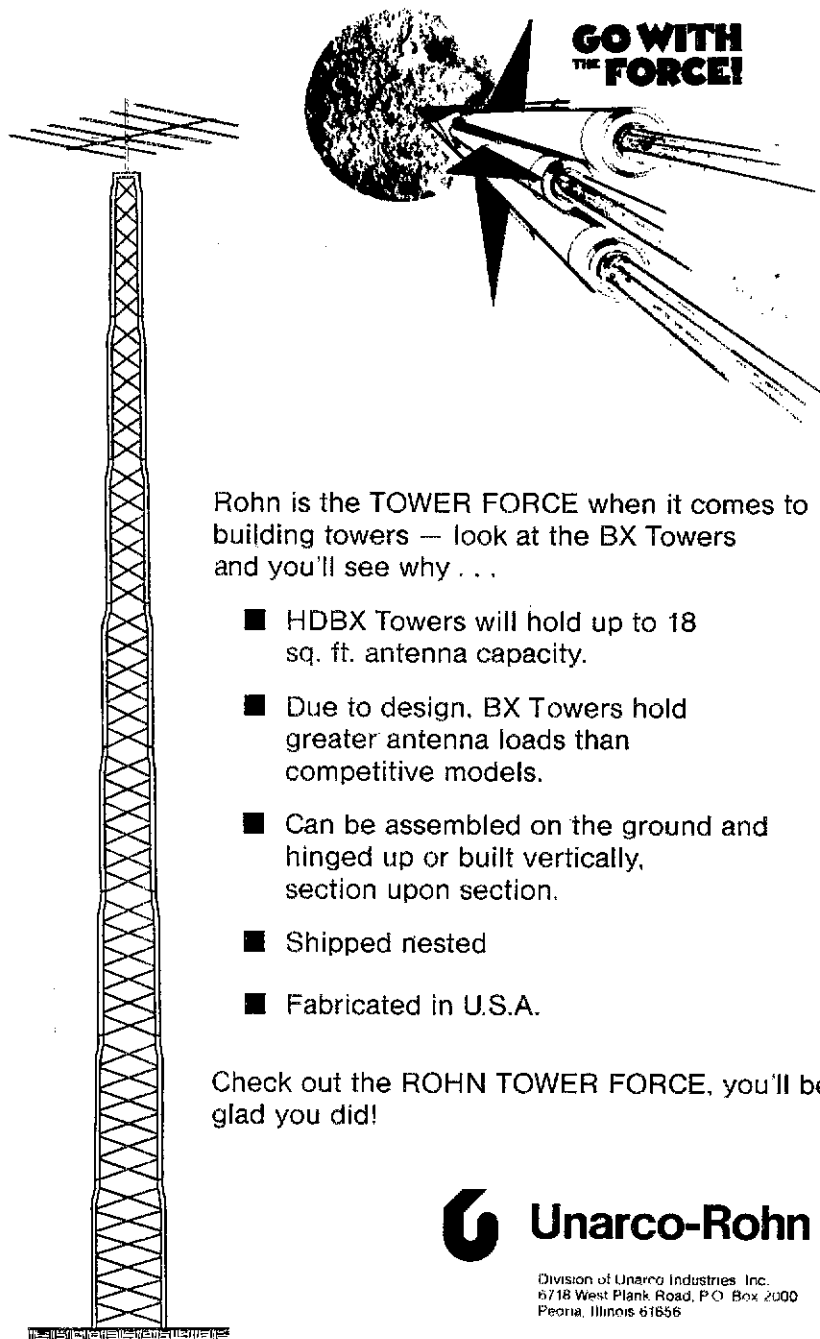
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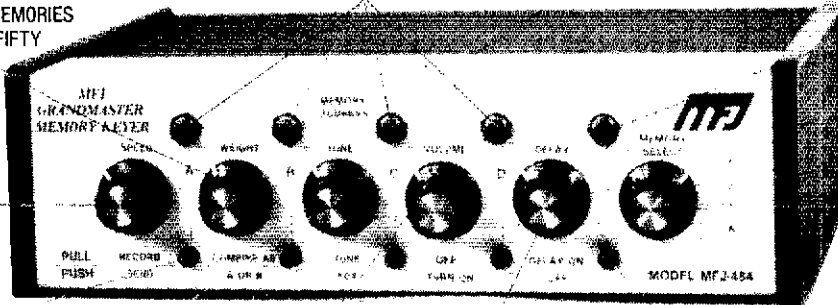
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Up to twelve 25 character messages plus a 100, 75, 50, or 25 character message (4096 bits total).

