

QST

devoted entirely to Amateur Radio

June 1978 \$2.00



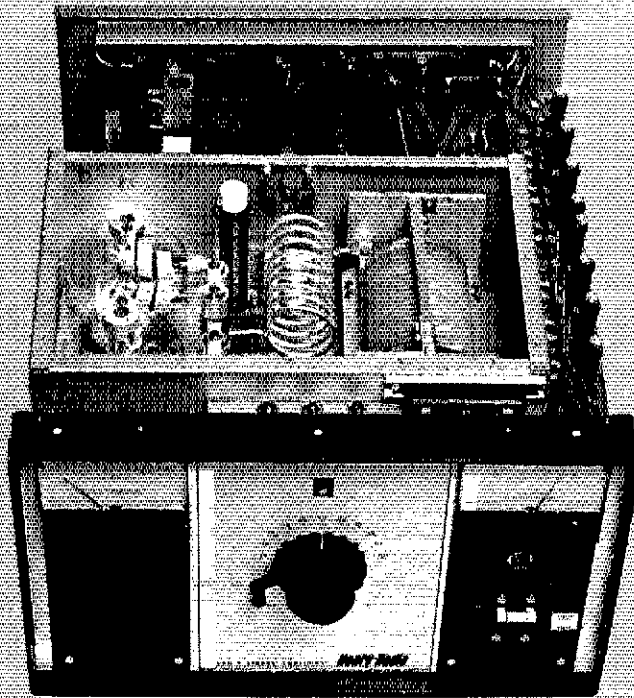
SAFETY

How safe is your ham shack? Are you being zapped by rf radiation?

Page 11



Before you buy an amplifier



Lift the Lid

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

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

2KD-5 GENERAL SPECIFICATIONS:

- * The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands.
- * Two Eimac 3-500Z glass envelope triodes operating in a grounded grid circuit.
- * Pi-L plate circuit with a rotary silver plated tank coil for greatest efficiency and maximum attenuation of unwanted harmonics.
- * Full legal input in all modes. 2000 watts PEP input for SSB, 1000 watts DC input for CW, RTTY and AM.
- * Jumper for 115 or 230 VAC, 3 wire single phase.
- * 10.5" high x 15" wide x 17.5" deep
- * Price...\$895.00

2K-4...LINEAR AMPLIFIER. Offers engineering, construction and features second to none. Provides a long life of reliable service, while its heavy duty components allow it to loaf along even at full legal power. Operates on all amateur bands, 80 thru 15 meters. If you want to put that strong clear signal on the air that you've probably heard from other 2K users, now is the time. Move up to the 2K-4. Floor console...\$1095.00

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

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

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

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

Model	Drive Power	Output Power	Price
LOW BAND VHF AMPLIFIERS (35 to 75 MHz)			
Tempo 100C30	30W	100W	\$159.
Tempo 100C02	2W	100W	\$179.
Tempo 100C10	10W	100W	\$149.

HIGH BAND VHF AMPLIFIERS (135 to 175 MHz)			
Tempo 130A30	30W	130W	\$189.
Tempo 130A10	10W	130W	\$179.
Tempo 130A02	2W	130W	\$199.
Tempo 80A30	30W	80W	\$149.
Tempo 80A10	10W	80W	\$139.
Tempo 80A02	2W	80W	\$159.
Tempo 50A10	10W	50W	\$ 99.
Tempo 50A02	2W	50W	\$119.
Tempo 30A10	10W	30W	\$ 69.
Tempo 30A02	2W	30W	\$ 89.

UHF AMPLIFIERS (400 to 512 MHz)			
Tempo 70D30	30W	70W	\$210.
Tempo 70D10	10W	70W	\$240.
Tempo 70D02	2W	70W	\$270.
Tempo 40D10	10W	40W	\$145.

Tempo 40D02	2W	40W	\$155.
Tempo 40D01	1W	40W	\$185.
Tempo 25D02	2W	25W	\$125.
Tempo 10D02	2W	10W	\$ 85.
Tempo 10D01	1W	10W	\$125.

TEMPO 100A10 VHF LINEAR AMPLIFIER. Completely solid state, 144-148 MHz. Power output of 100 watts (nom.) with only 10 watts (nom.) in. Reliable and compact... \$199.00
TEMPO 100A10/B BASE AMPLIFIER... \$349.00

Henry Radio also offers a broad line of commercial and FCC type accepted amplifiers covering the range of 3 MHz to 500 MHz. Henry amplifiers are in use all around the world. Commercial and export inquiries are invited.

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

please call or write for complete information

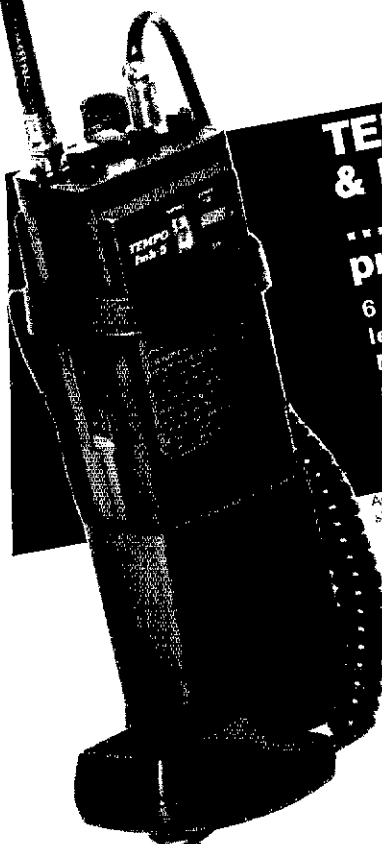
Henry Radio

11240 W. Olympic Blvd., Los Angeles, Calif. 90064 213/477-6701
 931 N. Euclid, Anaheim, Calif. 92801 714/772-9200
 Butler, Missouri 64730 816/679-3127

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

Prices subject to change without notice

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



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

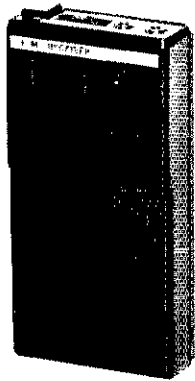
6 channel capability • selectable 1 or 2 - 1 or 5 Watts output (VHF) • Solid-state • Battery level meter • Earphone jack • Built-in charging terminals and separate charging jack for Ni-cad batteries • Flex antenna • Carrying case standard • Excellent frequency stability allows use with booster amplifier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

Accessory holder shown

TEMPO POCKET RECEIVERS

Low priced, dependable and the most compact receivers available

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



TEMPO VHF & UHF solid state power amplifiers

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

VHF (135 to 175 MHz)			
Drive Power	Output	Model No.	Price
2W	130W	130A02	\$199
10W	130W	130A10	\$179
30W	130W	130A30	\$189
2W	80W	80A02	\$169
10W	80W	80A10	\$149
30W	80W	80A30	\$159

UHF (400 to 512 MHz)			
Drive Power	Output	Model No.	Price
2W	70W	70D02	\$270
10W	70W	70D10	\$250
30W	70W	70D30	\$210
2W	40W	40D02	\$180
10W	40W	40D10	\$145
2W	10W	10D02	\$125

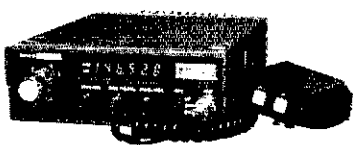
Lower power and FCC type accepted models also available



TEMPO FMT-2 & FMT-42 (UHF)

An exciting approach to mobile communication

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



TEMPO VHF/ONE PLUS

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

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

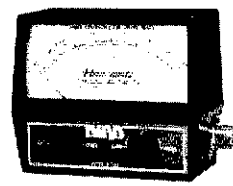
Sold at Tempo dealers throughout the U.S. and abroad. Please call or write for further information.

Prices subject to change without notice

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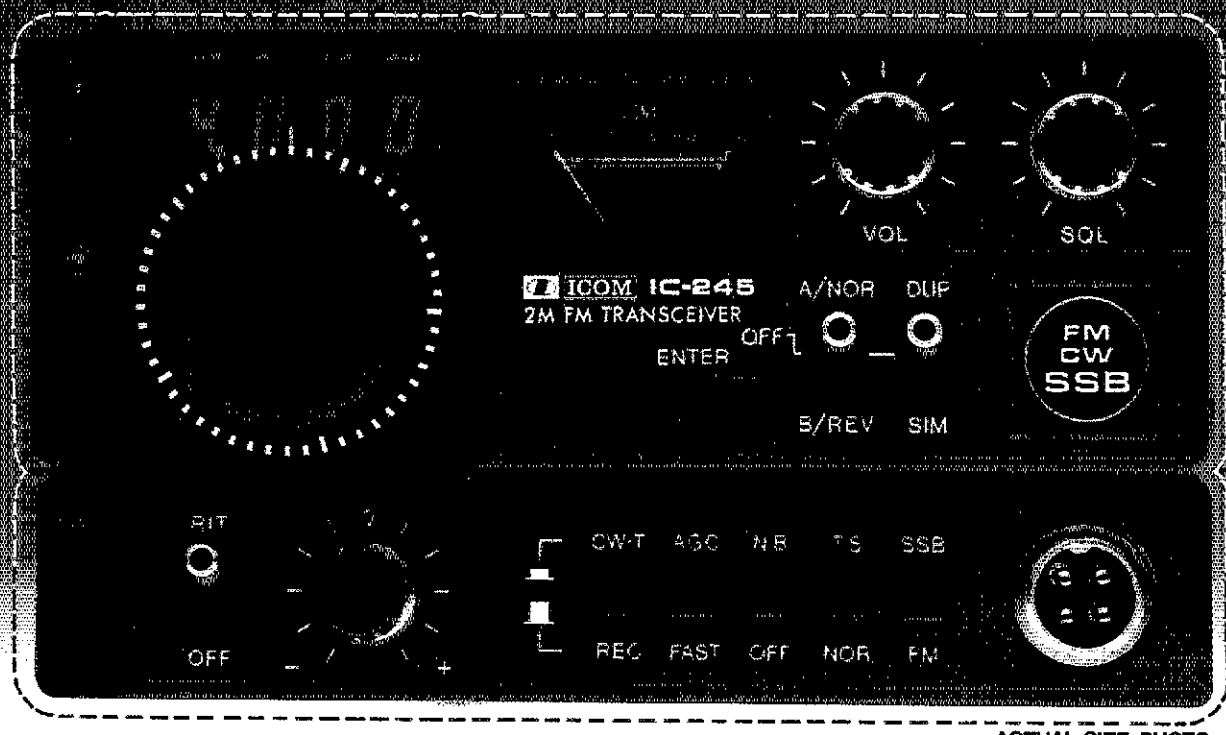
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 714/772-9200
 816/679-3127



BIRD Model 4362 Thruline Wattmeter

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

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



ACTUAL SIZE PHOTO

Try on MultiMode Mobile

Multi-mode mobile is the newest trend in VHF. The next time you are lamenting the limitations of your present mobile rig, just imagine how it would size up against the **IC-245/SSB Mobile Maximizer**. In addition to the complete FM capability through repeaters and the SSB capabilities from a home station, the **IC-245/SSB** offers superb SSB mobile performance to squeeze the most out of simplex mobile contacts. Mobil CW? No problem with the **IC-245/SSB**: just push the button and hit the key, and you're on the best mode for longhaul mobile DX. Some of the features which make all of this possible are:

- **Single knob frequency selection:** The **IC-245/SSB** is synthesized with convenient single knob frequency selection over the entire 4 MHz. No more fussing with two or more knobs just to check what is going on around the band. One easy spin of the dial does it all.
- **Two VFO's built in:** The second VFO, which is an optional tack-on with most other transceivers, is an integral feature in every **IC-245/SSB**.
- **Variable offset:** Any offset from 10 KHz through 4 MHz, in multiples of 10 KHz, can be programmed with the LSI synthesizer.
- **Remote programming:** The LSI chip provides for input of a Touch Tone[®] like programming pad from an external source, such as the microprocessor controlled accessory which will also provide scan and other functions (available summer '78). Computer control from a PIA interface is also possible (data available on request).
- **FM stability on SSB and CW:** Synthesis of 100 Hz steps makes SSB as stable as FM. This extended range of operation is attracting many FM'ers who have been operating on the direct channels and have now discovered SSB.

So for your next mobile radio, go all out after all of it and get the maximum in multi-mode mobile with the **IC-245/SSB**. **P.S.** A microprocessor controller with memory, frequency setting and Touch Tone[®] dialing will be available soon.

Maximize the new repeater band: both the **IC-211** and the **IC-245/SSB** operate the new FCC repeater spectrum with no modification.

All ICOM radios significantly exceed FCC specifications limiting spurious emissions.

Specifications: Frequency Coverage: 144.00 to 148.00 MHz; Modes: FM (F3), SSB (A3J), CW (A1); Supply Voltage: DC 13.8V ± 15%; Size: 90mm (h) x 155mm (w) x 235mm (d); Weight: 6.8 Kg; TX Output: F3, 10W; A3J, 10W (PLP); A1, 10W; Spurious Radiation: -60 dB below Carrier; Microphone Impedance: 600 Ohms; Sensitivity: A3J & A1, 0.5 microvolt input gives 10 dB S-N/N; F3, 0.6 microvolt or less for 20 dB quieting S-N; D/N, at 1 microvolt input, 30 dB; Spurious Response: -60 dB or better; Synthesizer Frequency Range: 144.00 MHz to 148.00 MHz; Synthesizer Step Size: 5 KHz for FM, 100 Hz or 5KHz for SSB

Specifications are subject to change without notice.

HF/VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

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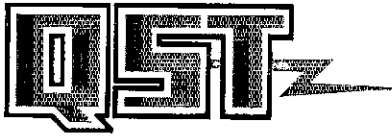


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THE COVER

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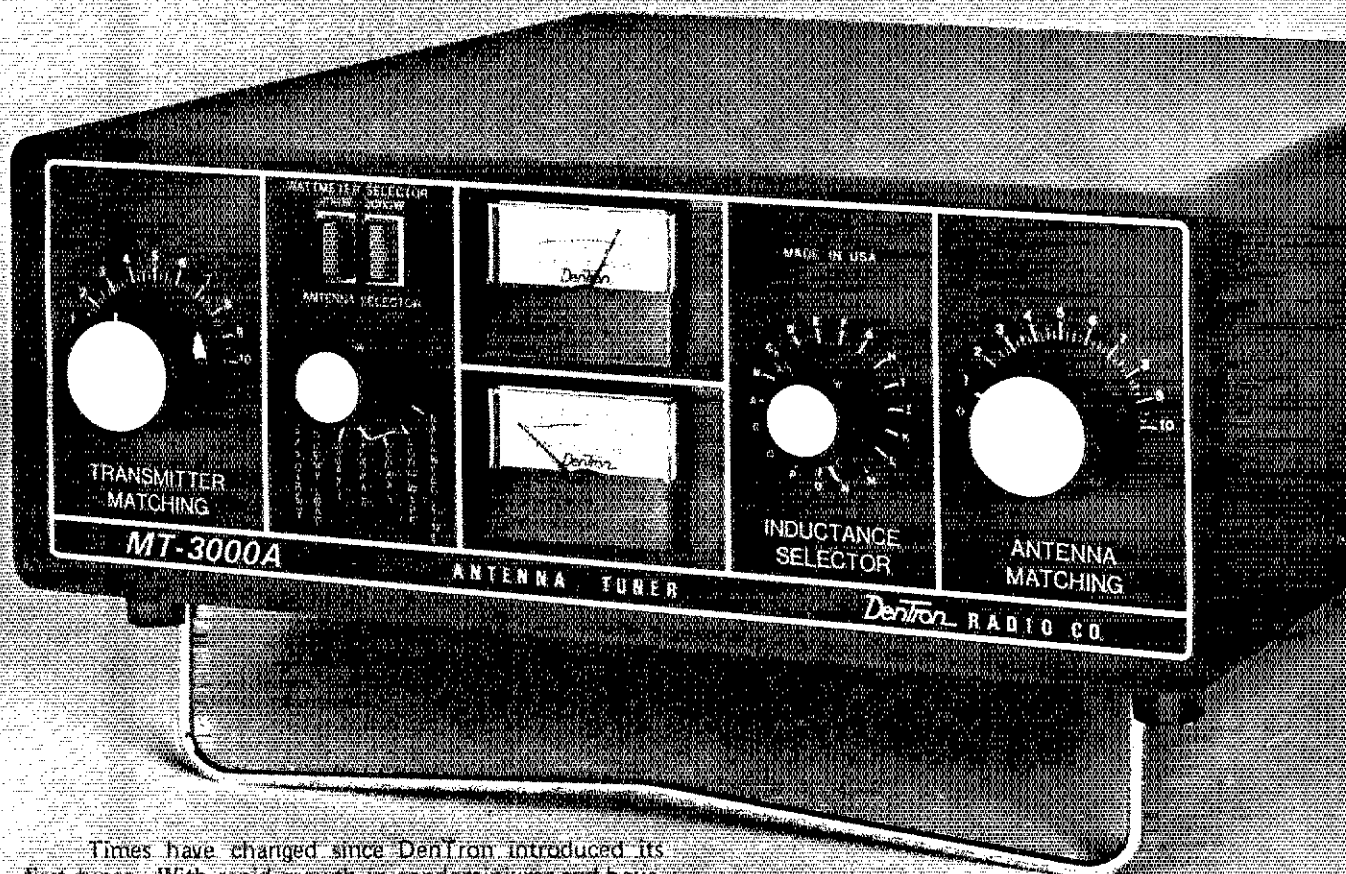
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Look closely at the new MT-3000A. You've never seen anything like it.



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

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

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

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

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

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

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

The compact size alone of the MT-3000A (5½" x 14" x 14") makes it revolutionary. Combine that with its four built-in accessories and we're sure you'll agree that the MT-3000A is one of the most innovative and exciting instruments offered for amateur use.

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

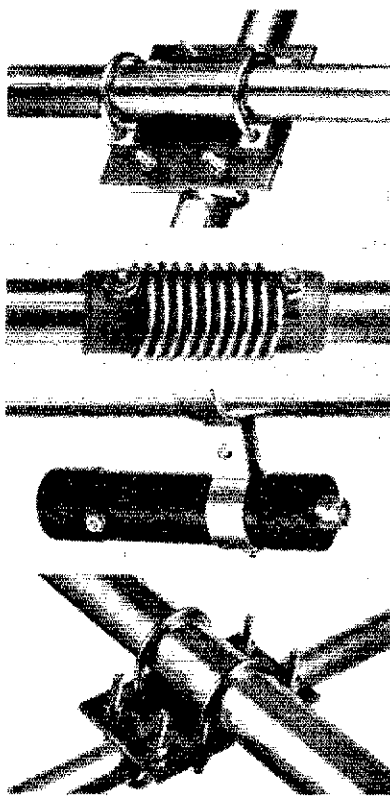
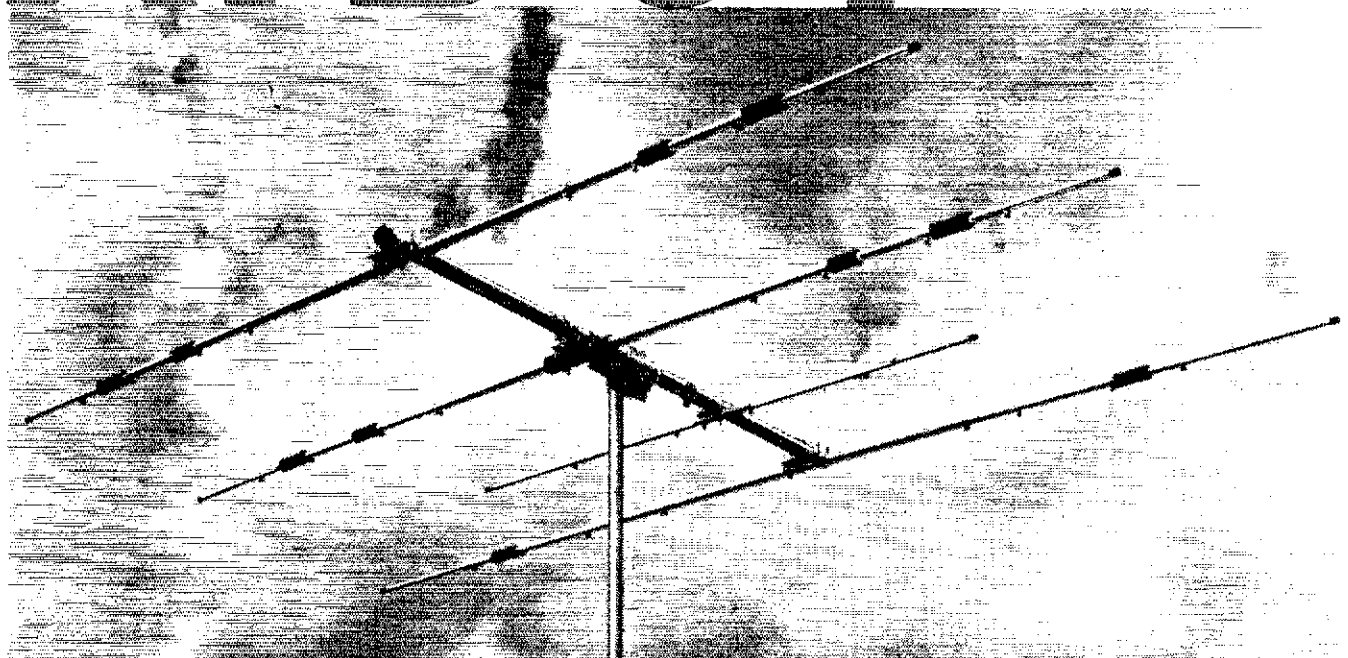
As unique as this tuner is, there are many things it shares with all DenTron products. It is built with the same meticulous attention to detail and American craftsmanship that is synonymous with DenTron.

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

DenTron
Radio Co., Inc.

2100 Enterprise Parkway
Twinsburg, Ohio 44087
(216)425-3173

ATB-34



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

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!

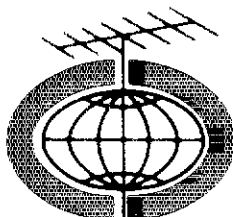
SPECIFICATIONS

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"		
TURNING RADIUS -	18'9"		

UPS SHIPPABLE

**COMPLETE
NO EXTRAS TO BUY**

IN STOCK WITH DISTRIBUTORS WORLDWIDE



cushcraft

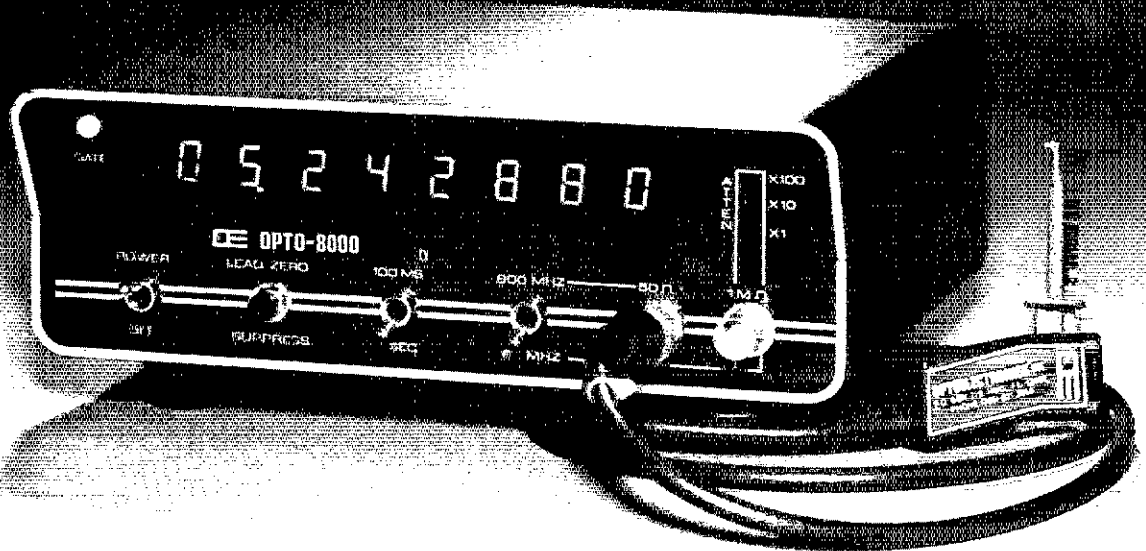
CORPORATION

BOX 4680, MANCHESTER, N.H. 03108

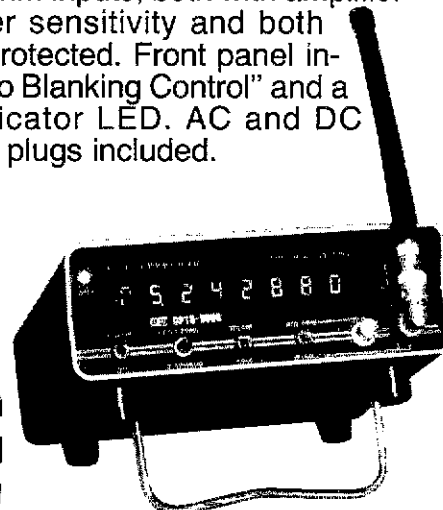
600 MHZ. FREQUENCY COUNTER

±0.1 PPM TCXO

OPTO-8000.1



This new instrument has taken a giant step in front of the multitude of counters now available. The Opto-8000.1 boasts a combination of features and specifications not found in units costing several times its price. Accuracy of ± 0.1 PPM or better — *Guaranteed* — with a factory-adjusted, sealed TCXO (Temperature Compensated Xtal Oscillator). **Even kits require no adjustment for guaranteed accuracy!** Built-in, selectable-step attenuator, rugged and attractive, black anodized aluminum case (.090" thick aluminum) with tilt bail. 50 Ohm and 1 Megohm inputs, both with amplifier circuits for super sensitivity and both diode/overload protected. Front panel includes "Lead Zero Blanking Control" and a gate period indicator LED. AC and DC power cords with plugs included.



SPECIFICATIONS:

Time Base—TCXO ± 0.1 PPM GUARANTEED!
 Frequency Range—10 Hz to 600 MHz
 Resolution—1 Hz to 60 MHz; 10 Hz to 600 MHz
 Decimal Point—Automatic
 All IC's socketed (kits and factory-wired)
 Display—8 digit LED
 Gate Times—1 second and 1/10 second
 Selectable Input Attenuation—X1, X10, X100
 Input Connectors Type —BNC
 Approximate Size—3" h x 7 1/2" w x 6 1/2" d
 Approximate Weight—2 1/2 pounds
 Cabinet—black anodized aluminum (.090" thickness)
 Input Power—9-15 VDC, 115 VAC 50/60 Hz
 or internal batteries
 OPTO-8000.1 Factory Wired **\$299.95**
 OPTO-8000.1K Kit **\$249.95**

ACCESSORIES:

Battery-Pack Option—Internal Ni-Cad Batteries and charging unit **\$19.95**
 Probes: P-100—DC Probe, may also be used with scope **\$13.95**
 P-101—LO-Pass Probe, very useful at audio frequencies **\$16.95**
 P-102—High Impedance Probe, ideal general purpose usage **\$16.95**
 VHF RF Pick-Up Antenna-Rubber Duck w/BNC #Duck-4H **\$12.50**
 Right Angle BNC adapter #RA-BNC **\$ 2.95**

FC-50 — Opto-8000 Conversion Kits:

Owners of FC-50 counters with #PSL-650 Prescaler can use this kit to convert their units to the Opto-8000 style case, including most of the features.

FC-50 — Opto-8000	Kit \$59.95
*FC-50 — Opto-8000F	Factory Update \$99.95
FC-50 — Opto-8000.1 (w/TCXO)	Kit \$109.95
*FC-50 — Opto-8000.1F	Factory Update \$149.95

*Units returned for factory update must be completely assembled and operational



OPTOELECTRONICS, INC.

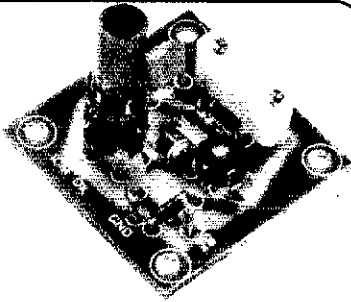
5821 NE 14 Avenue
 Ft. Lauderdale, FL 33334
 Phones: (305) 771-2050 771-2051
 Phone orders accepted 6 days, until 7 p.m.



TERMS: Orders to U.S. and Canada, add 5% to maximum of \$10.00 per order for shipping, handling and insurance. To all other countries, add 10% of total order. Florida residents add 4% state tax. C.O.D. fee: \$1.00. Personal checks must clear before merchandise is shipped.

for the experimenter!

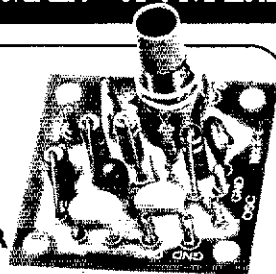
INTERNATIONAL CRYSTALS & KITS
 OSCILLATORS • RF MIXER • RF AMPLIFIER • POWER AMPLIFIER



OX OSCILLATOR

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

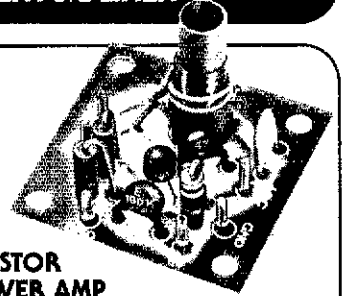
\$4.95 ea.



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.

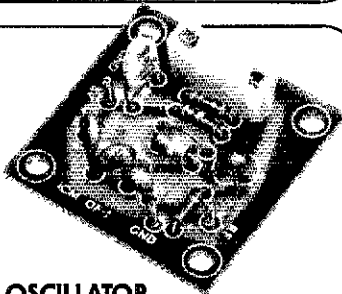
\$5.50 ea.



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.

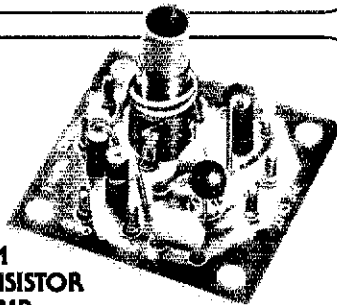
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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

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

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In 1970, two back-to-back *QST* editorials lamented the state of the Post Office. When these were written we had hoped that mail service would soon improve with the advent of a more efficient system. Since then, a corporation has been formed, presumably taking the mail out of political hands. Billions of dollars have been spent on equipment and pay raises for Postal Service employees. Have we made progress since 1970?

Not very much, it seems. Large numbers of our members in Texas received their February 1978 *QST*, which was mailed to them from our printer in Kentucky on January 20, after March 1. Handling of the August 1977 issue was even worse, with more than 8,000 copies hung up in the Postal Service for nearly four weeks.

When this happens, our members often blame us. There is no more visible "mistake" we at Headquarters can make than a member failing to receive *QST*. When a member writes or calls about nondelivery of *QST*, we check the carbon copy of the mailing labels for that particular issue and 99 times out of 100, the address will be there. Unless you've had a change of address, or are a late renewal, you will be on the main mailing list. If your address doesn't appear, we will probably find it on a weekly supplemental mailing for late renewals and changes of address. If we can't find it there, we determine what we did wrong.

Use of a computer has allowed us to handle a 65 percent increase in membership over the past eight years with a net reduction in Circulation Department staff of one person. This means we are cranking the data into the computer at a fantastic rate. We do make errors, but we have to keep them under control. If we have an error rate of just 1 percent, we would have 1 million "typos" on our membership records, which contain 100 million characters of data!

Once in a while our printer will put the wrong tag on a bag of *QST*s and the copies end up in Des Moines instead of Des Plaines. The worst case occurred when copies going to Austria arrived there via Australia. When errors like this occur the Postal Service sends us an "Irregularity Report." We go back to our printer, and he disciplines the employees who made the error. If things got bad enough, we could even fire our printer. But how can we fire a virtual monopoly like the Postal Service? (Some large publishers such as Reader's Digest are experimenting with alternative forms of delivery in met-

ropolitan areas. The number of copies involved is just a fraction of their total circulation, however.)

The buck stops where? When we receive a large volume of complaints, all we can do is to file our own with our Postal Service customer representative. In the case of the August 1977 issue, the buck stopped at the Cincinnati Bulk Mail Center where *QST* is first dispatched from our printer. But all they could tell us was "*QST* arrived on time and was quickly dispatched." We heard unofficially from our printer (who happens to be the nation's largest) that five bulk mail centers along the East Coast were backlogged with mail at that time.

We have a file of letters from the Postmaster General on down concerning what happened to one issue. The buck was passed down the line to a low-level employee who plainly stated that there was no way to account for the delay for that particular issue because the Postal Service cannot trace second-class mail.

A typical complaint we receive is "My friend down the street has already received his copy, where's mine?" Retiring Circulation Manager Joe Moskey, W1JMY, received his February 1978 issue at home on February 14. W1AW Chief Operator Chuck Bender, W1WPR, received his copy from the same West Hartford Post Office on February 3rd! Marion Bayrer who handles most of the *QST* nondelivery complaints received her copy on February 16.

It seems that if *QST* isn't hung up at a BMC, the local carrier often delays delivery. One member told us that his carrier was seen driving around town in his personal car with a trunk full of undelivered "junk" mail. Here in Connecticut, the Newington Fire Department found the attic of a carrier's house full of undelivered mail when they answered an alarm a while back. All we could give was sympathy and a replacement copy of *QST* to the member whose copy had been delivered with soup stains all over it. *QST* must make good reading at the Post Office during lunchtime!

The 1970 editorials brought to light one important point, and it's worth repeating: There will be little real improvement in mail delivery until the public demands the mail service to which it is entitled. How can you see that this happens? There is a congressional election this fall. Ask *your* candidates where they stand on the issue of improved mail service. — W1GNC

League Lines...

In this issue you will find information about the FCC's 8th Notice of Inquiry in Docket 20271, relating to preparations for WARC-79. This notice was released by the Commission somewhat after our normal deadline, and only some fancy footwork on the part of our editorial and production people made its inclusion in this issue possible. But because WARC-79 will have a significant effect on the future of the amateur radio service, we thought you ought to have the information as rapidly as possible. In the process of juggling things around to make room for the WARC story, we had to delete other material which had already been made ready for use. One victim of the last-minute shuffle was "YL News and Views." That column will reappear next month -- we hope that you will forgive its absence this month. Likewise, "FM Repeater News" will reappear in July QST.

The American Society of Association Executives (ASAE) has awarded its 1978 Management Achievement Grand Award to ARRL for its training program developed by the Club and Training Department. ASAE described the training program as "a fine example of the best in association management techniques." A short paper describing ARRL's training program will appear in a journal of ASAE.

OSCAR 8 is now transmitting educational bulletins! Listen around 29.490 MHz during the first two morning passes (North American school hours) on Monday, Tuesday, Thursday and Friday. Send OSCAR 8 telemetry reports to ARRL hq and receive a special QSL. Report forms available for an s.a.s.e.

This month's editorial laments the spotty postal service QST receives. How do the commercial ham magazines "solve" the problem? They mail earlier, which means earlier deadlines and less-timely news. Examples: April QST carried the announcement of the successful March 5 launch of OSCAR 8 and May QST had details on the FCC's new callsign program. This month we have the latest FCC WARC proposals, which were not available until the first week of May. You're unlikely to find this information in the June issue of any of the commercial publications. See page 9.

Wanted: film cleaning and repair. We have about 100 films needing routine maintenance. Can you help with free or very low cost cleaning? Please contact Club and Training Dept., ARRL hq.

Highlights of the 1978 ARRL National Convention in San Diego appear on page 51. See August QST for additional information.

Know any hams who work in the media? ARRL Public Information Office maintains a current file (strictly confidential) for use in getting amateur radio publicity. We need contacts in AZ, CO, DE, ID, NE, NV, NH, SD, VT, WA and WY. Write ARRL Public Information Office with any information.

We have received word that DOC is changing the callsigns of amateurs in the Yukon from VE8 to VY1 permanently. Amateurs in the Northwest Territories will retain their VE8 calls.

The U.S. Air Force has announced that it will initiate a series of ionospheric modification tests this summer. These tests, similar to those documented in "Communicating at VHF Via Artificial Radio Aurora," Nov. 1974 QST, will be conducted by the Institute for Telecommunications Sciences using the ionospheric heater at Platteville, CO on behalf of the Air Force's Rome Air Development Center. The tests are tentatively scheduled to occur during three successive two-week periods starting approximately June 15, July 15, and August 15, 1978. Amateurs throughout the southwestern part of the United States, from Mississippi to California, and Mexico may experience unusual propagation conditions on all bands up to the 70 cm band. If more detailed scheduling information can be determined in advance, W1AW will carry announcements on regular Official Bulletin schedules. Don't forget to report any unusual propagation conditions to hq.

The U.S. Supreme Court has declined to review the Schroeder case. This is a partial victory and a partial loss for amateurs (page 56, QST April 1978). Details in next month's "Happenings."

How Safe Is Your Ham Shack?

Part 1: We'd all like to be safe, but often don't know how to prepare for apparent — or subtle — hazards. This series will explore the dangers to hams from radiation, chemicals and electricity, and how you can deal with them. Subject of this first part — nonionizing radiation.

By Nickolaus Leggett,* N3NL

Strong rf fields, which many amateurs encounter almost daily, can be harmful. How harmful? That has not been fully resolved, and recent media coverage of the subject has served only to alarm the public, often needlessly. A member of the IEEE's Committee on Man and Radiation (COMAR), Dr. John M. Osepchuk, recently told the U.S. Senate Committee on Commerce, Science and Transporta-

tion that the mass media have often exhibited serious misinformation and embellishments of the truth that tend to highly exaggerate the degree and nature of the hazard. The two articles that follow discuss the nature and extent of the hazards — to amateurs as well as their neighbors — of nonionizing radiation. They agree that commonsense precautions can virtually eliminate its effects.

greatest potential hazards — lie in the wide spectrum between these limits.

Cause of Biological Damage

The mechanism by which strong radio waves can cause biological damage is dielectric heating. In this process, the molecules of the body are agitated by the rapidly changing electric field of the radio wave. This agitation causes the body to heat up. This is the physical principle that is used in microwave ovens, most of which operate on a frequency of 2450 MHz. For this heating to be noticeable, the radio waves have to be quite strong:

The biological research community agrees that dielectric heating damage of the body can occur at power densities well above 10 milliwatts for each exposed square centimeter of surface area (10 mW/cm²). However, there is a great controversy about possible biological effects of weaker power densities. The Soviet Union and the Eastern European Nations

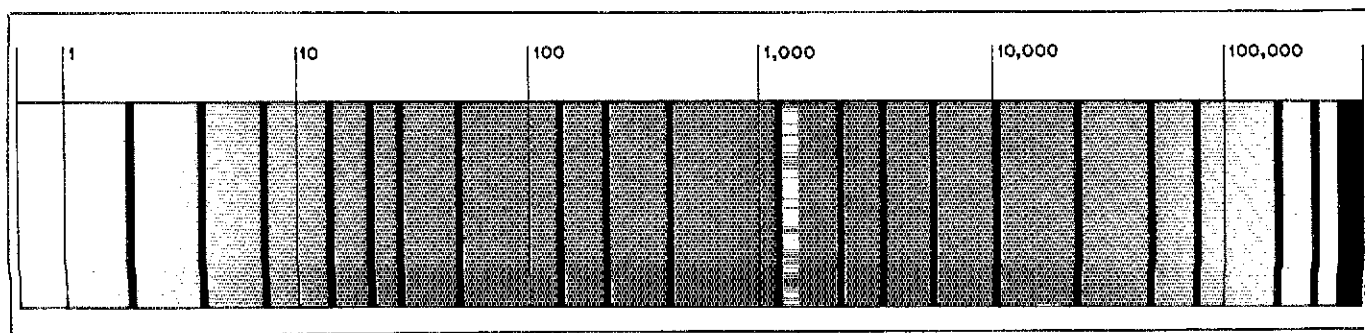
How safe is your amateur station? No, I am not talking about how well-grounded your station is. The question here is concerned with your exposure to radio waves. Throughout the history of radio communication, most sources of radio waves were thought to be harmless (unless you foolishly touched the anten-

na). This view has been changing with growing concern about the health impact of radio waves, or nonionizing radiation.

The spectrum of nonionizing radiation is essentially bounded on one side by 60 Hz, the frequency of household electricity, and on the other side by optical frequencies corresponding to infrared and visible light. The chart on this page shows where the amateur bands — as well as the

*International Research and Technology Corp., 7655 Old Springhouse Rd., McLean, VA 22101

Electromagnetic spectrum, with the amateur bands designated by vertical bars. The frequency range of maximum deep heating is colored red and decreases in intensity as you go higher or lower. The actual frequency range of absorption of electromagnetic energy will also vary with body size and shape — the smaller the body, the higher the frequency. The scale is semi-logarithmic and calibrated in MHz.



report physiological and psychological effects at much weaker power densities which have not yet been widely accepted by western researchers.¹ This disagreement on the biological impact of non-ionizing radiation is reflected in the different national standards for radio wave exposure. For example, the Soviets have a standard of 0.01 mW/cm² for people who work with radio; the U.S. occupational standard² is 10 mW/cm².

Radio Waves in the Environment

As a result of the increasing interest in the ecological impact of radio waves, the FCC, the Bureau of Radiological Health (HEW), and the Environmental Protection Agency have made surveys of radio wave exposure. EPA has made surveys in seven cities using a mobile receiving system that sums up signal strengths over many frequency bands within the radio spectrum.³ This system thus allows them to compute the total exposure of citizens to radio signals of many frequencies.

The total strength of the signals reaching the population as a whole is very weak. Indeed, the EPA reports⁴ that for 99 percent of the urban population the total exposure is less than 0.001 mW/cm². That is, the exposure is less than one-millionth of a watt for each square centimeter of area. This is low compared to the current U.S. occupational standard of one one-hundredth of a watt for each square centimeter of area (10 mW/cm²).

Broadcast stations (fm and TV) were found to be the most significant sources. The nearest stations contribute almost all of the ambient exposure. This is to be expected in view of the rapid weakening of radio signals with distance. Radar stations were found to be very weak sources of ambient radio frequency energy.⁵ This was somewhat surprising in view of the high peak power of a radar transmitter. Two factors weaken the strength of the radar signals. Most of the time the radar set is not transmitting at all but rather, it is looking for radio echoes. When it is transmitting it is powerful but the long periods of silence reduce the *average* power to a low level.

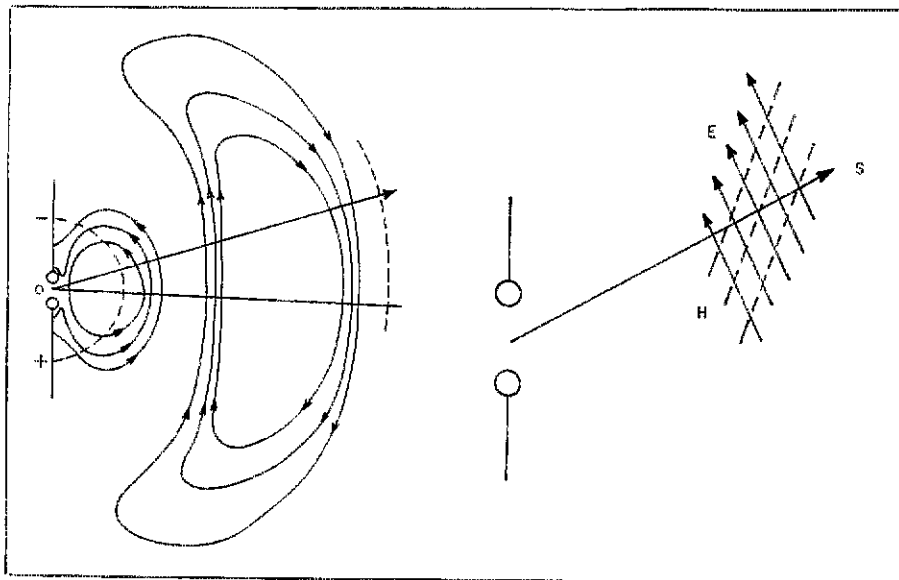
Exposures Close to the Antenna

The above findings do not mean that all exposures to radio waves are harmless. The situation of very low signal strengths does not necessarily hold for locations that are very close to a source of radio waves. If you are very close to an operating broadcast antenna, you can receive an exposure that greatly exceeds the U.S. occupational limit⁶ of 10 mW/cm². To become overexposed in this manner, generally one has to be employed in the servicing of such radio equipment.

Amateur Power Density

Obviously, an amateur radio station has

¹Footnotes appear on page 13.



The near-field (left) and far-field patterns around a vertical dipole are illustrated with an ac voltage applied to its terminals. Near-field power density is difficult to measure due to the disorganized field caused by components moving transversely as well as in the direction of the wave front. In the far field, power density is more easily measured since only the transverse component of either the magnetic (h) or electric field (e) is significant.

a strong field in the immediate proximity of its antenna too. But the extent of the strong field is less because of the much lower output power in the amateur service. In order to examine the strength of this field, it is necessary to distinguish between the *near field* and the *far field* of an antenna.

As shown in the illustration, the near field is the field close to the antenna. The approximate extent of the near field for large antennas can be found by using the simple formula:⁷

$$\text{Distance in meters} = \frac{2 D^2}{\lambda}$$

where

D = maximum dimension of antenna in meters

λ = wavelength in meters

Using this equation for a half-wave dipole on the popular 2-meter band yields a near field radius of about one meter.

Beyond this one-meter distance is the far field of your antenna. In the far field of your antenna, the familiar inverse square law operates and the strength of the radio waves is easy to calculate. The following equation allows you to compute the power density in the far field.⁸

$$X = \frac{P \cdot G}{4\pi R^2}$$

X = power density in mW/cm² along the main beam

G = gain of the antenna expressed as a power ratio (i.e., a gain of 5 dB equals a power ratio of 3.162)

P = output power of your transmitter in milliwatts (1000 mW = 1 W)

R = distance from the antenna in centimeters (100 cm = 1 M)

Calculations of approximate far-field power densities for amateur installations are shown in Table 1. The power density is quite low in many amateur stations, but there can be situations where the power density is too high.