A switch combines 25 character messages for up to three 50 character messages.

To record, pull out the speed control, touch a message button and send. To playback, push in the speed control, select your message and touch the button. That's all there is to it!

You can repeat any message continuously and even leave a pause between repeats (up to 2 minutes). Example: Call CQ. Pause. Listen. If no answer, it repeats CQ again. To answer simply start sending. LED indicates Delay Repeat Mode.

Instantly insert or make changes in any playing message by simply sending. Continue by touching another button.

Memory resets to beginning with button, or by tapping paddle when playing. Touching message button restarts message.

LEDs show which 25 character memory is in use and when it ends.

Built-in memory saver. Uses 9 volt battery, no drain when power is on. Saves messages in memory when power loss occurs or when transporting keyer. Ultra compact, 8x2x6 inches.

PLUS A MFJ DELUXE FULL FEATURE KEYS. lambic operation with squeeze key. Dot-dash insertion.

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- Speed, volume, weight, tone controls
- Combine memory switch
- Repeat, tune functions
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Similar to MFJ-484 but with 1024 bits of memory, less delay repeat, single memory operating LED. Weight and tone controls adjustable from rear panel. 6x2x6 inches. 110 VAC or 12 to 15 VDC.

THIS MFJ-481 GIVES YOU TWO 50 CHARACTER MESSAGES.

- Repeat function
- Tune function
- Built-in memory saver

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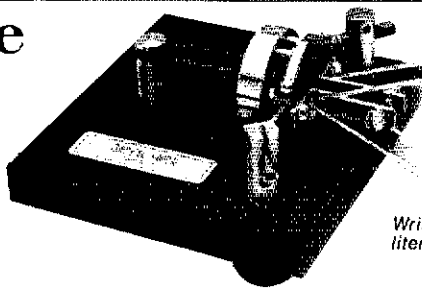
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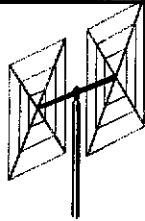
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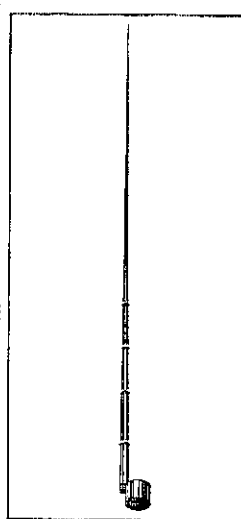
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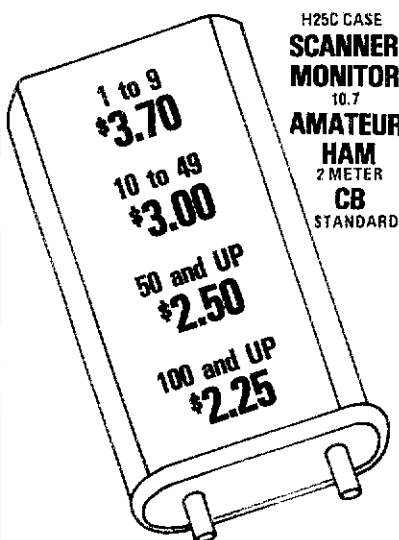
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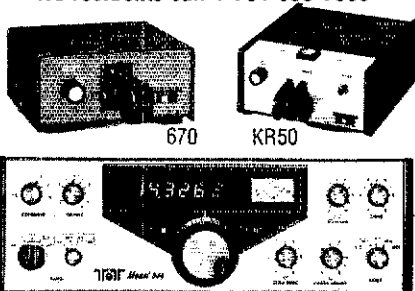
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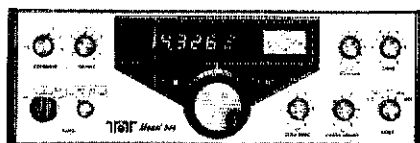
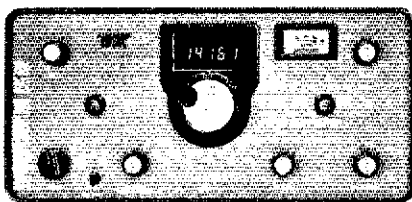
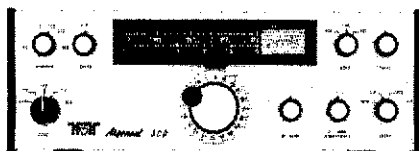
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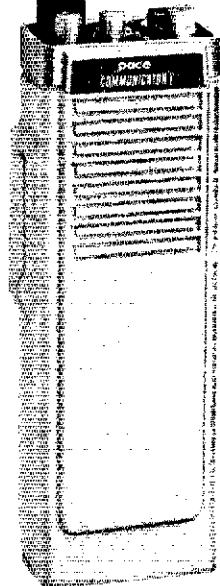
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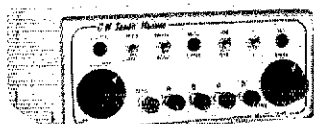
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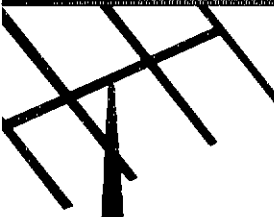
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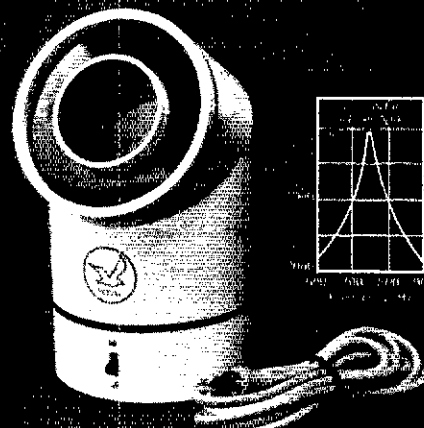
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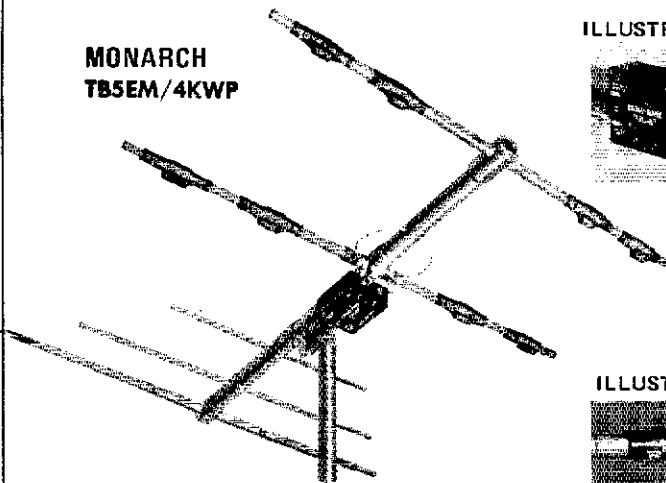
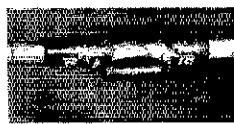