The situations where high power densities are involved would usually involve very high gain antennas with quite high transmitter output powers. Thus, operators doing high power work should review the cited references and compute their power density. If the power density reaching occupied areas is higher than about 0.5 mW/cm², the amateur should consider rearranging the system to lower the exposure. The value of 0.5 mW/cm² is chosen to match the probable, future U.S. standard for exposure of the general population to a continuously operating source.

Unfortunately, it is not easy to calculate the near field about an antenna. The near field is complex because of the interference patterns created by signals arriving from different parts of the antenna with differing phase relationships. This complexity is a great limitation because most of the biologically significant exposures will be in the near field. A

Table 1
Approximate far-field densities in milliwatts per square centimeter (mW/cm²) at a distance of 10 meters from a uhf antenna

Antenna Gain	Transmitter CW Output Power		
	10 watts	50 watts	500 watts
10 dB	0.00796	0.0398	0.398
15 dB	0.0252	0.126	1.26
18 dB	0.0502	0.251	2.51

cautious approach would be to mount your antenna so that people will not be passing through its near field. This precaution should not greatly inconvenience the uhf operator, who more than likely follows it already by mounting his antenna high and clear to get maximum DX. □

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quency and Microwave Radiation: A Review of Selected Soviet, East European and Western References," *Biological Effects of Electromagnetic Waves*, Vol. 1, U.S. Department of Health, Education and Welfare (Bureau of Radiological Health), Rockville, MD, December 1976.

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RF Heating in the Ham Bands

By A. Peter Ruderman, Ph.D.,* VE1PZ

An amateur license is a license to transmit rf energy. When you key your transmitter you generate electromagnetic and electrostatic fields around your antenna; when you receive you are tapping the far weaker fields that started at the output of someone else's transmitter. We are immersed all the time in the very weak fields of all the transmitters in operation anywhere in the community: those of other hams, commercial stations, CBers, airport control towers, paging systems, microwave ovens and even 60-Hz power transmission lines.

Rf radiation is often referred to as non-ionizing radiation in order to distinguish it from the ionizing radiation that is associated with X-ray equipment and nuclear power plants. There are important differences: Ionizing radiation, for example, can have a cumulative effect. (This is why atomic plant employees and uranium miners have a lifetime total safe dose to worry about.)

Nonionizing radiation can hurt people when it causes a buildup of heat by agitating the molecules in some part of the body. An increase of 2 degrees C in the temperature of the testicles can cause temporary sterility. An increase of 10 degrees C in the temperature of the eye can cause cataracts to form. This damage is permanent. Greater increases in temperature can be fatal by literally cooking your insides.

Normally, the effect of rf exposure is not cumulative unless tissue damage occurs, since whatever heats up can cool down. The damage caused by rf radiation depends on the amount of power, distance of the individual from the power source,

amount of shielding and above all the frequency. The frequency determines how much heat will be generated in the body from a given amount of rf power. It takes only some simple commonsense precautions to protect hams from rf damage in most cases.

A Look at the Ham Bands

From 1.8-30 MHz most of the radiation passes right through you without any aftereffects. Only a small amount is converted to heat. If you consider that a 1 degree C rise in temperature is tolerable (i.e., like the low fever of a mild cold), you might have to spend an hour or more just three feet away from the feed point of an antenna radiating 500 watts of power at 8 MHz to achieve this effect.

At 144 MHz enough energy is absorbed to cause more rapid heating, and a body close to the energy source at moderate power over a prolonged period can suffer harm.

At 420 MHz about half of the rf energy is converted to heat in the body. This is probably a real danger point.

From 1000-3000 MHz the rf energy is almost completely absorbed in the body. Microwave ovens fall in this range.

At 10,000 MHz we are back to half the energy being absorbed. Still higher frequencies tend to be reflected instead of passing through, as at communication frequencies. The wavelength is such that the energy can just hit the nerve endings in the skin and provide nature's warning signal of feeling the heat.

Safety Standards

If you are operating in the 10-meter band with 1 kW of radiated power, and the operating position is 10 meters from the antenna, the power density on the operator would be about 0.8 mW/cm².

This looks safe enough, and in fact the radiation pattern from the vertical, dipole or beam, would be such that a ham 10 meters below the feed point would be receiving less than the theoretical radiation.

Unless there were serious leaks, poor shielding, lots of rf in the shack from radiating feed lines, unbypassed leads, etc., there does not seem to be much of a problem.

2 Meters and Up

At 144 MHz and higher, the picture is quite different. First of all, more of the rf energy is converted to heat in the body. Second, although power is generally lower, a mobile antenna on the car roof is very close to the operator. And a handie-talkie with a built-in microphone brings the operator within a couple of inches of the antenna.

If a mobile operator were transmitting with 10 watts of radiated power, and the antenna was on the left front fender, less than one meter from the driver's seat, you could easily get a power density of 10 mW/cm², which might be hazardous in the case of long uninterrupted transmissions. With a handie-talkie, a built-in microphone, and only one watt of radiated power, the density would be three or four times as great.

The safety precautions should be obvious. Avoid rf in the shack by using shielded or field-canceling feed lines. Use a roof-mounted antenna for mobile work in the vhf range, if possible. Avoid prolonged use of handie-talkies and use power in the milliwatt range whenever possible.

If you are sensible, and understand the frequency related nature of rf fields, you will not be at risk. I operate happily from 1.8-148 MHz myself. □

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Low-Noise GaAs FET UHF Preamplifiers

At last! Low-noise preamps for 432 and 1296 for about \$50.

By Paul Wade,* WA2ZZF and Allen Katz,** K2UYH

Gallium-arsenide field-effect transistors (GaAs FETs) have recently come into use as low-noise microwave amplifiers. Amateur experimentation has shown that they can provide excellent performance on the uhf and lower microwave amateur bands. These devices, described in a recent article,¹ are rather expensive, particularly the ones characterized as C-band and X-band (4-12 GHz) microwave low-noise amplifiers. However, other GaAs FETs, characterized as *power amplifiers* for low and medium-power (up to 1/4 watt) microwave applications will provide almost the same noise figure at uhf and are being made available to amateurs. The power devices also have wide dynamic range, providing less intermodulation distortion and lower susceptibility to burnout. The receiver preamplifiers to be described are relatively simple to construct and have sufficient

tuning range for almost any GaAs FET available.

Construction

These preamps for 432 MHz (Fig. 1) and 1296 MHz (Fig. 2) use power GaAs FETs made by Microwave Semiconductor Corp.; however, devices made by NEC (Nippon Electric Co.) perform at least as well, and many similar devices will also certainly work. Construction details may be seen in the photographs and schematic diagrams. The 432-MHz preamp constructed by K2UYH is built in a 2-1/4 × 1-1/2 × 1-inch (57 × 38 × 25-mm) box made of double-sided printed-circuit board. A cover plate is recommended but does not significantly affect tuning. The GaAs FET source is soldered to the central shield board with the drain lead projecting through a hole. Several other versions have been constructed; in one of these, the wire inductors are replaced by straps placed parallel to the bottom plate, and spaced approximately 1/8 inch (3 mm) above it; a typical strap dimension would be 3 inches (76.2 mm) long by 1/2-inch (13 mm) wide.

The 1296-MHz preamp built by WA2ZZF is constructed in a 2-3/4 × 2-1/8 × 1-5/8-inch (70 × 54 × 41-mm) Minibox (BUD CU-3000A or equivalent). The GaAs FET is bolted between two pieces of 1/16-inch (1.6 mm) printed-circuit board, using 0-80 screws (available at many hobby shops). The lead height is just right to sit on top of the 50-Ω lines printed on these boards. The ground connection for the tuning capacitors is provided by mounting screws and by copper foil soldered around one edge of each board. The groundplane sides of the board are smoothly tinned to reduce copper-to-aluminum corrosion.

Handling Precautions

The MSC GaAs FETs have static-resistant gold gates, and are only susceptible to damage from overvoltage or excess heating. Some other types, particularly those of Japanese manufacture, have aluminum gates which are very sensitive to static burnout, and should be handled in the same manner as unprotected MOS devices. In any case, work quickly when soldering the devices and use a grounded

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¹Wade, "Introduction To GaAs Field Effect Transistors," *ham radio*, January, 1978, p. 74.

Fig. 1 — A 432-MHz GaAs FET preamplifier built by K2UYH. The transistor is mounted to the central shield by soldering the source lead directly to the copper foil. The drain lead of the transistor passes through a hole in the shield.

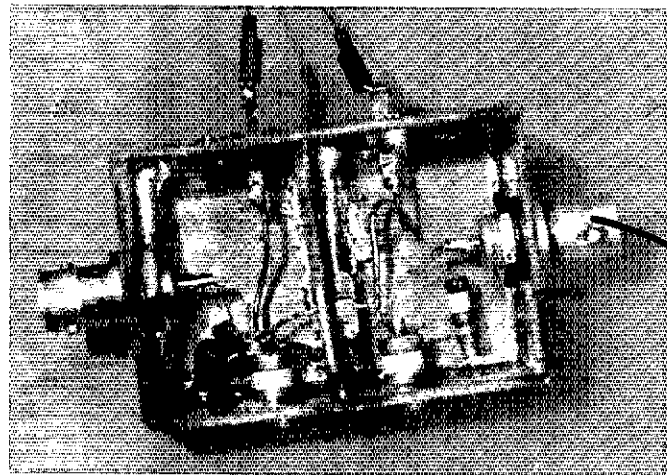
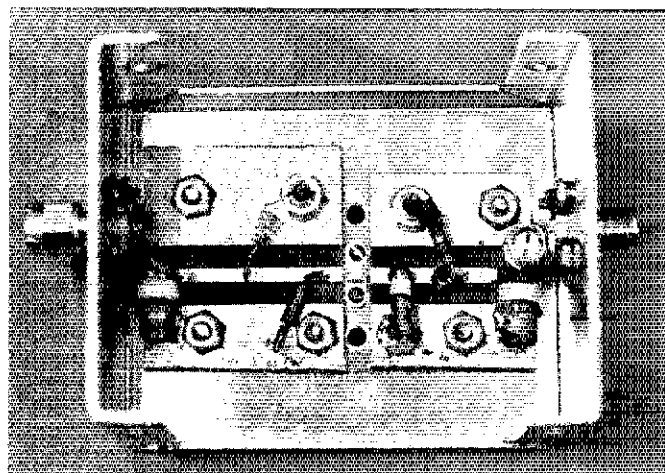


Fig. 2 — A 1296-MHz GaAs FET preamplifier built by WA2ZZF. In this model, the transistor is connected to striplines etched on glass-epoxy board. SMA-type coaxial connectors are shown, although type N or BNC connectors may be used.



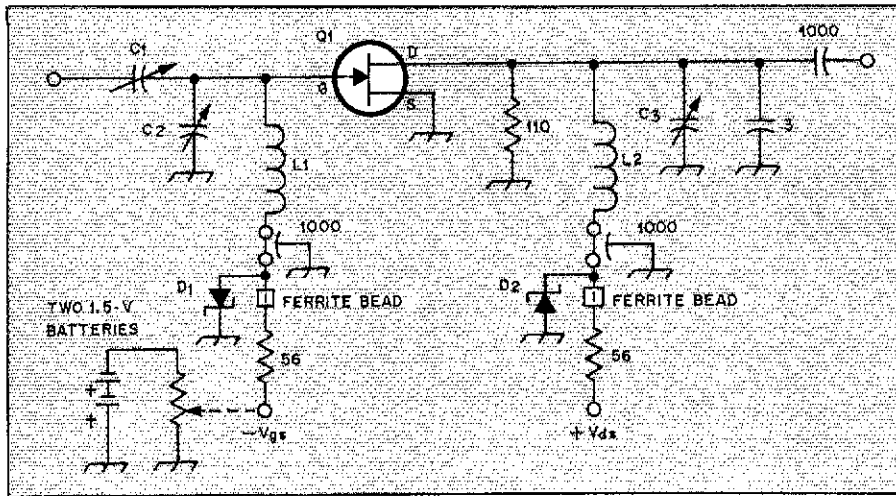


Fig. 3 — Schematic diagram of the 432-MHz preamplifier.

C1 — 0.3- to 3.5-pF piston trimmer (Johanson or JFD).
 C2, C3 — 0.8- to 10-pF piston trimmer (Johanson or JFD).
 D1, D2 — Zener diode, 5.6 volts (4.7 to 6.2

volts usable).
 L1 — 1 turn no. 18 wire (see photo) or strip-line (see text).
 L2 — No. 18 wire, 0.9 inch (23 mm) long.
 Q1 — GaAs FET (see text).

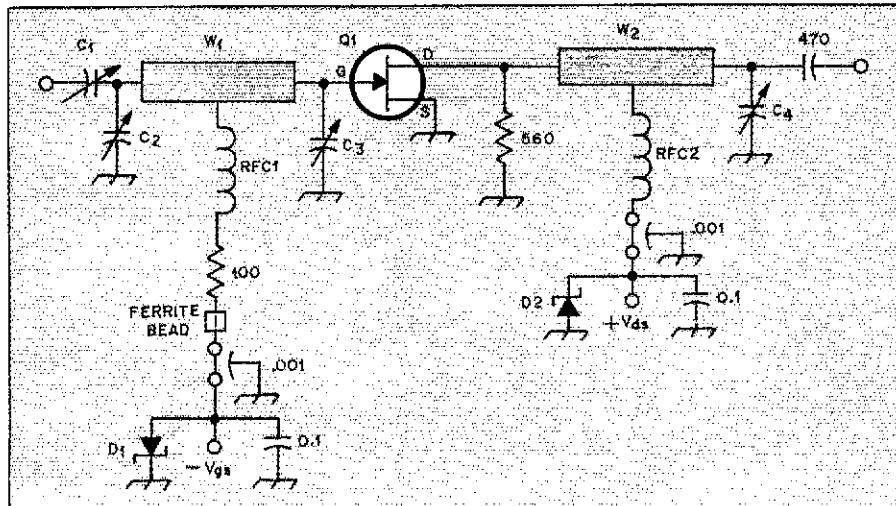


Fig. 4 — Schematic diagram of the 1296-MHz preamplifier.

C1, C2, C4 — 0.8- to 10-pF piston trimmer (Johanson or JFD). Note: C1 may be replaced by a fixed low-inductance capacitor of 10 pF or more.
 C3 — 0.3- to 3.5-pF piston trimmer (Johanson or JFD).
 D1, D2 — Zener diode, 5.6 V (4.7 to 6.2 V usable).
 Q1 — GaAs FET (see text).
 RFC1 — 3 turns, 1/16-in. (1.6 mm) ID, in lead of resistor, spaced wire diameter.

RFC2 — 5 turns no. 32 wire, 1/16-in. (1.6 mm) ID, spaced two wire diameters.
 W1 — 50- Ω microstripline, 0.105 in. (2.7 mm) wide by 0.9 in. (23 mm) long on 1/16-in. (1.6 mm) thick double-sided G-10 printed-circuit board.
 W2 — 50- Ω microstripline, 0.105 in. (2.7 mm) wide by 1.1 in. (28 mm) long on 1/16-in. (1.6 mm) thick double-sided G-10 printed-circuit board.

or cordless soldering iron. After assembly, the Zener diodes shown should protect the device in normal operation. Of course, it should be realized that these devices are physically small and require reasonably careful handling.

Adjustment and Performance

Normal operating voltages are $V_{DS} = 1.5$ to 3 V, $V_{GS} = -0.5$ to -2 V; gate current is negligible and may be supplied from a battery. Peak the tuning capacitors on a strong signal, then trim them and adjust the drain and gate voltages with the aid of a noise-figure meter or weak-signal

source. Minimum noise figure occurs near the tuning for maximum gain. Output tuning should have little effect, but the noise figure is sensitive to the input tuning and gate voltage; varying the drain voltage should give a broad peaking of noise figure. Drain current is controlled by gate voltage. After peaking up the preamp, drain current will probably be between 20 and 100 mA.

It should be emphasized that these devices have extremely high gain at uhf and will readily oscillate unless adequate precautions are taken. Stability is obtained by the use of the resistor connected

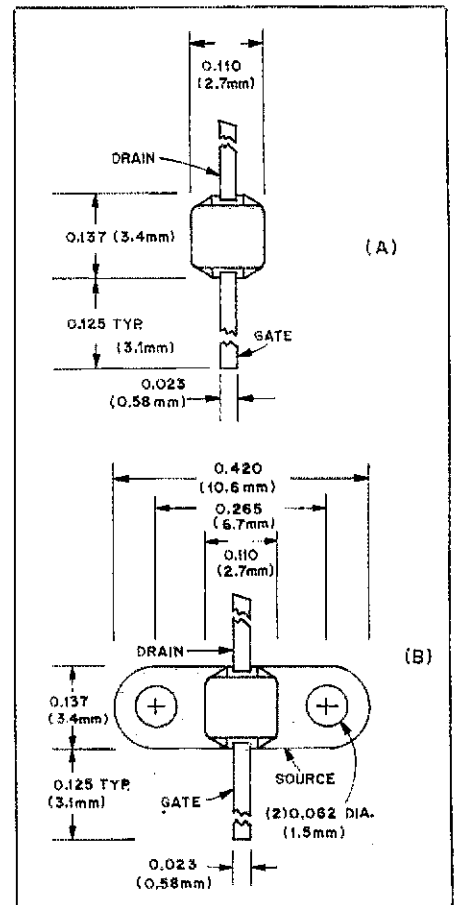


Fig. 5 — Dimensional information for the GaAs FET packages supplied by MSC. At A, case style 98, top view, and at B, top view of case style 97. Drain and source leads are spaced 0.065 inch (1.65 mm) above the bottom of the case. MSC designation for these case styles is Flipac.

directly from the drain to ground, at the expense of some gain reduction. The values shown should provide adequate stability if good bypassing is used; gain will be around 20 dB at 432 MHz and 15 dB at 1296 MHz. Any increase in the value of these stabilizing resistors is at your own risk!

Typical noise figures to be expected with these preamps are on the order of 1 dB at 432 MHz and 3 dB or less at 1296 MHz. The devices are capable of even better performance than this; significant improvements are obtainable at 1296 MHz with attention to good uhf construction techniques and low-loss circuitry. However, the circuits shown are easily reproduced and still provide excellent performance.

[Editor's Note: GaAs FETs selected for amateur use are being made available to amateurs by Microwave Semiconductor Corp. at a special amateur price of \$40. These devices, designated MSC H001, are available only to licensed amateurs in quantity one to 10 units. To order, send 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.]

Build This Novice Four-Band Vertical

Basic Amateur Radio: Putting your first amateur station together can be an expensive proposition. One way to cut costs is to keep the antenna simple. Here's how I shaved the price and provided four-band operation.

By Marian Anderson,* WB1FSB



Is operation with one antenna acceptable if it covers the 80-, 40-, 15- and 10-meter bands? For a new Novice that's a reasonable approach, I decided. My backyard is smaller than that of most urban homes, so full-size dipole or inverted-V antennas were out of the question. I don't own a tower (yet!), so it seemed that a ground-mounted vertical antenna would be worth trying.

After reading the *ARRL Antenna Book*, I decided that a ground-mounted vertical antenna would be easiest to build. Some radial wires could be buried, and the metal fence which encloses the backyard could also be hooked up to enlarge the ground system. I preferred this type of antenna to one installed above ground, because radials of specific lengths for each of the four bands would have been needed for a roof-mounted, groundplane type of vertical. The buried wires for the ground-mounted antenna could be any convenient length, as long as the available space would permit. From what I have read about these antennas, I believe that reasonable performance can be had even if the ground radials aren't numerous and long, although generally the more you have, the better.

With the help of WB1FB I purchased some used aluminum tubing that would telescope together and give me a 25-foot (7.62-meter) antenna. The wall thickness of the tubing is 0.058 inch (1.5 mm). Three 10-foot (3.1-m) sections are used. The largest diameter is 1 inch (25.4 mm). The center telescoping section has a

diameter of 7/8 inch (22.2 mm) and the top piece of tubing has a 3/4-inch (19-mm) diameter. This material, plus hose clamps for holding the sections together, came to \$8. An old ceramic rotary switch, a coaxial connector, a feed-through bushing, and a piece of Air Dux coil stock were acquired at a flea market for an additional \$3. Two medium-size, ceramic standoff insulators were donated by WB1FB. He said they cost him 50 cents each at a swap session. All that remained to collect was a weatherproof box for the loading coil, some 50-ohm coaxial cable and six U bolts. My OM, Bob, found some used 1-1/2-inch steel pipe (38 mm) which is 7 feet (2.13 m) long. It is used as a support for the vertical.

Constructing the Antenna

A lawn-edger tool was used to make slits in the lawn, out from the base of the antenna toward the edges of the backyard. The slits were cut to a depth of 2 inches (51 mm). A total of 10 radials were buried in the slits. Some are only 15 feet (4.57 m) in length, while others are 25 feet (7.62 m) long. The metal yard fence was bonded together as needed, using wire jumpers between the fence sections. A single buried wire joined the fence to the common ground point at the base of the antenna.

My OM drove the steel pipe into the ground to a depth of 4 feet (1.22 m), leaving 3 feet (0.91 m) above ground for attaching the vertical antenna and weatherproof box. Construction details are shown in Fig. 1.

Although a wooden box could have been used to house the loading coil, switch

*Technical Secretary, ARRL

and other hardware, I used an old electrical housing that my OM had in his junk box (Fig. 2). It was drilled and punched on the bottom surface to hold the feed-through bushing, coaxial connector, switch and ground terminal for the radials.

WIFB designed the antenna, but he wasn't sure that an acceptable impedance match could be had on all four bands without a complex matching network. We decided to try his idea, so the installation was completed.

Adjusting the Vertical

I helped my OM install the antenna, then called WIFB for some assistance in

tuning the system. He thought we could tune the vertical for 40 meters and make it work okay as a 3/4-wavelength vertical on 15 meters. For use on 80 meters it would be fairly short (63 feet or 19.20 m is the correct length for 3.7 MHz). With base loading it should offer adequate service out to a few hundred miles on 80 meters. Finally, it would operate as a 3/4-wavelength vertical on 10 meters.

We hooked a homemade SWR indicator in the coaxial line at the base of the vertical. A small amount of transmitter power (5 W) was applied at 3725 kHz and the 80-meter switch lead was touched

DeMaw, "A QRP Man's RF Power Meter," *QST*, June, 1973.

on the turns of the coil until minimum reflected power was indicated (Fig. 3). An SWR of 1:1 was obtained. The wire was then soldered in place on the coil. Next we fed power to the antenna on 7125 kHz and touched the 40-meter switch lead to the coil turns until an SWR of 1:1 was read. While using the same coil tap we fed power to the antenna on 21.1 MHz and checked the SWR. It was approximately 3:1. By moving the coil tap just one turn we were able to get an SWR of 1.5:1 on 15 meters. A recheck on 40 meters followed. The SWR for that band was less than 2:1 — not a bad compromise! The coil was bypassed entirely for operation on 10 meters: An SWR of 2:1 was indicated at 28,100 kHz. The length of the overall antenna for operation on 28,100 kHz should be 25 feet or 7.62 m (3/4-wavelength radiator). However, the switch leads inside the coil housing add to the antenna length. If an SWR of less than 2:1 is desired, break the 10-meter switch lead and insert a 100-pF air variable capacitor. The unwanted reactance can be tuned out by this means and a low SWR will result.

Opening and closing the cover of the metal box had only a minor effect on the SWR. We were ready at last for an on-the-

Fig. 1 — Dimensional drawing of the four-band Novice antenna. The top ends of the two lower tubing sections are slit four times each by means of a hack saw. This permits a tight joint when the hose clamp is compressed. The vertical is attached to one metal plate with U bolts. The large standoff insulators with metal feet connect this plate to a pair of small ones. The latter are attached to the steel support pipe by means of two U bolts. The metal box is also affixed to the steel pipe with two U bolts. The band switch is a single-pole three-position ceramic wafer type. L1 can be a 5-inch (127-mm) length of B & W 3029 Miniductor, 2-1/2 inches (64 mm) in diameter, 6 turns per inch of no. 12 wire. See text for alternative mounting methods.

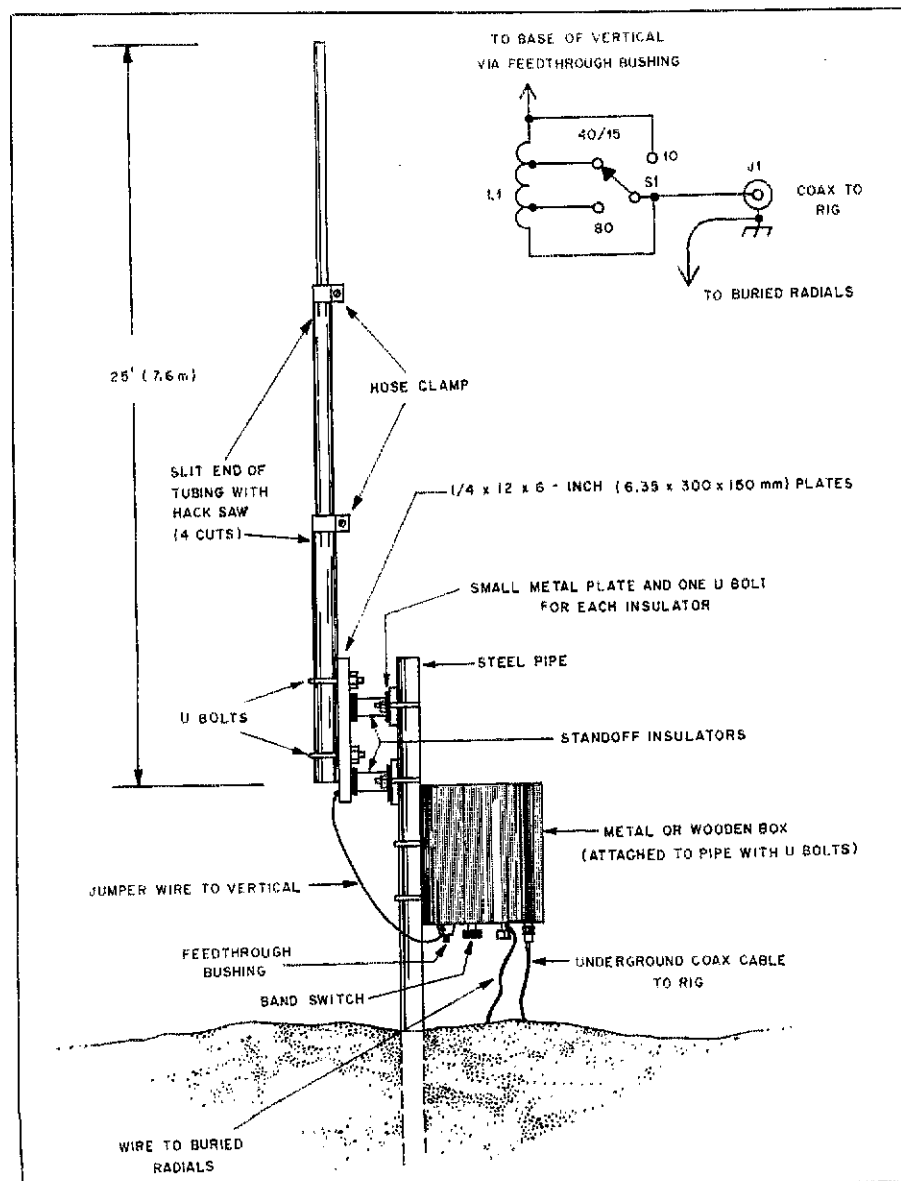
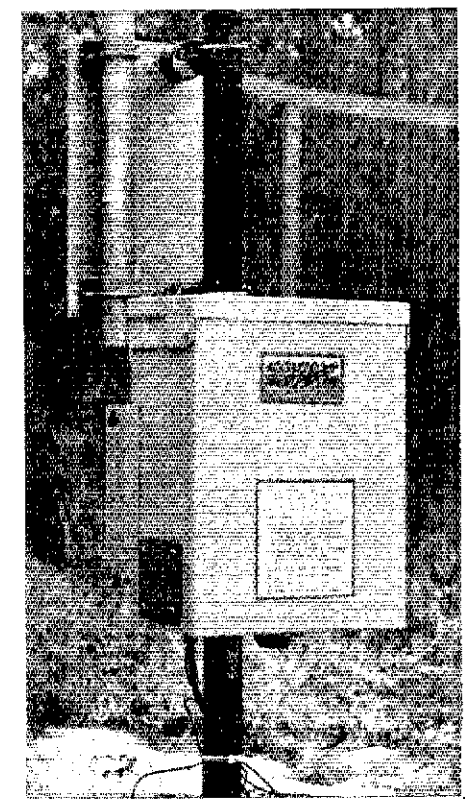


Fig. 2 — Closeup view of the base of the vertical. The aluminum tubing is affixed to a metal plate. The latter is attached to the iron support pipe by means of two surplus standoff insulators. Small aluminum plates are attached to the ends of the insulators to permit them to be fastened to the iron pipe by means of U bolts. The radial wires are connected to the bottom of the coil-housing box.



air test of the system. Fig. 4 shows the interior of the coil and switch housing.

Results

Good signal reports have been received on all bands. The first QSO on 40 meters netted an RST 599 report from North Carolina and many similar reports followed on 80, 15 and 10 meters. I feel that my WAS award is not too far away now that this antenna is in operation.

An Alternative

There are many ways you can duplicate this design using substitute materials. For example, electrical conduit with couplers between the sections should be satisfactory in place of the aluminum tubing. The entire structure could be made from 2 x 4 (50 x 100 mm) lumber. If that is done, the radiator could even be a 25-foot (7.62 m) piece of no. 10 wire, supported on the side of the wood with standoff insulators.

Instead of the mounting method shown in Fig. 1, the vertical pipe could probably be inserted into a 2-foot (0.61-m) length of PVC tubing, then clamped to the mounting plate. This would eliminate the need for the two standoff insulators. Better still, four or five wraps of Teflon sheeting (10 mil or 0.25 mm thickness) could be placed over the bottom end of the vertical before clamping it in place on



Fig. 3 — The author checks the SWR of the antenna during final adjustment of the system.

the mounting plate. Teflon can be purchased at most plastic-supply houses.

I hope this idea is useful to other Novices who are trying to keep the budget within reasonable limits. I like the way my antenna is working. Others should have

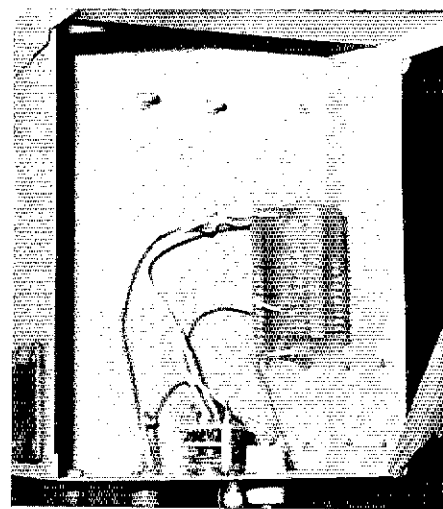


Fig. 4 — Interior view of the coil housing showing the switch, feedthrough bushing, coaxial connector, and ground post for the radials. The coil shown is a piece of Air Dux stock with a tapered pitch. It was obtained at a flea market.

good luck with this antenna also. Oh, by the way, the ground radials are made from various scraps of wire. The size isn't important, and they can be insulated or bare. I have quite an assortment of wire types buried in my lawn!

Basic Antenna Concepts

Advanced antenna theory requires knowledge of some very esoteric mathematics. But the reason even many basic ideas are so hard to understand is that they are so hard to believe!

By Tony Dorbeck,* K1FM

Alf had tried everything and was at his wit's end. His shack looked like a wholesaler's warehouse with baluns, tuners, wire, and even the remains of a gigantic roll of coax scattered about the room. The coax was really annoying to Alf since it represented his latest disappointment.

"Build this small-sized, broadband, sturdy antenna," the article had said. Well, Alf did, and about all you could say

was that it was sturdy, since he used no. 12 Copperweld. While the author of the article collected his royalty, and Heath sold another Cantenna (this was the main element used in the broadbanding scheme), Alf was left with another turkey to clutter his shack. The prime insult came when a ham who lived down the street said he thought his signal strength was about 20 dB under S1!

Alf went back to a commercial antenna model that seemed to work about the best for him. It was an all-band, trap, folded

unipole that was *supposed* to give you 24 dB gain on all frequencies and in all directions except at the low end of 160 where the gain was specified at 23.5 dB. Even Alf was skeptical about the manufacturer's figures, but then the antenna was better than nothing. He was listening to the local roundtable net one night when he realized something he hadn't noticed before: The old Prof's signal was a lot stronger than everybody else's. But come to think about it, that's the way it always seemed.

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Someone else noticed this also, and mentioned it to the Prof. When asked what he attributed this to, the Prof said he thought it was his antenna system . . . which he said was the best he could muster under the circumstances. Needless to say, Alf was all ears. During the course of the roundtable, Alf tried as diplomatically as possible to find out what the Prof was using. "Oh nothing exciting. But why don't you come over and see it sometime."

Alf Pays a Visit

About an hour and a half later, a somewhat amused Prof found Alf knocking at his door. "Would have gotten here sooner, but I couldn't find the house right away." (Alf had driven up and down the street a number of times looking for a big antenna tower. Finally, checking the street number the Prof had given him, Alf found a dwelling that appeared much the same as the rest of those in the little university town.)

Alf was further perplexed when he was ushered into the Prof's shack. "Perhaps he's got a big amplifier somewhere," thought Alf. But there was only an ordinary-looking transceiver. "Maybe it's the tuner he's using." And then he caught sight of the homeliest looking contraption he had ever laid eyes on. Sitting on a shelf by the window was the Prof's "tuner." There were no glittering knobs or fancy components; in fact, it looked like something out of a flea-market vendor's junk box! To Alf's surprise, the Prof said that was exactly where the coils and capacitors came from.

The antenna itself consisted of a wire going out to a tree in the backyard, and a ground stake which the Prof said was for "cosmetic purposes."

"But where's your balun? Where's your radial system? And I don't see a trap anywhere? How do you get that thing to work on *all* bands and keep the SWR below 1:1?" cried Alf.

At the last comment, the Prof seemed to bristle a bit and Alf thought he better start listening instead of expounding his own antenna theories. After all, that was what he came for, to learn something. Before the evening was over, learn he did.

The Prof Explains

"First of all, let's clear up this confusion about SWR," said the Prof. "That's what the tuner, Transmatch, matching network, or whatever you want to call it, is for: to match an unknown antenna impedance to the nominal 50-Ω output of your transmitter. But you could just as easily cut a dipole to a half wavelength and feed it directly with either 50- or 75-Ω line. Most likely, the SWR will be low enough so that no further matching is necessary."

Alf thought about this for awhile and said, "But that's not what I saw in your yard. It looked like a long piece of wire

fed at the end rather than in the middle the way you would feed a dipole"

"Well, that's what I use on 75 and 40 since I don't have room for a center-fed antenna," said the Prof. "But there is almost always room for a dipole on the higher bands. I even used an indoor antenna on 20 when I lived in an apartment. Actually, what I'm using on 75 and 40 is still a dipole anyway."

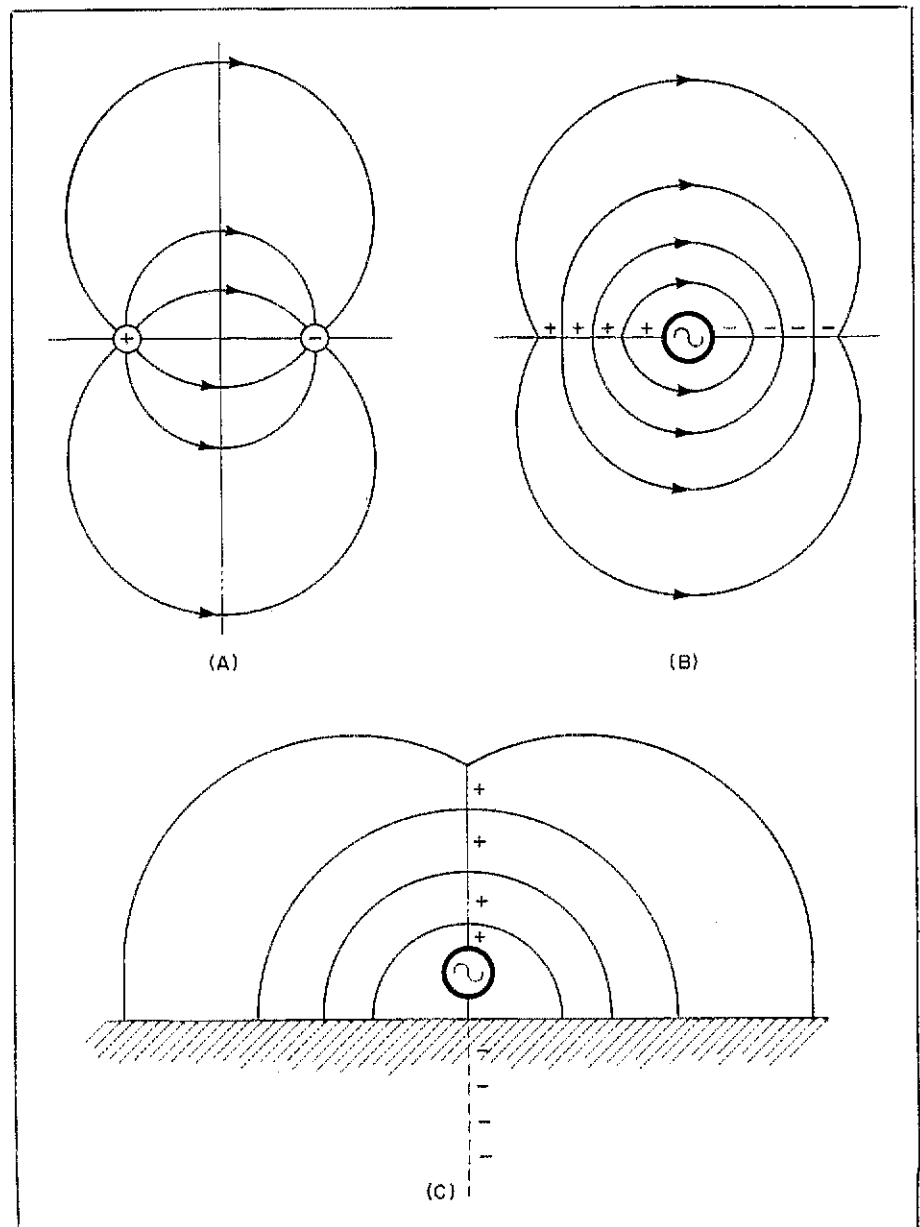
Alf looked really confused and the Prof said, "All right, one question before I continue."

"Well, I thought a dipole was a center-fed wire antenna that was *always* a half-wavelength long. Yours is neither," said Alf. To help him explain, the Prof drew the sketch shown in Fig. 1.

"Actually, the term dipole has more uses than just in antenna theory," he

began. "For instance, if you said 'dipole' to a chemist, he might think you were referring to a form of molecule. But it all concerns a charge configuration as I have drawn. A plus and a minus charge are arranged along a line and the field plot then appears as I have shown (Fig. 1A). This is a dipole. However, if you connected a generator to a pair of wires (Fig. 1B), you would also have approximately the same field plot. Furthermore, connecting one side of the generator to ground (Fig. 1C) still gives you a dipole field above the ground. It was just as though another wire extended below the generator forming an image of the wire above it. While this picture has to be modified somewhat in actual antenna applications, the important thing to keep in mind is that almost all simple wire antennas can be thought of as

Fig. 1 — "Dipole" fields of two point charges (A), a charged wire (B), and a charged wire over a perfectly conducting ground (C).



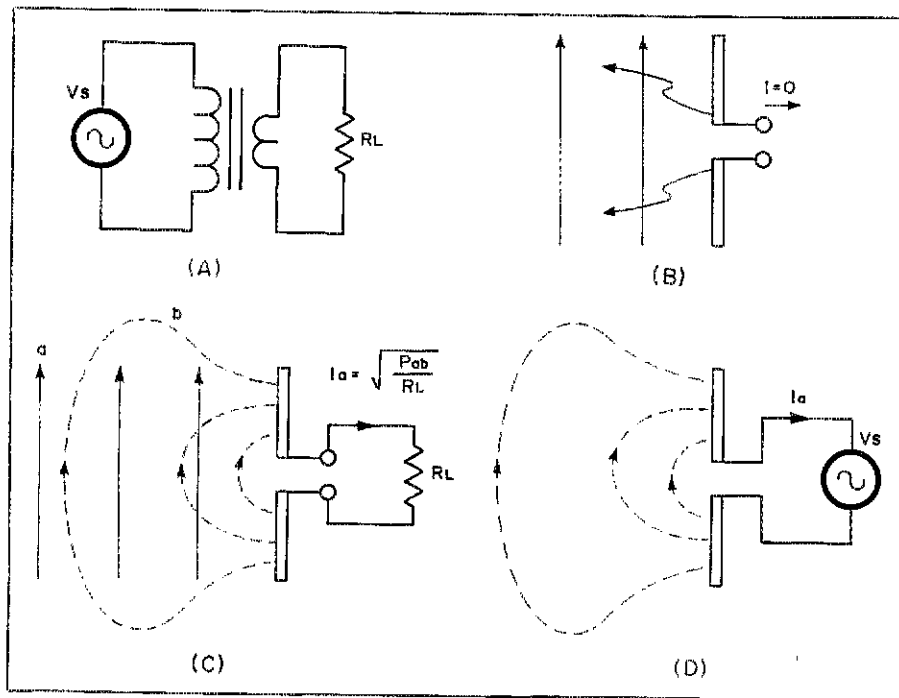


Fig. 2 — A transmitting-receiving antenna combination has many similarities to ordinary coupled circuits (A). An incident plane wave induces a voltage across the antenna terminals (B) but no power is absorbed unless a load is connected (C). However, the field produced by the current in the load is indistinguishable from one caused by an actual source (D).

meant with the aid of more drawings (Fig. 2).

“Suppose we put another antenna in the fields of any of the types we have discussed previously. At a great distance, the curvature of the field lines would become less and less until the wave front appeared as a series of straight lines (Fig. 2B). Assuming for the moment that no load (no receiver) was connected to the antenna terminals, some energy would be reflected from the antenna (solid jagged lines). But no power would be absorbed since the current at the antenna terminals would be zero.

“On the other hand, suppose we connected a load (Fig. 2C) across the antenna terminals. Then a current would flow and power would be absorbed (P_{ab}) by R_L . But since the current that produces this power also flows through the antenna terminals, it must set up a field just as though a power source was connected there instead of a load (Fig. 2D).

“But the problem now is how do we tell whether or not the antenna current, I_a , is caused by a source or by power being absorbed by a load. The two conditions are indistinguishable, which is why I said there is no such thing as a receiving antenna. But I might also add that there is no such thing as a *transmitting* antenna either since, as we see, we can't really tell the difference.

“Of course, this picture is oversimplified and perhaps a third diagram (Fig. 2A) will clear matters a bit. Here we have an ordinary transformer connected between a source and a load. We often talk about the primary and secondary windings, but not the sending and receiving ends of the coil configuration. We realize the source and load could be interchanged, and, provided their values were adjusted properly, the transformer could be used in the reverse direction. Transmitting and receiving antennas spaced some distance apart work in much the same manner, with one important exception. Not all the power emitted from the transmitting antenna is absorbed by the load connected to the receiving antenna. Some of it, as we saw, gets reradiated from the receiving antenna and some of it is propagated in directions other than the one where the receiving antenna is located. Of course, most of *this* energy never gets to the receiving antenna. The latter effect becomes more pronounced as the distance between the two antennas is increased, and is called the inverse-square law. This is because the ratio of power delivered to the receiving-antenna load to the power radiated from the transmitting antenna diminishes proportionately with the inverse of the square of the distance.”

But What About Gain?

A lot of the questions that had always bothered Alf began to be cleared up. Not that the Prof had answered all of them,

some form of dipole as far as their basic operation is concerned.”

The Going Gets Tougher

By this time, Alf was beginning to get a new picture of how antennas work; one that never occurred to him before. For instance, there seemed to be a lot of really significant things happening in the space *surrounding* the antenna. He had always thought of an antenna as just a collection of wires and insulators that had to be big enough to squirt out the rf energy, as water squirts out of a hose. (Well, not quite.) But one thing always bothered Alf. What part of the antenna did the most radiating? Was it the ends? Was it the middle? Someone once told him the ends of the antenna weren't important since the current there was low and you had to have current in order to get radiation. If this was so, why not cut them off and keep making the antenna shorter and shorter. Wouldn't it still work just as well?

When Alf asked the Prof this question, the Prof really dropped a bomb — he said this was true! A one-foot dipole would work almost as well on 80 meters as one that was a half-wavelength long! Alf didn't believe him, so the Prof gave him an example. “Suppose we put 100 watts of power into a half-wavelength dipole. Where does the power go?” Alf said that was easy, it gets radiated. “Well, suppose we make the antenna only half that size. We will need a good matching network in order to tune out the reactance and then match the antenna resistance to 50 Ω .” Alf said that was okay; that was how he

thought his mobile antenna worked. “Well, suppose we keep on making the antenna shorter.”

Alf looked like a man who saw a checkmate coming in a chess game, and tried to change the subject. “By the way, Prof, did you work that new DX station that was on last night?”

“You didn't answer my question. If we made the dipole only a foot long and put 100 watts into it, where would the power go?”

“Well, it also gets radiated, I guess,” said Alf very quietly. A lot of his cherished notions were going down the drain. But Alf thought he'd stump the Prof on the next one. “That's acceptable for a transmitting antenna, but a one-foot dipole sure wouldn't be very good for receiving on 80 meters,” he said.

Then Alf went on to explain his concepts of receiving antennas while the Prof listened. “You know,” he said, “a receiving antenna has to be long enough to catch all the power in a passing radio wave. It's just like a pond in a rainstorm. The bigger the pond, the more rain you'll catch; it's the same with antennas. The bigger the antenna area, the more power the receiving antenna is going to collect.”

“That's fine, but there is *no such thing* as a receiving antenna,” said the Prof.

No Receiving Antennas!

The room suddenly became very quiet. Up till now, Alf had been taking the Prof quite seriously. But now he began to have his doubts. The Prof let him think about it for awhile, before explaining what he

but Alf realized he had been asking the wrong ones! For instance, the actual physical size of an antenna was not as important as how well it excited the fields in the surrounding space — especially those fields responsible for the radiation of energy. In essence, the antenna merely acted as a transition or coupling probe rather than as a source of radiation directly.

Alf also began to suspect there was a great deal more to the subject of antennas than the Prof was letting on. However, he also started to realize that the Prof had a habit of getting his point across by first oversimplifying matters and considering more sophisticated factors later.

The Prof then went on to explain that the one-foot dipole probably wasn't practical on 80 meters since its radiation resistance was so low and the Q would be too high. However, he pointed out that efficient antennas became practical very rapidly for longer lengths. He didn't elaborate on how the radiation resistance was calculated or that we could tell a transmitting antenna from a receiving one just by examining the fields around it (assuming we weren't permitted to see what was connected to its terminals).

Alf was also taken to task a bit for his concern (shared by many other amateurs) for antenna bandwidth. He didn't like the idea of having to adjust a matching network or change antennas to go from one frequency to another, or even from band to band. He wanted ease and simplicity of tuning in spite of the fact that some severe technical complexities would arise, defeating his intended goal. Things got more complicated rather than easier. The

Prof's philosophy was to get things straightened out on one band at a time instead of trying to tackle them all at once. This was particularly important if only limited space was available for an antenna system. The Prof said he had spent a considerable amount of time on his own antenna before he came up with one that had suitable performance. For instance, he had started out with a quarter-wavelength piece of wire, but a radial system wasn't practical. Sure, the antenna loaded up fine, but it was uncritical with regard to frequency change, which made the Prof suspicious. Sure enough, signal reports were very poor and other stations sounded rather anemic on his receiver.

Some homework and theory sessions brought out the fact that an end-fed wire that approached a half wavelength might be a better choice since the impedance was higher than a shorter version. This would offset somewhat the effect of not having a low-impedance ground system. Whatever ground resistance there was would be in series with many thousands of ohms rather than 36 ohms as in the case of a quarter-wavelength wire. This system seemed to work much better, especially since it was also possible to get a greater portion of the antenna up higher by running it over a tree.


More Surprises

The Prof and Alf enjoyed their talk and both agreed to visit again sometime. But Alf had one last lesson to learn — perhaps the most important of all. He was getting ready to leave when the Prof saw him examining the old tuner very carefully.

"That looks like a very interesting gadget. The trouble is a lot of this theory business is too technical for me. Maybe if I had the exact component values and the right dimensions of your antenna system, I could build a better one too. It's one thing for you engineers to design this stuff but what about us ordinary hams?"

"There's your old habit, Alf, jumping to conclusions again. Who said anything about engineering? As I have been saying, a good bit of my antenna background came through experience over the years. Also, a lot of study at home, talking with other hams, or listening to speakers at club talks and hamfests. I doubt if any single source could teach you *all* there is to know about antennas, or any other subject for that matter. You just have to do some digging and experimenting on your own."

"But if you don't teach engineering at the college here, why do they call you Prof? I thought . . ."

"Yes, jumping to conclusions along with preconceived ideas that you then accept as fact. If the theory doesn't fit the experiment, then the *experiment* is wrong. It couldn't be that your theory is wrong or that you are applying the wrong theory. Sure, I teach at the school, but it's not exactly engineering. I've been an agriculture instructor there for the last 25 years. Perhaps you ought to pay us a visit sometime. With a name like Alfalfa, I would think you would be interested in growing things. We've developed some of the biggest pumpkins that you ever saw." Alf wondered to himself if the biggest one was between his ears at times. 

Strays

I would like to get in touch with . . .

anyone with an instruction manual or information for a Jefferson-Travis 350AT transceiver, which vaguely resembles a Hammarlund Super-Pro receiver, ca. WW II. Gene Conway, WD4OKK, 2525 Fox Hall Lane, College Park, GA 30349.

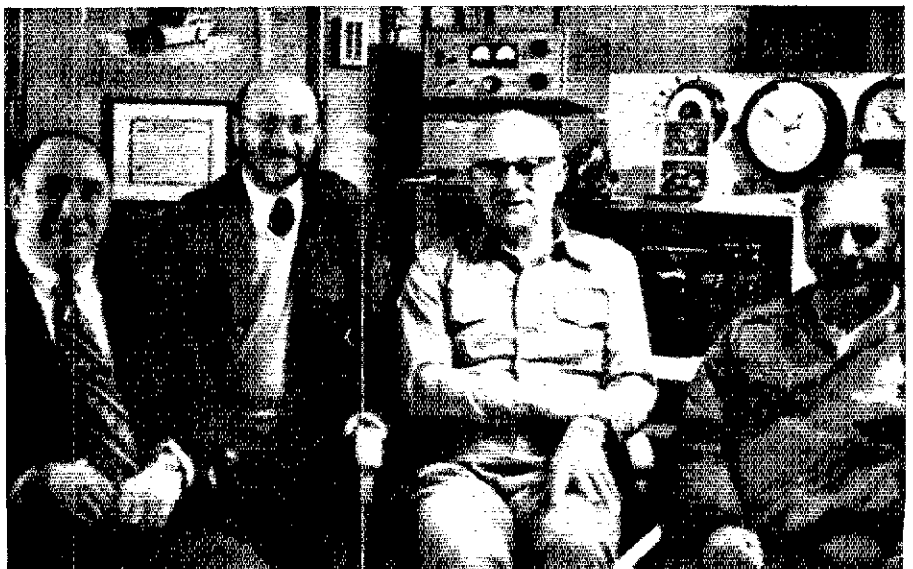
AMERICAN-ITALIAN ROUNDTABLE

At the suggestion of W2NHB, the American-Italian Roundtable has been reinstated for daily, informal meetings among Italians and Americans of Italian descent. They now meet from 1130 to 1330 UTC on 14.305 MHz. Italian is spoken most of the time, though many of the amateurs in Italy enjoy practicing their English. In fact, the group invites participation by all hams interested in contacting Italians all around Italy. AIR's present officers are (USA) Enrico Davoli,

WB4GKN, president; Amilcare Persichetty, W2NHB, vice president; Vincent Persico, WB2DXE, secretary; (Italy) Carlo

Camerini, I2CUK, president; Libero Massoni, I1VHQ, vice president; and Carmelo Ricosta, I8RLT, secretary.

The USA officers of the American-Italian Roundtable gathered during the ninth annual AIR dinner at the home of former QCWA President W2ALS. (Left to right) WB2DXE, WB4GKN, W2ALS and W2NHB.



A Low-Cost Dot-Memory Keyer

Ready to move up to an electronic keyer? Here's a weekend project that won't bankrupt you.

By James M. Rohler,* WBØLHE and William J. Vancura,** WB9OBB

Electronic keyers are popular home projects because they provide amateurs with a quality instrument with which to send perfect cw. The cw operator will appreciate the ease of building this keyer and take pride in designing his own enclosure and power supply. There is room for a personal touch to this project. All components for the keyer are readily available from mail-order suppliers and local electronic parts houses.

Operational Characteristics

The heart of the keyer is the 555 IC timer, thanks to its ability to operate over several decades of speed range without modification or component changes. Other clocks built from one-shot ICs or discrete components will usually only

*1967 Bristol Dr., Bettendorf, IA 52722
**4115 35th Ave., Moline, IL 61265

operate over a 6 to 10:1 speed range before components or timing capacitors require changing or operation fails completely. The timer in this circuit is wired in a nonstandard, inverted-output mode so that keying will be smooth and uniform, even on the first dot, with uniform spacing between characters.

The keyer has dot memory, which is particularly useful when using a single-lever paddle. The memory allows loading a dot while a dash is still being sent. Then after a space the dot will be sent perfectly. This eliminates the choppiness found in operating many nondot-memory keyers.

Dot insertion is available when using a "squeeze" paddle with the dot-memory keyer. The dot paddle will insert dots between or after dashes, even though the dash paddle is not released. Dot memory is convenient when forming characters

like K, X or \overline{BT} . The dot is sent first when both paddles are squeezed.

The KEY-TUNE input is particularly useful, not only for tuning the rig but also for playing messages that are stored in some form of digital memory for contests or code practice. The input may also be used with a straight key or in conjunction with the dot input to simulate a mechanical "bug" key.

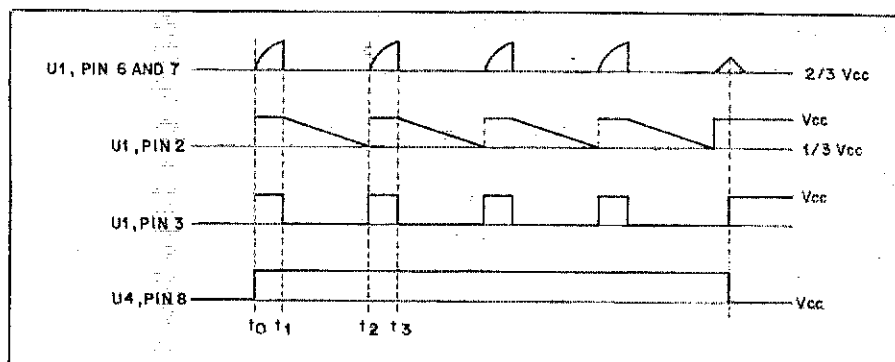
The Heart of the Keyer: The Clock

The clock is made up of the 555 timer IC and associated components. Operation of the clock can best be described by the timing diagram, Fig. 1. The actual circuit is shown in Fig. 2.

In the unkeyed state, pin 8 of U4A is in the low state. When keyed, $t = t_0$, and pin 8 goes high, quickly charging capacitor C10 through R3 until time t_1 . Time t_1 occurs when the threshold, pin 6, reaches two-thirds V_{cc} and causes pins 3 and 7 to be pulled low and initiate two control events. First, pin 3 toggles the keyer and enables the variable time-out period ($t_2 - t_1$), determined by R13 and C4 through D1. Second, pin 7 "resets" R3 and C10 for the next clock cycle.

The interval between t_1 and t_2 is an important timing interval, because it determines the clock speed and guarantees uniform clock pulses and character spacing. At t_1 , the period $t_2 - t_1$ is governed by the time constant $R_T C_4$, where $R_T = R13 + R12$ and by the 555, pin 2. Since D1 isolates the positive voltage on the charged capacitor, C4, from pin 3, the only discharge path is through the timing

Fig. 1 — Timing diagram for the dot-memory keyer (see text).



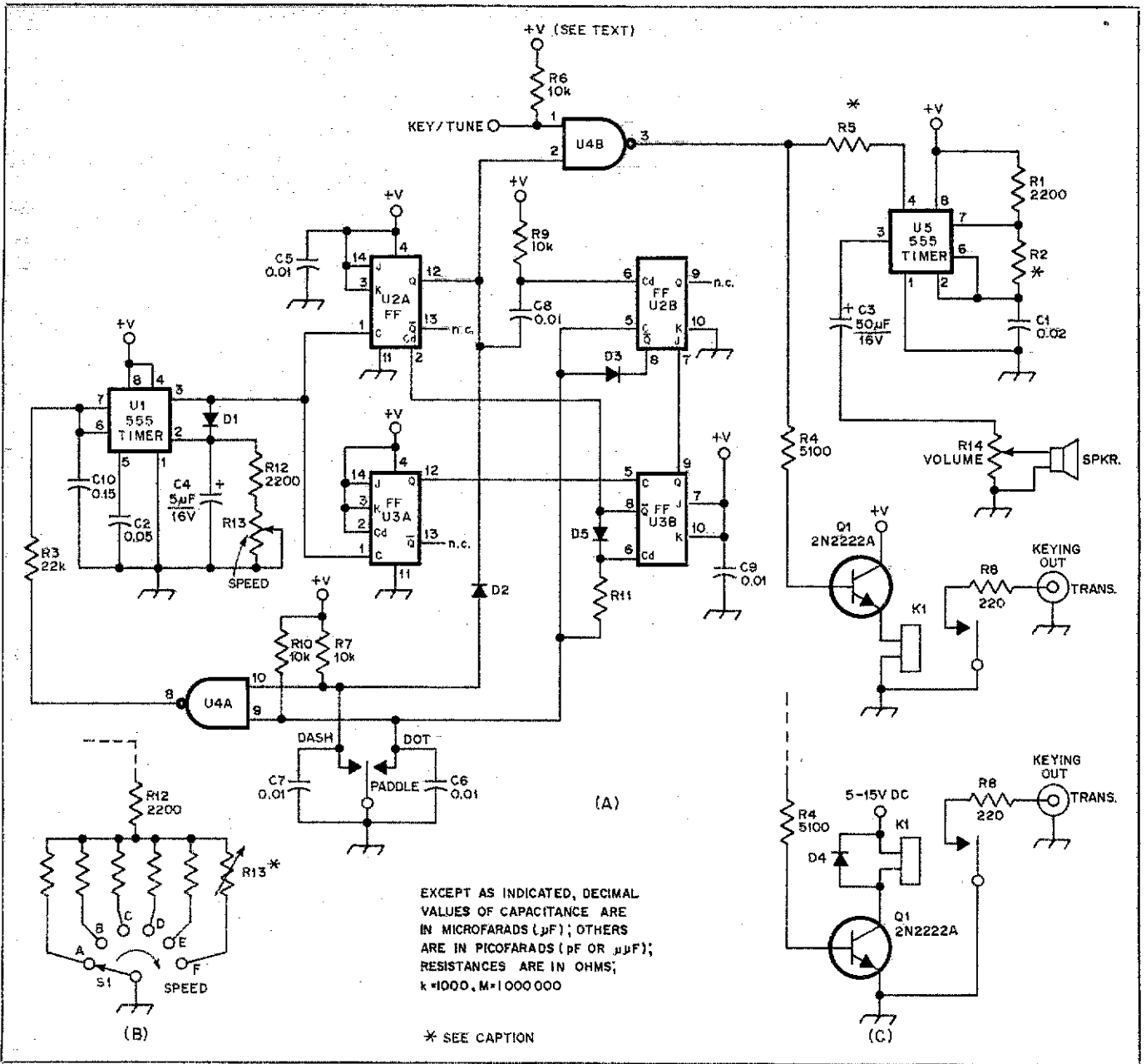


Fig. 2 — Schematic diagram of the low-cost, dot-memory keyer. Shown at B is an alternative speed-control arrangement, which may replace R12 and R13 at A. C shows the suggested circuit for reed relays requiring a higher coil voltage (see text). All resistors are 1/4 watt. Capacitors are disk ceramic except for those with polarity marked, which are electrolytic. Parts not listed below are identified on the diagram for aid in parts placement.

D1, D2, D3, D5 — 1N191, 1N4001 or any silicon diode rated at a minimum of 10 mA at 15 V.
D4 — Silicon rectifier diode, 1N4001 or equiv.
K1 — Any 5- to 12-V reed relay (see text).
LS1 — Any 8- to 40- Ω speaker.
R2 — 39 k Ω fixed, or 50 k Ω variable for tone adjustment.
R5 — 47 k Ω to 150 k Ω ; see text.

R11 — 470 Ω (TTL) or 15 k Ω (CMOS).
R13 — 50 k Ω variable (reverse audio taper if available) or for option B:
R13A — 45.8 k Ω for 5 wpm.
R13B — 19.8 k Ω for 10 wpm.
R13C — 12.4 k Ω for 15 wpm.
R13D — 8920 Ω for 20 wpm.
R13E — 5300 Ω for 30 wpm.
R13F — Same as R13 above.

R14 — 1000- Ω variable, audio taper if available; linear taper suitable.
S1 — 6-position slide or rotary switch.
U1, U5 — 555 timer IC.
U2, U3 — 7473 TTL or 74C73 CMOS dual J-K flip-flop IC.
U4 — 7400 TTL or 74C00 CMOS quad 2-input NAND gate IC (2 sections unused).

resistance, R_T . Pin 2, the trigger input, sets the output of the 555 high when the capacitor voltage drops below one-third Vcc. The cycle then repeats itself after resetting of the 555 at t_2 .

U5 is also a 555 timer. This is a more conventional application of the 555, making use of its capability to provide up to 200 mA of current for driving the speaker.

R2, between pins 6 and 7, can be selected for the operator's preferred tone pitch or may be replaced by a pot for changing the tone at will. R5 virtually eliminates the sidetone clicking normally encountered with gated oscillators. Its optimum value will depend on the supply voltage.

Two output keying circuits are offered, the choice depending upon your approach

for providing the reed relay. The circuit shown in the main diagram of Fig. 2 is particularly suitable if one winds his own reed-relay coil. By winding coil resistances of 100 to 200 ohms with fine coil wire on miniature relays, one obtains a satisfactory circuit combination. However, for those who purchase a commercial reed relay with existing coils, the rated coil


voltages are usually above 5 volts. The circuit of Fig. 2C, using the common-emitter amplifier, allows any voltage reed relay which is connected to an appropriate supply voltage to be used.

The alternate timing resistor arrangement shown in B of Fig. 2 offers one set of values for a six-position stepping switch; the sixth position of the switch allows conventional analog control of the keying speeds.

Packaging

Let your imagination be your guide in packaging this keyer. The small size of integrated circuitry offers remarkable savings in package size compared to vacuum tubes or discrete components. The photo illustrates several alternate methods of packaging used by the authors. Ready-made circuit boards are available.¹

Because the CMOS and 555 integrated timer chips can operate from between 5 and 15 volts, the power supply possibilities are varied. Operating mobile suggests use of the auto's supply. A battery pack, dc adapter, or simple dc supply are other possible power sources.

The photo also illustrates various physical enclosures. Homemade scrap aluminum and contact paper are useful items. Dry-transfer labeling adds a professional touch. Finally, placement of controls, jacks and labels is up to the individual constructor. However you do it, the result will be *you*. 

¹For those wishing to avail themselves, ready-made circuit boards are available from William Vancura, 4115 35th Ave., Moline, IL 61265. Enclose an s.a.s.e. with your request; price is \$4.

Even if you use ready-made circuit boards, there's plenty of opportunity for originality in packaging this keyer. Here are three different versions constructed by the authors.

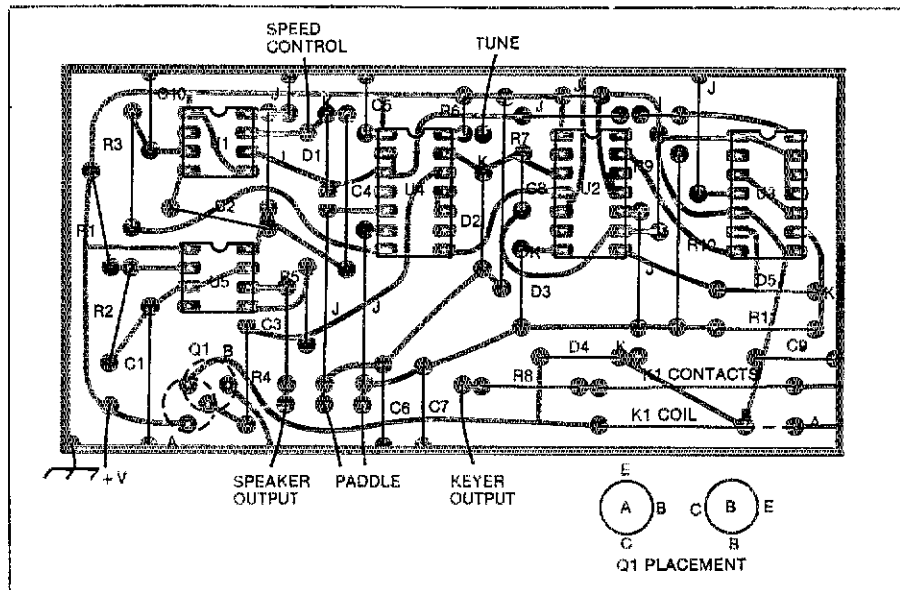
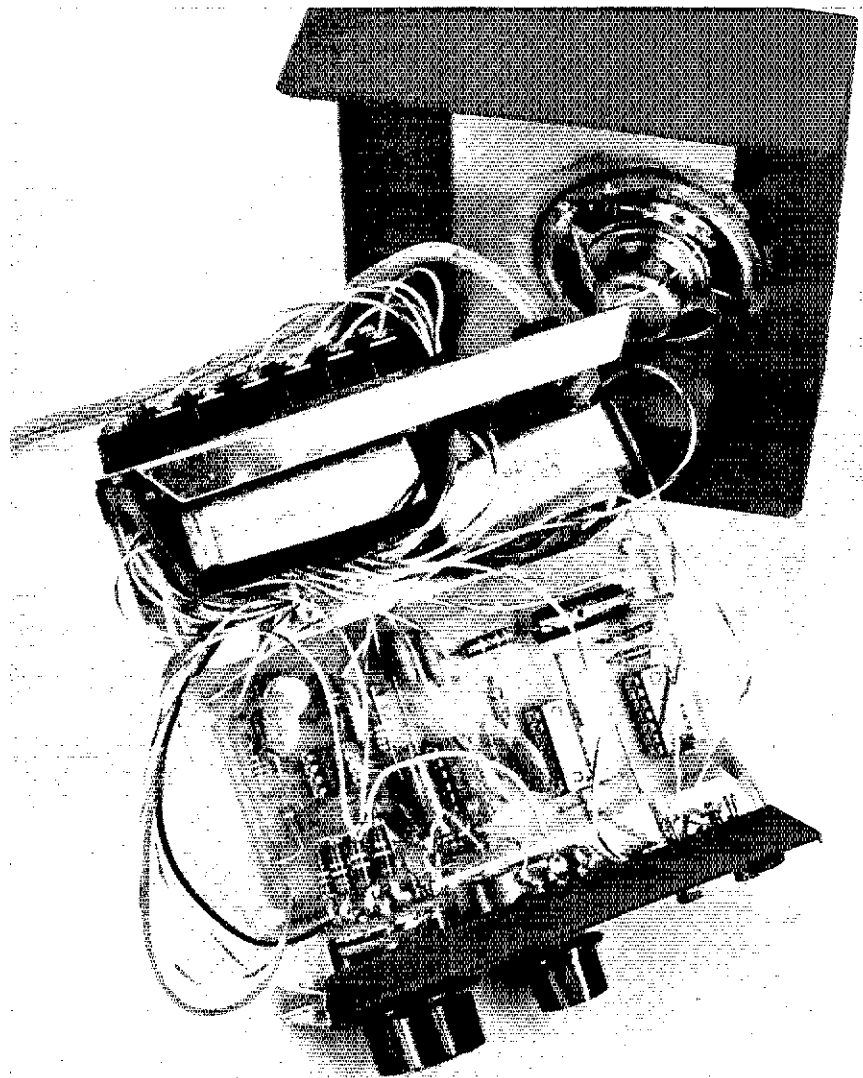


Fig. 3 — Actual size pc-board template for the dot-memory keyer. The pattern is shown from the foil side of the board, with the shaded area representing copper. J = wire jumper; K = cathode. The board pattern will accept installation of Q1 and K1 for either emitter-follower operation (A), or common-emitter amplifier operation (B). See text.

Interior view of one version of the keyer. Note that leads to the circuit board are left long, to allow the board to be lifted from the cabinet without disconnecting it.



Transmitter Design — Emphasis on Anatomy

Part 2: A VFO by itself doesn't offer much when it comes to transmitting, so let's proceed with the physical structure of our two-band transmitter. Here is some useful information on the frequency doubler and cw break-in delay circuits.†

By Doug DeMaw,* W1FB

Perchance you're wondering why our VFO described earlier couldn't be made to operate on 14 MHz as well as on 7 MHz. Well, there's no reason why the L and C components couldn't be modified to provide two-band coverage. In such an example a band switch would be included in the VFO module for the purpose of selecting the 7- or 14-MHz coils and capacitors. The disadvantages of that scheme are at least twofold. Mechanical instability is likely to result from the switch contacts and related leads. Also, the effects of oscillator pulling are more pronounced as the operating frequency is increased. Concerning the latter, it would be a difficult task to prevent chirp during 20-meter cw work if the VFO were operated at 14 MHz.

A more suitable technique at the higher operating frequencies is to employ the oscillator at one or more octaves below the desired excitation frequency, and utilize multiplication to obtain the required output frequency of the VFO chain. Through this process the mechanical instability is diminished greatly, and the frequency-multiplier stage or stages tend to isolate the oscillator from the load more effectively than would be the case with a straight-through buffer or amplifier.

Fig. 4 contains the circuit we will use for multiplication. Rather than follow the VFO chain with a single-ended frequency doubler (one transistor), we have elected to use what has long been known as a *push-push doubler*. Although the bases of the transistors are connected in push-pull

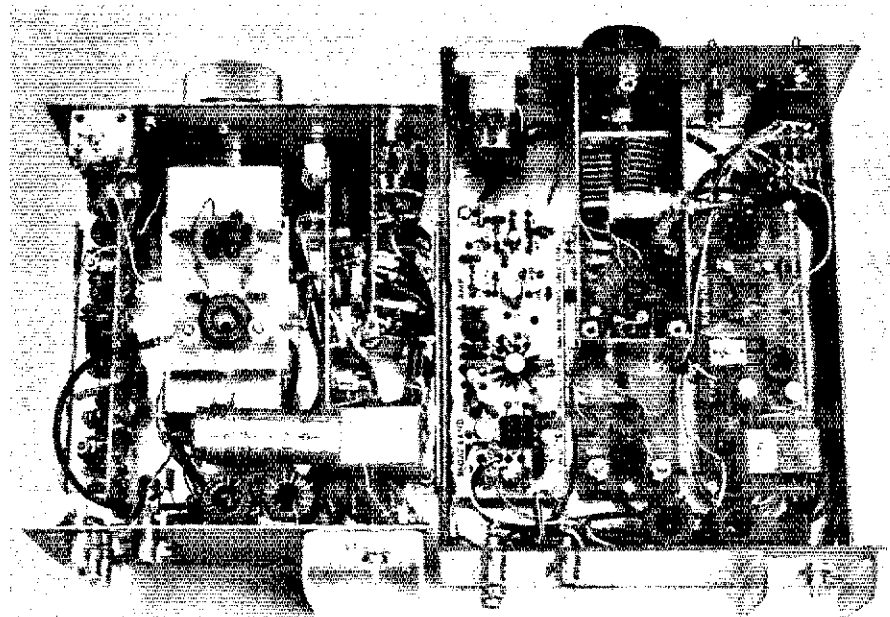
by means of broadband transformer T1, the collectors are tied in parallel. In this manner the stage differs from a *push-pull* amplifier, as the latter would have the collectors as well as the bases in push-pull. A push-push amplifier favors *even* harmonics, whereas a push-pull amplifier does its best job with *odd* harmonics. Furthermore, a push-push doubler is practically as efficient as a straight-through amplifier. A single-ended doubler would exhibit a typical maximum efficiency of only 50 percent as opposed to a push-push

doubler with a ball-park efficiency of 70 percent. There is no reason why a pair of JFETs couldn't be used at Q4 and Q5 of Fig. 4. If they were, however, the doubler output for this transmitter would be somewhat lower (inadequate) than with the 2N2222As we have employed.

Circuit Description

The VFO in Fig. 2 (Part 1, May *QST*) has a single-ended output terminal, so if we are to supply drive to the doubler of Fig. 4 it will be necessary to use a balun-

Interior views of the W1FB (left) and WA0UZO (right) versions of the transmitter. The push-push doubler/break-in delay module is at the far right in this photograph. The VFO and SWR-sensor modules are at the center of the WA0UZO unit, and the broadband amplifier may be seen at the left of his VFO. The PA stage is mounted on the rear wall (lower right) of each rig. The homemade heat sinks are visible on the back aprons of the enclosures.



†Part 1 appeared in *QST* for May, 1978

*Senior Technical Editor, ARRL

type transformer (T1). The energy reaching the bases of Q4 and Q5 must be of opposite phase to assure push-pull drive to the doubler. To accomplish this we have included T1, a trifilar-wound broadband transformer (three wires wound on the core at the same time). The black dots on the schematic diagram, at the top of T1, identify the phase relationship of the windings. It can be seen that one transistor base is fed 180 degrees out of phase with the other, thereby satisfying our need for push-pull drive. Forward bias is supplied to the doubler stage through the junction (C and F) of the two right-hand windings. A 0.01- μ F bypass capacitor brings that point in the circuit to rf ground.

For proper operation of a frequency

multiplier it is necessary to establish Class C operating conditions. The forward bias on Q4 and Q5 implies Class AB operation, but the output from the main VFO chain overrides the forward bias and drives the doubler into the Class C mode. Bias is applied only to make the doubler easier to drive.

In the interest of optimum doubler performance it is necessary to establish dynamic balance. Most discrete transistors of a given type number exhibit different electrical characteristics. In our application we are concerned mainly with any difference in transistor gain which might exist. Ideally, Q4 and Q5 should perform in an identical manner. A balancing control, R1 in Fig. 4, has been included to enable us to match the operating

traits of the two devices. A 47-ohm resistor is used on each side of the control to prevent the emitters from going directly to ground if the control arm is set at either end of its range. R1 is adjusted so that the output waveform (14 MHz) is as pure as possible. If R1 is set incorrectly there will be a substantial amount of the 7-MHz driving energy present at the collectors of Q4 and Q5. The worse the imbalance, the greater the level of the 7-MHz energy.

A tuned circuit (C8 and L3) is used at the doubler output to increase the available rf output voltage. A pure waveform would be attainable if only the 1000-ohm shunting resistor was used, but the doubler output would be quite low because of the dc voltage drop across the resistor. L3 permits the full supply voltage (less the drop across the 33-ohm decoupling resistor) to reach the collectors of Q4 and Q5. Also, the 1000-ohm resistor broadens the tuned-circuit response to provide a nearly constant output level across the VFO tuning range. Fig. 5 provides the pc-board pattern and parts placement guide for the doubler and break-in delay circuits.

The Final Touches

Checkout for the doubler is an easy assignment. The VFO module is connected to points A and B of T1. A 56-ohm resistor is attached temporarily between the doubler output (to the right of the 27-pF output coupling capacitor) and ground. The 56-ohm resistor simulates the load presented by the broadband amplifier (to be described later).

A short length of hookup wire is attached to the junction of the 56-ohm resistor and the 27-pF capacitor. The opposite end of the wire is placed near the antenna terminal of a receiver which is tuned to 7 MHz. Next, operating voltage is applied to the VFO chain and doubler. R1 and C8 can now be adjusted by setting them for *minimum* signal response at 7 MHz, as noted on the receiver S meter. If an oscilloscope is available, connect the scope probe to the top of the 56-ohm load resistor and adjust R1 and C8 for the purest waveform obtainable at 14 MHz. There may be some interaction between the adjustments of R1 and C8, so the foregoing steps should be repeated two or three times to ensure premium doubler operation.

A low value of coupling capacitor (27 pF) is used to prevent the approximate 50-ohm input impedance of the broadband amplifier strip from loading C8 and L3 excessively. During 40-meter operation the push-push doubler is bypassed so that the VFO output goes directly to the broadband-amplifier module.

Break-In Delay Circuit

A cw break-in delay circuit is not an essential part of a transmitter, but it does provide an operating convenience which

Fig. 4 — Schematic diagram of the push-push doubler. Fixed-value capacitors are disk ceramic. Resistors are 1/2-W composition, except for R1 (see below).
C8 — 110-pF mica compression trimmer (Elmenco 406 suitable).
L3 — Toroidal inductor; 17 turns no. 26 enam. wire on a T50-2 powdered-iron toroid core.
R1 — Pc-board-mount carbon control.

T1 — 17 trifilar turns of no. 26 enam. wire on an FT-50-61 ferrite toroid core. Twist wires approximately eight twists per inch before winding on core.

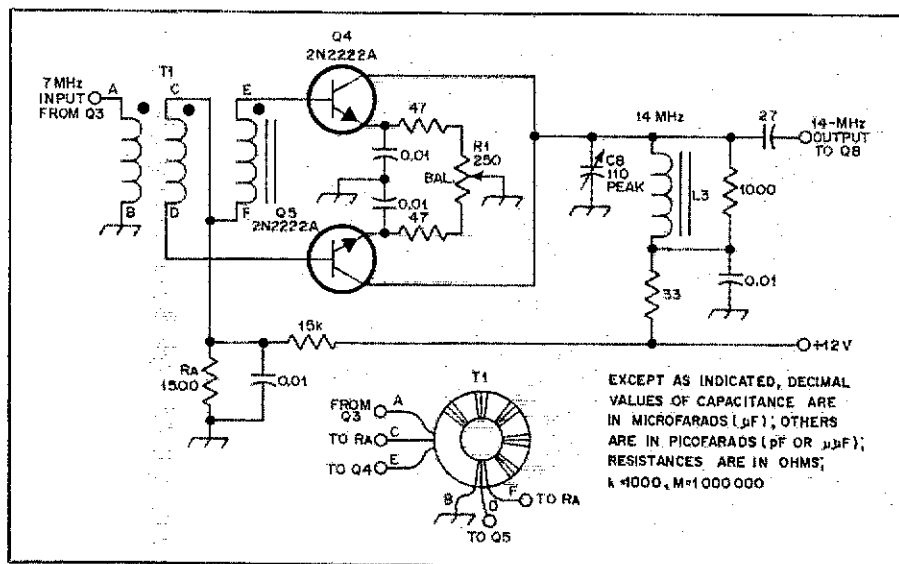
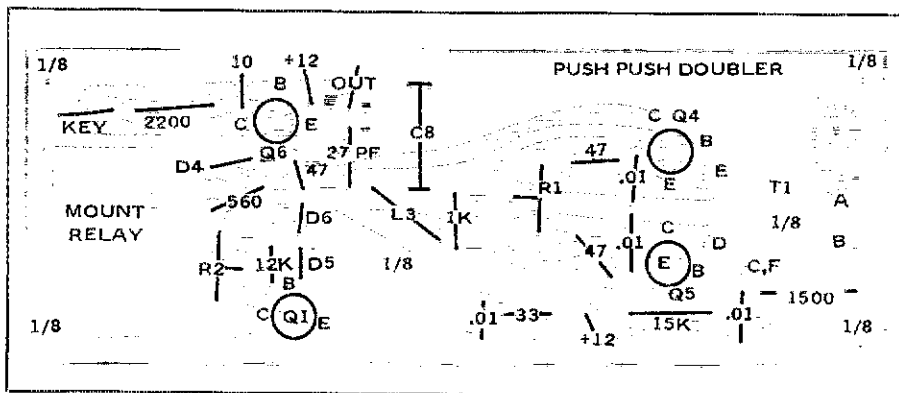


Fig. 5 — Scale layout and parts placement for the doubler/break-in delay board. View is from the component side of the board. Etching patterns for all circuit boards in this series will be published with Part 3; 1/8 indicates a 1/8-inch hole.



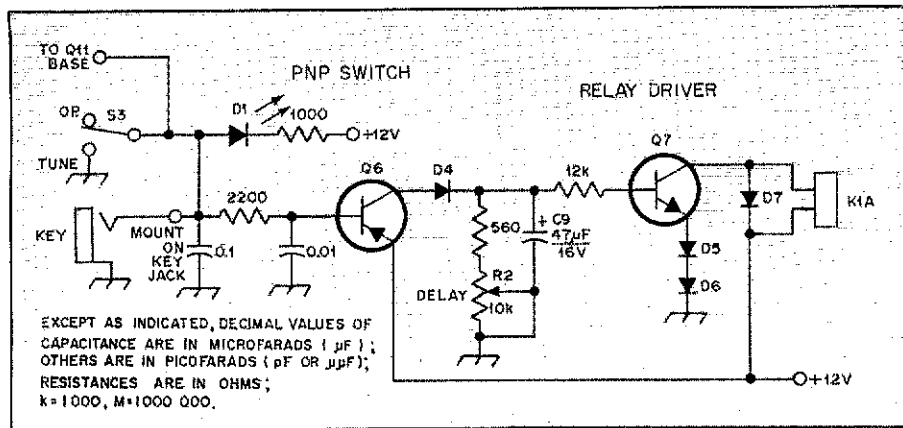


Fig. 6 — Schematic diagram of the break-in delay circuit. Disk-ceramic capacitors are used except for C9; it is electrolytic. Fixed-value resistors are 1/2-W composition. D4-D7, inclusive, are 1N914 silicon diodes. K1 is a dpdt 12-volt dc relay. A Potter & Brumfield 24-V dc relay (surplus) was used in the W1FB version of the transmitter. The spring was stretched to lessen the tension, enabling the relay to close satisfactorily at voltages as low as 11. The relay number is KHP17D12. A 12-volt version is available. Q6 is a 2N3906 or HEP715. Q7 is a 2N1711 or HEP736. R2 is a pc-board-mount carbon control.

makes it worth including. Manual switching could be used in place of the delay circuit to control the changeover relay, K1. Similarly, keying could be done by breaking the 12-volt supply to the keyed stages of the transmitter. The main advantage in utilizing a break-in delay system is that the operator has one less switch to manipulate between the transmit and receive modes. In some instances this permits faster mode changing than would be possible if mechanical switching was used.

Fig. 6 shows the break-in delay circuit. A straight key, bug or electronic keyer is connected to the input of Q6. When the circuit is completed, Q6 is effectively

biased into conduction. At that time 12 volts appear at the Q6 collector to place a charge in C9. R2 is set for the desired discharge time of C9. The greater the resistance, the longer the period before C9 bleeds to ground. D4 is used in the collector lead of Q6 to serve as a one-way path for the dc voltage — a gate of sorts. This component was added after two transistors were destroyed at Q6 by a voltage peak which originated (after Q6) as the key was closed. D4 permits the +12 volts to flow into the charging network, but prevents positive-voltage transients from flowing back toward Q6.

When C9 is charged sufficiently to pro-

vide the forward bias necessary to turn on Q7, current flows through the field winding of K1, causing the relay contacts to close. As the voltage across C9 decays (key open), a point will be reached at which Q7 has insufficient forward bias to provide the collector current needed to keep K1 energized. At that time the relay will open. D7 is placed across the relay field coil to clip voltage spikes caused by the inductive "kick" when the relay field collapses. The spike, if great enough in amplitude, can travel along the 12-volt bus and damage transistors elsewhere in the transmitter. Damage could occur to Q7 as well.

The diodes in the emitter return of Q7 are used to establish approximately 1.4 volts of fixed-value bias for Q7. Depending on the transistor used as the relay driver, the resting current of Q7 may be high enough to keep K1 closed even though C9 has been nearly discharged. D5 and D6 prevent such an event from happening. The LED indicator used in parallel with the key was added by WA0UZO in his model of the transmitter, but it is not essential to the operation of the circuit. It illuminates when the key is closed, thus functioning as a *transmit* indicator (a frill).

The break-in delay module can be tested by merely applying operating voltage and shorting from the key terminal to ground. If all is as it should be, K1 will close. R2 can be set for the delay time desired. If wiring errors have been avoided, and if no defective components were used, the "Freddie syndrome" should have remained dormant so far!

Strays



TRAVELING ABROAD?

□ The International Services Office of the Membership Services Department at Hq. is equipped to assist members in obtaining reciprocal operating permits and guest permits in more than 100 countries and territories around the world. In addition, it provides information on repeaters (vhf) in most of Europe and Latin America. If you have questions concerning amateur radio in other countries or are interested in joining the amateur societies of other nations, contact the International Services Office. They'll help you get the information you need. — WA6IDN

ARRL LAB ACQUIRES NEW TEST GEAR ITEM

□ It is with deep gratitude that we acknowledge the goodwill and generosity of Trio-Kenwood Communications, Inc., and its sales manager, Barry Copeland,

for the recent donation accepted by the ARRL Technical Department. Our long-standing need for a 2-meter, all-mode transceiver that could be used as laboratory test apparatus has been fulfilled by the Trio-Kenwood donation of a TS-700S. Its spectral purity makes it an ideal exciter for staff-developed 144-MHz amplifiers and higher-band transmitting converters. During off hours, the equipment is even used by the Headquarters Operators Club under our W1INF call! — W1FB

"WARC STATION" ON THE AIR AT 4U1ITU

□ As mentioned in the April *QST* editorial, "Simple Equipment, and WARC," one of the operating positions at 4U1ITU in Geneva, Switzerland, is now equipped with a simple, homemade transmitter and receiver to show that it doesn't take a \$1000 transceiver to enjoy amateur radio. During a February "open house" for International Telecommunication Union conference delegates, ARRL Assistant General Manager K1ZZ made

the inaugural operation. Sharp-eared W1LY in Vermont was the first from this side of the Atlantic to hear the 10-watt rig. In the effort, he also earned a new DXCC country! Parts kits for the transmitter and receiver are being made available in less-developed countries to give amateurs and prospective hams there a way to get on the air at reasonable cost.

K1ZZ sends the first transmission from an operating position at 4U1ITU that uses simple, efficient, minimum-parts equipment. (W4KFC photo)



Predicting Radio Horizons at VHF

Knowing the line-of-sight horizon of your proposed repeater antenna as well as your station's own aerial can help you predict coverage before you pour the foundation.

By Billy Walker,* W5GFE

On vhf, the higher your antenna the greater the range, other factors being constant. Antenna height is *the* single most important factor, as all amateurs know. But, just how high do we need to place an antenna to produce a specified coverage area? This article covers a few of the many factors involved in answering this rather complicated question.

Obviously, a given station can have 100-percent reliable communication over paths that provide line of sight between the transmitting and receiving antennas. Although this is an *ideal* case, let us use it for an example.

Referring to Fig. 1, we observe that the line-of-sight distance, the distance to the horizon, from an antenna varies with the height of that antenna above ground. The distance (D) is measured along the ground from the base of the antenna support to the horizon. Using trigonometry, it is not difficult to solve for D in terms of the antenna height above ground. Of course, the shape of the earth enters heavily into the picture. For instance, if the transmitting antenna is located on the side of a mountain, the antenna functions better in one direction than in another because of the shielding effect of the mountain. For

the sake of simplicity, we have assumed that the earth is conveniently round and, according to Webster, has a mean radius of 3959 miles (6371 km). We are also ignoring, for the sake of this discussion, obstructions such as hills and valleys.

Computerized Optical Horizons

With these assumptions in mind, a DEC-10 computer was programmed to calculate the distance that a station with a given antenna height could "see." That is, to calculate the distance from the base of the antenna support to the optical horizon for the antenna. Fig. 2 provides a graph of these calculations, and is most informative. Fig. 2 reflects the computer-generated optical horizon and includes a

factor of 33 percent additional distance, since radio waves tend to refract about that much more than light waves.

One first observes that the graph is not a straight line, but rather a curve which rises quite rapidly at first, tending to level off at greater antenna heights. Of course, the curve does not become flat at any practical antenna height but the tendency is obvious.

Fig. 2 was calculated with the repeater station in mind. Since repeaters are traditionally located at the best antenna location that can be arranged, the figures are reasonable for this application. For instance, a repeater located at an effective height of 500 feet (152 m) could expect an optical horizon of about 27 miles (43 km),

*Dept. of Computer Information Systems, West Texas State University, Canyon, TX 79015.

Fig. 1 — Definition of line-of-sight distance (D).

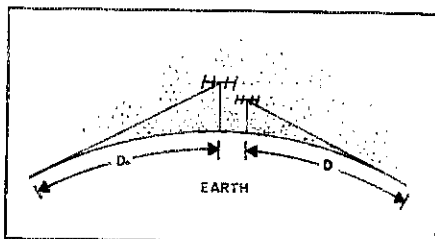
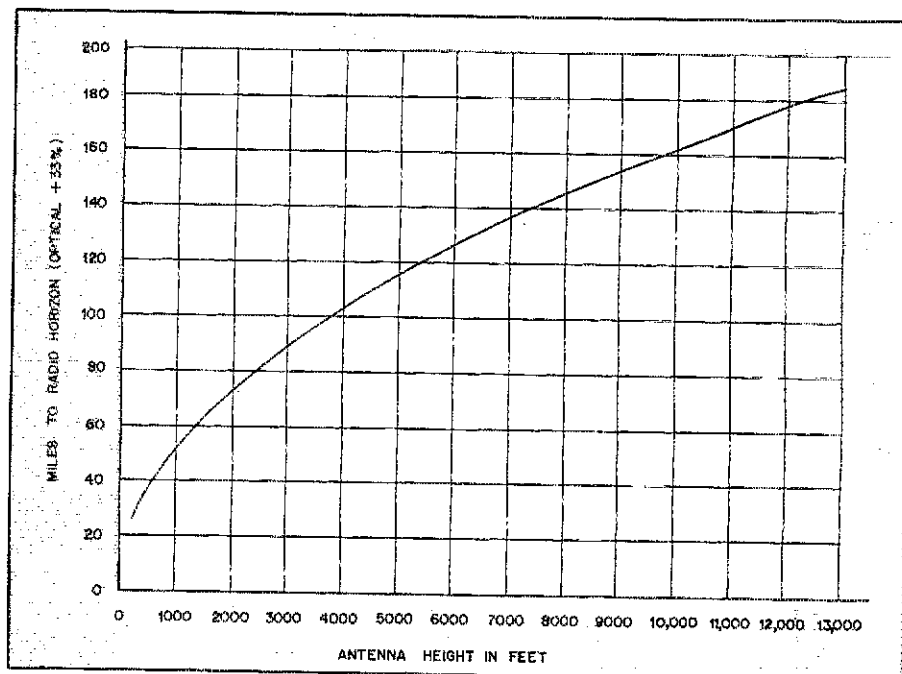


Fig. 2 — Miles to radio horizon for various antenna heights.



and a radio horizon of 36 miles (58 km). Height advantage falls off rapidly, however, and in order to double this coverage the antenna would have to be almost four times as high, or 2000 feet (610 m).

"But," you say, "I live more than 20 miles (32 km) from the repeater, and the repeater height is 250 feet (76 m) yet I can work it consistently. The graph says it is beyond my line of sight. Is that where the 33 percent factor comes in?"