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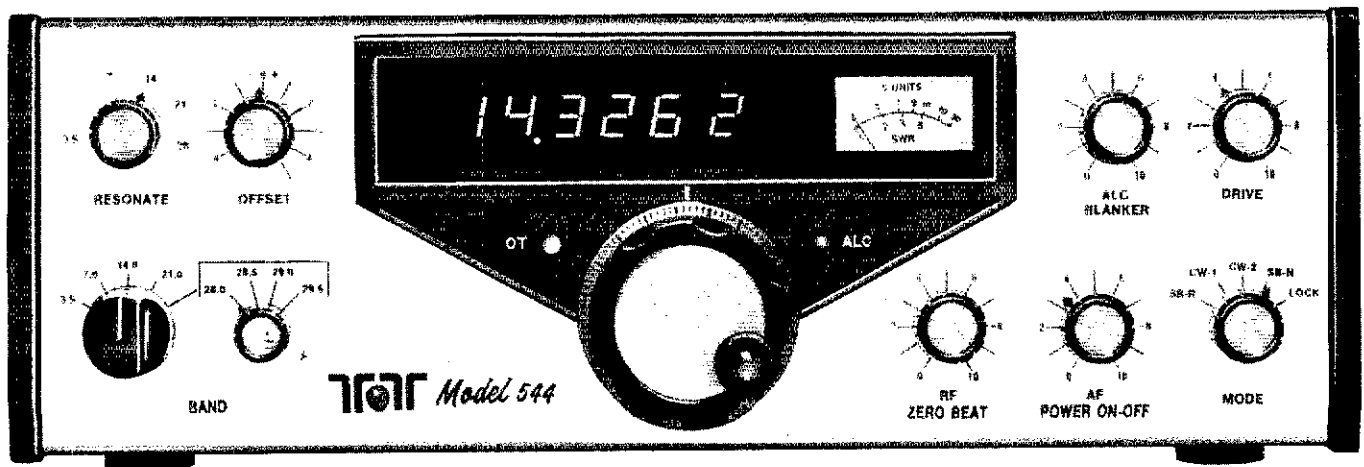
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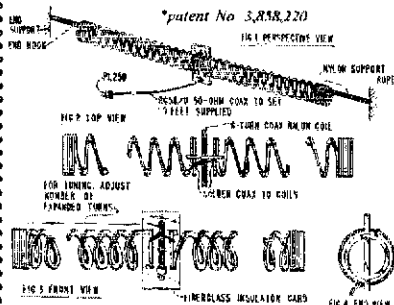
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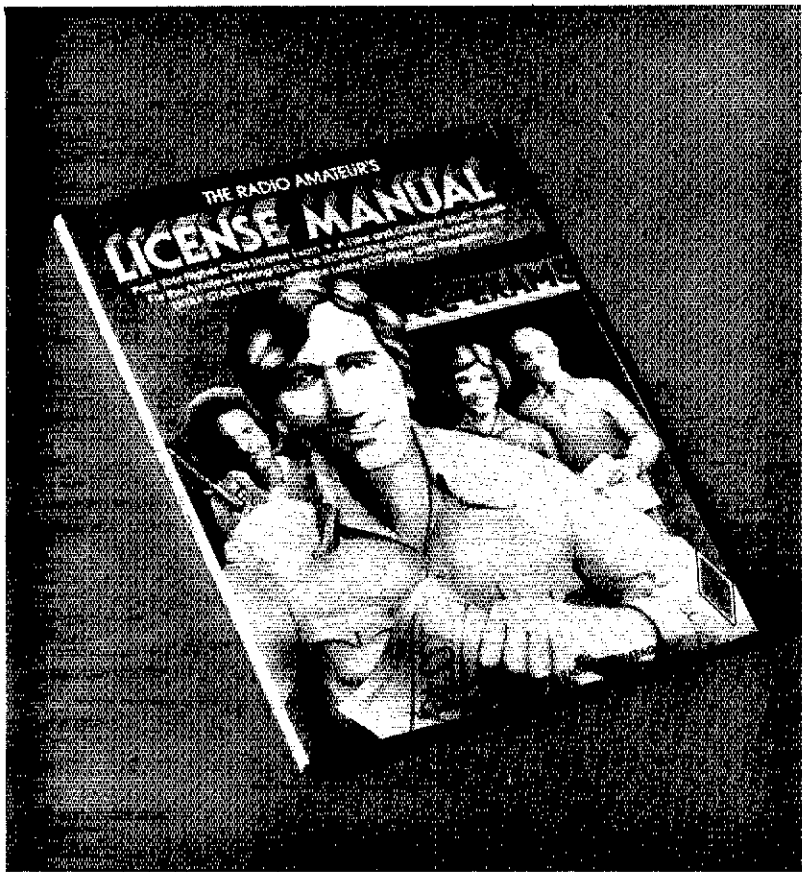
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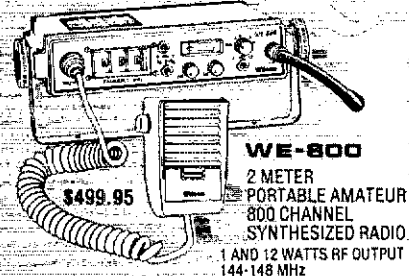
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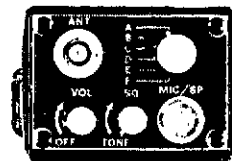