The answer is yes, but the height of *your* antenna must also be considered. By referring to Table 1 you can calculate your own optical horizon. For instance, your 50-foot tower gives you an optical horizon of about 8.7 miles (14.0 km). This added to the repeater horizon of 19.4 miles (31.2 km) gives about 28-mile (45.1-km) actual line-of-sight coverage between your antenna and the repeater — that's more like it.

Finally, although your *mobile* antenna isn't at any 50 feet (15 m), you get greater coverage than expected because its effective height is probably about five feet (1.5 m). Thus, Table 1 shows that your mobile optical horizon is about 2.7 miles (4.3 km) which, when added to the repeater's horizon, yields 22.1-mile (35.6-km) coverage (29.5 miles or 47.4 km for radio waves). That's within our experience.

The Effect of Radio Wave Diffraction

Returning to that 33-percent factor, it is a result of a phenomenon known as diffraction. Essentially, this can be explained by mentioning that radio waves, like all electromagnetic waves, bend around solid objects (of which the earth is one). That is, waves encountering an obstacle will bend as they pass the edge of the obstacle, thus causing energy to appear in the shadow of the object. This may be seen in the behavior of light waves by placing a pinhole in a piece of cardboard and then looking at a distant light through the

pinhole. There will appear to be concentric circles of light surrounding the pinhole. These circles are caused by light waves being bent at the edges of the pinhole, and then combining with other waves to produce patterns of bright circles where the various light rays happen to combine in such a way as to reinforce each other. This process is known as "interference."

One other factor must be kept in mind, a factor which makes the accompanying coverage calculations somewhat conservative. Most repeater antennas are configured so as to increase the amount of bending of the transmitted signal, further extending our range beyond the optical horizon.

The tables can be used to determine the necessary HAAT (height above average terrain) to employ when a given coverage is desired. If your friend Joe lives in the next town, which in Texas means up to 100 miles (161 km) away, you might want to devise an antenna system that will let you and Joe converse consistently. For instance, assume Joe lives about 80 miles (129 km) away. This distance may be covered in any of several ways. You can install a tower of sufficient height to cover the whole distance, like Superman, in a single bound. In this case, your antenna would have to be about 4500 feet (1372 m) in the air, considering optical horizons only, for line-of-sight communications. However, if Joe is willing to throw away his coat hanger and put up a real antenna, you can do better.

Junk Box Oil Derricks

Suppose Joe has an oil derrick in his junk box or lives on a mountain and can get his antenna 2500 feet (762 m) above the surrounding terrain. His optical horizon would be 61 miles (98 km); then *you* only need an antenna 250 feet (76.2 m) high for 100-percent communications. Note the total tower height is now only 2750 feet (838 m) compared with 4500

(1372 m) using the Superman approach.

As a more realistic example, consider two stations only 10 miles apart; Table 1 indicates a tower height of 65 feet (20 m) for the Superman approach, but if each station puts up a 20-foot (6.1-m) tower the distance can be covered with a total tower height of only 40 feet (12.2 m). The economics are obvious.

Remembering that factors such as antenna gain and pattern and atmospheric refraction add to the optical-horizon figures, one can estimate coverage for a given system using the optical-horizon information contained here. Computer studies of diffraction have been made on the DEC-10 computer, and work is continuing along these lines. In the meantime, this article should provide a working basis for those hams who want to determine conservatively their station capabilities and predict repeater coverage for that new machine.

Table 1
Optical horizons for antennas less than 100 ft high.

Height of Antenna		Distance to Horizon	
Feet	Meters	Miles	Kilometers
0	0.0	0.0	0.00
5	1.5	2.7	4.40
10	3.0	3.9	6.22
15	4.6	4.7	7.62
20	6.1	5.5	8.80
25	7.6	6.1	9.84
30	9.1	6.7	10.78
35	10.7	7.2	11.67
40	12.2	7.7	12.47
45	13.7	8.2	13.22
50	15.2	8.7	13.93
55	16.8	9.1	14.61
60	18.3	9.5	15.26
65	19.8	9.9	15.88
70	21.3	10.2	16.48
75	22.9	10.6	17.06
80	24.4	10.9	17.62
85	25.9	11.3	18.17
90	27.4	11.6	18.70
95	29.0	11.9	19.21
100	30.5	12.2	19.71

Strays

FIELD DAY IN KL7-LAND

□ In a mosquito-infested clearing 61 miles north of Anchorage, the Matanuska Amateur Radio Association discovered the essence of Field Day in our first effort last year. We logged 175 contacts under emergency conditions, but Murphy struck time and again.

Being a new club, we all made sure the rig, beam and generator arrived safely. An inventory of our other supplies, however, revealed only three dozen hot dogs, one case of soda pop, 12 cans of insect repellent, and two rolls of Charmin.

After setting up KL7ILA's rig, we discovered the key had forgotten to come along. KL7MD homebrewed a combination soda-can-and-nail keyer, which really

It looks peaceful enough, but Murphy was to make our first Field Day one to remember!



puzzled the operators on the other end.

Next, the generator fuel tank sprang a leak. We quickly borrowed a windshield-wiper solvent tank from KL7DOB's car and some hoses from the other vehicles to make a temporary fix. This worked fine except for the film of oil on our windshields.

All in all, we came through the whole exercise with a knowledge of abilities we didn't know we possessed. — *Bob Rivenburgh, KL7JCK*

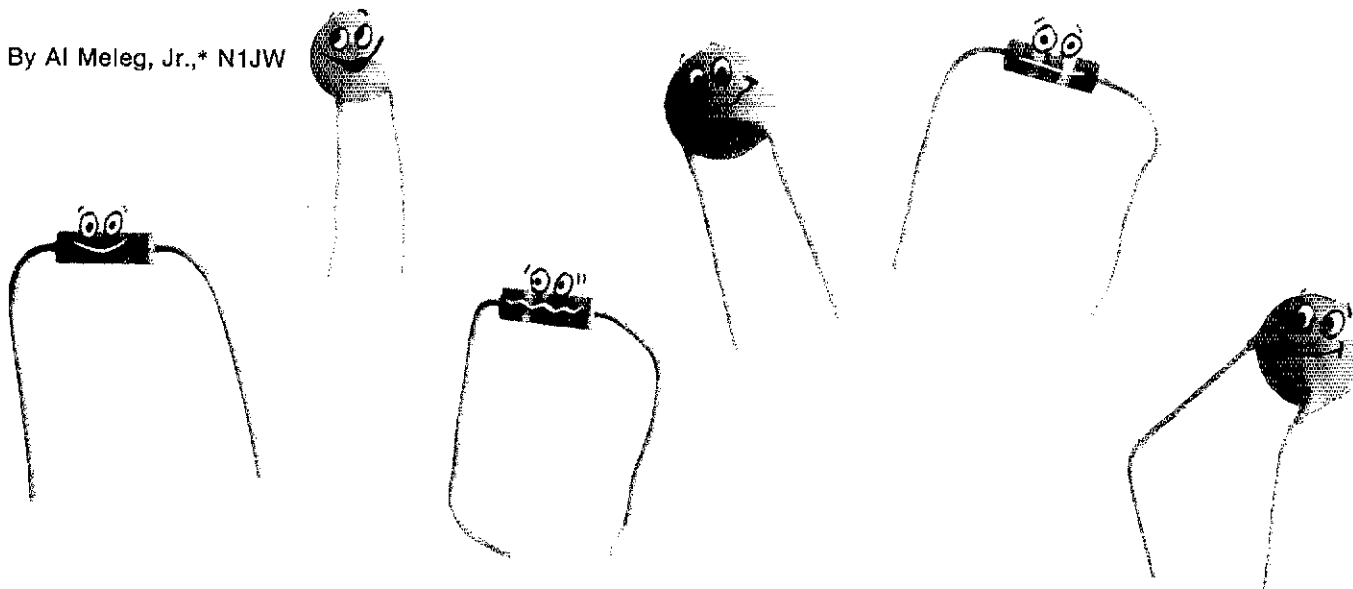
QST congratulates . . .

□ Hans Tischer, KP4EBQ, selected for Honorable Mention recognition by the National Weather Association. He is an ARRL assistant emergency coordinator.

The ABC Active Filter

Meet this high-performance solid-state circuit for reducing noise and improving selectivity. You can expand it in building-block fashion.

By Al Meleg, Jr.,* N1JW



What is common between people and electronic filters? Probably nothing more than that each may be classified as either active or passive. In human affairs, we recognize these personal characteristics easily. But in electronics, what are active and passive filters? Whether active or passive, filters serve to remove, reduce or emphasize particular electrical waveform components that appear in a given circuit. For instance, hum may be filtered from a B+ line. Noise in radio reception may be reduced. And certain desired frequency ranges may be emphasized in audio circuits such as bass boosting on a hi-fi system.

Well then, what about active and passive filters? The general purpose of either type filter can be the same, but the difference is that a passive filter lacks such active components as ICs, transistors or vacuum tubes. The components of a passive filter are generally confined to resistances, capacitances and inductances. While these components are also needed in active filters, the latter also contain a means of amplification that is provided by the active components mentioned above. One advantage of having amplification is that signal loss resulting from filter usage may be overcome. But there is another interesting aspect of amplification which applies to active filters such as the ABC. This will be explained.

After several years of trying many different circuit configurations while also doing considerable research on filter systems, I devised the concept of what I call the ABC filter, a flexible electronic device that is expandable in building-block form. Additional stages may be cascaded, depending on how steep the filtering must be. The number of stages may range from one to eight.

Active filters have increased in popularity in recent years, not only because of their effectiveness, but also because of the abundance of inexpensive operational amplifiers that may be used in their construction. Many amateur operators firmly believe that when an active filter is used for improving receiver selectivity, the audio band-pass characteristics offer an advantage over filtering at the i-f level.

There is one drawback involved in the construction of some active filters; that is the problem of selecting proper component values. A one percent or better tolerance requirement may be in order. Is there an alternative? Yes, indeed! Let me introduce you to the ABC circuit.

Two General Configurations

While there are many commonly used configurations for active filters, they generally fall into one of two main categories. In one case, the feedback path returns to the negative, inverting input where the gain of the amplifier is usually

presumed to be infinite. In the second arrangement, the feedback path returns to the positive, noninverting input where the gain is considered to be unity.

Single- and multiple-path configurations are to be found in each category. The circuit in Fig. 1 uses a single feedback path falling into the second category. The circuit Q is a function of all component values. Multipole filters are usually made by cascading several of these two-pole

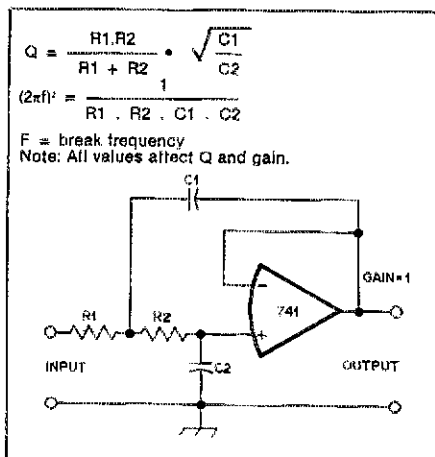


Fig. 1 — A popular active-filter circuit. The IC in this circuit and those of Figs. 2 and 3 may be either a 741, general-purpose operational amplifier or a type LM-201A, high-performance, operational amplifier or equivalent. Fixed resistors, when used, are 1/4 watt. See text regarding Q and circuit values.

*224 Oak St., E. Hartford, CT 06118

stages. Each stage usually requires a different Q. This amounts to employing different resistor and capacitor values for each stage. In other words, no two values are the same.

While playing with the circuit equations one day, an interesting situation became apparent. The Q of the circuit was found to be a function of stage gain when the gain is greater than unity. The break frequency (the frequency at which attenuation of the filter comes sharply into play) is not affected by stage gain. Therefore, the break frequency can be selected by choosing all resistors of equal value and all capacitors that have equal value. Adjusting the gain with R_g varies the Q. Refer to Fig. 2.

Selecting Components

As you compare Figs. 1 and 2, you will observe that Fig. 2 represents an adaptation with Fig. 1. The formula associated with Fig. 1 may be considered the more complex case even though the configuration of this widely used circuit is simple. In Fig. 2, the two fixed resistors are labeled R, indicating that whatever value is selected for one resistor must apply also to the other resistor. Furthermore, both capacitors in Fig. 2 must have identical values.

With the unity-gain circuit of Fig. 1, component mismatch not only results in a change of break frequency but also a change of Q, which usually degrades circuit performance. Close tolerances are required. In contrast, the ABC circuit shown in Fig. 2 provides a means of counterbalancing a change in Q by the adjustment of R_g . In fact the Q is adjustable from one-half to such a high value that oscillation can be produced. By shorting the input, the ABC circuit may be made into a simple oscillator.

I have found the ABC circuit most handy for building constant-amplitude (Butterworth) filters which require equal break frequencies at each stage with only the Q values being different. (The Chebyshev filter, on the other hand, requires different break frequencies for each pole pair or stage.)

As a guideline to construction, one should keep in mind that the individual R values and the individual reactances of the capacitors should be kept within the range of 1000 to 100,000 ohms. An example of typical component values might be $R = 5000$ ohms and $C = 0.1 \mu\text{F}$. This combination will produce a break frequency of approximately 300 Hz. Likewise, a 3-kHz filter may be constructed with a $0.01\text{-}\mu\text{F}$ capacitor and an R value of 5000 ohms.

When applying the formula to the design of an ABC filter, choose a standard value for C. The chart on page 34 of *The Radio Amateur's Handbook* for 1978 can be helpful in making this selection. Next, solve the equation for R. The break

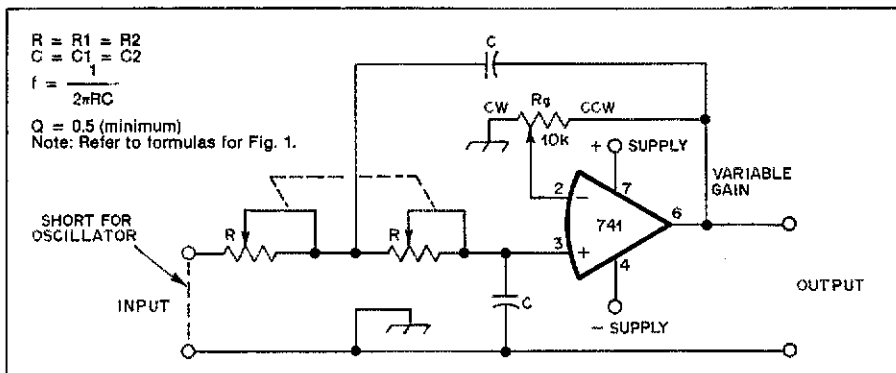


Fig. 2 — The ABC low-pass filter. Optional ganged variable resistors, as shown, provide the filter with a variable break frequency. By shorting the input connections, the ABC filter becomes an oscillator. Pin numbers shown above are for the 8-pin type 741 IC and apply also to Figs. 1 and 3. The dual polarity power supply returns are referenced to common. Voltages may range from 9 to 15 V.

frequency for the filter must be selected previously. Because the computed R value may be an odd figure, the nearest standard-value resistor should be used. If five-percent-tolerance components are to be installed in the filter, the completed unit can be expected to produce a break frequency that is likely to be within seven percent of the desired break frequency. No severe loss of performance is likely to occur, however, even if components have as much as a 20-percent tolerance. In the latter case, the break frequency will be slightly different from that of the calculated value.

Circuit Q

For both active and passive filters the circuit Q, and more particularly the Q of the capacitors, has a definite bearing on the operation of the filter. Where moderate-to-high selectivity is required from a filter, high-Q capacitors are desirable. This is true for tuned rf circuits as well as for audio-peaking or rejection applications.

Normally, one may expect capacitor Q to be relatively high because the losses of modern capacitors are generally low. Such is not true, however, for inductors. That is the main reason why in audio circuits RC active filters are preferred over the LC passive units.

How do you know when you have the proper Q? It can be calculated mathematically, but the easiest way is by trial and error. The procedure is simply to use a signal generator in conjunction with an ac VOM or an oscilloscope to observe the frequency response. Some of the inexpensive VOMs even have the meter scale calibrated in decibels.

For cascaded multistage configurations, a good design practice is to provide the first stage with the lowest Q and each following stage with a progressively higher Q. If the first stage should have the highest Q, some input signals may tend to

overdrive succeeding stages.

In Conclusion

A good choice for the operational amplifier to be used in an active filter is the 741. What is particularly good about this IC is that it has internal compensation for increasing stability.

Interchanging R and C components results in a high-pass filter. Cascading low-pass and high-pass sections results in a band-pass filter. The upper frequency range is limited only by the characteristics of the amplifier being used.

The ganged variable resistors shown in Figs. 2 and 3 are optional. Their use provides a filter with a variable break frequency. Fig. 3 is presented simply to illustrate the high-pass filter configuration.

I have used the ABC design many times over in such applications as suggested at the beginning of this article. The frequency coverage has ranged from dc to 20 kHz. Results have always been most gratifying. For the amateur who has need for an active filter, I heartily recommend the ABC. Construction is as simple as that!

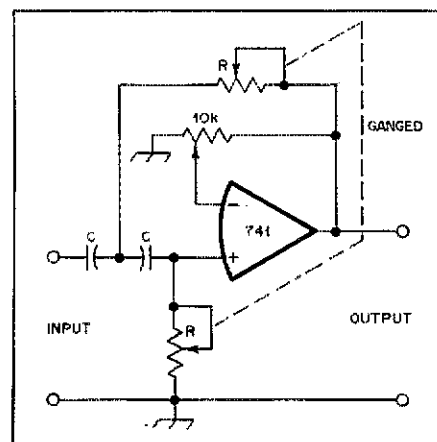


Fig. 3 — The ABC high-pass filter. Potentiometers may be ganged for a variable break frequency.

Producing Weather Satellite Pictures at Lower Cost

Get the FAX! Buy now! Pay later! Sounds almost like a sales pitch. Nevertheless, a Telefax machine will provide you with the main ingredient for producing easily affordable weather satellite pictures.

By Lindsay R. Winkler,* W7AVE (ex-W6WMI)

The fascination of seeing pictures from American and Russian weather satellites excites you. Back at the ranch, telephone in hand, you locate the needed facsimile equipment. Not many weeks later, the device delivered and installed, you see the first prints roll off the machine. Full satisfaction is apparent from your Cheshire-cat grin. In time, however, the resulting dent in the family budget grows. What to do? Cast dismay aside and read on!

My recent retirement at a time of sharply rising costs induced second thoughts about operating expenses at my very active APT (Automatic Picture Transmission) station. A careful study of cost factors led to the revitalization of a Western Union Telefax system described in *QST* nearly three years ago, and in *Specialized Communications Techniques for the Radio Amateur*.¹ For superior picture reproduction, I switched to photographic paper, a move that led to side-by-side visual and infrared pictures. With three pairs of pictures being produced from each 8- × 10-inch photographic sheet, the cost of individual prints dropped to 9.3 cents. However, hum and noise plagued the pictures. The solution was delayed by a change of residence.

Reworking the Telefax System

Upon resumption of work on the Telefax system, unused wiring and components were removed from the chassis. A light gun was built around the rather expensive Sylvania R-1168 crater tube.² An

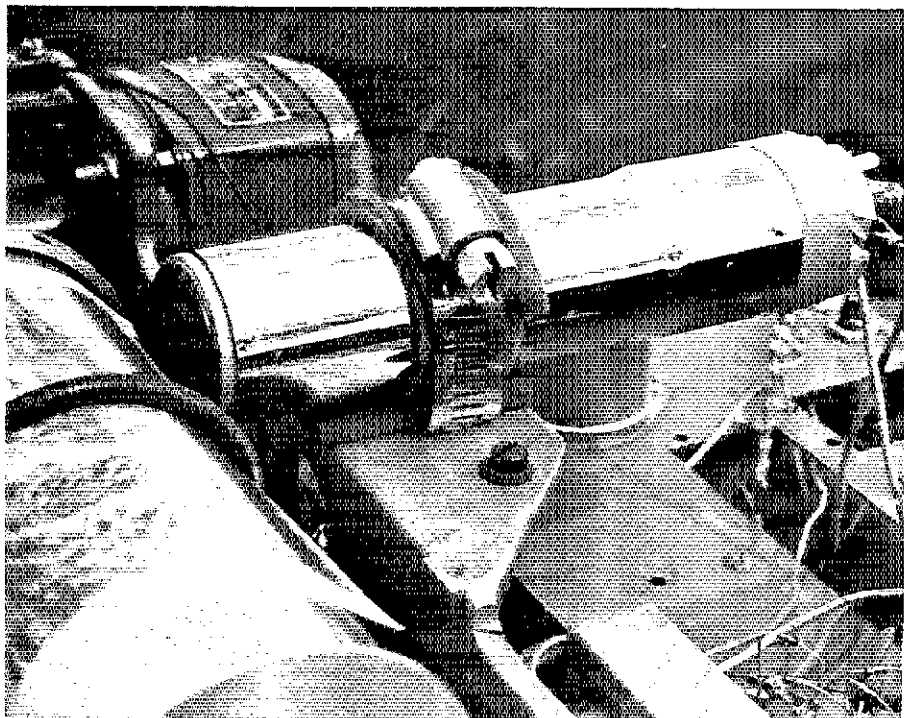
old microscope eyepiece, labeled 50X, was mounted in a five-inch length of 1-1/4-inch brass sink tailpipe. The pipe interior was painted black to reduce reflections. Fortunately, the base of the R-1168 fits easily into the expanded end of the tailpipe, from which an octal socket protrudes. The microscope eyepiece (eye-end out) is placed at the opposite end of the tailpipe after increasing the diameter of the eyepiece with masking tape. No additional aperture is needed.

The light gun is supported by a stainless-steel worm-screw hose clamp,

obtainable at hardware and automotive stores. Holes drilled into the band coincide with holes formerly used to hold the original Telefax telescope. A 1/8-inch Masonite spacer and a wrapping of felt protects the light gun from screws inserted to hold the band in place. The gun is clamped firmly in place by adjusting the worm screws after focusing.

While focusing, the light spot will appear slightly above the center of the drum. Focus should favor the violet end of the spectrum, which means the lens should be a bit closer than apparent focus. For the

The light-gun assembly on the author's modified Telefax unit. A Sylvania R-1168 crater tube and a 50X microscope eyepiece are housed in the chrome-plated enclosure.



*Rtc. 1, Box 209, Walla Walla, WA 99362
¹Footnotes appear on page 34.

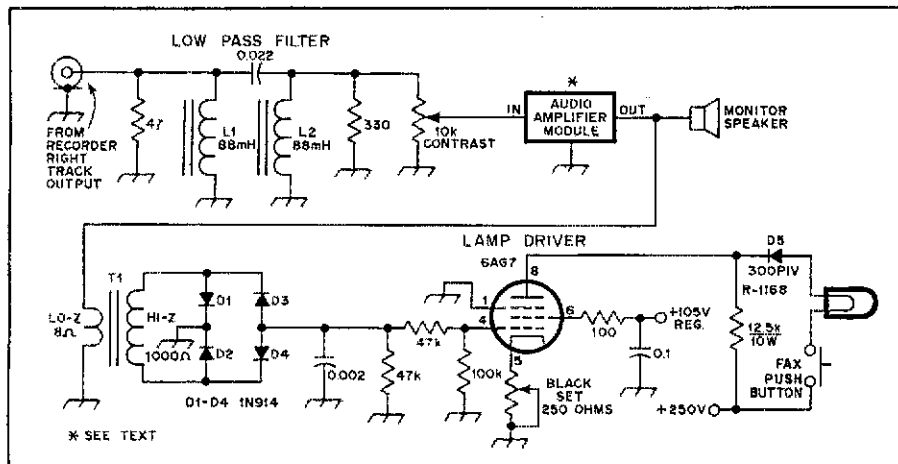


Fig. 1 — Hum and noise appearing in Telefax pictures are reduced by the filter section of this diagram. A 1-watt Radio Shack amplifier overcomes filter insertion loss. The lower portion illustrates the lamp driver circuit. Resistances are in ohms; k = 1000. Capacitances are in microfarads.

final test, odd pieces of photo paper should be used and then examined under a reading glass after processing. Sharp, nonoverlapping lines are needed for good, crisp pictures.

The electronic circuit in Fig. 1, constructed with original sockets and components, is built onto the FAX chassis. No changes were made in the power supply. With only minor socket rewiring, the 6V6 stylus driver is replaced by the rather obsolete 6AG7, which now serves as the lamp driver.

Several functions are handled by the push buttons. The green or incoming button controls the drum-advance motor and the R-1168 lamp. When the lamp is turned off (automatically or by means of the stop button), the buzzer is activated. The white button is used to deactivate the buzzer. The red button is seldom used.

Noise and Hum Suppression

Incorporation of a high-pass filter, con-

structed from data in *The Radio Amateur's Handbook*, suppressed the previously mentioned noise and hum. A 1-watt Radio Shack audio amplifier compensated for insertion losses from the filter. See Fig. 1.

Omission of the redundant infrared picture permits six pictures of snapshot size to be obtained from a 28-cent sheet of polycontrast rapid RC paper. This slides the cost per picture to 4.6 cents and each photograph can contain a 10-minute portion of a NOAA pass.

When preparing the unit for use, double-stick tape (Scotch) is aligned to the right of the index line. Two other short lengths are placed on the opposite side of the drum to catch the two corners of the half-sheet. The RC paper has a high affinity to fresh Scotch tape. Therefore, when new tape is applied, the tape should be rubbed with one's fingers to reduce this tendency.

Telemetry information appears at the

right side of the picture when correct framing is achieved. This adjustment requires the use of an oscilloscope. Other operating tips include use of a low-power (10-25X) hand microscope to resolve cloud structure details. One should avoid limiting cloud peaks and washing out detail. Resist riding the video control like the plague! High-quality audio tape, such as Scotch 207, is a must for recording satellite transmissions.

Improving the Stylus Method

Satisfaction with the improved performance of the Telefax sparked more curiosity. What about the original Western Union stylus method of producing pictures? Could that be upgraded? W6KT and his son, W6JQR and I agreed on the possibility. From their drawing board came one modification design; from mine another. Each "remodulator" was different, but in the end the results were equivalent. Figs. 2 and 3 illustrate the difference.

Preparation for this modification also requires removal of such components as the signal-line transformer, relays and those parts associated with the transmitting amplifier no longer needed. Refer to the schematic diagram on page 472 of *The Radio Amateur's Handbook* for 1977, or *Specialized Communications Techniques*, page 80.

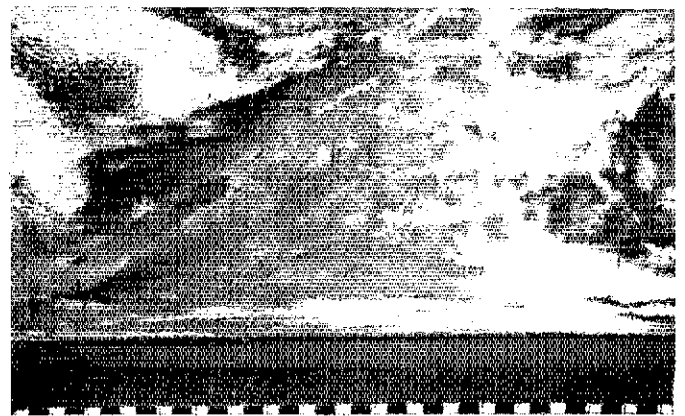
The ac amplifiers of the Telefax require an ac subcarrier modulated opposite the satellite carrier. The answer: Provide a new 10- to 12-kHz subcarrier plus a remodulator and presto — white clouds appear.

Once completed, my transistorized remodulator was installed outside the Telefax between the filter output (Fig. 1) and the internal recording potentiometer of the Telefax. The unijunction oscillator, Q3, provides a new 10-kHz subcarrier that is fed to point X through Q2 and a 10-kΩ isolation resistor. Transistor Q1 is biased by R4 to the point where the 10-kHz sub-

A view of Baja California and Mexico through "Russian eyes." The twin 60-line pictures were made by the method described, using Teledeltos burn-off paper. (The right edge of each of these photos is the leading edge as it comes from the Telefax.) (W6KT photo)



Cloud-covered Sierras and Lake Tahoe appear in the north. The Sierras, Salton Sea, and the Gulf of California form a characteristic line. The Imperial Valley is visible between the Salton Sea and the Gulf. A reading glass makes these clear.



carrier measured at point X just begins to drop. The positive voltage from the APT signals, applied from the demodulator diodes to the base of Q1, increases conduction of Q1 to reduce the voltage at point X. In turn, the black produced at the stylus is diminished. Maximum APT signal produces minimum stylus current and white clouds in the pictures.

The Stylus Is the Key

Good picture results depend on the stylus. For clarity, the original WU 0.009-inch diameter stylus is strongly recommended.⁴ Use of the original "burn-off" or thermal paper further reduces the expense of producing acceptable pictures. There is some reduction in picture quality by this method, but it does provide a rapid, no-development means of monitoring our NOAA and the Russian Meteor satellite transmissions.

Excellent pictures have been taken from Meteor 2-2, now functional on 137.3 MHz. The 120-line video is recorded at 1-7/8 in./s on the right track of the tape recorder, while the 20-Hz standard ac is recorded on the left track. Playback is at 7-1/2 in./s. This arrangement permits production of two side-by-side 60-line pictures of good quality.⁵ The drum is turned at 240 rev./min by the amplified 80-Hz standard signal generated by playback of the 20-Hz recorded signal at four times the original recording speed.⁶ The 2.5- μ F capacitor in series with the winding of the Telefax "gray" motor must be exchanged for a 1.6- μ F capacitor at this speed.

The original carriage-motor speed is maintained for printing on both photographic and burn-off versions with some acceptable length/width distortion visible. Carriage motors are synchronous, however, and W6KT modified the length/width ratio a bit by running the carriage motor at 50 Hz for the NOAA pictures and at 80 Hz for those from Meteor 2-2.⁷ A voltage-controlled oscillator produces square waves which are converted to sine waves and amplified to the 117 volts required to operate the carriage motor — an optional refinement.

Pictures obtained through this process have high archival value. On a shorter-term basis, one quickly finds that friends and neighbors become enthusiastic to see "what's in the wind!"

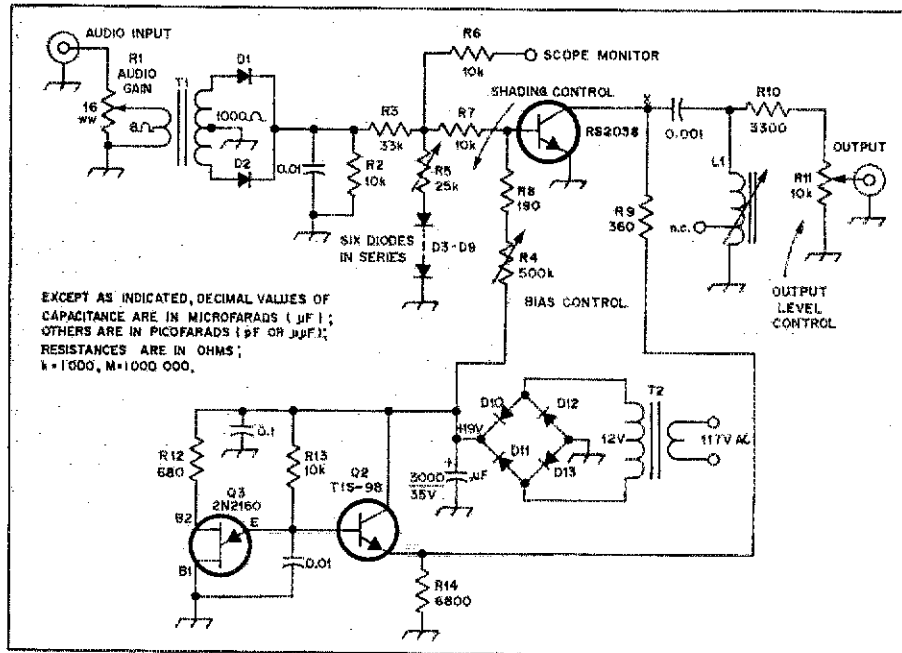


Fig. 2 — The W7AVE transistorized remodulator. Compensation for poor linearity of paper response is provided by this circuit, which has a shaping network consisting of R3, R5 and D3-D9, inclusive. R5 also controls amplification. The number of diodes in the series determines the knee position of the performance curve. L1 is adjustable for best results. Resistors are 1/4 watt.

- D1-D9 — Switching, type 1N914.
- D10-D13 — 1 A, 50 V. Radio Shack no. 276-1101, or equiv.
- L1 — Variable 95- μ H, Miller horizontal-oscillator coil no. H-1034 or equiv.
- Q1 — Rf power amplifier, Radio Shack no. 276-2038 or equiv.
- Q2 — Low-noise general-purpose npn amplifier, Texas Instruments no. T1S-98, Radio Shack no. 276-2009, or equiv.
- Q3 — Unijunction oscillator, Texas Instruments no. 2N2160 or equiv.
- T1 — Audio output, 1000 ct to 8 ohms, Radio Shack no. 273-1380 or equiv.
- T2 — Miniature filament, 12 V, 300 mA, Radio Shack no. 273-1385 or equiv.

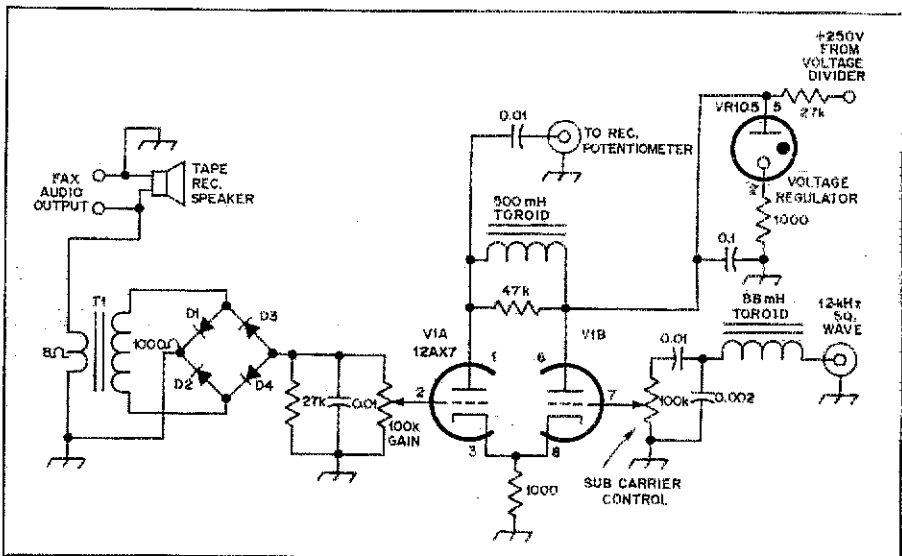


Fig. 3 — A tube version of the remodulator designed and built by W6KT and W6JQR. T1 is Radio Shack no. 273-1380. A 40- μ F capacitor should be added to the Telefax power supply to reduce hum. Connect it between the 5Y3 filament ct and ground. D1-D4 are 1N914s. Refer to the original Telefax diagram as shown in *The Radio Amateurs Handbook* or *Specialized Communications Techniques*. Resistances are in ohms; k = 1000. Capacitances are in microfarads.

Footnotes

- ¹Winkler, "Facsimile Transceiver for Weather Satellite Pictures," Technical Correspondence, *QST*, May, 1974. Also see "Feedback," *QST*, July, 1974.
- ²A three-speed, two-track tape recorder is essential to the operation of the system described therein. Speed changing is required.
- ³The R1130B is much cheaper than the R1168 and should be considered as a replacement. Lamps may be available from these suppliers: (Eastern U.S.) George W. Gates Co., Hempstead Tpk., Franklin Square, NY 11010, tel. 212-347-0787; Central Scientific, 2600 S. Kostner Ave., Chicago, IL 60623, tel. 312-277-8300; (Western U.S.) Universal Light Source, 1553 Folsom St., San Francisco, CA 94103, tel. 415-626-1213.
- ⁴Western Union styli are unavailable. Carbon steel

wire no larger than 0.009-inch (from either a fine wire brush or a section of piano wire) or a guitar string may be used. The maximum size of 0.009 inch seems very important to good reproduction. Since one of the two identical pictures will always be entire, one need not phase the Meteor pictures. The "Magic Tape" method of splicing will make the second picture available as well. The Meteor synchronization method is essentially

the same as that for the NOAA pictures. Compare this information with the more detailed description in Footnote 1 above. The 240-line Meteor mapping satellites on 137.15 MHz may be printed out by recording a 40-Hz tone along with the picture, then doubling the speed on printout. These satellites have excellent land/water resolution but are not always operational over North America.

A Low-Cost Burglar Alarm for Home or Car

How many times have you wanted to install a burglar alarm? Probably plenty! WA6MBP tells how you can at a savings of many bucks. And your spouse will think you are an electronics whiz.

By Jerry D. Arnold,* WA6MBP

After having my apartment broken into and my desk rifled (but fortunately, no ham gear stolen), I decided that it was time to install a burglar-alarm system. And, following a journey to a local vendor of such appliances, I was "alarmed" to find out some of the prices for systems. Necessity being the mother of saving the checkbook, I went to work to design something usable.

My ultimate design was to have an alarm that would (1) trigger automatically when any door or window was opened; (2) allow time to get inside and shut it off before sounding, or let the alleged thief get inside to "catch his hands in the cookie jar"; (3) sound the alarm for a preset period of time, then reset the entire system; and (4) (most important), save me a bundle!

With these features in mind, I almost decided to hire a trained German shepherd. But I continued to mull the problem over until I thought about an IC-timer chip or, more correctly, two timer chips. The design I came up with is so simple, I wondered why it hadn't appeared before. What I ended up with was two one-shot, or monostable timer chips (NE555), the first triggering the second and the second driving the alarm bell.

Circuit Details

The basics of the circuit, Fig. 1, are like this. A negative-going pulse supplied by any door or window switch is coupled to pin 2 of U1, the trigger input, through C1, R1 and R2. This enables the first timer, which is the "entry delay time." I chose an RC time constant of approximately 20 seconds, C2 and R3. At the end of this 20-second time period, a negative pulse

from pin 3 of U1 (output) is applied to the trigger input (pin 2) of U2 through C4. This enables the second timer, driving the output high. The output has a small low-current relay in series (K1), which is energized as the output goes high. The relay contacts have the necessary voltage for the alarm bell on them.

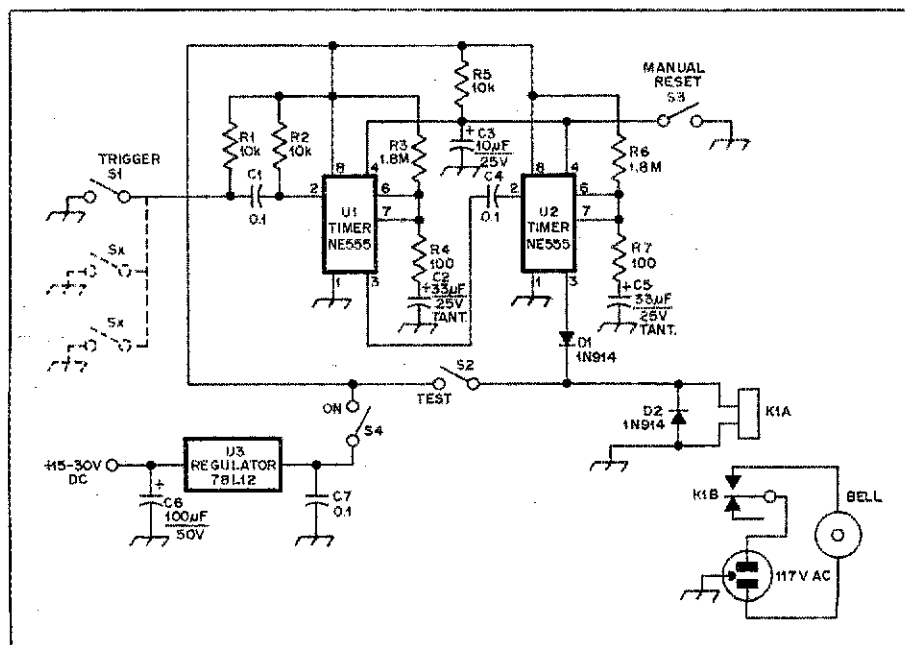
The time constant for the second timer (R6 and C5) is the "alarm sounding time." I chose about one minute, but this, like the first timer, can be altered to suit your own particular needs. I found that shorter than one minute did not seem to be long enough to attract attention from any appreciable distance. And longer than

a minute-and-a-half to two minutes gets on people's nerves, regardless of whether they actually saw any thief.

Construction Details

The entire electronics package (minus the relay and bell) was housed in a small metal box and hidden under a sofa. The box has an on-off switch, a reset button, a test button, and connectors for the output and trigger input. In my particular setup I used a magnetic door switch to provide my negative pulse. The relay is located with the alarm bell (Radio Shack no. 273-020) in a weatherproof box outside. I did this because the bell was 117 V ac, and

Fig. 1 — Circuit diagram of the WA6MBP burglar alarm. See text for additional details.



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I didn't like the idea of running 117 V around through lightweight wire at the baseboard. The NE555 will drive a load up to 220 mA, so any small relay will suffice, such as Radio Shack no. 275-003.

For power I used a small battery-charger type of supply that I had on hand, but any small supply could be used as the current drain is very low. I also used a small three-terminal regulator, but this is really just a frill; very satisfactory results can be had without it, but I do not recommend higher than 18 V dc. I employed point-to-point wiring using a piece of Vectorbord, but, if desired, a pc board could be made.

A test button is included on the box to check alarm operation. All the switch does is apply voltage to the relay line to energize the relay, ringing the bell. A push-button switch is used to reset manually the entire system if it is desired to do so when returning to the house and wanting to leave the alarm system in

operation. So far I have not caught any burglars, but I did have one scare: when I came home and forgot the alarm was on!

This article was not written to be a build-it-just-like-this project, but rather to give some food for thought on this subject, showing just one of the many possibilities from this type of IC. With the price of a commercial alarm system ranging anywhere from \$50 to \$300, it's nice to know that you can build an alarm system of your own that will do everything a commercial system does for under \$25, even if everything is bought brand new. With people lamenting the fact that building is a dying art and that parts aren't available, I was able to find everything for this project at a local Radio Shack store. I first perused my junk box and came up with the power supply, relay, Vectorbord, switches and resistors, so all I had to buy were a couple of inexpensive tantalum capacitors, the 555s, bell and a Minibox.

I'm sure that many refinements could be added to this system, but for now, it fills the bill nicely. Try it yourself! 



Feedback

□ A review of the procedures used in checking the entries in the 1977 ARRL DX Competition has shown that in at least two instances, credit for a claimed contact was disallowed without there being sufficient evidence that the contact did not take place. At this late date, and in fairness to all participants, it has been concluded that the only practical way to proceed was to declare an amnesty for all entries which were disqualified in this competition.

All participants in the 1977 DX Competition were notified that they were eligible to participate in this year's contest. Additional awards will be made as appropriate.

Headquarters regrets the necessity of this action, and extends its apologies to the contest community.

See the tables at right for adjusted scores and ranks.

□ In the "Crowbar-Proof 12-V Power Supply" (Watts, August 1977 QST, page 36), Q1 should be shown in Fig. 1 as a HEP type S5005, not a HEP 5003.

□ The photos of Linda Fuller and Sharon Toal were inadvertently switched in "YL News" for April. Sharon is the one holding the Saint Bernard.

□ The new call of ex-K8AKC, as reported in West Virginia "Station Activities" for April, is N8LW.

□ In the April Public Service Diary of "Public Service," the aircraft search in Tell City, IN, involved the Owensboro, KY, ARES rather than the Evansville, IN, ARES.

Adjusted Scores (1977 ARRL International DX Competition)

CW
Single Operator
 Eastern Massachusetts
 W1ZA (K1EA, opr)
 1,928,160-2080-309-C-88
 N.Y.C.-L.I.
 W2GGE 843,258-1138-247-C-56
 WA2YHK 732,108-988-247-C-67
 Northern New Jersey
 K2BMI 1,381,788-1572-292-C-81
 Eastern Pennsylvania
 W3RJ (K3DZB, opr)
 1,590,528-1744-304-C-81

Multi-Single

Eastern Pennsylvania
 W3BGN (+ N3AD, W3IGQ)
 2,200,380-2170-338-C-96
 WA3YGH (+ K3JGI, WA3YHT)
 922,554-1437-214-C-96
 Northern Florida
 WA4UFW (+ WB4YKU)
 178,860-542-110-C-80
 Santa Clara Valley
 K6MA (+ WA7RKR, net)
 401,811-887-151-C-45

Multi-Multi

Eastern Pennsylvania
 K3WW (+ K3UEI, K3WJV, W3HXK, WA3LNM)
 3,105,360-2724-380-C-98
 Maryland
 W3AU (+ CX1EK, WA2LQZ, K3EST, W3IN, WA3HRV)
 5,030,880-3760-446-C-98
 East Bay
 WA6NGG (+ N6VV, K6PJY, WA6FWJ)
 1,494,588-2111-236-C-98

Low Band

Connecticut
 WA1LNQ 337,842-822-137-G-52

PHONE

Single Operator
 Eastern Pennsylvania
 W3WJD (WA3LRO, opr)
 3,378,420-2740-411-C-88
 W3RJ 2,817,776-2226-392-C-80
 Los Angeles
 W6RTT 393,588-754-174-C-20

Multi-Single

Eastern Massachusetts
 W1ZA (+ K1EA, W1NJL)
 2,605,932-2268-383-C-98

Adjusted Club Scores (1977 ARRL International DX Competition)

Club	Score	Entries	Rank
Potomac Valley RC	70,468,272	99	1st
Frankford RC	64,591,608	86	2nd
N,CA DX & Contest Coop.	37,438,881	101	4th
NE Contest Club	18,579,360	41	7th (was 8th)
Wireless Inst. of the NE	15,453,863	43	9th
S,CA Contest Club	11,193,219	22	10th
Order of Boiled Owls of NY	4,935,363	14	13th (was 15th)
NFL DX Assn.	1,143,414	9	30th (was 33rd)

Product Review

Radio Shack TRS-80 Microcomputer

Why review a computer in an amateur radio journal? Two reasons: There are some very practical day-to-day uses of computers in amateur stations (at least in some stations) and a growing number of ARRL members are expressing interest in "home" computer systems. The former reason includes esoterics such as satellite tracking, contest operation and remote control of repeaters, and the not-so-esoterics, such as simple logging. All can be done using methods other than computers, but computers can simplify the routine. The latter reason came out in a recent survey of U.S. amateurs which showed that many are now involved with "home" computers, while lots more are interested.

The TRS-80 is an appliance-operator's dream. When you remove it from the shipping carton, simply connect the proper cables, plug it in, turn it on, and begin programming (if you already know the BASIC language). BASIC is an acronym for Beginners All-purpose Symbolic Instruction Code, the form of computer language used with the TRS-80. BASIC uses

English words or abbreviations and math symbols.

The system consists of the power supply, tape recorder, video display, keyboard/central-processing unit and, perhaps most important for the beginner, the user's manual. The manual is an excellent programmed-learning text that takes the beginner from ground zero through BASIC programming, debugging techniques and advanced subroutines. It is clear, concise and precise; but at the same time it has been written with enough charm and wit to enable the seasoned pro to speed through it without falling asleep. The author, Dr. David A. Lien, is to be congratulated for his text.

What Will It Do?

The TRS-80 with Level I language will handle any problem that can be solved using the BASIC statements shown in the table. These, combined with 26 possible number variables, up to 876 array locations, two string variables and the storage/retrieval cassette system, allow the user quite a bit of freedom in programming

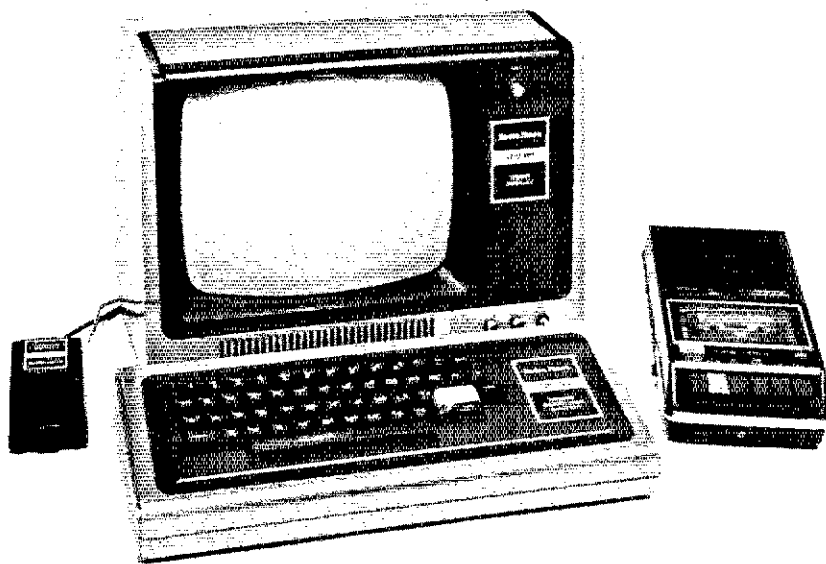
for a microcomputer in this price class. If you are used to a four-function \$7 calculator, that probably seems like a lot; if you routinely tie up an IBM-370 for hours, then it will seem very inadequate.

The TRS-80 can best be described as adequate for most of the things that a typical "home" computer user would want to do. (There are options which make the system far more powerful.) Also included in the Level I BASIC are the standard logic operations including parentheses, IF-THEN, GOTO, GOSUB, etc. The manual contains complete programs for subroutines of square roots, exponentiation, logarithms, and exponential and trig functions if the need should arise. These subroutines are accurate to five or six decimal places over much of their allowable range, which is accurate enough for most applications (although not nearly as accurate as the other functions already built into the TRS-80 BASIC). Table 1 contains a listing of the TRS-80 Level I BASIC statements/commands.

The manual includes a number of programs

Table 1
Summary of Level I BASIC

Statements/ Commands	Purpose	Statements/ Commands	Purpose	Statements/ Commands	Purpose
NEW	Clears out all program lines stored in memory.	IF-THEN	Establishes a test point.	MEM	Returns the number of free bytes left in memory.
RUN	Starts program execution at lowest-numbered line.	FOR-NEXT	Sets up a do-loop to be executed a specified number of times.	INT(X)	Returns the greatest integer which is less than or equal to X.
RUN###	Starts program execution at specified line number.	STEP	Specifies size of increment to be used in FOR-NEXT loops.	ABS(X)	Absolute value of X.
LIST	Displays the first 12 program lines stored in memory, starting at lowest numbered line. Use ↑ key to display higher numbered lines (if any).	STOP	Stops program execution and prints BREAK AT ### message.	RND(θ)	Returns a random number between 0 and 1.
LIST###	Same as LIST, but starts at specified line number.	END	Ends program execution and sets program counter to zero.	RND(N)	Returns a random integer between 1 and N.
CONT	Continues program execution when BREAK AT ### is displayed.	GOSUB	Transfers program control to subroutine beginning at specified line.	+	Addition
PRINT	Prints value of a variable or expression; also prints whatever is inside quotes.	RETURN	Ends subroutine execution and returns control to GOSUB line.	-	Subtraction
INPUT	Tells computer to let you enter data from the keyboard.	ON	Multiway branch used with GOTO and GOSUB.	*	Multiplication
INPUT	Also has built-in PRINT capability.	AT	(Follows PRINT) Begins printing at specified location on display.	/	Division
READ	Reads data in DATA statement.	TAB	(Follows PRINT) Begins printing at specified number of spaces from left margin.	=	Assigns value of right-hand side to variable on left-hand side.
DATA	Holds data to be read by READ statement.	SET	Lights up a specified graphics location on display.	<	Is less than
RESTORE	Causes next READ statement to start with first item in first DATA line.	RESET	Turns off a specified graphics location on display.	>	Is greater than
LET	(Optional) Assigns a new value to variable on left of equals sign.	POINT	Checks the specified graphics location; if point is "on," returns a 1; if "off," returns a 0.	=	Is equal to
GOTO	Transfers program control to designated program line.	CLS	Turns off all graphics locations (clears screen).	<=	Is less than or equal to
				>=	Is greater than or equal to
				<>	Is not equal to
				A through Z	Take on number values.
				A\$ and B\$	Take on string values
				A(X)	Store the elements of a one-dimensional array.
				<i>Logical Operators</i>	<i>Function</i>
				*	AND
				+	OR



The TRS-80 system consists of the video display (monitor) which has a 12-inch screen (measured on the diagonal), the keyboard control/processing unit (sitting in front of the video display), the power supply (left), and cassette tape recorder. (The instruction manual is not pictured here.) Programs and data may be stored on cassette tape.

ready to be typed into the TRS-80 including one for designing a cubical quad antenna. The program even computes theoretical gain figures! Several other game and business-related programs can be copied directly from the manual. We wrote a program to compile and sort data relating to the amount of time that Hq. employees spend on various tasks. These tabulations are needed for certain records that must be maintained. Additionally, we prepared a number of programs related to OSCAR 8 and its orbits. This was done with just the standard unit (4 kilobytes of RAM and BASIC Level I), although the program for OSCAR 8's orbits would have been simpler with the BASIC II option. Other programs written by Hq. staffers include "tic-tac-toe," "family budget," and some fancy graphics displays.

Overall Impressions

If you are a computer "appliance operator," then you will want to consider the TRS-80 system. The system is ready to go as soon as it is unpacked. Should the TRS-80 ever need servicing, Radio Shack has a complete service facility available. One word of warning, though: If you want to enjoy *your* TRS-80, don't let your spouse or children know how easy it is to use, or how much fun it can be!

Technical Stuff

The heart of the TRS-80 is a Z-80 microprocessor chip. ROMs (4096 bytes) contain the Level I BASIC, keyboard-scanning routines, video-display drivers and cassette-interface routines. Dynamic RAMs are used for the main storage area with the standard "4-k" unit providing 3583 bytes of usable storage. The video-display logic generates the necessary video and sync signals to form 16 lines of 64 alphanumeric characters. To allow for expansion of memory and the addition of options, an expansion port has been supplied.

Included in Radio Shack's BASIC Level I are some commands not usually found in "4-k BASIC." These additional functions control

the graphics display formatting. Other than these unique commands that have been added to the standard BASIC language to enhance its programming capability, there are a few differences (that we could find) between the TRS-80 BASIC and Dartmouth BASIC. The two languages are compatible, according to Radio Shack. Several optional shortcuts or "shorthand" commands have been provided in the TRS-80 BASIC, however, allowing the user to conserve memory space when writing programs.

A special feature of interest to those who are new to the world of computers is the TRS-80's automatic debugging scheme. This consists of preprogrammed software inside the computer which spits out WHAT, HOW and SORRY statements when you make a boo-boo. The system is almost foolproof! If you ask the computer (in a program statement) to do something that it cannot do, it simply returns with the appropriate statement. WHAT means it doesn't understand the command in question either because of improper grammar or because the command is not in the computer's vocabulary. HOW tells you that although the computer understands the command, it cannot carry out the action because you have exceeded some limit or because something is missing. An example would be telling the computer to GOTO a line number which is nonexistent. Finally, a SORRY reply informs you that you have run out of memory, and therefore can't continue to add program statements.

This nifty system of debugging not only saves you time when you are debugging new programs, it also teaches you what you can and cannot do, so you can practically "learn as you program."

It is possible that the radio amateur who plans to use the TRS-80 in conjunction with his ham station could encounter some problems. The writer noticed that the TRS-80 seemed to generate rf-noise which was quite pronounced on a 2-meter fm rig when the computer was operated within a few feet of the indoor 2-meter fm antenna. This noise was not detect-

able with the same receiver installed in the car when the car was parked roughly 35 feet from the computer. Although we lack the facilities at ARRL hq. to make quantitative measurements of rf-leakage radiation, a look at our spectrum analyzer with its input connected to a short antenna not far from the TRS-80 showed a broad band of noise-type energy extending to above 100 MHz. Depending on the location and the method of coupling the TRS-80 into the ham station, receivers could suffer when it comes to pulling in weak signals.

One staff member who used the TRS-80 in his home also mentioned that the video monitor of the system was sensitive to rf from amateur transmissions in the hf bands, and that on one occasion errors in the program itself were introduced during the presence of rf. On the other hand, the TRS-80 has been used here at ARRL hq. extensively with no noticeable aberrations in operation while the eight transmitters of WIAW are simultaneously on the air (WIAW does have a pronounced effect on some other office equipment). Presumably, installing extensive shielding and bypassing would alleviate both of these problems. Radio Shack Headquarters has been advised of these situations, so later production units may be improved in this regard.

One *important* caution should be stressed here. The TV monitor of the TRS-80 system is transformerless, with one side of the chassis connected directly to the 117-V ac line. A polarized power plug is installed on the end of the power cord and due warning regarding the "cheating" of this plug via extension cords and the like is provided in the instructions. But an isolation transformer should definitely be added if direct ground connections are made to the monitor when wiring in other amateur equipment.

Peripherals

As mentioned before, numerous peripherals are available that interface with the TRS-80 system. These include a line printer (\$1300), a hobby printer (screen, electrostatic type, \$600), Mini-Disk (mini floppy, \$500), expansion interface module (\$300), BASIC Level II ROM (\$100), and 16-kilobyte (kB) RAM boards (\$290). Radio Shack is also coming out with a sizable software library for the TRS-80, including payroll, personal finance, home recipe/conversion/directory, and Algebra I, to name a few. All of the above items are currently available.

The TRS-80 as supplied from Radio Shack can support up to 16 peripherals using its 40-pin expansion port located at the rear of the cabinet. If you are a prospective buyer of a TRS-80 system, you should be aware of the hardware and software necessary to support some of the accessories mentioned. The line printer and the Mini-Disk require and are supported by Level II BASIC. The expansion interface unit is also necessary before the line printer or Mini-Disk can be hooked up.

QST plans to carry a review of the TRS-80 Level II BASIC, but for those of you who are impatient, here are a few of the added features listed by the manufacturer: edit mode, PEEK, POKE, trig and scientific functions, 22.5-dimensional arrays, extended string functions and PRINT using format.

The TRS-80 system is capable of supporting a total of 12 kB of ROM and 48 kB of RAM including that contained both within and outside the keyboard/microprocessor cabinet. A total of 12 kB of ROM and 16 kB of RAM will fit

inside the integral cabinet; additional RAM can be located inside the expansion-interface cabinet.

Additional products and programs are being developed by Radio Shack to augment the TRS-80. The current price class of the TRS-80 system shown is \$600. For more information contact a Radio Shack store or write Tandy Computers National Advertising, 1 Tandy Center, Fort Worth, TX 76101. — *NIUM*

KANTRONICS 8040-B RECEIVER

Billed as the "Lightweight Champ," the 8040-B receiver is an inexpensive alternative to the high prices of most new hf amateur gear. This direct-conversion receiver covers 100 kHz on each band, 80 and 40 meters, covering the entire Novice segment in each case.

Actually, the 8040-B converts frequency twice on 40 meters, as Fig. 1 illustrates. The incoming signal on, say, 7050 kHz, is routed to the 40-to-80 converter. There it is mixed with a 3.4-MHz signal using a dual-gate MOSFET mixer. The resulting 3.65-MHz output is fed to the tuned rf amplifier which serves as the first stage of the actual receiver. After amplification the 80-meter signal enters another dual-gate device, where it is beat against the signal from the 3.65- to 3.75-MHz variable-frequency oscillator (VFO).

The VFO in the 8040-B is of the Colpitts variety and uses an FET as the active device. It is designed to be relatively stable, utilizing polystyrene capacitors in the voltage divider section, and a negative temperature coefficient capacitor (NP0 type) in the tuning network. A 2- to 14-pF air variable capacitor tunes the VFO.

The output of the MOSFET mixer is a combination of the two input signals, the sum of those signals, and the difference between the signals. The difference is in the audio range, so a low-pass filtering network follows the mixer stage. This filter passes the audio while present-

Yes, the 8040-B receiver really is almost as small as it looks here. It weighs about as much as a loaf of bread.

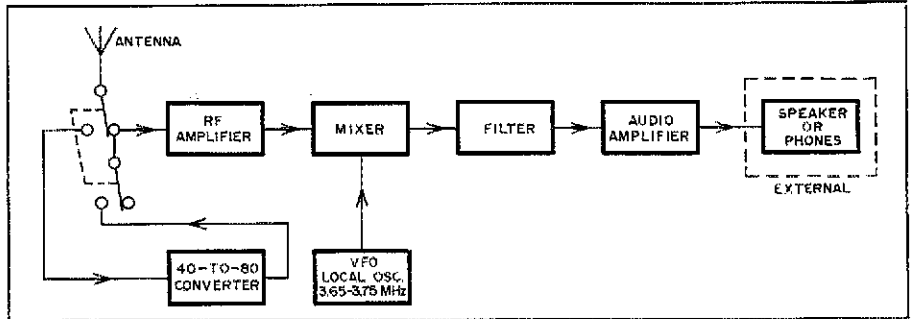


Fig. 1 — Block diagram of the 8040-B receiver.

ing a high impedance to the rf components of the mixer output.

The audio portion of the signal, containing the intelligence we wish to hear, is amplified by an integrated circuit and fed to the headphone jack on the rear apron. There is no internal speaker. The 8040-B has both audio and rf gain controls, with the former placed in the circuit between the audio filter and the IC amplifier and the latter just ahead of the rf amplifier stages.

Two 9-volt transistor batteries supply power to the receiver, and are mounted inside the enclosure. The antenna jack on the rear panel is of the Motorola type such as found on car radios. This makes quick connections somewhat difficult if one normally uses standard coaxial cable fittings.

Kantronics supplies a tuning wand with the 8040-B to tweak the tuned circuits in the converter and rf amplifier stages. The receiver is designed to operate with any low-impedance antenna, nominally 35-75 ohms, although it will of course work with reduced sensitivity using most anything for an aerial.

An aluminum chassis is used to enclose the 8040-B, the whole package being about the size of a small lunch box. State-of-the-art design is employed, with the use of one IC, one FET and

three dual-gate MOSFETs. All components except switches, jacks, gain and tuning controls are mounted on a single pc board, which is attached to the chassis bottom.

A comparison between this reviewer's Drake R4-B receiver and the 8040-B proved interesting. Few signals could be copied on the Drake receiver which could not be copied on the Kantronics, the main difference being in the selectivity. Of course the Drake, when new, cost five times the 8040-B's 1978 price of about \$80.

Uses for this lightweight compact radio are limited only by the owner's imagination . . . mountaintopping, Field Day operations, something to listen to at the office during lunchtime. The 8040-B is manufactured by Kantronics, Inc., 1202 E. 23rd St., Lawrence, KS 66044, tel. 913-842-7745. — *KITX*

Kantronics 8040-B Receiver

Frequency coverage: 3.65-3.75 MHz; 7.05-7.15 MHz.

Power requirements: Two 9-V batteries.

Dimensions: (HWD) 2.9 × 6.6 × 6.0 inches (74 × 168 × 152 mm).

Audio output: 8-ohm impedance, Motorola-type jack.

Tuning dial: Vernier type.

Sensitivity: One microvolt provides readable signals.*

Selectivity: 1 kHz at 6 dB down.*

*Verified in the ARRL laboratory.



HEATH AMATEUR RADIO NOVICE LICENSE COURSE

The Heathkit Individual Learning Program Novice course recently passed the "acid test" at ARRL headquarters. With absolutely no amateur radio background the Technical Department assistant secretary, Pam Guay, progressed to being Pam Guay, WB1GHH, in a few weeks' time.

Heath's course comes at a time when ARRL-supported license classes are being conducted the length and breadth of the land, so why is there a need for such a study program? It's especially helpful to those individuals who have no class available to them, or who cannot, for one reason or another, attend such classes.

Skepticism about such a course is natural, so Heath offers a clincher . . . a money-back guarantee if the purchaser fails to pass the FCC Novice exam. That's certainly a brave offer in a situation where the manufacturer has no control over *how* the course is utilized.

Aside from a little lunchtime help with the

international Morse code, Pam studied at home exclusively, using the Heath course. Her interest increased as she progressed, and she's now on the air. The once pristine loose-leaf binder containing the written material is a little tattered, the pages dog-eared. Two cassette tapes included with the course are still functional. Thanks in part to the Heath Novice course, the ARRL Technical Department is now 100 percent licensed, and it looks as if we won't get our \$25 back! This course *works* and is recommended to prospective amateurs who must "go it alone." Available from Heath, Inc., Benton Harbor, MI 49022. — *KITX*

LOW-COST COLLINS MECHANICAL FILTER

Amateurs who build their own ssb generators and receivers will be heartened to learn that Collins Radio now has available a modestly priced mechanical filter. The component is intended primarily for the CB market, but the specifications indicate that amateurs should find many practical uses for the filter.

Actually, two filters of this type are available — upper- and lower-sideband types. The upper-sideband unit bears the number 526-9897-010. Center frequency is 456.45 kHz. The lower-sideband filter is designated 526-9939-010. Its center frequency is 453.55 kHz. There is also an a-m type of mechanical filter available, 526-9920-010, center frequency 455 kHz.

In terms of tolerance, the 3-dB bandwidth of the ssb filters is 1.95 to 2.2 kHz. The typical 60-dB bandwidth is rated at 4.5 kHz. The characteristic impedance for the sideband filters is 2700 ohms. A value of 12,000 ohms is specified for the a-m filter. The 3-dB bandwidth for the latter is 5 to 5.5 kHz. Insertion loss for the ssb filters is specified as 3.5 dB. For the a-m filter it is 8 dB. The typical passband ripple is 1 dB and 2.5 dB for the a-m unit. Resonating capacitors (two each) for all three filters are required. The correct value is 360 pF. The filters are designed with a balanced input for use with a balanced modulator and an unbalanced input.

Rockwell states that the lower-sideband

filters are available off the shelf at a price class of \$32. The international price class is \$39 plus duty. These are band-pass types of mechanical filters, so upper- and low-sideband operation is possible by proper selection of the BFO frequency. The filters measure approximately 18 × 71 mm, and the height, excluding pins, about 21 mm. The manufacturer is Rockwell International, Electronics Devices Division, 4311 Jamboree Rd., Newport Beach, CA 92663. — *W1FB*

CLEGG FM-28 2-METER FM TRANSCEIVER

The Clegg FM-28 is a fully synthesized radio for 2-meter fm, covering the range of 144.0 to 147.995 MHz in 5-kHz steps. Featuring a power output of 25 watts "HI" and 0.25 to 4 watts "LO" (adjustable), the FM-28 provides versatile mobile as well as fixed-station capability.

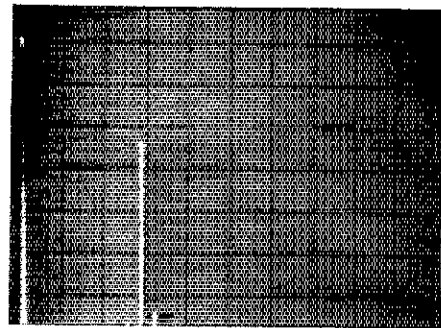
Mobile use of the FM-28 is enhanced by its solid construction and such operator-oriented features as the mic jack located on the left side to maximize cord length. The illuminated frequency readout (four-digit LED plus two backlit permanent numbers) is also oriented toward mobiling. The speaker is mounted pointing toward the bottom of the case for under-dash installation.

For fixed-station use the mobile bracket stays in the car, and a radio with clean rectangular lines goes indoors. A wire stand enables the user to "aim" the radio up from a desk or tabletop.

Inside the FM-28

The FM-28 is packed with circuitry, much of the room taken up by the 25-watt amplifier and the readout board. All circuits are well shielded and boards are easily accessible for servicing. The instruction manual provides a board-by-board description of purpose, design and location within the radio.

The synthesizer, a standard TTL design, utilizes a crystal-oscillator/mixing arrangement for switch selection of one of four 1-MHz ranges. Tens and hundreds of kilohertz are selected by means of BCD switches going to a



Spectrum-analyzer display of the FM-28 transmitter output (high power position). The vertical pip on the far left is generated internally in the analyzer. The vertical scale is 10 dB per division and the horizontal scale is 50 MHz per division. Measurements were made at 20 watts output, with the unmodulated carrier (tall pip) notched to enhance the dynamic range of the analyzer system. All spurious outputs are 75 dB down or greater, meeting current FCC regulations.

programmable divider; the BCD output is also fed to decoder drivers for the LED display. The 5-kHz switch turns on the last LED digit as a five (it is normally off) and provides a voltage across a diode in the basic oscillator to change the frequency to produce a 5-kHz shift in frequency.

The FM-28 receiver is of straightforward design with a dual-conversion superhet layout for fm reception, a signal-strength meter and an output for a discriminator meter via the accessory plug on the back. The test unit did exhibit a slight hiss when the receiver was squeaked in a quiet environment.

Output power from the transmitter is adjusted by limiting drive to the final amplifier and can be set for fairly low output. T-R switching is all solid state; there are no relays to be found. The final is SWR protected.

It's Convenient, Too

Operator convenience is excellent in the FM-28. Offset is selected by one switch and activated by another, handy if the operator does not move from one "split" to simplex to another split often. The kHz selector switches go 'round and 'round, which is nice when going from '88 to '91. As may be evident from the photo, all the controls are standard for 2-meter units. The radio can be turned on and used by someone unfamiliar with it with a minimum of head-scratching.

The FM-28 is manufactured by Clegg Communications Corp., 208 Centerville Rd., Lancaster, PA 17603. Their toll-free sales and service number is 800-233-0250. Price class of the FM-28 is \$360. — *WA6RBE*

Big knobs and easy-to-read LEDs highlight the operator-oriented Clegg FM-28:



Clegg FM-28 2-Meter Transceiver

Dimensions (HWD) and Weight: 2-5/8 × 6-5/8 × 10-3/4 inches (67 × 168 × 273 mm), 7 pounds (3.18 kg).

Power requirements: 13.8 V dc at 7 A high-power transmit.

Frequency range: 144 to 147.995 MHz in 5-kHz steps, fm only.

Power output: 25 W (HI) or 0.25-4 W (LO).

Receiver i-f bandwidth: 14 kHz at -3 dB, 25 kHz at -70 dB.

Transmitter deviation: Factory-set at 5 kHz, adjustable from 3 to 15 kHz.

Technical Correspondence

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

HOW TO TVI-PROOF YOUR GREENHOUSE

□ The article entitled "TVI Sleuths at Work" in February 1977 QST, coupled with the punchy editorial in the same edition by Dick Baldwin, prompted me to grab the typewriter and put on record a TVI happening which was a trifle unusual here at G3FXB. I moved to the present location in the spring of 1974, fully aware that this was a channel 1 area with a relatively low field strength. Channel 1 in Great Britain uses a video carrier of 45 MHz and an audio carrier of 41.5 MHz. It will be immediately apparent that this channel poses a serious potential harmonic problem both from the second harmonic of 21 MHz and the third harmonic of 14 MHz. However it was felt that being a rural area with reasonable physical separation from one's neighbors and given commercial ham gear with reasonably low levels of harmonic output, no serious problems would be experienced.

Once the quad was up and operation commenced, a couple of problems became apparent, but both appeared to be simple overload of the front ends of the sets involved. In both cases the installation of a high-pass filter cured the problem. The domestic TV at G3FXB is uhf only (vhf channels are being phased out over here), but a vhf receiver was obtained and a check made for harmonics. The level seemed to be low so it was assumed that all was well. It was two years later in the long dry summer of '76 that an irate caller at the door during the WAE contest confirmed indeed that all was far from well. The caller came from a location some 120 yards down the lane and had a summer cottage which he only used for a few weeks of the year. Furthermore he pointed out that another neighbor also using vhf was experiencing a similar problem. A high-pass filter was fitted with no improve-

ment, and it became fairly obvious that there was indeed a harmonic problem, despite the satisfactory checks two years earlier. It was agreed that I have the receiver at my QTH for a series of checks. With some apprehension the set was switched on to observe the problem firsthand.

The first thing that became apparent was the fact that there was serious TVI. The worst band seemed to be 14 MHz, and here even a few watts of rf were sufficient to cause a picture wipe-out even though the vhf receiver antenna was 150 feet from the quad. The first move was to try a high-pass filter on the TV, but it was of no benefit. TV feeders in Great Britain are all 72-ohm coax and in some cases a high-pass filter will be ineffective because the offending rf simply flows over it. The filter was therefore grounded directly to the tuner — again to no avail. The next move was to try a "braid breaker" on the coax just in the event that rf on the braid was in fact still the problem. It was not. The final move was the filtering of the ac line to the TV, but again the result was negative.

Attention was now turned to the transmitter, although it did not seem logical that harmonic content could have risen substantially in the past two years. The first move was to check the equipment on a dummy load. Basically the tests were satisfactory. There was a small amount of leakage through the screening of the FLDX-2000 linear at high power levels, which really seemed to have no bearing on the problem. The next move was to load the equipment up on the antenna again, but with a good-quality low-pass filter in circuit. Again there was no improvement. Things were now getting distinctly puzzling.

I have often read of the so-called "rusty bolt effect" in TVI, giving rise to contact rectification and harmonic generation, and I had tended to dismiss it fairly lightly. It looked now that

this was an aspect of the situation that would have to be given serious consideration. Two facts tended to confirm that this was indeed the way to go. First, the TVI was at its worst when the transmitter was tuned for maximum output at the fundamental frequency. Such is not normally the case with pure harmonic radiation. More important was the second discovery, that the TVI was at its worst when the quad was beamed west, virtually side-on to the TV antenna. This gave strong support to the theory that the fundamental was the problem, insofar that the level of TVI was directly related to the directivity of the quad.

The garden at 'FXB contained some wire fences that looked like they could be the problem. When firing west the quad was pointed in their general direction, and the fences consisted of rusty wire attached not very securely to equally rusty angle irons. The lot was removed, but alas, the TVI still persisted.

At this stage it was fortunate that a fellow ham came forward with a portable detection device tunable from 40 MHz upward, with a visual as well as audible indication of output. As soon as this device was put into service things began to happen. Two things emerged — namely that the level of third harmonic from 14 MHz was far greater in the garden than it was either around the house or around the quad, confirming that the problem was a very bad dose of contact rectification. As you may well know, the English are a nation of gardeners. Unlike North America, a high percentage of English backyards boast a greenhouse for the propagation of plants and the growing of tomatoes, grapes and similar things that require that extra amount of heat and sunlight. Furthermore these greenhouses often boast a heating system. The 'FXB QTH was no exception. It boasted a rather old and decrepit greenhouse with a defunct heating system, and it was upon approaching the greenhouse with the detection device that the needle really wrapped itself around the stop. The whole place was a hotbed of contact rectification. For one thing the metal frame was strengthened by lengths of studding secured by nuts. In many cases the whole lot was rusty, yet the nut loose. Even worse the heating system consisted of two large iron pipes stacked one above the other. They ran a total length of 48 feet and were made up of three-foot sections with obviously a substantial number of joints. These two pipes and their brackets were a mass of rust, having never seen a coat of paint. Physical movement of any of these pipes or brackets was guaranteed to trigger off the most violent reaction on the detection device, which of course became even worse at higher power levels.

Whilst it was possible to remove the studding on the metal framework, clean all the surfaces, and tighten all the nuts, it was entirely impractical to do anything with the heating system. Fortunately it was not used and so it was entirely removed. With it went the TVI. What was left was the real harmonic that was generated by the transmitter directly, and which had previously been masked by the rusty-bolt radiation. This was of a low level and completely

G3FXB (left) and the gardener standing before the guilty greenhouse.



suppressed by the low-pass filter.

This experience highlights an interesting problem as outlined in "TVI Sleuths at Work." How would I have made out if that greenhouse had been in a neighbor's garden and not mine? — *Al Stater, G3FXB, Wynchwood, Park La., Maplehurst, Horsham, West Sussex, RH 13 6LL, England*

TROPOSPHERIC PROPAGATION

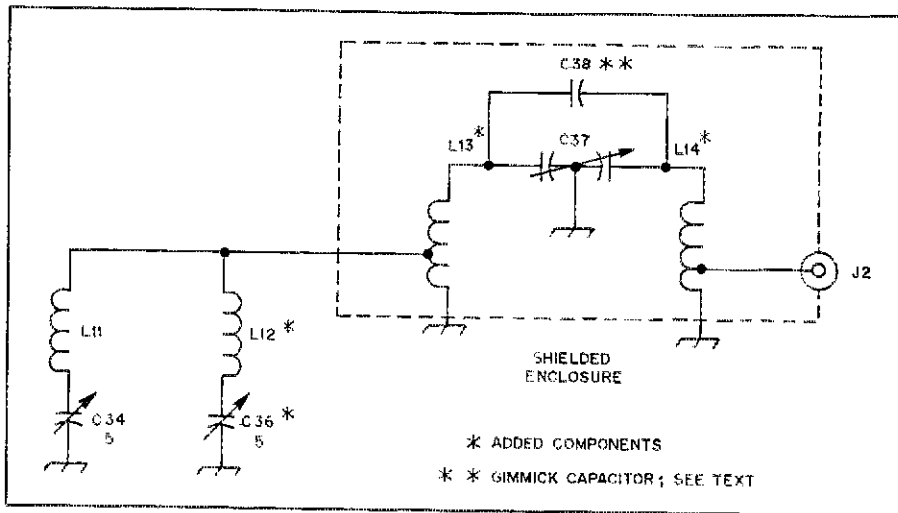
□ I would like to offer one small correction to W1XZ's otherwise competent and educational article, "An Introduction to the World Above 50 MHz" (*QST*, November, 1977). In his discussion of meteorological phenomena which can enhance radio propagation on the 2-meter band, the author described a tropospheric "thermal inversion," capable of refracting (bending) radio signals, as "a cold-air mass sitting above an area of warm air." This is a common misconception; in fact, the situation is just the opposite.

For convenience in discussion, the earth's atmosphere is divided into regions on the basis of temperature trend with increasing altitude. Within the troposphere, the lowest region, the temperature normally drops steadily until the tropopause (the boundary between the troposphere and stratosphere) is reached at 8-12 km. Thus, it is normal for cold air to be sitting over warm air. Consider that high mountains remain snowcapped all year, even in equatorial regions.

Within the troposphere, the rate at which temperature decreases with altitude, or "lapse rate," varies considerably with latitude, time of day and year, and weather conditions. The colder the overlying air (large lapse rate) the greater the extent of mixing and turbulence, for the following reason. Picture a parcel of warm, low-level air. Warm air tends to rise, but as it does so it reaches a level of lower atmospheric pressure, so it expands. As it expands, it cools and becomes more dense. If, in rising to a higher level, this air parcel is still warmer and less dense than the air at the higher level, it will continue to rise. If it is now similar in temperature and density to the surrounding air, its upward motion will stop. If, however, it is colder and more dense than the air at that higher level, the imagined process would have not occurred in the first place.

When the lapse rate becomes low or negative (warm air overlying cold, more dense air), vertical motion ceases, except for diffusion. The latter case, warm air over cold, is what defines a tropospheric "thermal inversion." It is this sort of abnormal temperature and density profile that often traps air pollutants over cities, especially in valleys, and that occasionally provides a refracting medium for radio waves within the troposphere. The contact surface between the two layers of air can be quite well defined, extensive and persistent. Note that the tropopause is just a global, persistent thermal inversion which inhibits mixing of tropospheric and stratospheric air masses.

Whether or not the term "tropo" is a misnomer is a question of definition. If the radio-wave refraction process occurs in the troposphere, then the term may be appropriate. However, it should be understood that the medium for thermal-inversion propagation is a contact surface between air masses of different densities, rather than a region of high electron density as in ionospheric (D, E, F level) propagation, and that the phenomenon is



Schematic diagram of the W2GN converter modifications. C37, C38, L13 and L14 are enclosed in a small metal box mounted in place of output connector J2. L12 and C36 are mounted inside the enclosure housing the converter.

L12 — 9 turns no. 16 wire, air core, 1/4-inch (6.4-mm) diameter, 3/4-inch (19-mm) long.
L13, L14 — 10 turns no. 16 wire, air core, 1/4-inch diameter, 13/16-inch (21-mm) long, tapped 1-3/4 turns from ground.
C36 — 5-pF air trimmer (Johnson 189-0564-001 or equiv.).

C37 — 3-pF butterfly air-variable (Johnson 160-203-001 or equivalent).
C38 — Approximately 1-pF gimmick capacitor, two parallel pieces of plastic-covered no. 18 wire 3/8-inch (9.5-mm) long. The wires should touch each other and lie flat against the top of C37.

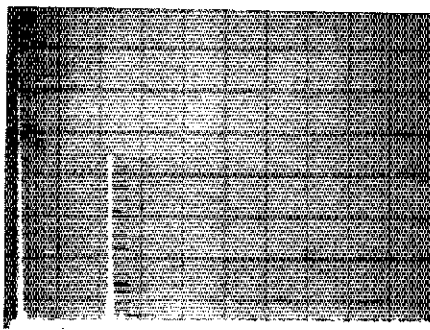
the result of atmospheric inactivity. — *Dave Lewis, W2HMT, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO 80309*

REDUCING SPURIOUS OUTPUTS FROM THE W2GN 220-MHz TRANSVERTER

□ I have learned that the spectral output of the W2GN 220-MHz transverter ("A 220-MHz Transmit Converter," January 1978 *QST*, page 16) has some spurious outputs which exceed the maximum levels permitted by FCC regulation. Corrective steps are given here.

A series-tuned trap takes out local-oscillator leakage and an external band-pass filter bolted to the top cover of the converter eliminates all

Spectral output of the transmitting converter as modified. Vertical lines on the graticule correspond to 100-MHz/division. Horizontal lines indicate 10-dB/division. The large pip 2.2 divisions from the left side of the display is the fundamental output of the converter, notched 35 dB to prevent overload of the spectrum analyzer mixer. Power output was measured at 4.6 watts during this test. Spurious responses are 68 dB or more below the fundamental.



other spurious outputs. Spectral output of the unit as modified is shown in the accompanying photograph. I mounted my band-pass filter in a 2-1/4 x 1-3/8 x 1-1/8-inch (57 x 35 x 29-mm) cast aluminum box (Pomona 2428) but an enclosure made from pc-board scrap will work as well. As modified, the transmit converter greatly exceeds all FCC requirements for spectral purity.

Adjustment

If a spectrum analyzer is not available to aid in aligning the filters, an alternative method will work nearly as well. With the converter energized but not excited with a 28-MHz signal, an rf probe connected to the output port should indicate the presence of 192-MHz LO leakage. C36 should be adjusted for minimum signal.

Connect the converter output to a dummy load through a directional wattmeter, or connect the rf probe in parallel with the dummy load. Apply a small amount of drive at 28 MHz and adjust C37 for maximum output. When the converter is properly aligned, it should be possible to obtain about 4.5 to 5 watts output.

The manufacturer's part number for C24, C26, C28 and C32 was incorrectly listed in the caption for Fig. 3, page 17. The correct part number is Johnson 160-208-001. — *Fred Merry, W2GN, 35 Highland Dr., E. Greenbush, NY 12061*

INTERFERENCE MANUAL

□ An informative booklet concerning the problems of interference as it affects mobile radio equipment is available from the makers of Champion Spark Plugs. The booklet, entitled *Giving Two-Way Radio Its Voice*, offers a thorough treatment of the subject. A copy is available for \$1 from the Champion Spark Plug Co., Box 910, Toledo, OH 43661. (Attn: Dept. M-2R Merchandising Order Processing.) — *W1JEC*

Hints and Kinks

A SIDETONE MONITOR-OSCILLATOR-AUDIO GENERATOR

In the process of replacing tubes with transistors and ICs to reduce heat in my SB-102 transceiver, a practical circuit came to mind for a tone generator. The circuit would be suitable for a sidetone monitor and a code-practice set. It would be designed around a Mostek MK5086N IC for the signal generator with an MPF102 FET for the audio amplifier. My finished product proved that the plan was good.

Voltage requirements are not critical. In this case, 12 V were obtained from the filament chain of the transceiver, rectified by means of a diode, and then filtered with a 1000- μ F capacitor.

Choice of a crystal for the generator should be from the range of 2 to 3.5 MHz. Avoid selecting a frequency that radiates harmonics in the amateur bands. For example, a 2.5 MHz crystal meets these requirements for the 3.5- to 30-MHz bands.

Selection of one of four tones to suit the individual is obtained by means of S1. Actual tone frequencies may be determined by these simple formulas. Crystal frequencies are in Hz.

$$T1 = \frac{f(XTAL)}{5120} \quad T2 = \frac{f(XTAL)}{4672}$$

$$T3 = \frac{f(XTAL)}{4234} \quad T4 = \frac{f(XTAL)}{3776}$$

S2 deactivates the MK5086 when cw is not used. This switch is usually contained on most rigs. The Drake TR-3, for example, is supplied without connections to this switch. The SB-102 has a comparable switch wired for the existing sidetone monitor.

As shown by the diagram, the balance of the circuit is conventional. The gate voltage supplied through keying keeps the MPF102 inoperative while the key is open. When the key is closed the negative bias is removed.

Negative voltage (-V) is used for grid-block keying. R9 is internal for many tube-type transmitters and transceivers. R6 may be connected to the key jack. R10 is inserted to prevent loading the audio-amplifier stage.

The tones produced through my SB-102 sound nice and rock-solid. To use the device for a code-practice oscillator, simply ground the cw key switch and use a key in place of S2. — James Garrett, K5BTW

BRINGING ANTENNA LEADS INTO THE HOUSE

When I embarked upon the construction of my "dream station," shortly after moving into our newly purchased home, I needed to resolve the matter of how I should bring the antenna leads into the basement. Drilling holes in the walls or floors definitely was a no-no. My solution was to replace one of the glass panes in a basement window with a piece of Plexiglas on which feedthrough connectors, insulators and terminal strips were mounted.

For those who may wish to spend about \$3 to

do the same, may I offer this advice. When drilling Plexiglas, start with small holes no larger than 1/4 inch (6 mm), then work your way up to the desired size. Use a reamer if you have one. A little such care will avoid cracking the Plexiglas. — KITX

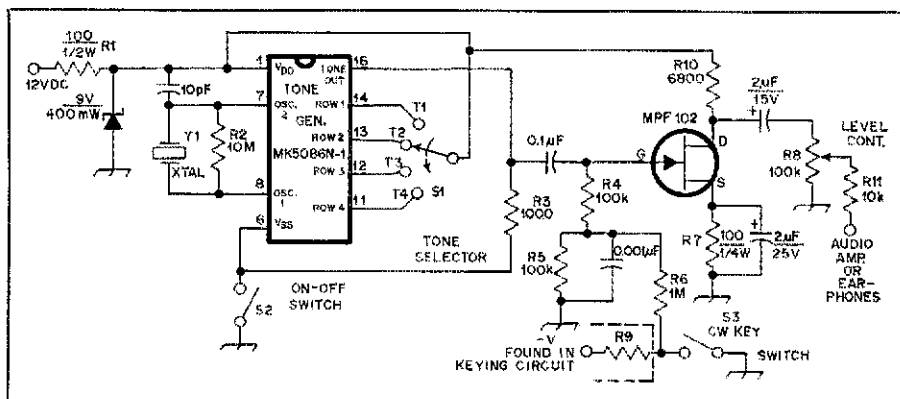
DIFFERENTIAL CAPACITOR IDEAS

□ Much work can be saved in making a differential capacitor (see November 1977 QST) if

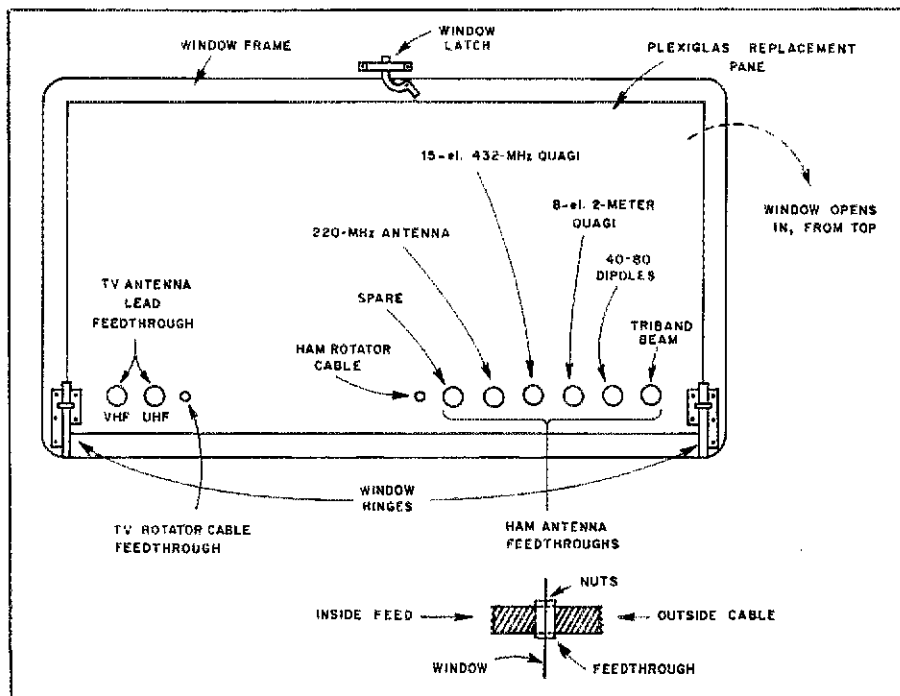
one obtains the military ARC-unit capacitors complete with connecting cable. Simply loosen the set screws on the large gear of one capacitor, rotate the plates approximately 180 degrees, and retighten the set screws. A flexible insulated coupling connected through the panel to a spinner knob will allow fast tuning.

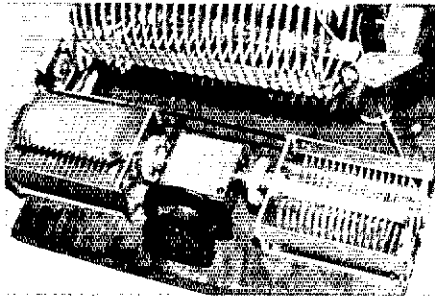
Some years ago, I built a Transmatch using these capacitors in the above manner. It has worked like a charm on all bands, 80 through 10 meters. The antennas have ranged from long wires, beams, quads to even wet strings!

A combination sidetone monitor/code-practice oscillator/audio generator using a Mostek MK5086N IC. R1 is 1/2 watt. All other resistors are 1/4 watt. R9 is generally found in the negative grid-block keying circuit of transceivers. A 10-k Ω series resistor connected in the line from the tap on R8 prevents loading the audio amplifier stage.



Replacing a basement windowpane with a piece of Plexiglas provides an easy way to bring antenna leads and control wires into the house. Feedthroughs may be mounted on the Plexiglas. There is no strain on the cables when the window is opened if a small amount of slack is provided.





A Millen right-angle drive shaft provides a nifty means for making a homemade differential capacitor.

There's nothing like the Transmatch to take the guesswork out of getting that low SWR. — *Don Berger, W7HPI*

Concerning those homemade differential capacitors, I suggest employing the solution I have used for some time. The photograph with this article illustrates how I have obtained differential action by using a right-angle shaft drive mechanism made by Millen. Other sources of right-angle drives might be located by contacting gear manufacturers listed in telephone directories (Yellow Pages). Some hobby shops may also be able to make such a mechanism. — *William Barnard, W6ST*

BETTER S/N AND GAIN FOR SB SERIES

Owners of Heath SB-100 or SB-101 transceivers may find a noticeable improvement in set performance by substituting 6HS6 tubes for the 6AU6s in the IF (V-10) and mixer (V-11) stages. Noise levels are substantially reduced with this change and, because of the increased gain, lower audio gain-control settings may be used. The transconductance of the 6HS6 is almost double that of the 6AU6. Heath changed to the 6HS6 in the SB-102 model. All modifications mentioned in *QST* for April, 1968, were made before the tube change in my transceiver, but the substitution of the 6HS6 made the greatest change in signal-to-noise ratio. — *B. W. Southwell, W6OJW*

PONG GAME CAUSES TVI

Recently, severe TVI appeared on both TV sets in my home whenever I operated on 40-meter CW. Each set was equipped with Drake TV-300-HP filters. The kilowatt transmitter has a Drake TV-3300-LP low-pass filter. Interference was most severe when running full power, but was still present to a lesser degree when I used my Collins 32S-3 exciter alone. A spectrum analyzer proved the fault was not with the exciter.