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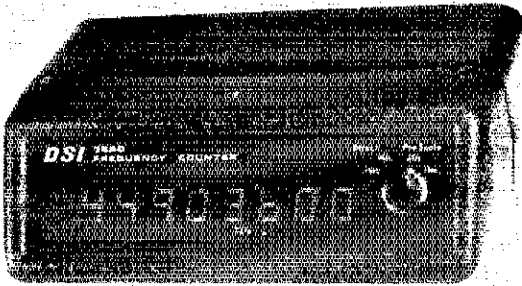
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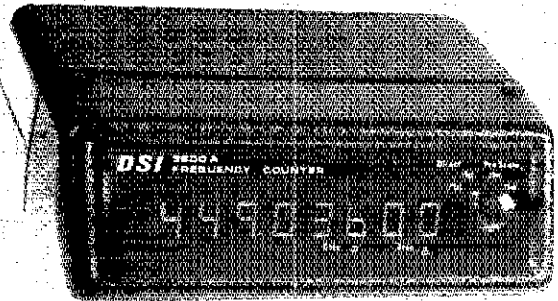
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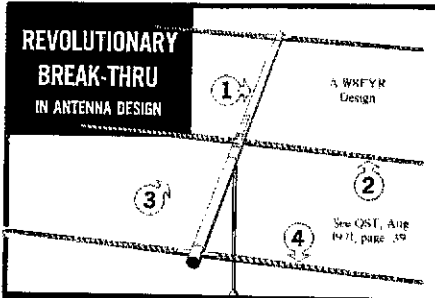
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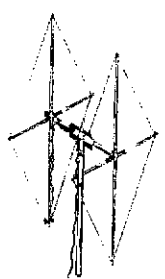