After much detective work, I found that a Super Pong IV TV game, which my sons had connected to the small TV set in their bedroom, was to blame. The power cord to the game had been unplugged and the remote antenna switch was in the TV position, thereby disconnecting the game from the TV antenna terminals. Yet the game was rectifying my 7-MHz signal and generating plenty of harmonic-type energy. When the cable from the game console was disconnected from the remote antenna switch, the TVI disappeared. Those amateurs who experience TVI in their homes should not

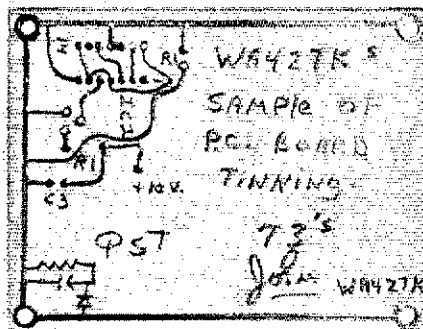
overlook similar equipment as a possible source of such interference. — *D. A. Contini, N4SA*

TINNING CIRCUIT BOARDS

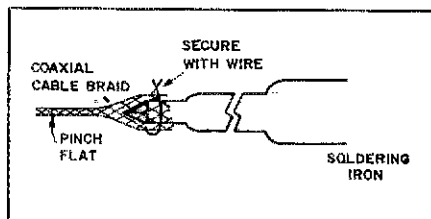
Your home-etched pc boards will have a more professional appearance and will be easier to solder if tinned in this manner. A 1-1/2-inch (38-mm) length of outer braid from a piece of RG214/U coax or equivalent is slipped over the tip of a 40-watt soldering iron. Secure the braid with a few turns of wire. Pinch the end flat. (See the drawing.)

The copper should be clean. Apply a thin layer of liquid rosin flux to the metal. After heating the iron, fill the braid with a good grade of rosin-flux solder. Then brush the solder onto the metal with slow, even motions. Don't overheat the board. Keep the braid filled with solder.

After tinning, clean the excess flux from the board with flux remover or alcohol, and then buff lightly with extra-fine steel wool. — *John W. Kmet, WA4TZK*



Circuit boards may be neatly tinned by using the WA4TZK brushing technique.



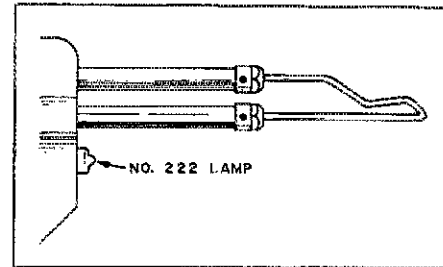
Coaxial cable braid slipped over the tip of a soldering iron provides a brush for tinning pc board circuits.

OBTAINING COPPER WIRE

The shops listed in the Yellow Pages of the telephone directory under "Electric Motors — Repairing" are good local sources of enamel-coated copper magnet wire. To avoid wearing out your welcome, try to anticipate your needs and buy in quantity. — *M. Evett, W6TQA*

SOLDERING-IRON TRICK AVOIDS SHADOW

I'm sure that many people who use Weller soldering guns install a new replacement tip with the bent portion inserted in the lower stud. Doing so, however, tends to cast a shadow on



Installing the tip of a soldering gun in this manner avoids a shadow on the work.

the work as the bulb is mounted beneath the lower stud. My suggestion is to install the new tip with the straight portion below the bent part as shown in the drawing. If you've encountered this problem, try this trick. Bet you'll like it! — *C. A. Chamberlain, W5RSR*

CRIB SHEET FOR ICOM IC-22S

I find a "crib sheet" with channel, frequency and mode information is a handy reference item. One is fastened to the dashboard of my car and another is secured to the front panel of my 12-V dc supply for my base station ICOM-IC-22S. I attached these with rubber cement to make removal easy.

To make the crib sheet, I had the list typed, reduced on a photocopy machine, and then encased in a clear-plastic adhesive sheet available from a vending machine. In our area these machines are found in department and discount stores. Office supply firms are likely to have 8 x 10-inch (203 x 254 mm) sheets, if one should desire that size.

Another crib sheet that I use is for an external-programming diode box that I use with my '22S. This was printed out for me by an H-P printing programmable calculator. I put the tapes together, photocopied the whole thing, and encased it in the same plastic-sheet material. — *Jim Gandy, K4HPP*

CH	FREQ	MODE
1	16/76	A
2	34/94	A
3	22/82	A
4	28/88	A
5	52/52	SPX
6	31/91	A
7	04/64	A
8	58/58	SPX
9	10/70	A
10	37/97	A
11	07/67	A
12	25/85	A
13	40/00	A
14	19/79	A
15	46/46	SPX
16	66/06	B
17	01/61	A
18	785/785	SPX
19	665/665	SPX
20	81/21	B
21	94/94	SPX
22	49/49	SPX

A crib sheet like this makes a handy reference item for use with the ICOM IC-22S.

On the Road with Uncle Charlie

The Federal Communications Commission monitors the ham bands, citizens band and other radio services from a fleet of specially equipped cars and vans. Let's look at a typical day.

By Charles J. Harris,* WB2CHO/KARK5519

We pulled into the left-hand lane and slowly eased by the 18-wheeler. The needle on the dash-mounted direction finder swung abruptly as we passed.

"That's the one," shouted the FCC engineer as he drove the completely unmarked late-model car down the interstate. "Did you see the S meter jump as he keyed his mic? Positive DF, positive i-d."

I hadn't even seen the trucker. Operating in the shotgun position, I had been far too busy logging all the required information in the FCC DF form: the vehicle type, the license number (immediately called in to the Motor Vehicle Department for identification), the exact time and position on the interstate, the footage readings on the tape recorder, the method of DFing, the channel, handle and as much of the conversation as I could write down. By the time I had all this required information down, the engineer was already spinning the dial of the Drake SPR-4, looking for out-of-band stations between 10 and 11 meters. Nothing local, but a few skip stations were about S9.

Back to the 40 channels — listening, tuning, monitoring, driving. I saw how the excitement of chasing illegal operators could quickly pale. And this was only the start of my first morning of direction finding with the FCC Field Operations Bureau.

Direction Finding — FCC Style

Under a special arrangement worked out through the Washington headquarters of the Commission, FCC Engineer-in-Charge Jerry Freeman had invited me to the Norfolk, VA, Field Office. The purpose of my visit was to view the engineer training operation there and learn more about the activities of an FCC engineer. CB enforcement, while only a small part of the engineer's duties, is typical of the FCC's direction-finding techniques, so Freeman assigned Engineer - Dennis

Carlton to a turn at 11-meter monitoring during my visit.

The sun was barely up as I joined Dennis at the coffee pot. He was taking a last look at the "trip file," a collection of interference and other reports, broken down by geographic areas.

"If there is a chronic or habitual offender in the area we'll be covering today, he'll show up in the trip file. If we see a pattern of operating, we will spend some time listening for him," Carlton explained.

The trip file for the Richmond area was empty. "We're up there often enough to keep them honest," Carlton declared. "That's the key to CB rule compliance: public education and strict enforcement. We put our own CB station, KFCC1000, on the air to explain the rules and answer questions, and we send out the unmarked monitoring vehicles to follow up. Neither enforcement nor education alone is sufficient."

While we chatted at the coffee pot, another FCC engineer was completing the final checks and calibrations on our direc-

tion finding gear in the FCC car. We headed for the garage.

As we entered the parking area, I looked around for the traditional white van. Everyone knows that the FCC monitoring vehicles are large white vans with lots of antennas and government license plates. I spotted the van, but we were headed in the opposite direction, toward an unmarked, late-model sedan. The only antenna visible was an a-m radio whip; there were no special plates or markings of any kind. You could walk right by the car and never know it was one of the FCC's special enforcement vehicles. So much for the "white van" myth. (I later learned that the white van is used in some vhf monitoring of land mobile and other services, but not in CB or amateur enforcement.)

On the Road

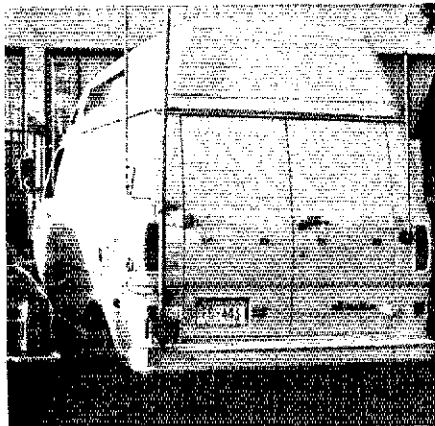
Carlton warmed up the gear as we headed out of town. "Not much sense in listening around here," he explained. "It's the training ground for every CB enforcement engineer in the country. They're on the road continuously. You can listen for hours and never hear a violation."

"If that's true, this must be the only place in the country where everyone obeys the CB rules," I countered. But he was right. After 45 minutes of monitoring we failed to uncover a single illegal transmission. Two housewives exchanging recipes on channel 12 even signed off after five minutes. That was the first time I had ever heard the five-minute rule obeyed!

As we drove toward Richmond, Carlton demonstrated the operation of the DF equipment. The monitoring receiver is a modified Drake SPR-4. I tried to remember the exact frequencies of the CB channels, but Carlton seemed to know them almost by feel, without even looking at the dial. Lots of practice, I guess.

"This button selects either left-right or front-back indication," he said. "The meter in the dash gives an approximate reading of intensity. One right-left and one front-back reading gives you the

The famous "white van" used for spectrum-occupancy investigations and technical compliance in the VHF range. It monitors the Land Mobile Services (taxi cabs, police and so on) but *not* amateurs or CBers. (WB2CHO photos)



*Club and Training Manager, ARRL

correct quadrant. The meter also gives some idea of the distance. You start driving in the right direction and watch the meter for an increase in signal strength. Any sudden flips would indicate you drove past the station."

We DF a Housewife

It was far easier to demonstrate than to explain, so we DFed a housewife who was operating completely legally. We still had not heard any improper operation. As we swung around corners, the signal strength increased. Carlton backed off the rf gain while watching the meter and driving.

Suddenly he turned onto a side street. I grabbed for the armrest as we cornered. "Just a hunch," he shouted as we straightened out. "We play hunches a lot."

As he had guessed, the meter needle swung abruptly as we proceeded down the residential street. His hunch, which I suspect is actually many hours of practice, was right on. In seconds we had stopped in front of a house with three CB antennas.

Carlton picked up a small black box and pushed an earphone from it into his ear. He pointed the large arrow on the top of the device toward one antenna after another.

"That's it," he exclaimed. "The ground plane attached to the chimney. This box is a null indicator. The signal drops sharply when it's pointed directly at the signal source. It's very accurate, but it only has a range of a few feet. If we can find the right house or even the right block, we can often pinpoint the antenna with this."

My turn came to try the null indicator. I could hear the null all right, but it was so sharp that it required a steady hand to separate the various antennas in the neighborhood.

Triggering Violations

As we drove away from our successful DF, Carlton explained the phrase "triggering violations": "We don't stop every time we see an antenna over the legal limit; nor do we sit and listen to one station or channel trying to catch someone. We keep tuning the channels, listening for an obvious violation, such as failure to identify. If the station i-ds reasonably often, we'll just try another channel.

"The triggering violations are the ones which seriously disrupt the service or our efforts to improve it. These include: failure to identify, illegal power, use of VFOs and amateur equipment, operation outside the legal frequencies, and the use of the radio in illegal operations, such as prostitutes advertising on CB. If we investigate one of these violations and notice that the antenna is over the legal limit, or that no copy of Part 95 of the rules is available, we add that to the list."

We continued touring the area — listen-



Sorry, we can't show you photographs of the unmarked FCC monitoring cars! This well-marked truck is used for TV and fm broadcast monitoring, but its mere presence quiets almost every band.

ing, tuning, monitoring. "The Norfolk gang prefers the longer trips," Carlton explained, "when they get a chance to do some real enforcement. Things are pretty quiet around here."

We finished the day with our one violation in the file. When I commented on our lack of success, Carlton immediately corrected me. "It's just the opposite. The best days are the ones when you don't hear *any* violations. That's what we are trying to achieve. We're not out to get anyone, only make the service useful for everyone."

How About the Ham Bands?

When asked how much time he spends listening to the ham bands, Dennis replied: "Frankly, not much. The hams do a very fine job of keeping their bands in good shape. And the fixed monitoring stations can effectively monitor the lower frequencies. Since hams always identify, DFing is seldom required. Besides, if a real problem shows up on the amateur bands, we get dozens of calls at the office. Not much slips by the hams."

When I asked if this amateur assistance was helpful to his job, Carlton answered: "Sometimes, when it is timely. If we get a report that someone was jamming the repeater last night, there's not much we can do. And tape recordings of the violation also don't really help; we have to collect our own evidence. What we can really use is operating habits, times, frequencies and so on, so that we can go after habitual offenders ourselves."

This request for FCC monitoring can backfire: In a recent interference problem

on the West Coast, the FCC monitored a net listening for the alleged interfering station. While doing so they issued several hundred notices of violations to net members for failure to identify properly and for other violations.

As I watched Carlton compile the trip report, a copy of the registration of the truck we had monitored was waiting for us. We checked it against the microfiche record which lists all licensees by name, call sign and address.

While demonstrating the versatility of these files, Carlton looked up my name. "Look at all the Charles Harrises there are."

"Yes, there are a lot," I agreed. "Most of them me, due to the number of secondary and club licenses in my name." I was brusquely reminded that the FCC has proposed eliminating these extra licenses to reduce its paperwork crunch.

Writing Up the Violation

Carlton finished up the violation file, including a "Notice of Apparent Liability," the official form which tells the CBER that he has been caught and owes the government a \$50 fine.

The form actually details the violation and offers three alternatives: pay the fine, reply in writing why you shouldn't pay the fine (a very rare case of mistaken identity) or ask for a personal interview with the FCC District Engineer-in-Charge to discuss the case.

"Most just pay the fine," Carlton explained. "Or if they do ask for the interview, they pay the fine when they hear their voice played back on the tape. In any case, once we issue the notice, we no longer have the authority to cancel or reduce the fine. Only the Washington office can do that, and as far as I know, they have never reversed one of our cases. You see, we are *very* careful about sending out these notices. If there is any doubt whatsoever about the case, we throw away the whole file."

"That certainly is following the constitutional ideal of innocent until proven guilty," I commented. "What happens to the fines? Bet they go right into the U.S. Treasury like the license fees, and the FCC doesn't get to keep a dime."

"Exactly. We never see the money. Besides, it's not really much money. The important thing is that the notice becomes a public document, and many CB publications print lists of offenders. This public exposure shows the CB community that we do monitor, we do catch people, and we do mean business. Again, it's the combination of public education and strict enforcement which will return the citizens band to the citizens for their use and enjoyment."

No Advance Warning

"So, that's what CB enforcement is all about."

"Well, that's a taste of it," Carlton continued. "Most of our trips are much longer lasting, several days or a week at a stretch. Then we take the microfiche reader in the car with us, and get the vehicle license plate information from the DMV over the radio.

"The licensees do not have any advance warning that we will be in a given area. Rumors to that effect are very common, and we do nothing to stop them. At least the bands are clean for that length of time.

"After we monitor an area for about a week, we make a series of station visitations. These are usually done on the weekends, when there is a better chance of finding the licensee at home. Also, we do these all on the day before we leave the area. The news of an FCC visit travels at the speed of light through a town.

"Why do we visit stations? We usually visit chronic offenders, those with a record of interference, suspected over-power, and that sort of thing. We take power measurements around the house, and then after entering, tune up legally and compare. Also, we have found a good deal of amateur gear used illegally."

"Does the licensee have to let you in?"

"The FCC regulations include a statement that the station is always available for inspection by an authorized Commission employee. We all have photo ID cards and badges to help eliminate the 'phonies'. But if the licensee won't let us in, we don't force the issue. We just get ourselves a court order and a couple of very large Federal marshals.

"By the way, we *never* stop cars along the road. Some people have been impersonating FCC employees, stopping Cbers and taking their radios. This is simply an elaborate form of theft. Some even drive a white van with big antennas."

Second Thoughts

As I drove back to my hotel after the long day, I considered what I had learned about a seemingly hopeless problem, CB rule compliance.

I can't help but remember the comment of FCC enforcement Chief Dick Smith on the subject. "They have asked me to hold back the tide of the Atlantic Ocean, and they have given me a little boy with a broom to do it." But listening to the 11-meter band around Norfolk has made a believer out of me. The citizens band can be used and be useful, with the cooperation of the FCC and every Cber. The Norfolk FCC team has shown that this combination really does work.

New DF Car Completely Unmarked

The specially equipped vehicle that Dennis Carlton and I used is being phased out in favor of new, state-of-the-art, automatic direction finding (ADF) cars. I viewed the prototype model; future ADF vehicles are in the works, as the FCC

budget permits. It is completely unmarked; the only visible antenna is the a-m radio whip. Concealed in the fiberglass roof is a rotating, multiport loop and associated electronics. From the outside, it looked like any late-model car.

But inside! In the dash, next to the speedometer, sits a neon directional readout, accurate to ± 1 degree. (Neon bulbs are used instead of LEDs for better visibility in sunlight.) Next to the driver is an electronic marvel: an all-band, all-mode receiver with frequency lock, digital frequency readout, spectral display, multimode demodulator, variable bandwidth and a frequency range from below the a-m broadcast band to 1 GHz.

The engineer merely tunes in the offending signal, locks the receiver on frequency, and watches the directional display in the dash. The display shows relative direction instantaneously. Engineer Carlton demonstrated the capabilities of the machine by tuning in the input frequency of the local vhf repeater. The directional indicator pointed off to the right. Suddenly another station came on and the light switched immediately to the left. As the conversation continued, the readout tracked the signals.

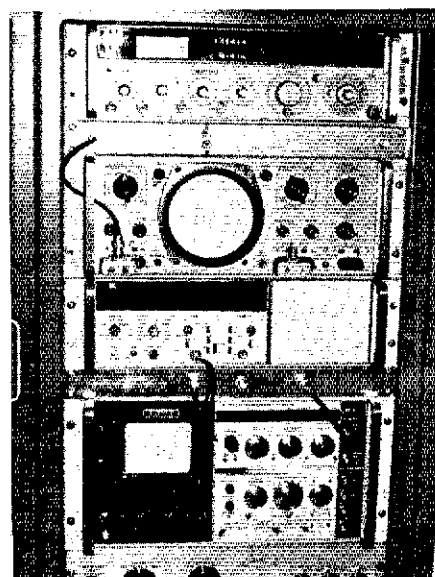
Fox Hunt?

"Fantastic! Can I borrow this for the next fox hunt in my radio club?" I asked.

"It is Commission policy not to allow the use of the \$20,000 ADF in amateur direction-finding competitions," came the formal reply from Dennis. "Unless they fail to identify," he added with a chuckle.

He continued: "A built-in integrated circuit averages the direction and eliminates confusing reflections, the source of infinite trouble in DFing.

Not bad test equipment, for a mobile! This is part of the monitoring gear in the white van, set up for critical analysis of vhf signals.



Reflections and standing waves give false readings, but when the car is in motion, these readings disappear in the integrator, leaving only the desired readout. It's perfect for beginning DFers and engineers, as it eliminates the months and months of practice needed with the other DF vehicles.

The Special Equipment Construction and Installation branch in Powder Springs, GA (the only such operation of its kind), designed, built and installed the ADF equipment in the prototype model. It is still the only such vehicle in existence.

A Winner First Time Out

Engineer Ferrel Bentley describes the car's first real field test, in an amateur radio enforcement case.

"Hams in the New Orleans area had been complaining to the Commission for months about a very troublesome repeater jammer. Some person (or persons) was using a 'laughing box' and obscenities to destroy the value of the repeater. All amateur attempts to DF the culprit were thwarted by the multiple readings and reflections characteristic of DFing in a metropolitan area, and by the constant motion of the jammer.

"We drove the ADF to New Orleans and within 15 minutes we had located the jammer, in motion in the middle of town. A few days later the FCC engineers had accumulated enough evidence to turn the case over to the Justice Department for prosecution. The result? Two pleas of guilty to broadcasting obscene language and interference." (See "Happenings," January 1978 *QST*, page 68.)

I queried Engineer Bentley on the machine's capabilities.

"Well, we don't want to give away our little secrets," he said. "But if a station is on long enough to be noticed, he's on long enough to permit accurate DFing. In fact, we no longer bother to get the addresses of offending stations. It's faster to get in the ADF and drive to the signal location than to look up the address on a map and figure out how to get there!"

Contest Operating Aid?

As an active contester, I suddenly had a thought. "Can the machine give the location of skipped signals as well?"

"Certainly. It will indicate the apparent direction of the signal, whether it is line of sight, or skipping around the world."

What an addition to a contest shack! You could know exactly which direction to point your antenna for maximum signal strength. Does the early morning opening to Europe bring signals in from the south? This machine will tell you. Open the variable bandwidth a bit and you can watch for other openings to other directions. The machines, or similar ones, are available commercially, but the five-figure price tag will put it out of the range of most hams!

Up Your Code Speed

How to leap over 20 wpm with a — “Wuh, wuh . . . wee, wee . . . wes, wes . . . west, west!”

By Roland J. McMahan,* K7CD

Hams who enjoy working cw do not write down every letter. They sound out the words in their heads as the letters arrive. The letter W is not a “double U” to them. It is “wuh, wuh.” The word *west* would be sounded out this way: “wuh, wuh . . . wee, wee . . . wes, wes . . . west, west!”

These cw operators enter log data, sometimes make a note or two, and then sit back and enjoy a ragchew. You can do it, too. Receive phonetically. Cw is fun!

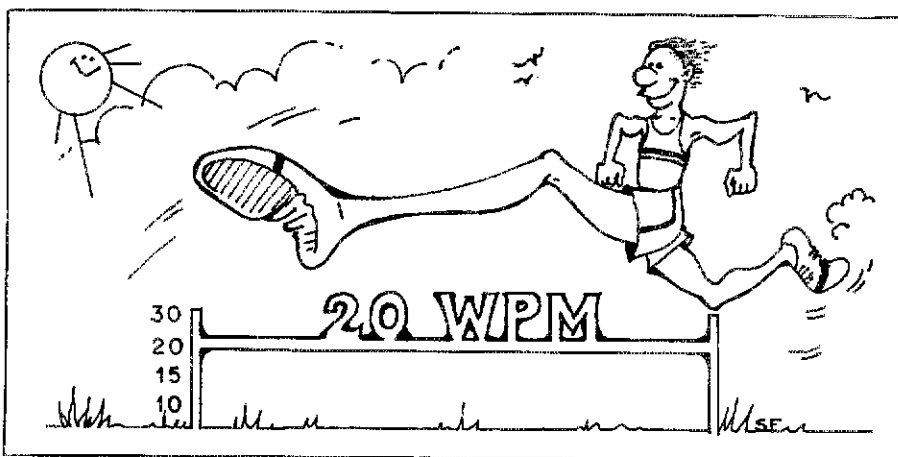
This unique teaching aid consists of a two-way word game between the instructor and a student. It can be carried out on the air with a licensed ham, or by using a code-practice oscillator rigged up with two keys.

How the Game Works

The instructor sends a word and the student, instead of writing down the word, sends it back immediately. The student does not attempt to remember the letters in the word, but instead “sounds out” the word as the letters build up. When a W is received, he does not think “double U” but “wuh, wuh.” If the next letter is A, he thinks “way, way.” If the last letter is S, he thinks “was, was.” Now he has the word “WAS,” so he sends it back immediately.

I start with two-letter words for students who are copying five words per minute or less, and with four-letter words for those copying over 10 words per minute. Longer words and greater speed go hand in hand in this game. When the student returns three words successfully in any series, longer words are sent, a little faster.

When five-letter words are returned, I start sending the names of states, starting with the simpler ones and building up to Connecticut or Illinois. When the longer names of states are returned, the student



will have successfully leaped over his code barrier. Never again will he try to retain the letters in a word; just the sounds of those letters in the word.

Some amateurs can send much better than they can copy. This word game seems to coordinate the incoming and outgoing telegraphic code portions of their brains so that the two activities become equally easy. One student I was instructing could easily send 14 wpm, but could receive only five wpm, and that with very poor comprehension. As he returned the simple words, it became obvious that he was having trouble with certain letters. I used three-letter word groups as words until the F, L, M, N, C and Y problems were eliminated. His speed jumped to 12 almost immediately.

Tried and True

Although the word game may be new, the phonetic method of copying is not. A blind student told me that he was taught to copy code by sounding out the word. High-speed operators who appear to copy words are actually putting the sounds represented by the letters together as they come in. One student had a great deal of

trouble at 16 wpm. After 30 minutes of the word game, he was copying more than 20 wpm! Now he is copying 25 and occasionally 30 wpm.


Here's another typical example of how the word game works. The student this time was WB7BXR's OM.

Friday morning, we worked at 10 wpm on the words, “the, tree, barn, fence, horse, house.” We then went on to states and I gradually increased the speed to 16 wpm. At this point he quit — “in hysterics,” WB7BXR told me. I asked her to explain to her OM that I have to press him to his limit all the time for the game to work. Reluctantly, he came back on and we picked up again at about 16 wpm.

Saturday, we were at it again. However, he had to start at 14 wpm as students tend to lose touch overnight. He was up to 20 wpm by the time we quit.

Monday, we worked for 30 minutes, and he got up to 24 wpm where he copied accurately many new states.

That's the way it works.

If you have a cw speed block, try the word game with a friend. Copy the code in your head, sounding out the words. It's fun and the results will amaze you. 

*Rte. 3, Box 155, Hayden Lake, ID 83835

QRQ 20

Want to "send faster, 20 words per minute"? Don't we all! Why not try a few less obvious sources of code practice?

By Norris K. Maxwell,* K5BA

The secret of raising your code speed is to constantly attempt to copy at a speed just above your present ability. You will suffer some frustration at first, but regular daily practice will soon bear fruit. The next question: How best to find dependable sources of practice?

Code practice tapes and records offered for sale by commercial vendors are good for learning the code. You'll find that your subconscious memorizes them after you've heard them several times, however, and you'll catch yourself writing a word before it is sent.

Direct off-the-air copy solves this. The ARRL's code-proficiency program offers excellent cw practice (check this issue of *QST* for the schedule). Sometimes, though, your personal schedule and the WIAW transmissions may not coincide. If so, you must find another source.

Maritime CW: A Rich Source

Good cw practice transmissions can also be found outside the amateur bands. In spite of gleeful predictions by the radiotelephone and radioteletype world, the maritime frequencies are still lively. Do a little listening on these bands: 415-510 kHz, 2065-2107 kHz, 6200-6525 kHz, 8195-8815 kHz, 12.33-13.20 MHz, 16.46-17.36 MHz.

These are rich sources of good cw practice. The first signals you will notice are the coastal stations of the Maritime Service. They are easily identified because their call signs have three letters, while maritime mobile stations are assigned four-letter calls.

You can depend on coast stations to send press, traffic lists and weather broadcasts on schedule. After a few days of listening you will be able to tabulate a code practice schedule which permits you to tune in when you have the time. As a beginning, look for the stations listed in Table 1.

Procedures to Listen For

Commercial procedures differ slightly from amateur practice, so you may

Table 1
Regular CW Broadcasts by Coast Stations

Time (UTC)	Call	Frequencies (kHz)	Notes
0030	NAM	8090.5, 16180, 20225	Norfolk, VA, U.S. Navy weather and traffic Halifax, NS, weather
0100	CFH	4255, 6430, 8697, 12990, 16926.5	
0130	WAR	3347, 5217, 14405	Washington, DC, U.S. Army MARS broadcast Tuesday only at 15, 20 and 25 WPM Chatham, MA, press.
0300	WCC	4331, 6376, 8586, 8630, 12925.5	
0718	KPH	6465.5, 6348, 8558, 8713.5, 12695.5, 12844.5	Point Reyes, CA, press
1200	VIS	8482	Sydney, Australia, press
1250	WCC	(See 0300 above)	Traffic list
1400	NAM	(See 0030 above)	Traffic
1430	WNU	4310, 6495, 8570, 12826.5	New Orleans, LA, traffic list
1500	KPH	(See 0718 above)	Traffic list
1648	WSL	6416, 8514, 8658, 12997	Amangansett, NY, traffic list
1818	WSL	(See 1648 above)	ARA Broadcast Sunday only
2300	WLO	8474.5, 12704.5	Mobile, AL, weather

wonder what you are hearing. Land stations transmit continuous QRA or V tapes somewhat like this: "VVVV DE WCC OBS? QSX 8, 12, 16 AND 22 MHZ K." This means that WCC will accept ships' weather observation reports and is listening for calls on the 8, 12, 16 and 22 MHz bands.

The maritime frequencies are divided into calling and working bands. A ship (KHXP, for example) wishing to contact WCC will call on the calling band indicated and WCC will answer "KHXP DE WCC UP." This indicates that the ship operator should move down in frequency (or up in wavelength) to the working frequency.

Twice each hour you will hear a transmission interrupted with "AS SP" (wait — silent period). That means the station is ceasing operation to listen on the 500-kHz (600-meter) international distress frequency.

Shore stations send lists of traffic on hand at scheduled times during the day,

consisting of the ships' call signs. These transmissions are good practice, because you will not have the tendency to anticipate the next letter as you might in clear-text transmissions.

Both commercial and U.S. Coast Guard stations send weather broadcasts at scheduled times each day. You will find these broadcasts listed in *Worldwide Marine Weather Broadcasts*, issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, and the U.S. Navy Weather Service Command.¹

Another source of cw practice information is Robert B. Grove's *Confidential Frequency List*.² The author speaks of "old fashioned cw," but his judgment is a little premature. QST

References

¹Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. \$2. Stock number 003-018-0071-1 or catalog number CS5.119-976.

²Gilfer Associates, Park Ridge, NJ 07656.

*623 Ute, Stillwater, OK 74074

League-Sponsored Insurance Program Off to Flying Start

League's new fire and theft insurance is quickly becoming a popular benefit of membership. Here's how it works.

By Bonn A. Gilbert, Jr.*

Q. *My home station and accessories are already covered under Homeowners. Why must I include them in order to cover my mobile and handheld gear?*

A. In order to obtain the low premium rate of \$1 per \$100 of replacement cost, it was necessary to require that all gear be insured. The main reason was to "spread the risk" in order to keep the premium as low as possible.

Also, most Homeowners policies will pay only *actual cash value* of the gear at the time of loss. The ARRL Fire and Theft Coverage pays *replacement cost*. This means that you can insure the gear for what it will cost to replace it, not what an insurance company thinks it is worth after you have used it for a month, a year, or 20 years!

Q. *What if I have Homeowners and ARRL coverage. Will both pay?*

A. Yes, but only up to 100 percent of the replacement cost. Only one deductible will apply per loss.

Q. *Can our ARRL-affiliated club insure its equipment under the policy?*

A. Yes. Complete the application in the club's name, then have an official sign it.

Q. *If lightning strikes my antenna and then damages my station, is the gear covered?*

A. Yes.

Q. *Can I insure my test gear?*

A. Yes.

Q. *What about TVs, radios (other than ham), stereos, etc. Can they be insured?*

A. No. It's for ham gear only.

Q. *Can I insure my CB gear in the car? I use it for emergency communication.*

A. As long as the CB gear represents 10 percent or less of the total gear insured, you may include it. Example: \$2000 worth of ham gear would carry \$200 worth of

CB gear. We all know that CB gear has a very high loss rate. If the program included all CB gear, it would "kill" a good deal for all of us. We don't want this to happen!

Q. *How will the insurance company know whether or not I insure all my gear?*

A. There is no way to police each individual. However, we are counting on the integrity of our policyholders. A few cheaters could spoil a great thing for all of us. Without large numbers of members enrolling and each paying his fair premium, based on his gear, the company cannot afford to offer the program at such attractive rates. The costs of administration and claims payments would exceed that collected in premium. Should this happen, we all lose.

Q. *What should I do to file a claim?*

A. Simply call the toll-free number 1-800-423-6597, and a claim form will be mailed to you. Be sure to get a police report in the case of theft. In most cases, this is all that will be necessary.

Q. *I called the toll-free number and no one answered. Why?*

A. The toll-free number is located at the California Service Office. Therefore, they are on *Pacific Time*. Their office hours are 9 A.M.-5 P.M. You may have called before they opened — especially if you called from another time zone.

Q. *I live in California. Why can't I use the toll-free number?*

A. Since it is a national IN-WATS line with a terminal in California, the toll-free number is unavailable to California residents because of California Public Utilities Commission regulations. Residents of California, Hawaii, Alaska and Canada may call 213-967-6597.

Q. *I mailed my check weeks ago. It has been cashed, but I still have not heard a word from the company. How come?*

A. Due to the tremendous response to the program, policy issuance has been delayed

somewhat. Please be patient. Your policy will be arriving shortly. Your coverage was effective on the first day of the month following the date your check was deposited.

Regardless of when you receive your policy, you have 30 days from the date you actually receive it to look it over. If for any reason, it does not meet with your approval, you can cancel with a full refund.

Q. *I sent in my application, but now I have bought some more equipment. What should I do?*

A. If the new gear cost less than 25 percent of the amount already insured, it is automatically insured. Example: You insured \$1000 initially — now you bought \$250 more. It is covered. Be sure to keep any receipts on gear purchased during the policy year so you can prove that it was purchased after the original effective date.

Q. *That's great, but I insured \$1000 worth the first time and this new piece of gear cost \$500. Now what?*

A. Simply list the new gear on a sheet of paper, along with your name, address and QST label number. Send it to G & H, clearly marking it "Supplement Coverage," along with your check at the same \$1/\$100 replacement cost value.

Q. *Charter Enrollment closed April 15, 1978, but I still want to enroll. Can I?*

A. Yes. However, the company has reserved the right to "underwrite" the policy; if you have had losses in the past, they may not issue coverage. Should this happen, your check will be refunded in full.

Q. *I live in Canada. Should I remit in U.S. funds?*

A. Yes. Please have your bank draft a check through a U.S. Exchange Bank.

[All members should have received a pamphlet describing the insurance program in detail. If you did not, write ARRL, enclosing a self-addressed envelope to speed the reply. — Ed.]

*G & H Insurance Administrators, Inc., P. O. Box 11616, Charlotte, NC 28209

San Diego: Sun, Fun, Great Convention

1978 ARRL National, September 22-24

By Sybil Allbright,* W6GIC

Go to the 1978 ARRL National Convention and not only will you attend one of the best programs ever, but you'll also enjoy the height of Indian summer in and around San Diego, a Mediterranean-style city that has it all. Sponsored by the San Diego County Amateur Radio Council, the convention takes place at the Town and Country Convention Center.

The convention promises an agenda filled with distinguished speakers, technical sessions galore, a three-part vhf/uhf seminar, and many great exhibits open Friday, Saturday and Sunday. In addition, the Quarter Century Wireless Association will hold its national convention concurrently.

Forums

During the weekend, presentations will embrace ATV, SSTV, RTTY, OSCAR, DX, vhf/uhf, antennas, public relations, public service, computers and the latest information on the new narrow-band voice modulation, along with coherent cw. Besides the ARRL open forum, FCC forums have also been arranged, presenting an opportunity to discuss amateur matters with the Commission representatives on hand from the Personal Radio Division and Field Operations Bureau. Also scheduled to speak are representatives from JPL Pasadena and other laboratories and research centers.

These sessions have already been set:

1) Public relations with Lenore Kingston Jensen, W6NAZ.

2) Antennas in a five-hour forum coordinated by Lew McCoy, WIICP, ARRL senior assistant technical editor.

3) Narrow-band voice modulation, presented by Tom Lott.

4) An editors' forum on "The Technological Future of Ham Radio" will be presented by Jim Fisk, W1HR, *ham radio* editor-in-chief; Armond Noble, N6WR, *Worldradio* editor-in-chief; and Harry Dannals, W2HD, ARRL president.

5) Telephone interconnect devices, with Ace Collins, K6VV.

6) WARC preparations, given by Vic

Clark, W4KFC, IARU Region 2 president.

7) A three-hour microwave forum, featuring transmitters, receivers, antennas and a demonstration by the San Bernardino Microwave Society.

8) "Project Sunfire," a program about solar energy, with Mark White and the explorer scouts from JPL.

9) The Personal Communications Foundation forum, with Kenneth Wideltz, WA6PPZ, talking on legal responsibilities and liabilities of amateur radio in RFI, antennas, regulations, zoning and so on.

10) "Microprocessors and Ham Radio," presented by Dr. Robert Sudging, of Digital Group.

11) Printed-circuit construction techniques, as explained by Charlie Forman, from UCSD.

VHF/UHF Seminar

Bob Buaas, K6KGS, is the overall chairman for a full-day (Saturday) seminar on vhf/uhf topics. It is divided into three sessions: band planning, repeaters and nonrelay communications.

The band-planning session, chaired by Bill Pasternak, WA6ITF, immediate past chairman of the Southern California Repeater Association, will include national input on how coordination is now accomplished across the U.S., protection of nonrelay interests, spectrum management, and enforcement. The nonrelay session, chaired by Lou Anciaux, WB6NMT, will include simplex, sideband, fm and the exotic modes, such as EME, OSCAR, ATV, RTTY and computers. And the repeater session, chaired by Bob Thornburg, WB6JPI, will include advanced repeater techniques, repeater-user control, remote-control techniques, and advances in DF techniques.

Ladies Program

A busy weekend is being planned for the ladies. On all days there will be a hospitality room with demonstrations of crafts. The Saturday luncheon has a program featuring "Dress Americana," a fabulous look at the history of fashions,

including 50 beautiful, authentic costumes of the First Ladies of the United States. More activities are being planned, so watch for announcements.

Other Events

As mentioned, many details of the 1978 National Convention are still being worked out, but these other activities are firmly scheduled:

1) As part of the FCC's participation, exams will be administered on Saturday for all grades of amateur licenses from Technician through Amateur Extra Class.

2) The banquet on Saturday night will feature Alvino Rey and his musical group.

3) Our many major exhibitors will be open Friday from 5 to 10 P.M., Saturday from 9 A.M. to 4 P.M., and Sunday from 9 A.M. to 3 P.M.

4) A Digital Group computer will be on display receiving cw, then displaying it on a video screen while a voice synthesizer speaks it in English.

5) A DX, fm and QCWA breakfast will be held Sunday morning, with a special entertainment program at 10:30 A.M.

6) A transmitter hunt will be held about 1 P.M. on Sunday, using 146.76 MHz.

Accommodations

The '78 convention is being held in the beautiful Town and Country Convention Center, enclosing forum rooms, exhibit space and banquet room all on one floor. Parking is free. The entire hotel has been reserved for our convention and there are many fine motels within a mile. Rooms at the hotel are going fast! Call 714-291-7131 for your reservation, or write to Town and Country, 500 Hotel Circle, San Diego, CA 92108. Convention information may be obtained by writing to Sam Dear, General Chairman, 13031 Papago Dr., Poway, CA 92064.

Credit and Sponsorship

Volunteers who are working to make this one of the most rewarding nationals ever include Sam Dear, K6BWT, general chairman, advertising and registration; Bob Brunette, WA6SND, vice chairman; Sybil Allbright, W6GIC, secretary; Glen Peterson, WB6BOD, program; Lyle Fisher, K6NC, budget and financing; Larry Harvey, N6LY, printing and program book; Lou Baughman, W6PKA, exhibits and prizes; Fran Harvey, ladies program; Jim West, W6QLO, Wouff Hong and clubs' booths; Bob Brunette, Wayne Bamford, W6PDA and Ed Way, WA6EYX, advisory committee; and Rose Marie Dear, bookkeeper.

The San Diego County Amateur Radio Council comprises a group of 18 clubs active in the county from near the Mexican border to the north county boundary. QCWA is composed of many chapters all over the United States. Together, they will try to give you your money's worth at the 1978 ARRL Convention.

Last Call for Comments on FCC WARC Proposals

The U.S. public has one last chance to influence the frequency allocations which radio services will use for the remainder of the 20th century.

By David Sumner,* K1ZZ

Just as this issue of *QST* was going to press, on May 5, the Federal Communications Commission released its latest proposals in the continuing preparations for the 1979 International Telecommunication Union World Administrative Radio Conference (WARC-79). This round, which is the third opportunity for public comment on the proposed international Table of Frequency Allocations, will be the final opportunity for the general public to comment upon the most important aspect of WARC-79 preparations: the size and location of the bands in the radio spectrum which will be available to the various radio services, including the Amateur Service, through the year 2000.

The latest proposals are contained in the Eighth Notice of Inquiry in Docket 20271. The two earlier drafts of the Table of Frequency Allocations were in the Third and Fifth Notices; the others, including the just-released Sixth and Seventh Notices, deal with technical and operational matters other than spectrum allocation. Like its predecessors, the Eighth Notice is a massive document, and there was only a very short time available to study it before the *QST* deadline. However, because the deadline for comments is June 30 and is not likely to be extended by more than a week or two, we felt it was extremely important to provide as much information as possible in this issue.

The Eighth Notice contains both good and bad news for amateurs. The best news is that the FCC has proposed new, exclusive, worldwide allocations for the Amateur Service in the vicinity of 10, 18 and 25 MHz. In so doing, the Commission joins other administrations on at least four continents which are supporting amateur requirements for new bands be-

tween the present 7-, 14-, 21- and 28-MHz allocations. The Commission-proposed bands are somewhat narrower than those supported by other administrations and represent only 300 kHz of additional spectrum, much less than that required by our growing Amateur Service. However, it is significant that the Commission has now accepted the concept of new amateur bands. The new bands would provide the

FCC has proposed new, exclusive, worldwide allocations for the Amateur Service in the vicinity of 10, 18 and 25 MHz.

Amateur Service with a significantly improved ability to communicate reliably over long distances for a greater portion of each day. The rationale for the new bands was discussed in detail in two recent *QST* articles about the Fifth Notice of In-

quiry: "FCC WARC Proposals, Round 2," July, 1977, and "Amateurs Respond to FCC WARC Inquiry," October, 1977. Members are urged to refer to those two articles for background on the discussion to follow, because time and space do not permit repetition here.

Other good news is that we have retained many of the gains which have been made in the WARC proceedings to date. As discussed in the earlier articles, the Commission has proposed new Amateur-Satellite Service bands in the microwave region. The Commission also has proposed a new shared allocation for amateurs at 902-928 MHz, an expansion by 50 kHz of the present 21-MHz band, and a rearrangement of the 7-MHz band to alleviate the problems caused by the present sharing with Broadcasting.

However, there are also some setbacks in the Eighth Notice, most of them suffered at the hands of Broadcasting. An amateur allocation at 160-190 kHz, proposed in the Third Notice and withdrawn in the Fifth, still has not been reinstated

Fig. 1 — This is how the heading of your filing with the FCC should look. Comments should be addressed to the Secretary, Federal Communications Commission, Washington, DC 20554, and should be mailed so as to arrive by June 30.

BEFORE THE FEDERAL COMMUNICATIONS COMMISSION Washington, DC 20554	
In the Matter of An Inquiry relative to preparation for a General World Administrative Radio Conference of the International Telecommunication Union to consider revision of the international Radio Regulations.	DOCKET NO. 20271
RESPONSE TO EIGHTH NOTICE OF INQUIRY	
To: The Commission	

*Assistant General Manager, ARRL

despite persuasive arguments by amateurs. At 1.8 MHz, 60 kHz of a proposed exclusive band has been designated for

The top 50 kHz of the 3.5- to 4.0-MHz band would be allocated to the Broadcasting and Fixed Services under the latest Commission proposals.

Broadcasting. The top 50 kHz of the 3.5- to 4.0-MHz band would be allocated to the Broadcasting and Fixed Services under the latest Commission proposals. An expansion of the congested 14-MHz band, supported by the Commission in two earlier rounds, has now disappeared and the band returned to its present limits. Finally, one of the proposed new satellite bands, at 3400-3410 MHz, has been withdrawn.

Broadcasting's gains come in the face of massive technical evidence that they are not justified. The Commission is under

Broadcasting's gains come in the face of massive technical evidence that they are not justified.

pressure to provide greater access to the spectrum by minority broadcasters; however, extending the present standard broadcast band upward from 1605 to 1860 kHz is a poor way to accomplish that objective. These frequencies are unsuitable for broadcasting, because the daytime groundwave coverage is poor compared with lower frequencies and the evening coverage is limited by severe skywave interference. Hundreds of millions of existing receivers would be rendered obsolete. Hf Broadcasting has been searching for spectrum below 5.95 MHz to provide more reliable winter service in years of low solar activity over certain paths. The only domestic request for this comes from a private broadcaster who wishes to reach the Caribbean from a transmitter site in Florida. This single request can hardly justify the reallocation of a portion of an amateur band which supports a great deal of public-service and disaster communications and which is already one of the most crowded. These and other points will be elaborated upon in the League's comments.

Table 1 summarizes the present amateur allocations in ITU Region 2 (North and South America, plus Hawaii), along with the most recent FCC proposals.

Table 1

Present Allocation	FCC Fifth Notice Proposal	FCC Eighth Notice Proposal
Below 4 MHz		
1.8-2.0 shared extensively	1.8-1.9,* 1.9-2.0 shared	1.86-1.9,* 1.9-2.0 shared
3.5-4.0 shared	3.5-3.9,* 3.9-4.0 shared	3.5-3.9,* 3.9-3.95 shared
4-27.5 MHz		
7.0-7.1,* 7.1-7.3 shared with Broadcasting in other regions	6.95-7.25*	same
none	none	10.1-10.2*
14.0-14.35*	13.95-14.4*	14.0-14.35*
none	none	18.068-18.168*
21.0-21.45*	20.95-21.45*	same
none	25.76-25.86*	25.11-25.21*
27.5-1215 MHz		
28.0-29.7*	same	same
50.0-54.0*	same	same
144-148* (satellites 144-146)	same	same
220-225 shared w/gov't. radiolocation (RL)	same, but add share with mobile	same
420-450 shared w/RL (satellites 435-438)	same	same
none	902-928 with extensive sharing	same
1215 MHz-10.5 GHz		
1215-1300 shared w/RL	1240-1300 shared w/RL; add Sat. 1290-1300	same but change Sat. to 1250-1260
2300-2450 shared	add Sat. 2390-2400	same
3300-3500 shared	add Sat. 3400-3410, more sharing with mobile	delete Sat.
5650-5925 shared	add Sat. 5650-5670, more sharing	same
10000-10500 shared w/RL	same	same
Above 10.5 GHz		
24.0-24.05 GHz shared w/ISM (satellites 24.0-24.05 GHz)	same	same
24.05-24.25 GHz shared	same	same
48-50 GHz shared	49.8-50 GHz,* add Sat.	same
71-76, 165-170, 240-250, above 300 GHz shared	add Sat. 71-76, 165-170, 240-250 GHz; some additional sharing	same but change 71-76 to 76-81 GHz

A comparison of the present amateur frequency allocations in ITU Region 2 (North and South America, plus Hawaii) with the FCC draft proposals of May, 1977 (Fifth Notice), and May, 1978 (Eighth Notice). Unless otherwise indicated, frequencies are in MHz. "Sat." indicates that an allocation to the Amateur-Satellite Service has been proposed (detailed here only above 144 MHz); an asterisk indicates exclusive allocation; "same" indicates no change between the Fifth and Eighth Notices.

Several additional changes of a minor nature have occurred since the Fifth Notice. The proposed band at 25.76-25.86 MHz has been moved to 25.11-25.21 MHz. The proposed band for amateur satellites at 1290-1300 MHz has been moved to 1250-1260 MHz. An allocation at 71-76 GHz has been adjusted to read 76-81 GHz. If any other changes of a similar nature slipped by us during our quick examination of the document, we will mention them next month.

An interesting footnote affecting 10-kHz segments of the high-frequency bands has been proposed by the Commission. Under this proposal, 3.79-3.80, 7.24-7.25, 10.19-10.20, 14.34-14.35, 18.158-18.168, 21.44-21.45 and 25.20-25.21 MHz would be designated internationally for the handling of communications into and out of areas affected by natural disasters. Normal amateur operations would be affected only when such a disaster occurred; at that time, disaster communications would have priority in those segments and routine operations would be required not to interfere.

The Commission will accept written

comments from the general public on its Eighth Notice of Inquiry until June 30. See Fig. 1 for details on how to submit comments. Your original comments must be accompanied by 19 copies if they are to reach everyone at the Commission who is involved in WARC preparation; however, even an original and one copy will be placed in the public record and will receive limited circulation.

By year-end, the Commission must complete its work on the proposed Table of Frequency Allocations so the final U.S. position may be forwarded to the ITU and distributed to all the member-nations for study. Some changes certainly will be made between now and then, as competition continues between the interests of the various government and non-government users of the radio spectrum. However, the final U.S. position is likely to be much closer to the eighth Notice version than to that of the Third Notice, or to the *status quo*. The League will continue to be in the thick of the battle, working with dedicated volunteers from the amateur community to provide the best possible representation for the Amateur Service in this all-important proceeding.

League Files Further Opposition to Commission's 10-Meter Amplifier Ban

In this column last month we told you that the FCC adopted rules to prohibit the marketing of amplifiers capable of operation between 24 and 35 MHz, and to impose a limited, temporary (technically it expires in three years) type-acceptance program on amplifiers that operate below 144 MHz (Dockets 21116 and 21117). The League has now filed a Petition for Partial Reconsideration in this proceeding. In its petition the League vigorously opposes the ban on the marketing of 10-meter amplifiers as being harmful to the Amateur Radio Service without producing any commensurate benefit in the Commission's enforcement program. The petition demonstrates that the public record shows no evidence that the ban would serve any useful purpose over and above the limited type-acceptance program adopted by the Commission.

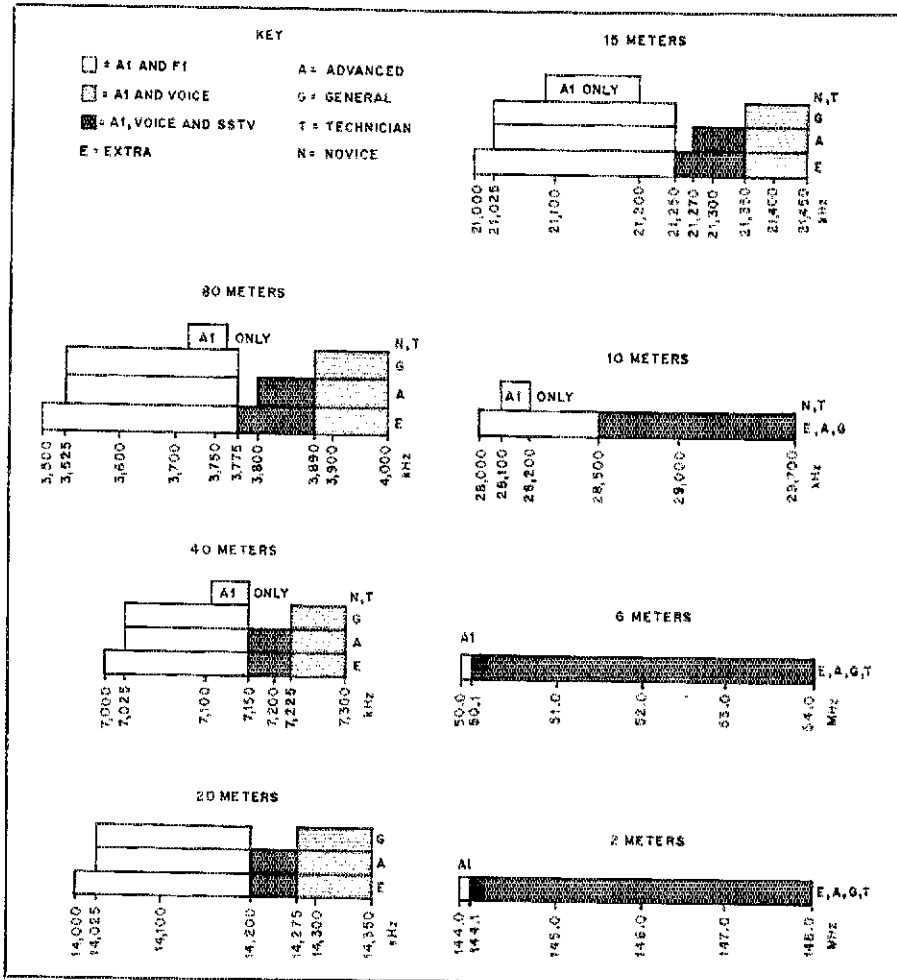
The limited type-acceptance program adopted by the Commission is far less damaging to the Amateur Radio Service than the program originally proposed by the FCC in February 1977. At that time the Commission proposed to require type acceptance of amateur amplifiers and transmitters. As adopted, type acceptance would cover only amplifiers that operate below 144 MHz.

The type-acceptance program would prohibit the marketing of amplifiers which could be coupled to a 4-watt CB radio (for example, rf-actuated amplifiers capable of being driven with 4 watts), but would not prohibit the marketing of amateur amplifiers which require higher drive. This would be less disruptive to manufacturers of amplifiers intended for amateur use than would a total ban. The League did not contest this limited, type-acceptance requirement under the condition that the Commission will actively explore long-term solutions to the problem, such as point-of-sale control or the establishment of RFI susceptibility standards.

The ARRL emphasized that the Commission faces an overall problem much greater than the illegal use of amplifiers by CBers and unlicensed persons — the easy availability of radio gear of all sorts to unauthorized users. The petition cites the fact that there have been reports of unlicensed operation on the maritime mobile mf bands due to the availability of obsolete maritime radios at low prices. Furthermore, the League states, the only long-term solution to this problem is to require the showing of a valid license at the point-of-sale of such radio equipment. — *K1FHN*

[Editor's Note: Amateurs desiring additional details may send an s.a.s.e. (24¢) to ARRL hq. requesting Reconsideration Petition 21116.]

*Public Information Officer, ARRL



U.S. amateur suballocations effective since May 15, 1978. Copies of this chart are available from ARRL headquarters. Send a stamped, self-addressed envelope and ask for the "Members Guide to the U.S. Ham Bands."

FCC THREATENS AUTOPATCH, ARRL REBUTS PORTIONS

The FCC issued a communique dated April 5, 1978, dealing with third-party traffic in general and with autopatch in particular. Although the FCC specifically stated that its intention was to "clarify misunderstandings," it is clear that the Commission views autopatch abuse as a serious problem which may eventually lead to official action. It is not difficult to predict what the FCC's action would be if it does indeed come to that.

The FCC noted that even though there are

no regulations in Part 97 dealing specifically with autopatch; all telephone interconnection devices are covered in general under the rules governing third-party traffic. The Commission went on to quote from Section 97.79(d), "the licensee of an Amateur station may permit any third party to participate in Amateur radio communication from his station, provided that a control operator is present and continuously monitors and supervises the radio communications to insure compliance with the rules."

In the most controversial portion of the communique, the FCC interpreted the above to the effect that "this clearly prohibited auto-

patching and reverse autopatching through automatically controlled repeater stations and required a control operator to be on duty at all times during these operations. Furthermore, all calls not initiated at an Amateur station had to be screened by the control operator before being placed on the air." (See below for ARRL's rebut on autopatching.)

The FCC went on quoting from Section 97.114 which prohibits an amateur from transmitting or delivering third-party traffic "involving material compensation, either tangible or intangible, direct or indirect, to a third party, a station licensee, a control operator, or any other person." The Commission stated that this clearly prohibited the delivery of third-party traffic consisting of business communications on behalf of any party.

The FCC defines business communications as "any transmission or communication, the purpose of which is to facilitate the regular business or commercial affairs of any party." The FCC went on to emphasize that it draws no distinction between "profitmaking and charitable organizations." Thus, while the individual amateur may perceive a difference between a building contractor and a church, the FCC claims its rules define both as "business"; therefore, FCC rules prohibit any communications on the amateur bands that would facilitate the day to day operation of either of these organizations.

In response to this communique, ARRL General Manager Richard Baldwin, W1RU, drafted a letter to FCC's Chief of the Personal Radio Division, John B. Johnston, which agreed with most of the content of the release but disagreed with the portion regarding automatically controlled repeaters and autopatch. Portions of that letter are quoted below.

"As you know, the League shares your concern about the great potential for abuse which is represented by repeater autopatch facilities. Autopatch has given the Amateur Service a unique ability to provide emergency and other meritorious public service communications within a local area. At the same time, it tempts

a small part of the amateur community to use the facilities for purposes which are outside the traditional objectives of the Amateur Service. The League is addressing this problem on a continuing basis, most recently in the 'Guidelines for Autopatch and Phone-Patch Use' (page 60, February 1978 QST) and 'Washington Mailbox' (page 63, April 1978 QST).

"While we agree with the intent of the public notice, we must disagree on one point: the statement that Section 97.79(d) '... clearly prohibited autopatching ... through automatically controlled repeater stations and required a control operator to be on duty at all times during these operations.' While this prohibition is clear with respect to reverse autopatching, because of the very nature of that form of operation, it is not at all clear with respect to an autopatch which is initiated by a licensed amateur who accesses a repeater in the usual manner. In fact, to the contrary, the Commission clearly intended that third-party traffic be permitted on a repeater operating under automatic control. In its Notice of Proposed Rulemaking in Docket 20112, the Commission stated 'Depending upon the actual situation, there are several steps the licensee of a repeater station desiring to operate his station by automatic control can take to preclude many of the abuses encountered with amateur repeaters. For instance, if commercial third-party traffic by automatic telephone system interconnect becomes a problem, this function could be discontinued during periods of automatic control.'

"Clearly, the burden is upon the licensee of the repeater to determine if autopatch abuse is a problem on his automatically controlled repeater, and, if it is, to discontinue the feature during periods of automatic control. However, it is equally clear that, on the many repeaters throughout the country where autopatch abuse is not a problem, the Commission had no intention of imposing such a restriction at the time automatic control was first proposed and adopted.

"With few exceptions, the Commission's efforts since 1972 to deregulate repeater opera-

tion are very much appreciated by the amateur community. This public notice, while illuminating a problem which exists on some repeaters in some parts of the country, appears to be a step in the opposite direction, and, indeed, appears to be an unwarranted attempt to change basic policy. The public notice notwithstanding, the record clearly shows that autopatches on amateur repeater stations operating under automatic control are not in violation of the Commission's rules unless the content of the autopatch is commercial or otherwise improper."

FCC CONTINUES CRACKDOWN ON "HFers"

The FCC announced April 5 that it had issued orders directing 15 CB licensees to show cause why their licenses should not be revoked for out-of-band operation. Since this does not involve amateur frequencies or the Amateur Service, ARRL has no direct interest in such proceedings. We mention it, however, because these licensees would have been ordered to show cause why their amateur license should not be revoked if they had been amateur licensees. If an individual is involved in deliberate out-of-band operation (27.5-28.0 MHz, for instance), the FCC can and will revoke all licenses that he may possess including CB, amateur and commercial.

VERMONT HAMS GET ANTENNA SUPPORT

Vermont amateurs will no longer be plagued by "accidental" regulation of amateur radio towers by local zoning authorities. Prior to the passage of this legislation, local zoning boards were able to limit the height of amateur radio antennas by applying ordinances limiting the height of "structures." However, under a new law a zoning authority may regulate antenna height only if an ordinance specifically gives the zoning authority this power.

Governor Snelling signed the following, Senate Bill 223, as amended, into law: An Act to Add 24 V.S.A. Section 4407(13) Relating to Zoning of Antennas. Section 1: 24 V.S.A. Section 4407(13) is added to read:

(13) Antenna structure.

Unless a zoning bylaw specifically prohibits to the contrary, a bylaw limiting the permissible height of structures shall not apply to antenna structures.

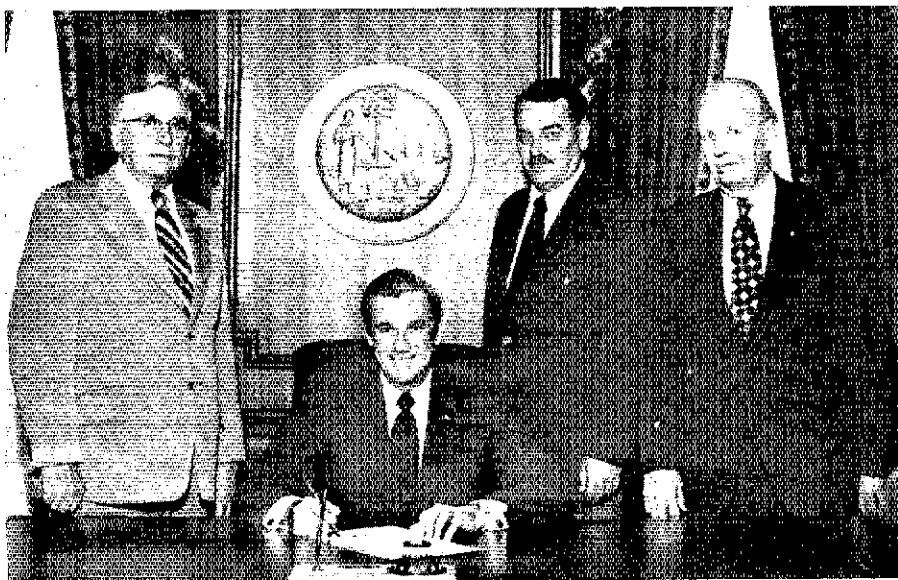
Section 2:

An operator who erects an antenna between the effective date of this act and March 15, 1979 and an operator who on the effective date of this act is maintaining an antenna structure in violation of any municipal bylaw without the benefit of the status of "preexisting non-complying structure" shall not be entitled to the benefit of such status, as against a bylaw duly adopted on or before March 15, 1978.

The wording is somewhat different from the language originally proposed by Senator William Doyle of Washington County. Most notable is the addition of Section 2. Stated in simple terms, Section 2 says that antennas erected between now and March 15, 1979, will not be grandfathered if the municipality enacts a height restriction before March 15, 1979. In addition, any antenna currently in violation of a zoning law will not be grandfathered.

After March 15, 1979, any Vermont amateur will not have his antenna's height restricted

Florida Governor Reubin O'D. Askew signs the Amateur Radio Week in Florida proclamation as Charles W. Walters, chief, Bureau of Communications, Division of Disaster Preparedness (W4HMO); Herbert W. Johnson, director, Division of Disaster Preparedness, State of Florida and Mr. Harvey Cotton, executive assistant to the governor look on.



unless his town has an ordinance specifically limiting the height of all antennas.

While a town may enact such an ordinance, important facts must first be considered. Before a town can adopt an ordinance, it must publish its intent, allow comment, call meetings, etc. Any town will be reluctant to do so if hams, CBers, television antenna owners, and others turn out at a meeting to protest this action.

Congratulations to Jim Harrison, WB1CZB, of Barre, Senator Doyle, and Representatives John Huffman and Tom Koch, who led many others in the passage of this bill. — WA3NLO

THREE STATES CELEBRATE AMATEUR RADIO WEEK

South Carolina Governor James B. Edwards proclaimed the week of May 14 through 20 as Amateur Radio Week in South Carolina. He cited public service communications, goodwill, technical advancement and other good deeds as justification for this honor.

Florida Governor Reubin Askew proclaimed June 18 through 24 as Amateur Radio Week in Florida. The governor noted that amateur radio operators stand ready at all times to come to the aid of their communities, that they engage in innumerable programs of assistance and rehabilitation of the handicapped in the development of radio as a hobby and that they are continuously alert to offer additional communications services when the country faces a national emergency.

Alaska Governor Jay Hammond proclaimed the week of August 21 through 27 as Amateur Radio Week in Alaska. In announcing this honor, the governor specifically cited the public service of the Alaskan hams during the earthquake and the Fairbanks flood. The governor encouraged all Alaskans to offer their support and thanks for the services provided by radio amateurs throughout Alaska.

PRESIDENT CARTER SPEAKS TO HAMS THROUGH KM1CC

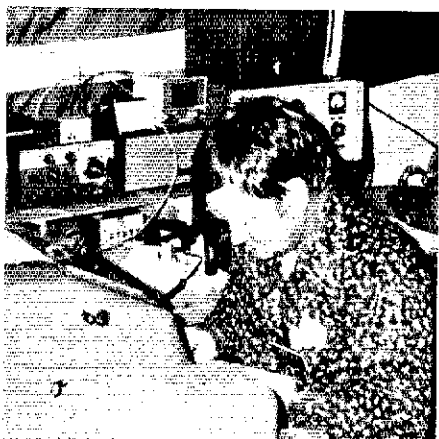
President Carter sent a message to all amateur radio operators during the recent operation of the Marconi special events station (May 1978 *QST*, page 42). The text of the message that KM1CC relayed to all amateur radio operators follows:

"Seventy-five years ago, a new era of international communication was heralded in by a historic exchange of messages across the Atlantic. On January 18, 1903, President Theodore Roosevelt first used the Marconi wireless to send the following message to Edward VII of England from a station on Cape Cod:

'In taking advantage of the wonderful triumph of scientific research and ingenuity which has been achieved in perfecting a system of wireless telegraphy, I extend on behalf of the American people most cordial greetings and good wishes to you and the people of the British Empire.'

Edward VII replied via the Poldhu Station in Cornwall, England:

'I thank you most sincerely for the kind message which I have just received from you through Marconi's transatlantic wireless telegraphy. I sincerely reciprocate in the name of the people of the British Empire the cordial greetings and friendly sentiment expressed by you on behalf of the American nation and I



Bob "Whitey" Doherty, K1VV, at his RTTY station during KM1CC's nine-day run, preparing tapes of various VIP messages for later transmission. He and other members of the Town of Barnstable Radio Club spent long hours planning the event.

heartily wish you and your country every possible prosperity.'

"That exchange marked a milestone in the history of communications. Since then, we have built on the invention of the distinguished Italian physicist, Guglielmo Marconi, and others, a global communications system that allows instant contact, not only between heads of state, but peoples of all nations.

"In recalling that historic message, it is fitting that we commemorate the event both with gratitude for the ways in which science and engineering have helped to unite us and with fervent hopes that such communications will serve the future course of peace and human progress everywhere."

Jimmy Carter
President of the United States

BEHIND THE DIAMOND

"You will probably never believe this," Bob Halprin, K1XA, said, "but my very first day on the job at League hq. I was a half-hour late." Fortunately, his career with the ARRL went uphill from there, as he rose from communications assistant to assistant communications manager for public service in about a year. In the interest of fair play we will refrain from commenting on his initial tardiness, except to say at the time Bob did not know Newington from Podunk Hollow.

A New Jersey native, Bob was born in Englewood but grew up in nearby Paterson and Fair Lawn. He spent his college years at American University in Washington, DC, where he was a broadcasting intern at a local TV station. "I spent most of the time partying with an assistant producer, but I did manage to write a script for one show," said Bob.

Following graduation with a BA in communications, it did not take him long to decide what he wanted to do; Bob started working in the ARRL Communications Department one month after graduation. His duties as communications assistant included putting together the *Net Directory* and writing the Public Service Diary, part of the "Public Service" column which appears monthly in *QST*. He now supervises net and repeater directory work and is also heavily involved with coordination of

ARES (Amateur Radio Emergency Service) and NTS (National Traffic System). Bob is also the Hq. liaison to the ARRL Emergency Communications Advisory Committee. Much of his effort goes into conducting the "Public Service" section of *QST* with emphasis on emergency communicating.

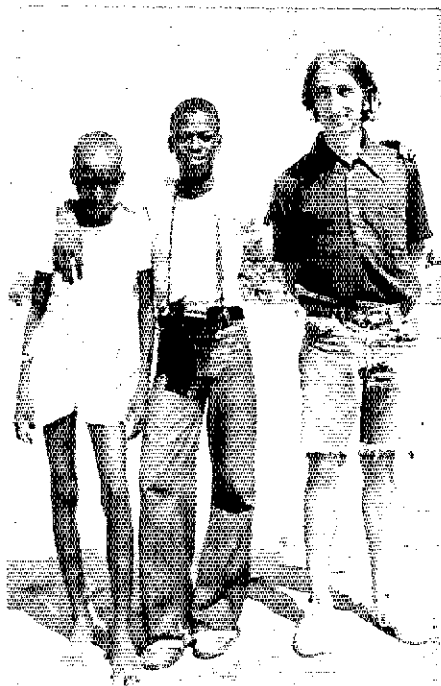
Bob's amateur career began in April, 1970, when he received WN2NOM. A General class license followed shortly thereafter, and in April, 1973, he earned his Amateur Extra Class. An avid traffic handler, Halprin is a TCC member and participates regularly in NTS. His awards include Bicentennial WAS no. 8, WAS, WAC, DXCC, 5BWAS (by the time you read this) and BPL. One of his favorite bands is 80 meters as evidenced by more than 100 countries worked there on cw and phone. Bob loves the Novice Roundup (he was high scorer among non-Novice ARRL staffers entering this year's fray), Field Day and various DX get-togethers.

One of his recent DX Contest efforts was the CQ WorldWide Contest in October, 1977, when Bob and Chod, WB2CHO, journeyed to sunny Senegal to operate 6W8MM. Together they garnered 4500 contacts and nearly five million points. "I enjoyed Africa. I hope we can get back there next year," he said.

Halprin openly admits his basketball fanaticism. "I make regular pilgrimages to Madison Square Garden to watch my heroes play. My team? The New York Knicks, naturally. Isn't everybody a Knicks fan?" At home, he plays sandlot basketball (the "I may be short, but I'm slow" style), specializing in long-range jump shots. His favorite hangouts are the basketball courts of nearby New Britain, CT.

Bob also has finished several full-length screenplays (as yet unsold) and is working on a novel. "I didn't get much time to write during the basketball season so now I am practically jumping through hoops to finish it," he said. — WAITZK

Bob Halprin, K1XA, soaks up the sun in Senegal with two friends during a rest period from operating in last year's CQWW contest.



Moved and Seconded...

MINUTES OF EXECUTIVE COMMITTEE MEETING
No. 368
March 11, 1978

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 1:58 P.M. on March 11, 1978, at the Washingtonian Motel in Gaithersburg, Maryland. Present: President Harry J. Dannals, W2HD, in the Chair; First Vice President Victor C. Clark, W4KFC; Directors Max Arnold, W4WHN, Richard A. Egbert, W8ETU, Ron Hesler, VE1SH and Robert B. Thurston, W7PGY; and General Manager Richard L. Baldwin, W1RU. Also present were General Counsel Robert M. Booth, Jr., W3PS; Directors Gar Anderson, K0GA, Charles Cotterell, W0SIN, Jack Gant, W5GM, Paul Grauer, W0FIR, Harry McConaghy, W3SW, Larry Price, W4RA, William Stevens, W6ZM, John Sullivan, W1HHR, and Phil Wicker, W4ACY; Treasurer John Huntoon, W1RW; and Assistant General Manager David Sumner, K1ZZ. Vice Director Gay Mihus, Jr., W4UG, entered the meeting at 2:10 P.M.

On motion of Mr. Hester, the Committee recognized the names of 116 newly elected Life Members, and directed the General Manager to list their names separately in *QST*. (It was noted that there are currently 14,332 elected and quarterly payment Life Members.)

On motion of Mr. Thurston, VOTED unanimously to grant approval of the following ARRL conventions: Virginia State, May 27-28, 1978, Roanoke, VA; Pacific Division, August 12-13, 1978, Reno, NV; Sask. Province, August 18-19, 1978, Regina, Sask., Canada; Alaska State, August 26-27, 1978, Anchorage, AK; Illinois State, September 10, 1978, Rockford, IL; Tennessee State, October 13-14, 1979, Memphis, TN; Delta Division, October 10-11, 1981, Memphis, TN.

On motion of Mr. Egbert, VOTED unanimously to approve affiliation of the following amateur radio societies: Amateur Radio Public Service Association, Sturgis, MI; Amateur Radio Soc. at Arizona State University, Tempe, AZ; Aroostook Amateur Radio Association, Presque Isle, ME; Boothel Amateur Radio Club, Portageville, MO; Brigham Young University ARC, Provo, UT; Brookfield Central High School ARC, Brookfield, WI; Carroll County Amateur Radio Club, Westminster, MD; Cass County Amateur Radio Club, Logansport, IN; Chatham Amateur Radio Club, Chatham, NJ; Clatskanie Amateur Radio Club, Clatskanie, OR; Council Rock High School Amateur Radio Club, Newtown, PA; Desert Waves Amateur Radio Club, Blythe, CA; Dillon County Amateur Radio Club Inc., Dillon, SC; Enfield Radio Amateurs Group, East Granby, CT; Enterprise Amateur Radio Society, Enterprise, AL; Flyweight DX Group, Kingsport, TN; Hays Amateur Radio Club, Hays, KS; Hettinger Amateur Radio Club, Hettinger, ND; Knickerbocker ARC of Knickerbocker Yacht Club, Port Washington, NY; Memphis DX Society, Memphis, TN; Monsanto Amateur Radio Association, St. Louis, MO; Motorola Amateur Radio Club, Plantation, FL; Mount Prospect Amateur Radio Club, Mount Prospect, IL; Northern Catskills V.H.F. Association, Middleburgh, NY; Riverfront Wireless Association, Florence, NJ; Rookies Amateur Radio Club, Elmira Heights, NY; Shreveport Amateur Radio Association, Shreveport, LA; Sierra ARC of the High Mojave, Ridgecrest, CA; Signal Propagators Amateur Radio Club, Athens, TN; Southwestern Oklahoma Repeater Association, Inc., Altus, OK; Teays Amateur Radio Club, Circleville, OH; Thornhill Radio Amateurs' Club, Thornhill, ON, Canada; Thornlea Secondary School ARC, Thornhill, ON, Canada; Toronto Repeater Group, Toronto, OH.

The Committee was in receipt of a request from the Northern California DX Club that the League cosponsor, with NCDXC, a travel tour to Japan in November. After extended discussion, on motion of Mr. Hester VOTED unanimously to decline the invitation for cosponsorship. The General Manager was directed, however to provide suitable editorial mention in *QST* of the travel tour, and to offer advertising space in *QST* at the customary rates.

The General Manager, in response to a directive adopted at the January Board meeting, reviewed in

detail the current status of action being taken in response to motions adopted by the Board at its January meeting.

On motion of Mr. Arnold, the General Manager was directed to address a letter, certified mail, return receipt, to Mr. Samuel C. McCluney, a Life Member, pointing out that it had come to the attention of the Executive Committee that Mr. McCluney's amateur license had been revoked in 1974 (46FCC802), subsequent to his election as a Life Member, and based on that action by the Commission the Executive Committee was notifying Mr. McCluney of its intention to expel Mr. McCluney as a member of the League, under the provisions of Article 10.

On motion of Mr. Thurston, unanimously VOTED to deny the request by Mr. Robert F. Koste, WB6MVZ, that the sum he had paid toward Life Membership dues be refunded.

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

After extended discussion, on motion of Mr. Clark, unanimously VOTED that the General Counsel file for reconsideration in the recent Report and Order on Docket 21135.

After extended discussion, on motion of Mr. Arnold, the General Counsel was directed to file a response to the further Notice of Proposed Rulemaking in Docket 21135, the response to exhibit the philosophy expressed informally by the members of the Executive Committee.

After extended discussion of the reported actions in Dockets 21116 and 21117, the Committee deferred action until the texts of the Reports and Orders became available for close study.

After extended discussion, on motion of Mr. Egbert, VOTED unanimously that the General Counsel formally convey to the Commission the League's concerns that the recent Notice of Waiver issued by the Commission in Docket 21033 with specific attention to the reconsideration action, should not prejudice the outcome of the matter of distinctive repeater call signs and separate repeater licensing.

On motion of Mr. Clark, VOTED unanimously to approve the holding of an ARRL Technical Symposium at DXPO78, on Saturday, September 16, 1978, at the Tysons Corner Ramada Inn, Falls Church, VA.

The General Manager reported a donation to the League of the sum of \$116.14 by the Milwaukee Net, in memory of departed member George Ruger, W9DVD. (Applause)

During the course of the meeting, the Committee discussed, without formal action, recent actions of the Department of Communications in Canada, the 1977 year-end financial statements, a revised forecast of 1978 income and expense, progress in employing a Washington representative, the expeditious delivery to directors of future reports and orders from the Commission, recent contacts with FCC Commissioners, a computer study of antenna height vs. field strength at nearby ground locations, and a possible date for the next meeting of the Executive Committee.

There being no further business, the meeting was adjourned at 5:36 P.M.

Respectfully submitted,
Richard L. Baldwin, W1RU.
Secretary

LIFE MEMBER APPLICANTS

Stephen L. Adamus, WA2HWO; James T. Adlington, WB5WGT; Keith D. Baker, VE2XL; Robert R. Ballantine, W8ISU; Thomas O. Barnwell, Jr., WB4EDD; Stephen E. Belter, WB9SGP; David K. Bernhardt, WA2OJQ; Jonathan R. Bloom, WA3JSV; Alan L. Bonner, K5VNJ; Thomas C. Bracken, W1UM; L. Branum, KL7JG; William D. Briggs, K6ANV; Erik W. Brom, WB0NIU; Jack Norman Brower, WA7NNH; Stephen F. Brown, N6OE; Jethro Busch, WA6SLN; Barry R. Campbell, W2CGX; Earl F. Campbell, WB0URF; Michael J. Cassidy, WA6LOW; John H. Chamberlain, W2NK; Daniel F. Church, WB5SNQ; Tony S. Circo, WA6MOA; Tommy C. Coalson, K4FMO; Michael S.

Cohoon, WA4QKF; Avery Comarow, W4OGK; Jeffrey W. Cook, N0FB; Geraldine A. Cooper, WA6QFO; Richard E. Darwicki, N6PE; Byron P. Davies, WB6BLA; David A. Deem, K3NGN; Franklin Doan; John A. Donaldson, WB5DGQ; Terry L. Edlin, K9TE; Lanny E. Ellis, K0EZ; Woodson R. Elsey, K1TXJ; Matthew J. Ellgroth, K9DUO; William F. Ford, WB6SNU; Catherine L. Frank, WB1GFC; David W. Freese, K7GP; Gary Leon Garriott, WA9FMQ; William Geib, WA8FFX; F. Michael Gholson, WB5MAC; David A. Givens, K5RSI; Robert D. Goodrich, WA3ZAO; Herbert M. Graham, K7ZEP; Robert W. Green, K0IDC; Ralph Haburton, K4DZ; Moses H. Hadnott, WB5JYP; Harold R. Hall, WB8ZDO; Fred A. Harris, N4UR; Louis W. Harris, K4EXW; Stevens Lawrence Hart; Scott Hartman, W6GOU; Donald B. Herman, WA2LJ1; Kerry G. Hinkley, K4ZED; Gerald S. Holliday, W4PKW; Keith M. Hoover, WA9VGX; Jack A. Hurst, WD8CF5; Arthur H. Johnsen, K0CNB; Douglas W. A. Joyce, VE3MV; Harry E. Killen III, WA3FOJ; Kazuo Kokaji, JA3KJW; Merrill F. Kottmeyer; Thom R. LaCosta, K3HRN; Lawrence L. Lanier, K1M1Z; James E. Linke, W8XX; Dale E. Lombard, WD0DM; Byron M. McKibben, WA4VC0; Warren P. McMurry, WB9DNR; James A. Meilahn, WB9VNO; Paul D. Mercado, W3FBF; Russell B. Mobley, WB0CTF; James D. Moore, Jr., WB5EPY; Larry Marion Moore, WB5IZW; Samuel W. Morrison, WB8ZS2; Frederick M. Mott, K8TRG; Anthony T. Nalepa, WB9KHK; Mart Dudley Nelson, WB5EXP; Guenther F. Noder, K8QJO; Richard M. Norley, WA1CFT; Bud L. Norwood, WA4QGV; Thomas P. O'Brien, WB5LWB; Earl E. Pape, WB9VRD; Herbert Pascal, W9AMO; Albert E. Peterson, W0NVZ; Herbert L. Ramey, WD5GDE; Marion A. Rauch, WB4RFB; Ronald C. Ray, WB3BKJ; Edmund B. Redington, Jr., WB4JHN; James Allan Redmond, VE3FSX; Lewis I. Reinbert, W2BIE; Michael G. Ritter, WA7VOY; Robert M. Rooney, K6RR; Willy A. Roelant, WB4KCI; John P. Sanger, W8QGQ; Leon A. Savidge, WA3EFE; Francis Schroeder, WB7SVG; Robert W. Slater, K9ZGT; Anton J. Smrekar, W9KDZ; George W. Spreht, K4JDW; Carol I. Stewart, WB0HTT; Mike Slough, WA4NHV; Paul H. Stowe, WA4IHY; Linda Lee Thompson, WD5FMP; Richard P. Thompson, WD5FMQ; Hans Tischer, KP4EBQ; George R. Tyrrell, K0CPT; Joan Upton, WB7UAB; Robert B. Van Hoose, WB4MLY/DA1AQ; Kenneth J. Vandevoort, WA0KYT; Ron Veelik, WA6LTH; Raymond A. White; Barry N. Williams; Ronald R. Wood, K0BRO; Masatake Yatabe, JA1JRK; Douglas Ray York, WB4VXN. [BY]

The Macon County VHF Association (Decatur, IL) receives its ARRL Charter of Affiliation from Edmond A. Metzger, W9PRN, vice director of Central Division (left). Recipients for the group are Dennis Vaughan, WA9TEC, president and Doug Stoutenborough, WB9PKE, secretary. (WB9TJA photo)



WARC All Services Meeting Produces No Further Surprises

Although some recent DOC actions have produced unheralded surprises to the amateur community, the Canadian Interdepartmental Committee's April meeting, concerning Canada's WARC position, produced nothing really new from the proposals contained in the published second draft paper. Over 65 service representatives attended this meeting, chaired by DOC's Director of WARC Activities, Mr. E. D. Ducharme. Representing the CRRL were Vice President Eaton, Counsel Benson and Director Hesler.

DOC was firm in its stand of the proposed loss of 3.8-4 MHz in favor of the Fixed and Broadcasting services, in addition to the other changes detailed on this page last month. We do have the feeling, however, that some flexi-

bility still remains in the government plans and the CRRL official reply to the second draft proposals shall vigorously document the many valid considerations for our IARU (International Amateur Radio Union) worldwide position.

Although Canada's proposed amateur loss in the 80-meter band (our primary concern) remains unaltered, at this point in time, we have reason to believe that the Department may be prepared to moderate this somewhat, although not entirely. Notwithstanding, the CRRL remains categorically in opposition to accepting any loss, *whatsoever*, in our most important 80-meter portion of the spectrum. Should our efforts, in this connection, be without success we shall continue to work through our sister

IARU Region 2 societies in an effort to try and ensure that any loss whatsoever is outvoted at the WARC by their respective countries in Region 2! Due to the extreme importance of our 80-meter band, as presently scheduled, the CRRL cannot "buy" the hinted government suggestion that the proposed 10-MHz band more than makes up for the small proposed loss on 80 meters . . . that, we suggest, would be like trying to compare apples and oranges, insofar as propagation effect and other justifications are concerned.

A revision of the second draft proposals is expected to be issued in a few months and then, following a brief period for further comment, Canada's WARC position will become finalized.

UPDATE ON EXPERIMENTER LICENSE PROPOSALS

Following the WARC meeting outlined above, the same CRRL team met with the director general of the DOC Telecommunication Regulatory Service, Dr. John deMercado, in order to discuss and express the concern of Canadian amateurs over many of the far-reaching ramifications of the proposed Experimenter license. Although minor modifications to the proposals have been made, by DOC, the CRRL position opposes the many major issues contained in the *Canada Gazette* proposals. Quite frankly, we were considerably surprised and even dismayed over what we could only consider the uncompromising and indeed even autocratic attitude exhibited by Dr. deMercado. From this general tone, we do not expect that he is currently prepared to moderate his personal viewpoint. Therefore, we can only express the hope that submissions as we suggested last month, *by due democratic process*, will prevail upon him to alter his position. In point of fact, what we consider an unreasonable and unjustified attitude has precipitated a letter on the subject we recently dispatched to the office of the Minister of Communications!

Although the *Canada Gazette* comment time frame closes on June 1, Dr. deMercado advised that he had granted an extra 30-day period. Therefore, July 1 is now the closing date for comment. If you have not already expressed your comment by the time you read this report, we respectfully urge you, once again, to do so NOW!

POTPOURRI

□ The Tariff Board hearings, as they will pertain to amateur radio, have been postponed until the fall. We shall advise as to the firm date

when available.

□ *Intercom*, the magazine of the Canadian Armed Forces, is currently running a series of excellent articles about amateur radio, written by Ron Gebhardt, VE1VE. Ron was recently awarded a Certificate of Merit, for this commendable effort, by the Public Information Office of the ARRL.

□ We have been requested by the manager of ARRL Central QSL Bureau of Canada, Brit Fader, VE1FQ, to remind all Canadian members that this bureau is for *incoming* cards only. This bureau does not handle outgoing cards as these must be sent to ARRL Headquarters, Newington, CT 06111, in accordance with the established reference terms and rules. Also, when sending s.a.s.c. for incoming cards, these must go to the QSL bureau in the section in which you reside and not to the Central Bureau.

□ Eric Walden, VE3HLL, RR 1, Gowans-town, ON, N0G 1Y0, is compiling a booklet listing all current *Canadian* contests. Further information may be obtained by writing to him direct (this is not an ARRL/CRRL production).

□ Speaking of contests, the Fraser Valley DX Club has announced a brand-new contest. It commences May 1, 1978, and the basic rules are as follows: No QSLs required; just GCR list, giving date, GMT, frequency, mode and station worked. It is available to all world amateurs and all authorized frequency bands may be used, with these emission types: ssb, cw, SSTV and OSCAR (no repeater contacts).

U.S. and Canadian amateurs must work 15 Fraser Valley DX Club members, while amateurs in other countries must work seven members. The cost of the handsome certificate is \$1 (Canada and U.S.) and 5 IRCs or \$1 in U.S. currency for other countries. Send applications to Box 3112, Langley, BC, V3A 4R3.

□ New ARRL/CRRL affiliations are Northern Alberta Amateur Radio Club, Fraser

Valley DX Club and the Selkirk (Manitoba) Amateur Radio Club.

□ CRRL has again proposed to DOC that special prefixes be discontinued except for the case of an official station at a special event. DOC has advised that it has referred our request to its regional offices for comment.

□ The Fort George Amateur Radio Club, Box 835, Prince George, BC V2L 4T7, has announced its new "Pec Gee" Award. Requirement is to work five amateur stations located in Prince George (also available to SWLs on a heard basis), phone/cw or mixed contacts permitted, QSLs not required — send log data only. There is no charge involved.

□ Rick Proudfoot, VE3ILP, has been appointed a CRRL public relations assistant.

□ Mr. Jean T. Fournier has been appointed senior assistant deputy minister of the Department of Communications. Other DOC news is that a new district office has recently been established in Rimouski, PQ. This new office will be the eighth district office operated by DOC in the Quebec region and the 43rd in Canada.

□ CRRL hq. stocks a library of League training aids and other general-interest publications: films, *Moving Up to Ham Radio* and *Fine Business*; slide presentations, "OSCAR 6 & 7," "RCA COS/MOS Integrated Circuits," and "The ARRL Headquarters"; a complete set of quizzes; tape recordings: "World of Amateur Radio," "Tracking Interference Techniques," and "WABC OSCAR Presentations." Write to P. O. Box 418, Sackville, NB E0A 3C0, for a complete listing and order reservation form.

□ Need a poster to spread the word about that upcoming licensing class your club plans? What about one for that amateur radio exhibit at the mall or the movie showing at the high school? They're available free of charge along with public-relation handouts and other non-salable literature from CRRL hq.

Correspondence

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

CRIME AND THE RADIO AMATEUR

□ I have a story to tell that has to do with something we all dread — stolen property, but with the luck of the Irish there is a happy ending. Before going to work I noticed my HW-202 gone from my car — in my own driveway yet. The thieves never bothered to look for the microphone. I immediately phoned the local police, the local repeater association, and the Heathkit store where I purchased the set. That night, W2ZEE reported that monitors of the WR2AFO repeater had identified transmissions characteristic of my set (one of the few sets in the area with tone burst) but there was no audio. I ran right over to WB2ZND who was able to direct a beam toward the occasional signals. W2LCO did the same. We determined that the signal was within reach, but, unfortunately, the radio tinkers quit too soon. The next day, St. Patrick's Day, my XYL, Kathy, told me Heathkit had called. Upon callback I learned that an fm transceiver matching my description had just been brought in for a microphone! Two teenagers were being held by the Ocean Township police. They were charged with possession of stolen property. During the shakedown the police got more than they bargained for. The two suspects, teenagers from affluent families in my area, had an array of burglar tools, someone's CB radio, plus a few ounces of alleged marijuana. I truly believe St. Patrick was watching over me that day because in less than 36 hours my rig was back in my possession. Special thanks to all involved. — *John Craft, WA2GIE, Rumson, NJ*

□ John Ovenden, 14, knocked on the door of Tom, WA4ZET. John and his dad, Les, had discovered a break-in next door and asked for Tom's assistance. As the three discussed the situation, John remarked that while walking home he thought he had seen some people entering the woods across the street. The owner and family of the vandalized house had left, and Les had agreed to look after the home and animals. The police were called and John mentioned someone who he thought would have done this. Tom, with his 2-meter handheld, went with John to the suspect's residence and found him not home. Before they started to leave, the suspect drove into the driveway with his three companions and the stolen articles in the back seat of the car. WA4ZET used his rig to autopatch the police who came and arrested the suspect, and confiscated the evidence. Everything was recovered except for a few coins from a collection. — *Thomas Burnett, WA4ZET, Chamblee, GA*

□ It seemed logical that radio amateurs could help combat crime. I would like to congratulate WA6RVR of the county of Sacramento Sheriff's Department and his Radio Observer Project, and others who have shown that radio amateurs can help stop crime and not lay down and play dead for the CBers who have made the news through their public service. — *Ed Marriner, W6XM, La Jolla, CA*

WHY NOT WRITE?

□ What does a ham do? Nobody seems to know except hams! How can we rectify the situation? Think ham radio; put your thoughts into communications. Does your local paper give amateur radio an unfavorable slant due to TVI complaints? Don't just say to your ham friends, "Gee, isn't this awful? Why don't those newspaper people get their facts straight?" YOU put them straight; polite, but direct. Sure it takes time, but take the time. Dust off your dictionary and write a letter to the editor. Give him a

general idea of what amateur radio is all about, mention the experimental opportunities and international goodwill. Tell him about low-pass filters that most amateurs install on their transmitters and the high-pass filters that can help TV reception. Okay, maybe the odds are 10 to 1 that your letter would not even get a second glance. Maybe one editor or his assistant will come to see ham radio live. He in turn can reach others.

One day the host of a children's cartoon show caught my attention. It was his usual format to have guest speakers between cartoons so it dawned on me, why not ham radio? I sat down and wrote a letter simply stating what amateur radio is and why I thought it would be good for his particular show. Two months later I received a letter asking me to phone the TV station. After a two-minute interview we made a date for a live appearance on the "Ray Rayner Show." He told me not to make the mistake of thinking only children watched his show, but 75,000 teenagers and 100,000 adults, too. Three weeks later there I was on TV with butterflies galore. My 10-minute allotment stretched into 23 minutes. After it was all over, I realized the experience was fun. — *Janice Shillington, N9YL, Glendale Heights, IL*

A DIVERSIFIED FRATERNITY

□ I found the comments in KH6IDB's letter (March 1978 QST) interesting, especially the valid contention that the amateur fraternity continues to be dominated by oldsters.