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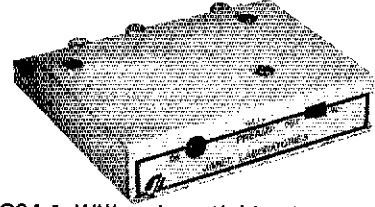
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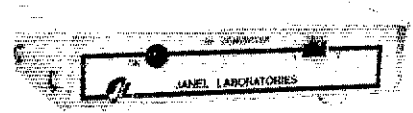
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No antenna tuner needed—Full legal power limit—Fully assembled and ready for operation—No radials required—1:1 VSWR to 50 OHM coax.

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Model	Bands	Ht	Price
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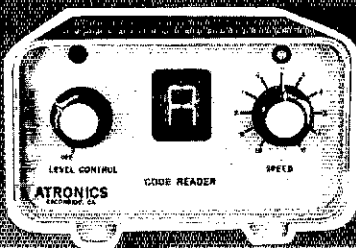


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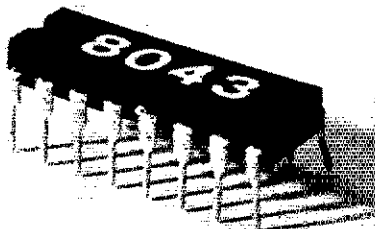
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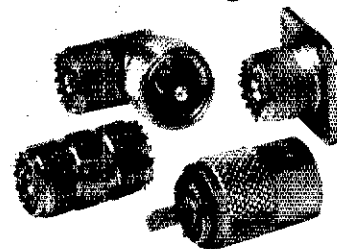
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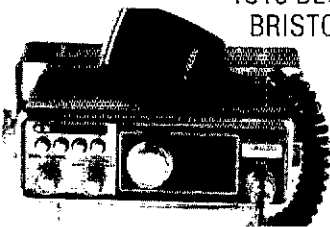
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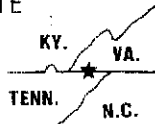


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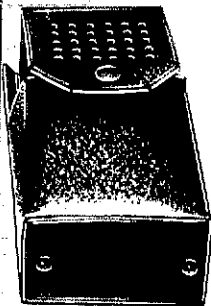
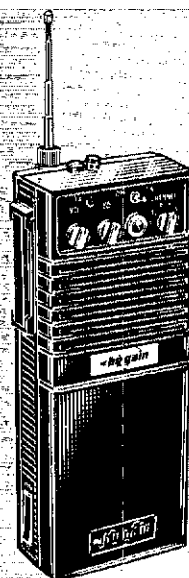
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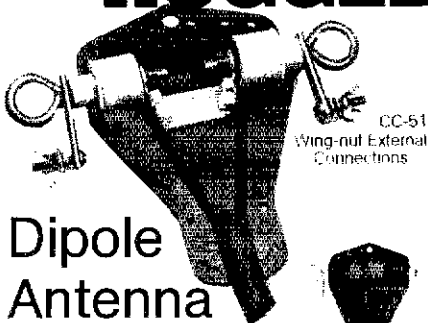
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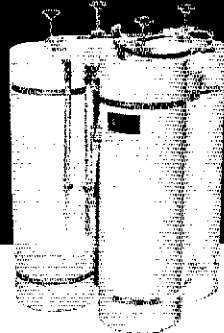
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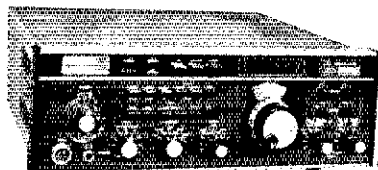
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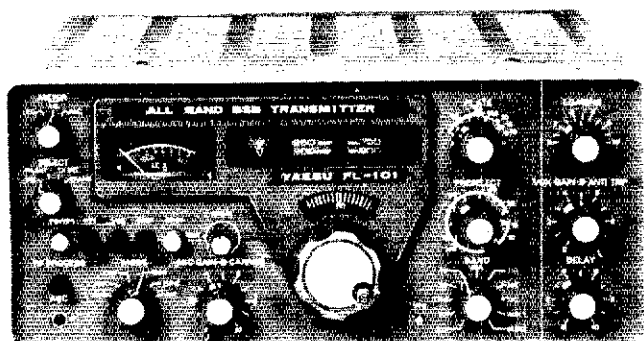
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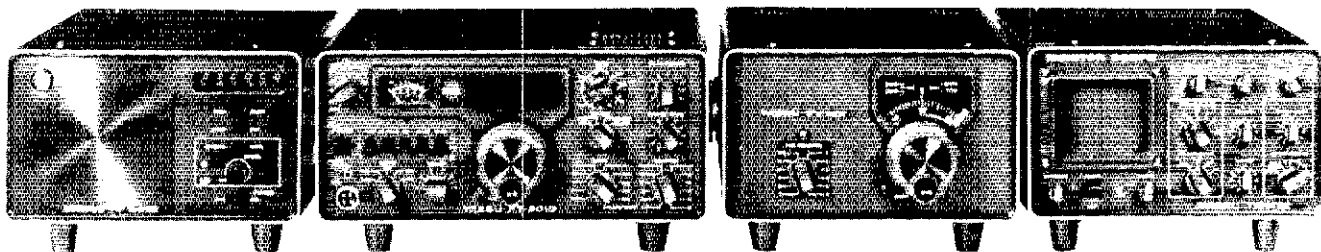
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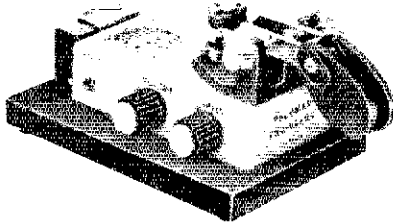


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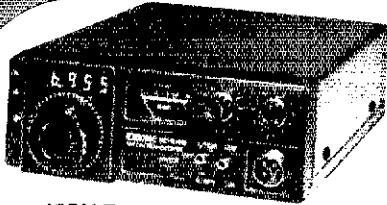
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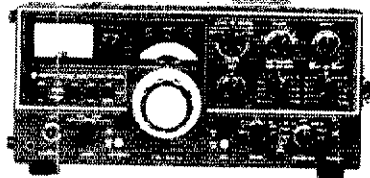
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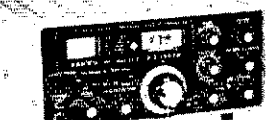
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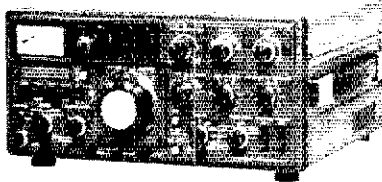


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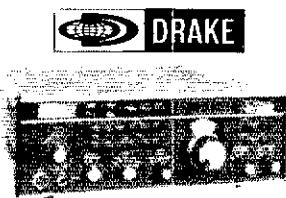
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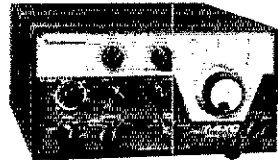
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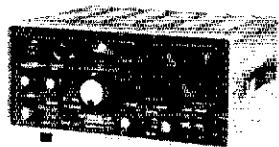
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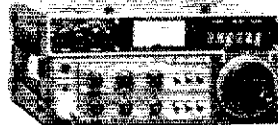
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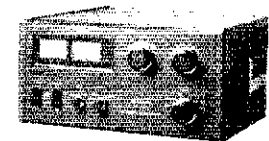
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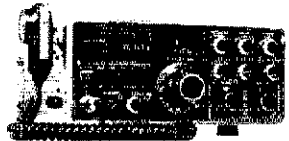
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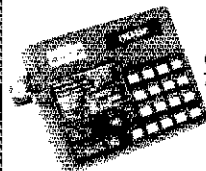


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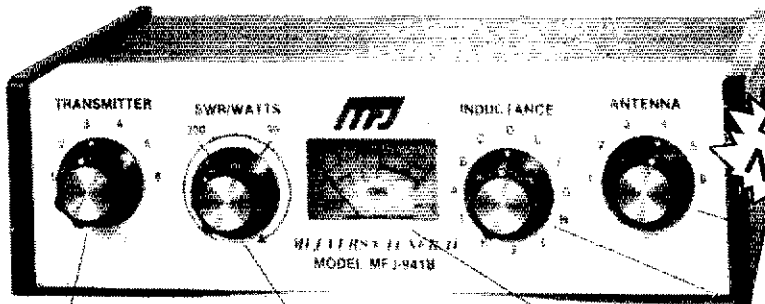
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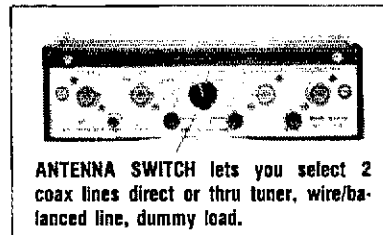
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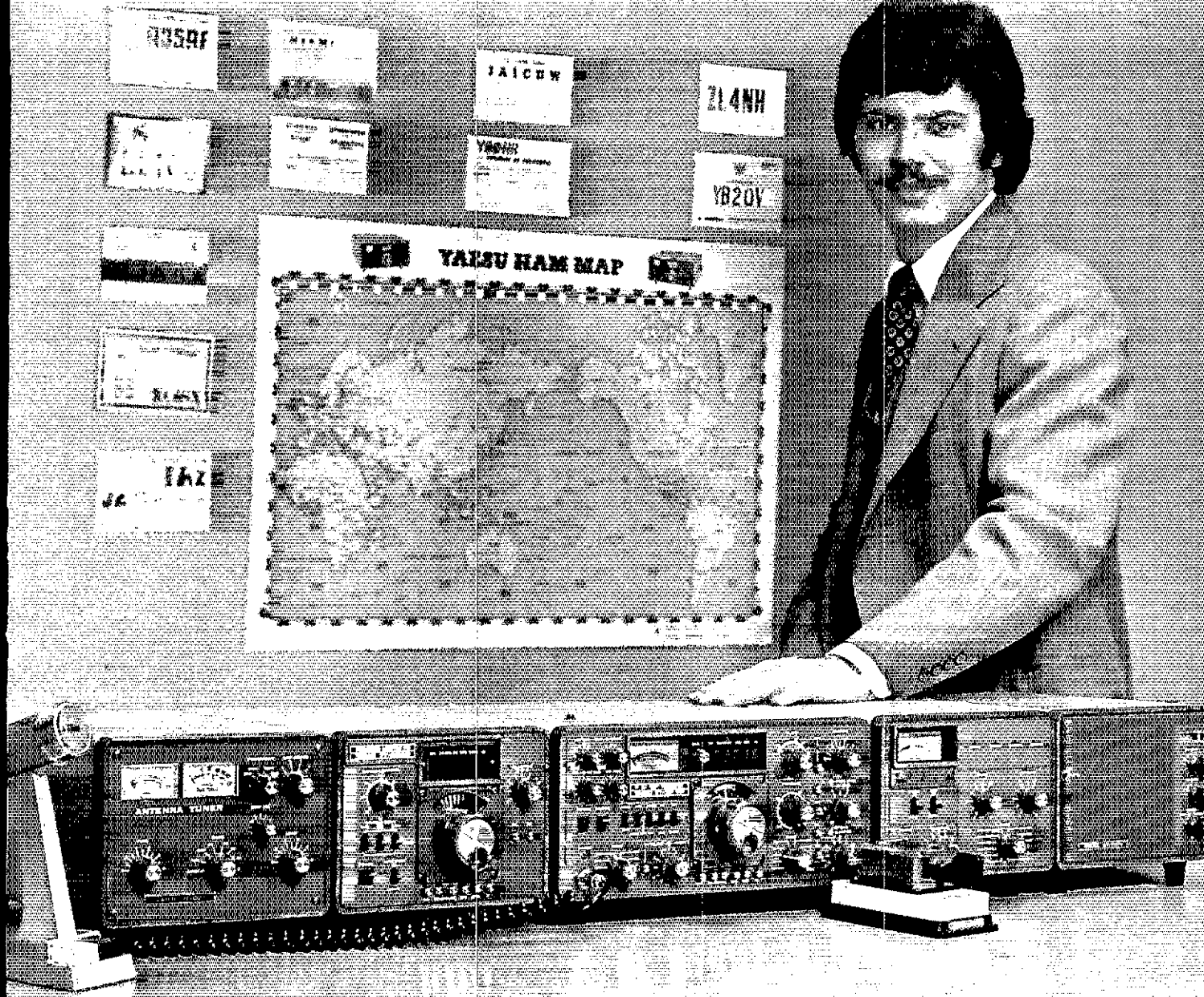
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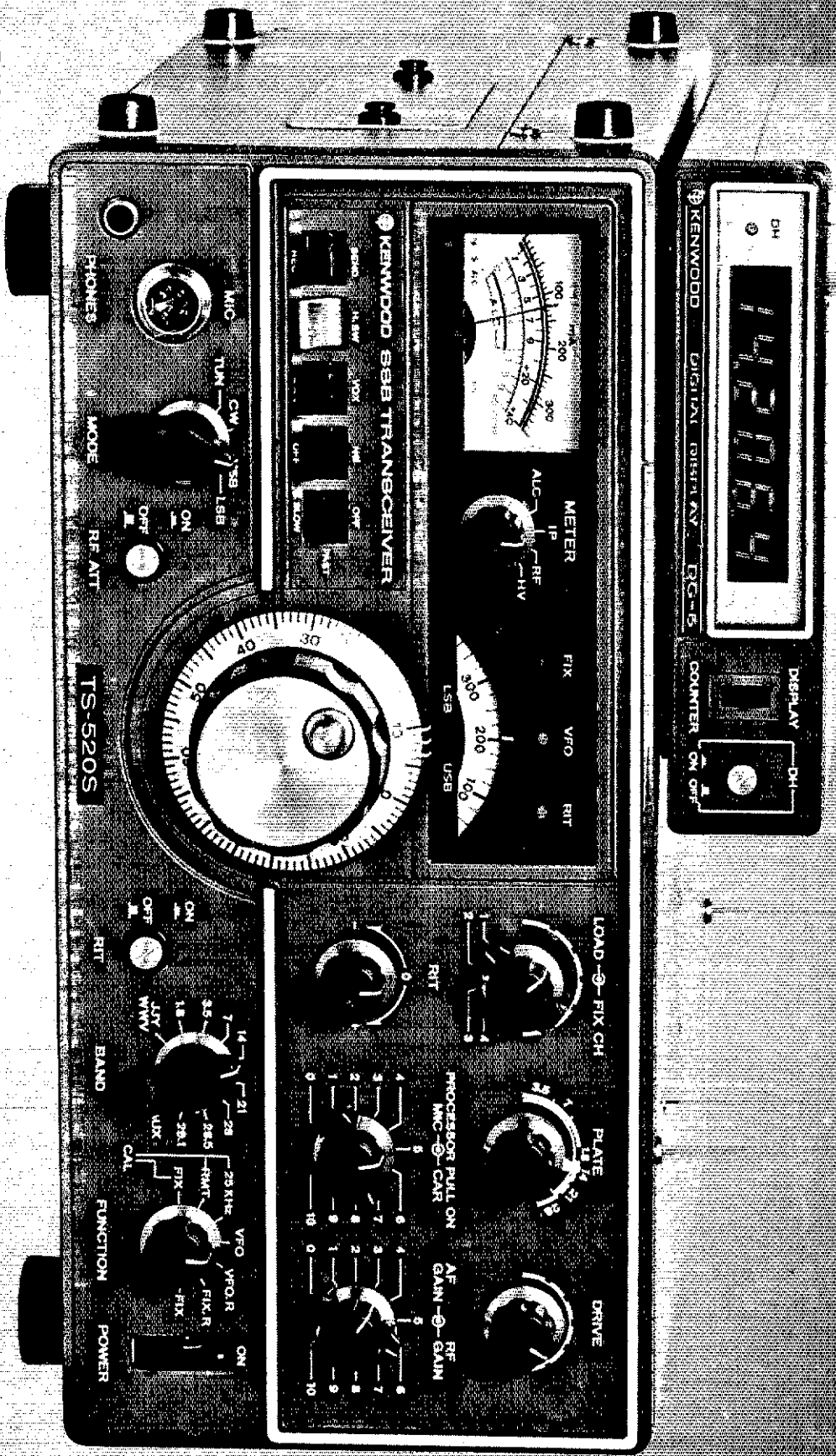
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