The fraternity is actually much more diversified than he realizes. It is just that the old gray beards are more visible. Witness the picture on page 55 of the same issue. Not one of the ARRL's Board has a Johnny-come-lately call. The reason for the disproportionate numbers of "old-timers" involved in League and club affairs is beyond me. One reason may be the patronizing attitude of some well-meaning oldsters toward any new amateur. Nothing will turn off a potentially active member faster. Discourtesy may be another factor. Occasionally egotism and impatience engender practices that are not in keeping with our traditions. One that comes to mind is the word "lid" hurled anonymously when some unfortunate soul pulls a boo-boo.

A part of my youth included employment as a landline telegrapher where the terms "ham" and "lid" were virtually synonymous and meant any non-professional or inept operator. For one ham (non-professional) radio operator to refer to another as a lid (implying ineptness) is at best presumptuous; at worst, arrogant and offensive. In amateur radio, fraternity should be second only to service. The League can lead the way, but only individual members acting in concert can achieve harmony in a group having such a wide range of ages, interests and aptitudes. One final comment to Phil's letter. The means for putting everyone on equal footing has been around for centuries. — *John Brown, N6JO, Fair Oaks, CA*

□ I respectfully wish to disagree with KH6IDB. I am an old-timer in terms of chronological age, but a relative newcomer to the ham community. I belong to the Petaluma (CA) DX and Experimenter Club and I've never been associated with a finer group — anywhere. Sure there are a bunch of old-timers in the club who are the cement holding the ham world together. There are sessions for the new Novices and skull sessions for upgrading. We have our share of young fellows, too, who are always willing to help in any situation. As for the XYLs, I think the radio is like auto mechanics; some ladies are interested. In my

short experience, I haven't seen an old-timer yet who could really be called a "nasty old man." God bless 'em! — *Cliff Fish, WA6KYA, Cazadero, CA*

A ZENITH IN AMATEUR RADIO

□ It was great to see that picture of R. H. G. Mathews, ex-9ZN, on page 16 of April 1978 QST. I had no idea Matty was still around. I bet the young squirts in ham radio today don't know that the name Zenith on TV sets, radios and so on came from an amateur radio call — 9ZN — which Matty first used as "ZN-th" for products of the old CRL. In addition to service as an ARRL director, Matty put in a year as a vice president, 1919-1920. Oh yes, I'm returning the extra "t" which QST put in his name. It's really "Mathews." — *Bill Fuller, Chester Depot, VT*

EDITORIAL CONGRATULATIONS

□ Congratulations on the "20-Meter Direct Conversion Receiver" (April 1978 QST) and, more importantly, on the philosophy expressed in the editorial. I suspect the appeal will not be limited to Africa but will be worldwide. Maybe more affluent Americans will be weaned away from overly complicated black boxes with everything except hot and cold running water. — *Dick McIntyre, K4BNI, Cape Coral, FL*

78 YEARS YOUNG

□ I wish to thank the ARRL staff for the help given me when I upgraded to Advanced. As I am 78 years old and retired, it really was quite difficult for me to retain the information necessary to pass the test. I found the *License Manual* and articles in QST quite helpful. The FCC examiners in Boston, MA, are to be commended too. — *Bernard Rogers, K1GRA, Hopedale, MA*

MUDDY WATERS

□ The latest decisions by the FCC sure seem to muddy the waters. First they remove the option of asking for a specific call sign if the Extra exam is passed. This removes a lot of the incentive for going for that level. The second action, allowing a ham who moves to another call district to keep his present call sure will louse up DX stations who are accepting calls by districts. What happens to the semblance of order? How does the transplanted ham respond? Where he used to live or where he now lives? — *Bill Rohrbach, WA2DXJ, Chatham, NJ*

2 METERS: LURE OR TROUBLE?

□ The lure or trouble with 2 meters is that you don't have to know how to design and build anything (but can), and all you need do is talk. There's no cw needed. Seems like quite a parallel to corned beef! "I have a Maytag receiver and a Frigidaire transmitter with a True Value Hardware clothes pole here. Whose stuff did you buy?" — *Temple Nieter, W9YLD, Evanston, IL*

A Journey Through Part 97

Have you ever noticed the occasional appearance in this column of funny-looking numbers and letters such as 97.28(b)(3) or 97.114(c)? These symbols refer to different sections of the Federal Communications Commission rules which govern amateur radio. But don't be scared by all those numbers and letters. There's really nothing complicated about the rules. In fact, an understanding of the rules can increase your understanding and appreciation of amateur radio. So let's take a light, not-too-technical journey through Part 97 — the amateur radio rules and regulations.

Q. How long are the amateur radio regulations?

A. The rules as published by the Government Printing Office are 30 pages long. But more important is the way they are organized: They are divided into seven subparts, plus appendices. The subparts are

Subpart A — General

Subpart B — Amateur Operator and Station Licenses

Subpart C — Technical Standards

Subpart D — Operating Requirements and Procedures

Subpart E — Prohibited Practices and Administrative Sanctions

Subpart F — Radio Amateur Civil Emergency Service (RACES)

Subpart G — Operation of Amateur Stations by Aliens

We'll discuss the appendices a bit later. The text of recent rules changes is not included in the rules published by the federal government. Copies of individual dockets, or rules changes, that have been adopted are available from the FCC's Public Information Office, however. [Editor's Note: Readers may also keep up with recent rules changes through QST's "Happenings" column, or by listening to official bulletins transmitted over WIAW.]

Q. What does Subpart A contain?

A. Subpart A contains the basis and purpose of amateur radio and a series of definitions. We cannot go into great detail about the content of the rules (unless you want the column to be 30 pages long!), but it's interesting to take a look at the basis and purpose of the Amateur Radio Service:

97.1 Basis and Purpose

The rules and regulations in this part are designed to provide an Amateur Radio Service having a fundamental purpose as expressed in the following principles:

a) Recognition and enhancement of the value of the Amateur Service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

c) Encouragement and improvement of the Amateur Radio Service through rules which provide for advancing skills in both the communication and technical phases of the art.

d) Expansion of the existing reservoir within the Amateur Radio Service of trained operators, technicians and electronics experts.

e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

It may seem like a tall order, but every time an amateur keys a transmitter he or she has a responsibility to fulfill the basis and purpose as quoted above. Remember that the next time you get on the air!

The remainder of Subpart A contains definitions of everything from club station to transmitter.

Q. What about Subpart B?

A. Subpart B lists in part the different classes of amateur radio licenses, the privileges of each, how to apply for, modify or renew a license, how to conduct a Novice exam, antenna height limitations, and how call signs are assigned. For example, many amateurs want to know how soon before expiration of their licenses they should apply for renewal. The answer is contained in Section 97.13(d): "Application for renewal of unexpired licenses must be made during the license term and should be filed within 90 days but not later than 30 days prior to the end of the license term."

Q. Subpart C is entitled Technical Standards. Is it as complicated as the title implies?

A. Well, we wouldn't recommend it for a first date, but there is nothing in it beyond the comprehension of any amateur. To avoid chaos in the amateur bands, it is necessary to define certain standards such as types of emissions authorized on certain frequencies, maximum authorized power, and purity of emissions. Subpart C contains a table listing all amateur frequency bands and the types of emissions allowed on each. It also contains a table showing all power limitations in all geographical areas on the 160-meter amateur band. The reason for all these power limitations on 160 meters is that the band is used by amateurs on a shared basis with the LORAN-A radionavigation system, and interference must be avoided.

No doubt every amateur knows that the maximum power input authorized is 1000 watts. But this isn't always the case! Section 97.67(b) of Subpart C also says "... amateur stations shall use the minimum amount of transmitter power necessary to carry out the desired communications." How many amateurs do you think unknowingly violate this rule every day?

There's another rule in Subpart C (97.75) which states, "The measurement of the emitted carrier frequency or frequencies shall be made by means independent of the means used to control the radio frequency or frequencies generated by the transmitting apparatus and

shall be of sufficient accuracy to assure operation within the amateur frequency band used."

If you're using a separate transmitter and receiver, you're in good shape. But using just a transceiver could conceivably be in violation of this rule because the same VFO used to control the transmit frequency also determines the receive frequency. However, note that you only have to measure the carrier frequency accurately enough to guarantee that it falls within the authorized amateur band. Usually a crystal calibrator is sufficient to do this, and many manufacturers install them in transceivers. Your receiver or crystal calibrator should be checked from time to time against WWV or some other accurate standard.

Q. What about Subpart D — Operating Requirements and Procedures?

A. As its title states, Subpart D sets forth what the operator of an amateur radio station may and may not do. It describes control-operator requirements, station-identification requirements, and logging requirements, to name a few.

Subpart D goes into detail concerning what may at first appear to be a very simple matter: the availability of the amateur operator license. Amateurs often ask, "Do I have to have my original license in my possession when operating my station or another amateur radio station?" The answer is contained in Section 97.83 of Subpart D: "The original operator license of each operator shall be kept in the personal possession of the operator while operating an amateur radio station. When operating an amateur station at a fixed location, however, the license may be posted in a conspicuous place in the room occupied by the operator." This means that if you wish to operate another amateur radio station, you must bring your original license with you. Many visitors to the League's headquarters station, WIAW, have been disappointed to discover that they cannot operate the station because they carry only a photocopy of their license with them.

Section 97.91 of Subpart D also prohibits one-way communications, but with the following specific exceptions:

a) Emergency communications, including bona fide emergency drill practice transmissions.

b) Information bulletins consisting solely of subject matter having direct interest to the Amateur Radio Service as such.

c) Round-table discussions or net-type operations where more than two amateur stations are in communication, each station taking a turn at transmitting to other station(s) of the group.

d) Code-practice transmissions intended for persons learning or improving proficiency in the international Morse code.

This is the very rule which authorizes WIAW to transmit its bulletins and code practice!

It appears that we've run out of space, so we'll have to pick this up next month.

*Deputy Manager, Membership Services, ARRL

International News

Conducted By Bruce Alan Johnson,* WA6IDN

Another Step Toward WARC-79

Before the 154 member-countries of the International Telecommunication Union can get together in Geneva for the major World Administrative Radio Conference in September, 1979, it's necessary for them to address some problems within specific services in specialized conferences. The most recent of these mini-WARCs were the Broadcasting Satellite Service conference in January, 1977 and the Aeronautical Service conference in Geneva in February, 1978.

During the second week of the Aeronautical conference, members of the IARU President's WARC Advisory Committee met formally in nearby Ferney-Voltaire, France, to review preparations for WARC-79, to observe the methods of operation at ITU headquarters and at the Aeronautical conference, and to become personally acquainted with delegates to the conference. During the course of the meeting, the attendees (VE3CJ, W4KFC, W1RU, K1ZZ, SP5FM, G2BVN, VK3KI, VK3ADW and W3OKN) agreed that IARU headquarters in Newtonington would take the following actions:

1) Prepare for distribution to telecommunication authorities in developing countries a descriptive and informative booklet on the Amateur Radio Service.

2) Highlight in a circular to be sent to all IARU member-societies the importance of the role of an amateur as a member of a delegation where possible.

3) Contact people with specialized knowledge to assist the IARU WARC Team.

In addition, delegates discussed

1) The submission of papers furthering the interests of the Amateur Radio Service to the Special Preparatory Meeting of the CCIR (International Radio Consultative Committee of the ITU) in October, 1978.

2) The submission of an article to the ITU *Telecommunication Journal* concerning the many technical contributions of amateur radio.

3) The formulation of a statement by the IARU President as to the organization of the IARU delegation to WARC-79.

4) The facilities and special items necessary for the IARU delegation.

5) The composition of the IARU delegation.

6) International travel by IARU headquarters personnel and officers between now and WARC-79.

7) Other matters relating to the advancement of the interests of the Amateur Service.

A seminar was presented to the assembled committee by Merle Glunt, W3OKN, recently retired assistant chief engineer of the FCC. Mr. Glunt is a recognized expert on telecommunication conference preparation and participation.

After some days of observing the Aeronautical conference, the advisory committee members hosted a reception at the ITU building for the conference delegates. This was yet another opportunity for the interests of the Amateur Service to be forwarded through personal contact with individuals who are likely to be delegates to the 1979 WARC.

In its press release concerning the Aeronautical conference, the ITU said that the continual growth in the Aeronautical Service "has led to an increasing congestion of the frequency bands available. It is, therefore, vital to ob-

tain the most efficient use of these bands." Isn't this the same problem that's confronting the Amateur Radio Service? That's why WARC-79 is so important, and that's why all our efforts for the next 500 days must be focused on WARC-79!

A GENTLEMEN'S AGREEMENT

Back in April 1976, 23 amateur radio societies of North, Central and South America (Region 2) met in Miami for the IARU Region 2 Division Convention. In response to an increasing number of complaints from the societies' members, the attendees passed a resolution addressing the question of where third-party traffic (when authorized) should be conducted. The resolution reads "It was agreed that in order to minimize interference with other international communications, the handling of third-party traffic should be conducted in the upper part of the 14200- to 14350-kHz band, and the lower part of the 14100- to 14200-kHz band."

North American amateurs in particular should be aware that in most other countries, "gentlemen's agreements" are the binding factors among amateurs, even with respect to where one can operate on phone and cw in each amateur band. The various national administrations do *not* regulate the subbands as does the FCC in the U.S.

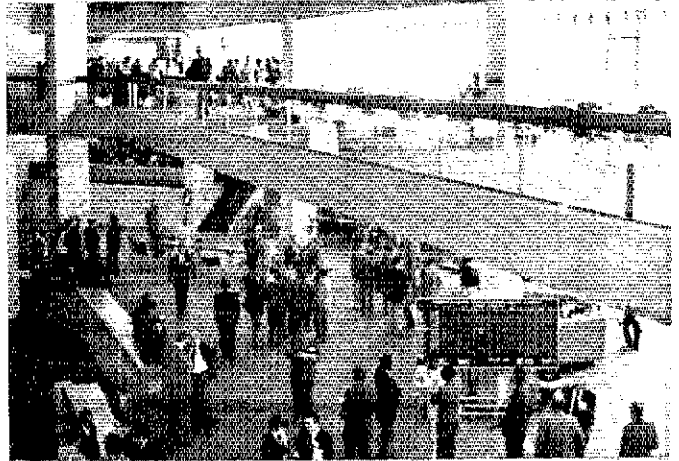
The ARRL voted in the affirmative for this resolution, and North American amateurs are strongly encouraged to abide by the agreement. This frees the lower portions of the band for other DX work. Your fellow Region 2 amateurs will be grateful!

*International Services Officer, ARRL

IARU President Noel Eaton, VE3CJ, is shown at left during the IARU reception talking with the Hon. A. L. Badalov, Deputy-Minister of the Ministry of Posts and Telecommunications in Moscow, and head of the Soviet delegation to the 1978 Aeronautical conference. Mr. Badalov is one of many WARC delegates who is enthusiastic over amateur radio. These receptions provide unique opportunities to introduce amateur radio to delegates from many countries, and to renew acquaintances with others. (W1RU photo)



Between sessions of the many daily WARC committee meetings, the lobby of the modern Conference Center in Geneva (the site of the WARC) provides a convenient place for delegates to chat and to meet one another. The board in the center of the picture lists the various committees and their schedules. The second level of the center offers refreshments and a comfortable setting for informal meetings and discussions. (W1RU photo)



Coming Conventions

- June 3-4**
Georgia State, Atlanta, GA
- June 10-11**
Mississippi Section, Senatobia, MS
- July 1-2**
West Virginia State, Jackson's Mill, WV
- July 28-30**
Oklahoma State, Oklahoma City, OK
- August 12-13**
Pacific Division, Reno, NV
- August 18-19**
Saskatchewan Prov., Regina, SK
- August 26-27**
Alaska State, Anchorage, AK
- September 1-3**
West Gulf Division, El Paso, TX
- September 10**
Illinois State, Rockford, IL
- September 22-24**
ARRL National, San Diego, CA
- October 13-15**
Midwest Division, Kansas City, MO

Hamfest Calendar

Alabama: The Clanton Radio Club holds its Ham Swapfest at the county fairgrounds on June 18, during the Peach Festival season. Prizes. Write to Herbert F. Arnold, W4FSW, P. O. Box 29, Clanton, AL 35045.

California: The Satellite ARC holds its annual Swap/Fun Fest and Santa Maria BBQ on June 18. Prizes. Swap table available. All-you-can-eat dinner — adults, \$6; children under 12, \$3. Contact Thomas I. Geiger, W2KVA, Swapfest Chairman, P. O. Box 2531, Orcutt, CA 93454. Tel. 805-925-0398.

Illinois: The 21st annual ABC hamfest of the Six Meter Club of Chicago is June 11 at Santa Fe Park, 91st and Wolf Rd., Willow Springs. Large swap row, displays, prizes and AF MARS meeting. Picnic grounds. Talk-in on 94 and 37/97 (PL2A). Advance registration \$1.50, at the gate \$2. Tickets from Val Hellwig, K9ZWV, 3420 S. 60th Ct., Cicero, IL 60650.

Illinois: The annual Egyptian Radio Club hamfest is June 11 at the club hq. in Granite City. Take I-270 to Rte. 3. Free admission. Prizes and activities for families and hams. Swappers row. Talk-in on 16/76. Contact Harry A. Turner, W9YZE, Hamfest Chairman, 1718 Worden Ave., Alton, IL 62002.

Illinois: The Jacksonville Area ARC hamfest is June 18 at the Morgan County Fairgrounds. "The hamfest with a lot of prizes and good eyeball QSOs." Advance tickets \$1.50 each or four for \$5. More info from JAARC, P. O. Box 571, Jacksonville, IL 62651.

Indiana: The third annual Lake County ARC hamfest is June 18 at the Izaak Walton League picnic grounds. Take I-94 to Rte. 249, north 1/2 mile. Overnight camping, no hookups. Food, prizes and fun. Advance tickets \$1.50 or, at the gate \$2. Proceeds go to club building fund. Talk-in on 52 and 84/24. Write to Tickets, P. O. Box 348, Griffith, IN 46319.

Indiana: The seventh annual Indianapolis ARA hamfest is July 9, from 6 A.M. to 4:30 P.M., at the

*ARRL Hamfest

- October 14-15**
New England Division, Boxboro, MA
- November 11-12**
Hudson Division, McAfee, NJ
- November 25-26***
South Florida Section, Clearwater, FL
- *Date Change

MISSISSIPPI SECTION CONVENTION

June 10-11, 1978, Senatobia, MS

The Chickasaw Amateur Radio Association will sponsor the Mississippi Section Convention in Senatobia, MS. The all-air-conditioned coliseum is located on the campus of Northwest Mississippi Junior College, located on Interstate 55 just 30 miles south of Memphis, TN.

There will be a complete program of forums, a large number of commercial exhibitors, flea market, XYL programs and many extras. Doors will open at 8 A.M. both days.

There will be a Saturday night banquet at the Ramada Inn in Senatobia at 7 P.M. Saturday. Please make banquet reservations through CARA, price \$5.50 a person. Bruce A. Johnson, WA6IDN, international services officer at ARRL headquarters, will present "WARC-79: There's Nothing More Important!"

Motel reservations should be made through

Marion County Fairgrounds. Overnight camping with hookup facilities. Forums: SSTV and ARRL, W9NTP; emergency communications, W9UMH; hobbyist microprocessing, K9EOH; and FCC. Exhibits, covered and outside flea market. Adult admission \$2, under 12 free. Prizes. Ladies' bingo. Write to Indianapolis Hamfest, P. O. Box 1002, Indianapolis, IN 46206.

***Kansas:** The Central Kansas ARC hamfest is June 3 and 4 at the Hilton Inn in Salina. Saturday: flea market; FCC exams at 9, send form 610 to Paul Grauer, W0FIR, Box 190, Wilson, KS 67490, mark item 19 "Salina, KS"; social hour at 6:30, banquet at 7:30, guest speaker W1UED from ARRL hq. Sunday: church services at 8:30; meetings start at 9, including ARRL, AMSAT, repeaters and DX; lunch; ladies' and children's activities. Registration \$2, banquet \$5, lunch \$4.

Maine: The Portland Amateur Wireless Association will hold a flea market on June 10 at the Red Coach Grill in Portland, exit 8 from the Maine Turnpike. Admission 50 cents, tables \$2.50. Prizes. Talk-in on 52 and 13/73. Further info from PAWA, P. O. Box 1605, Portland, ME 04104.

Manitoba: The 15th annual Peace Garden hamfest is July 8 and 9 in the International Peace Garden on the Manitoba-North Dakota border. Contact Lynn A. Nelson, WA0WBU, U.S. Chairman, 1101 Second St., Devils Lake, ND 58301, or R. H. Bryan, VE4RO, Canadian Chairman, P. O. Box 1118, Killarney, MB R0K 1G0.

Maryland: The first Central Maryland hamfest, sponsored by the Frederick ARC, is at the Frederick Fairgrounds on June 18. Country cooking and setup start at 6 A.M., general admission at 8. YLs and children free. Tables inside and out, tailgating. Talk-in on 52 and 13/73. Additional info from Mike Staley, New Market, MD 21774. Tel. 301-865-5484.

Michigan: The annual Superior Peninsula Amateur Radio Klub weekend activity is June 10 and 11. Saturday: Toonerville Trolley and river trip with W8NBJ, 9:30 A.M., admission; and fish fry at Pentland Township Hall, 6 P.M., adults \$2.50, under 12 \$2. KOA discount. Sunday: SPARK Swap and Shop, 9 to 4, Pentland Township Hall. Hobby computer demonstration, QCWA, QSL contest and YL activities. Registration \$2, tables \$1.50 and \$2.50. Talk-in on 01/61, 31/91 and 52. Write to Larry R. Baine, W8GBR, 110 West Truman, Newberry, MI 49868. Tel. 906-293-8651.

Missouri: The 1978 ICHN-MARAC County

the Ramada Inn in Senatobia (1-800-228-2828). Registration \$5. Talk in — 146.31/91, 146.52 and 3.987 MHz.

All correspondence should be sent to the Chickasaw Amateur Radio Association, P. O. Box 2, Hernando, MS 38632.

WEST VIRGINIA STATE CONVENTION

July 1-2, 1978, Jackson's Mill, WV

The 20th annual West Virginia State Radio Convention, sponsored by the West Virginia State Amateur Radio Council, will be held at Jackson's Mill State 4-H Camp the weekend of July 1-2. Highlights will include a technical forum presented by Stuart Leland, W1JEC; an ARRL forum with a discussion of current topics conducted by Perry Williams, W1UED and Vic Clark, W4KFC; MARS, phone and cw net meetings.

Registration: Tickets are \$3 each, 2 for \$5, or 5 for \$10 (does not include food or lodging). Full registration (includes food and lodging): preregistration \$18, at the Mill \$20, children (under 8) \$8. Full registration available from Dorothy Morris, WB8LAI. \$3 tickets from G. W. Puzzuolo, K8QEW. For further details contact Karl Thompson, K8KT, General Convention Chairman, 5303 Pioneer Drive, Charleston, WV 25312.

You won't want to miss this fun-filled weekend in the beautiful mountains of West Virginia!

Hunters National Convention is July 6-8 at the Holiday Inn in St. Ann. Take I-70 to the Lindbergh exit. Lots of prizes and fellowship. For further information, contact Jim Glasscock, W0FF, 3416 Manhattan Ave., St. Louis, MO 63143.

Montana: The Hi-Line Radio Club is sponsoring the Northcentral Montana hamfest on June 18 at Kipp Park, Malta, south of the Missouri River. More info from Richard Girres, W7IDK, 16 9th St., Havre, MT 59501.

New York: The Hall of Science Radio Club has two flea markets this year, with the first on June 18, from 9 to 4, at the municipal parking lot behind the courthouse on Queens Blvd., 126th St. and 82nd Ave., Queens. Sellers, \$2; buyers, \$1. Talk-in on 52 and 40/00. For information, call 212-699-9400.

North Carolina: The annual Gastonia Amateur Radio Society hamfest is June 10 and 11, rain or shine, at Karyac Park, Gastonia. Good food, flea market and fellowship. Church service on Sunday, family activities. Camping facilities, no hookups. Plenty of parking, table space and shade. Meet Roanoke Division Director W4ACY. Talk-in on 72/12. More info from Charles F. McKee, WA4BQH, 2162 Regent Ct., Gastonia, NC 28052. Tel. 704-865-2161 or 629-2282.

Ohio: The Goodyear Amateur Radio Club of Akron's 11th annual hamfest and family picnic is June 11, from 10 to 6, at Wingfoot Lake Park, on county road 87, near Rte. 43. Parking, shelters, play areas and refreshments. Sorry, no overnight parking. Family donation \$2.50 advance, \$3 at the gate. For details, write to Don Rogers, WA8SXJ, 161 S. Hawkins Ave., Akron, OH 44313. Tel. 216-864-3665.

***Ohio:** The combined Tusco ARC and Canton ARC hamfest is July 9 at the Stark County Fairgrounds in Canton. Admission \$3 per person, 16 and over. Further details from Max Lebold, WA8SHP, Box 3, Sandyville, OH 44671.

Pennsylvania: The Schuylkill Amateur Repeater Association sponsors their hamfest on June 18, rain or shine, at Lakewood Park, Barnesville. Gates open at 9 A.M. Take I-81 to exit 37, then east for three miles on Rte. 54. Talk-in on 52 and 78/18. Registration \$2, family free. Rides, refreshments and picnic tables. Large indoor and outdoor flea market area. More info from Carl H. Zimmerman, W3EEK, RD 2, Box 580, Tamaqua, PA 18252.

South Dakota: The annual South Dakota hamfest, sponsored by the Black Hills ARC, is July 1 and 2 at Surbeck Center, South Dakota School of Mines and Technology, Rapid City. Technical and ARRL

forums, industrial tours, and flea market. Prizes. Advance admission \$4.50, at the door \$5. Reserve early for accommodations. For assistance, write to BHARC, P. O. Box 1014, Rapid City, SD 57709.

Virginia: The Virginia Fone Net will hold its annual hamfest/picnic at the Blacksburg Middle School, Blacksburg, on June 17 and 18. Flea market indoors

and outdoors. Accommodations at Red Lion Inn, recreation facilities available. Banquet Saturday night. Write to Bill Redmond, K4IEC, 917 Rock Spring Rd., Winston-Salem, NC 27105.

Wisconsin: The South Milwaukee ARC holds its annual Swapfest '78 on July 8 at Shepard Park, American Legion Post 434, 9327 S. Shepard Ave.,

Oak Creek. Activities begin at 7 A.M. Parking, picnic area, food, refreshments and overnight camping available. Admission \$2, including "happy hour." Talk-in on 146.94 MHz. Details, including a map, may be obtained from SMARC, Robert Kastelic, WB9TIK, Secretary, P. O. Box 102, South Milwaukee, WI 53172.

Strays



QSL BUREAU AMITYVILLE

QSL bureaus do a fine job of helping hams snare that elusive, rare-country pasteboard, but who has ever heard of the U.S. Post Office taking an active part in QSLing worldwide? In the days of large-volume QSL managers, Jack Cummings, W2CTN, was a legend. He handled QSLs for amateurs in more than 100 countries. Each week the postmaster in the small town of Amityville, NY, bagged hundreds of cards and delivered them to W2CTN. After Jack's call became a silent key, the action stopped.

When this writer returned to Amityville from Navy duty in Scotland (where he had been active as GMSAHS), he was surprised to find in his mail, forwarded from Scotland, a batch of QSL cards not addressed to him. My cards had reminded the postmaster of W2CTN's old QSL bureau. He spread the word and suddenly cards lost in New York post offices were being boxed, bagged or sent singly to that new, mysterious point of trans-shipment, "QSL Bureau Amityville."

To date several thousand "lost" QSL cards have been delivered to my doorstep, and I've dutifully forwarded them to League headquarters and to bureaus all over the world. I've found cards from Bulgaria for Brazil, cards from Germany for Africa and recently a batch of 50 from New Zealand for England! FB PO TNX — WA2DHF



One batch of mysterious cards addressed to the elusive "QSL Bureau Amityville" await sorting in the ARRL Outgoing QSL Bureau.

GALLUPS ISLAND REUNION

Graduates of the Gallups Island (MA) Merchant Marine Radio School will hold a reunion in Boston on July 8. Operated by the U.S. Merchant Marine during WW II, the school's station was detailed in QST for June, 1941 and May, 1943. Plans for the reunion include a boat trip to the island, a clambake, and an evening get-together on the boat. Full details are available from Ed Hayden, K3OKL, 16 Decatur Ave., Annapolis, MD 21403, Tel. 202-296-6059, or Art Bradford, W1EQK, 214 Chestnut St., Duxbury, MA 02332, Tel. 617-934-2756.

WIND-POWER ENTHUSIASTS

Much practical information on wind power is being exchanged by amateurs checking into the Windheads

Net. The group meets on Tuesdays and Thursdays at 0330 UTC (Mondays and Wednesdays, 9:30 P.M., Mountain Time) on 3898 kHz. The net control is Mark H. Dankoff, WD5GQN, RFD 2 — Box 271, Santa Fe, NM 87501.

TRIPLE VENN

Like a giant Venn diagram, the amateur radio operations of three hams intersected on a Saturday afternoon last November. Allen Hebert, N5TV, heard a CQ on 15 meters and excitedly answered, for it was from Jeff Brent — N4TV. A few minutes later, they had a breaker — Gerret Harmsel, PA0TV.

GOOD NUMBERS

Louis Eckert, WA3KGC, recently filed an address change with us after completing eight years of service with the Navy. From Great Lakes, IL, to Round Lake Park, IL, his ZIP code changed from 60088 to 60073.

I would like to get in touch with . . .

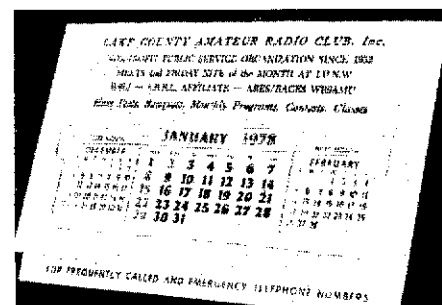
other former members of the Civilian Conservation Corps (1934-37). Charles A. Dutton, W9QLK, Rte. 1, Box 93A, Gays Mills, WI 54631.

other amateurs who are physicians or allied health personnel teaching biomedical instrumentation. I'm with the University of Texas at Houston and am especially interested in respiratory therapy, radio telemetry, critical care, and basic electronic teaching techniques. James McClure, WBSMHA, 6233 Gulfport, No. 2208, Houston, TX 77081.

PARADES LURE HAMS FROM HOME

Teams of amateurs provided backup communications and served as parade marshals and timers at two annual parades seen by millions both at the scene and on TV. About 70 hams from several area clubs helped out at the Tournament of Roses parade, in cooperation with the sheriff's department. At Arizona's Fiesta Bowl Parade, amateurs helped speed medical attention to a heart attack victim and an accident victim, while serving the parade organizers in a number of useful capacities.

This silver anniversary calendar is but one promotional effort of the Lake County (IN) Amateur Radio Club. They also have a regular club bulletin, and hold code and theory classes and exhibits at local shopping areas.



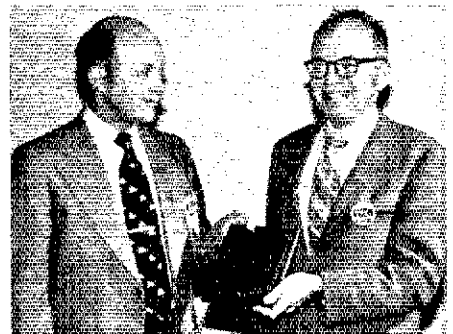
QST congratulates . . .

Ronald W. Apelquist, WB0NZB, whose biography is listed in *Dictionary of International Biography*, 1973; *Men of Achievement*, 1974; *Who's Who in the Midwest*, 1976-77; and *Community Leaders and Noteworthy Americans*, 1976-77.

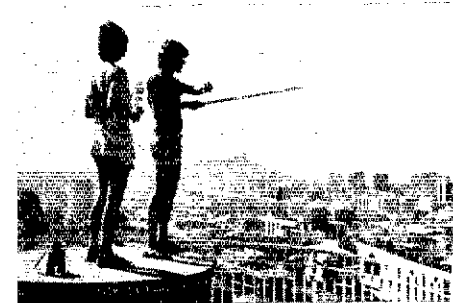
Dr. George Kimeldorf, WB5PYV/K2DEV, appointed head of the Department of Mathematics and Sciences at the University of Texas at Dallas, in Richardson.

Al Groff, K0VQM, an engineer with Collins Telecommunications Products Division of Rockwell International, who received a patent for an "absolute incremental hybrid shaft position encoder."

The Quannapowitt Radio Association took first place in a recent club newspaper contest conducted by John Sullivan, W1HHR, New England Division director. Here, Fred J. Lingel (right), K1CCW, editor of *QRA News*, accepts the plaque from the club's president, Bob Tadgeil, W1PIN. (W1VRK/N1BB photo)



Among the club activities of the University of Hawaii Amateur Radio Club are fox hunts. Here, members are at the Punchbowl lookout awaiting the next transmission from club advisor Katashi Nose, KH6IJ. To continue such projects and get a station going, the club seeks parts and equipment donations. Write to UHARC, Electrical Engineering Department, Holmes 483, 2540 Dole St., Honolulu, HI 96822.



Silent Keys

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

WA1AXF, Frederick J. Walsh, Hyde Park, MA
 W1EFP, William K. Coburn, Lexington, MA
 W1FK, Lawrence P. Hallett, Lincoln, MA
 K1GNA, Leon H. Libby, Saco, ME
 W1JBB, Merrill D. Randall, Portsmouth, RI
 WA1KCB, Lloyd G. Howell, Concord, MA
 WA1QNY, Wayne A. Stevens, Sharon, NH
 K1SXX, Morris Kallus, Portland, ME
 W1UQQ, Frederick A. Porter, Amherst, NH
 K2AXX, William A. Noah, Jr., Albany, NY
 W2CYS, Vincent Suhoski, Freehold, NJ
 W2DTK, Wilfred E. Schmidt, Lakehurst, NJ
 W2ESD, Robert Brinkmeyer, Huntington, NY
 W2FMF, Robert G. Rowe, Grand Island, NY
 K2GFL, Sanford "Bud" Cohn, Syracuse, NY
 W2GY, Marcus A. Felt, Englewood Cliffs, NJ
 W2IAG, Ralph J. Eckert, Woodhaven, NY
 W2OM, Lester J. Wolf, Haddon Township, NJ
 K2SFF, Harrison F. Edwards, Norwich, NY
 WA2SMM, Louis J. Lutz, Elmira, NY
 *WB2VKO, Murray Strober, Dumont, NJ
 WB3DSI, Bernard E. Sitter, LaVale, MD
 W3JEB, Kenneth B. Anderson, Greenville, PA
 W3NTB, Walter D. Todd, Royal Oak, MD
 K3PT, Emory C. Creager, Bala-Cynwyd, PA
 W3TAW, Leo F. Lynch, Altoona, PA
 K3VXK, K. William Krautter, Roslyn, PA
 WA4BML, William T. Stephens, DeLand, FL
 W4DTQ, Edward W. Forester, Bradenton, FL
 Ex-W4ECD, Fred G. Bookout, Torrance, CA
 WA4FWJ, Louis L. Bako, Tampa, FL
 K4IHG, Raymond J. Jacobs, Hollywood, FL
 K4LTG, Roger W. Geddes Sr., Burgaw, NC
 W4RG/Ex-W2DA, Hugh V.D. Roberts, Lecanto, FL

W4VUM, E. Paul D. Tabailoux, Key West, FL
 W4VYG, Edward G. New, Tappahannock, VA
 WA4YRS, James R. Adams, Oakwood, GA
 W5ATY, Charles S. E. Lowrey, Ft. Smith, AK
 WB5EWY, Oscar W. Hildebrand, Ragley, LA
 W5FWN, Vincent L. Marable, Dallas, TX
 W5GTN, Harold E. Winters, Weiner, AR
 W5HX, Frank A. Godfrey, Pascagoula, MS
 K5MFX, James E. McClintock, Leland, MS
 W5PGV, Ex-W9QZG, Allan C. Walden, Albuquerque, NM
 WA5YQR, Billy V. Geerdes, Woodward, OK
 WB6CEA, William L. Walsh, Pasadena, CA
 Ex-6DJ, Lawrence G. Merritt, Pasadena, CA
 W61YL, Wilbur K. Jefferies, El Segundo, CA
 W6KUU, Harold W. Eberte, El Cajon, CA
 Ex-WB6MHL, John Colaianni, Santa Barbara, CA
 *WB6MVF, Norman A. Noice, Yorba Linda, CA
 N6NP/K6IXS, Henry F. Davis, Daly City, CA
 W6QYW, James E. McClure, Norco, CA
 WB6QVE, Frank D. Ross, Long Beach, CA
 W6RM, Ray W. Hitchcock, Upland, CA
 WB6SQW, Merrill L. Dahlstrom, Monterey Park, CA
 W6WDU, George H. Mullnix, Mountain View, CA
 *WB6WPD, Earl F. Arbuckle, Sr., Whittier, CA
 K6YHJ, Robert M. Peterson, San Diego, CA
 K7DM, Lawrence W. Mallach, Newport, OR
 W7SRU, Fred A. Boggs, Port Townsend, WA
 W8AGE, Archie Huff, St. Ignace, MI
 W8BXA, Louis H. Swart, Warren, OH
 W8CMB, Edison B. Gerlach, Cleveland, OH
 Ex-W8DHU, George P. Sanger, Rockwood, MI
 W8FMU, Raymond L. Wardie, Morgantown, WV

W8GHL, H. Rowe Kinney, Hunting Valley, OH
 WA8KWQ, Carl J. Krohn, Newton Falls, OH
 W8LEW, John R. Crane, Olmsted Falls, OH
 W8LQT, Elbert F. Russell, Maple Hts., OH
 K8LXA, Clyde A. Rosaa, Conneaut, OH
 W8MHI, Fred Reif, Detroit, MI
 WA8MMA, Doran C. Jones, Hope, MI
 W8QJC, William G. Sakkers, Holland, MI
 K8SLU, Lloyd W. Reid, Crystal Falls, MI
 W8TLU, Louis E. Saraz, Cleveland, OH
 K8UNE, William Petrie, Pierpont, OH
 W8VQT, Nick Zuij, Brookpart, OH
 K8WJI, Roy E. Siik, Marquette, MI
 W8YGL, William J. Aull, Morgantown, WV
 K8YHX, David Gaines, Farmington, MI
 WA9ERA, John W. Buhrke, Glen Ellyn, IL
 WB9IBA, J. Eugene Konop, Rice Lake, WI
 K9TAC, Myron D. Welsh, Sr., Rockford, IL
 W9IUC, James H. Carnett, Harrisburg, IL
 W9ZYC, Elmer J. Justus, Chicago, IL
 W0AAA, Harold C. Suman, Jr., Overland Park, KS
 W0AOV, Earle Campbell, Centerville, IA
 WB0CYR, Virginia D. Chase, Lafayette, CO
 W0FMX, Guy L. Tullis, Oskaloosa, IA
 W0FWH, Joe B. Evans, Pueblo, CO
 WA0JCR, Ross Chase, Lafayette, CO
 WB0MCV, Kevin C. Malafa, Grafton, ND
 W0ZFI, William J. Smith, Boulder, CO
 VE1BMP, Bernard M. Parsons, Halifax, NS
 VE1VO, Karl E. Gaemper, Brooklyn, NS
 PZ1AH, S. Andre Soeperman, Surinam, So. America
 *Life Member

50 Years Ago

June, 1928

- There are commercial interests still masquerading as amateurs in our bands (with licenses), and Editor Warner takes a strong stand against such activities, including a report on League protests to the Federal Radio Commission.
- Geophysical prospecting (for ores and oil) is a growing field, and J. J. Jakosky presents an erudite

treatise on current techniques, with info on how to translate distorted field readings into a useful map of underground content.

- 9BHR, with an assist from IBDI, developed a simple grid-block system of keying for break-in, and recommends that it be used with a choke/filter to get rid of thumps (in the neighbor's broadcast receiver).
- Extensive observations made in Shanghai on short-wave signal fading are passed along to us through a translation from the French, courtesy A. L. Budlong. And C. E. Paulson from Iowa monitored 2XAF's 32-meter broadcast channel for a month, finding that the signal peaked during full moon and dipped at new moon.

□ Dr. Simpson's new station, 8CPC, is a beauty, as an extensive description shows; it even tends to overshadow the League's hq. station 1MK, pictured on the cover.

- A very small item reports a very important event — the appointment of Paul M. Segal, 3EEA, as General Counsel of the League.
- 7AW shows us the wattmeter he built, and how to calibrate the unit (if no standard is available) from household appliances such as a toaster.
- Honest reporting has obviously been a perennial problem in amateur radio; taking off on "TOM," someone identified as "Ma" points up the inaccurate use of our QRK and QSA/R system.

25 Years Ago

June, 1953

- E. F. Johnson Co. has produced a two-band automatic antenna-switching network for mobile (including streamlined housing), and W0EDX reports in detail the extensive lab and field program which developed the circuit.
- "Switch to Safety" is the theme of several pages of

good advice from WITS; it will show us how to live longer — if we practice what he preaches.

- The W1VW "Hetrofil" audio filter is rejuvenated, especially for beginners, in a simpler version by W1ICP.
- If you have the room but can't beg, borrow or steal an old windmill, W1XI's article shows how to build your own sturdy sky-hook for a big beam.
- 2RYI details a number of practical amateur applications of a v.t.v.m. in troubleshooting various circuits.
- Another step toward super-selectivity is described by W2CHO in the field of mechanical filters.
- The "Dallas Plan for TVI" has been highly suc-

cessful, and W5IT points up its effective solution to the very sticky problem of telling the owner of an inadequately designed receiver where the real trouble lies.

- Field Day time again! Another classic "Gil" cover illustrates both the labor and the delights of this most-popular activity.
- W9LUO found a simple way to get on 10-meter mobile — he packaged a 10-watt rig and a receiving converter, and runs both off the broadcast receiver power supply.
- W2AWH got a five-tube superhet and a four-stage, crystal-controlled transmitter, both for 2 meters, into a 4 × 5 × 6 box — inches, that is! — W1RW

Club Notes

A new slide show featuring the ARRL Outgoing DX QSL Bureau is now available for loan to affiliated clubs. The entertaining and informative slide/tape show was produced by Bureau Manager Bob White, W1CWW. When ordering, suggest several possible dates, as requests will be heavy.

WA1GXE writes to ask if we know of any clubs completely composed of physically handicapped or disabled amateurs. Contact Gary Mitchell at P. O. Box 1003, Fairfield, CT 06430.

Montebello School ARC (NY) thinks its members, age 10 and 11 (except for the trustee), make up the

youngest amateur club in the U.S. and Canada. Any challengers?

Affiliated councils and federations: would you like a list of affiliated clubs in your area from which to solicit participation? Send an s.a.s.e. and a list of ZIP codes of the territory you cover. Your council isn't affiliated? All that's necessary is for 51 percent of your member-clubs to be affiliated, and your director's approval (which we acquire for you). Ask us about it; include an s.a.s.e.

Is your hamfest registered? Send us the details — who, what, when, where and why — about two months ahead of the planned hamfest date. We'll let you know what other events are planned for that same day which might conflict or compete with your affair. If notified soon enough, we can list it in QST.

Don't forget to send us your Field Day summary sheet (one for the whole operation) and dupe sheets (one for each band and mode) in time. — W4ISTO

Strays

I would like to get in touch with . . .

□ French- or Spanish-speaking people interested in communicating with our high school language students; also those interested in discussion of the basic high school sciences. Can operate all bands. Dan Barron, WA9ZPC; Medford Senior High School ARC, WB9QZP, 1015 West Broadway, Medford, WI 54451.

□ Paul D. Hammond, W4ZAI, whose last known addresses were in Bossier City, LA (1959) and Thaxton, VA (1973). He was a boom operator aboard USAF tankers. James R. Watland, 4435 — 156th Pl. S.E., Bellevue, WA 98006.

When and Where to Operate — Part II

When propagation was discussed in last month's column, for lack of space no mention was made of the special on-the-air indication of propagation conditions available on 10 meters. There, a number of beacon stations transmit signals. If you can receive a beacon's signal, then you have positive proof the band is open to that part of the world. Table 1 lists the beacons described on page 33 of the January, 1978, issue of the IARU *Region 1 News* (published by Region 1 Division, Roy F. Stevens, G2BVN, editor).

DX Nets.

These are a gold mine if you are prospecting for new countries. Remember, though, that there are three basic types, and each requires a different operating technique.

One is an information net that serves solely to disseminate the latest news about DX activities. Frequently they are more or less sponsored or supported by a DX club. You can learn much simply by listening, or you may check in and participate if you so wish.

Another type of DX net may be called, for lack of better words, a new countries net. These exist to help increase the DXCC totals of deserving DXers. In a typical operation, DX stations check into the net; then the net control station calls for those who wish to work the DX stations. After a short list of stations is taken, net control coordinates contacts between the DX stations and those on the list. When one list is completed, a new one is taken and the process is repeated. Sometimes the lists are taken in sequence from the various call areas, but not always. If a rare DX station is participating, the competition to get on the list can be fierce. Nevertheless, the success of this type of net depends on everyone — whether on the list or not — respecting net control. When breakers disrupt the discipline, the DX stations may pull out and never return.

The third type of DX net is a service net. Basically such a net exists to pass traffic or in-

Table 1
International Beacon Project on 10 Meters*

Freq. (kHz)	Station	Location	Remarks	Freq. (kHz)	Station	Location	Remarks
28,185	OA4VHF	Lima, Peru	1	28,232.5	VP8	Falkland Is.	2
28,200	Common			28,235	VP9BA	Southampton, Bermuda	
28,202.5	9J2BB	Lusaka, Zambia	0500-0600GMT	28,237.5	LA	Norway	1
28,205	DL0IGI	Mt. Predigtstuhl, Germany	1500-1600GMT 28,200 H...00-05 H...30-35	28,240	PY1CK	Rio de Janeiro, Brazil	4
28,207.5	N4RD	Englewood, FL, USA		28,242.5	ZS	South Africa	1
28,210	3B8MS	Signal Mt, Mauritius		28,245	A9XC	Hamala, Bahrain	
28,212.5	ZD9GI	Gough Island	3	28,247.5	EA20IZ	Spain	Unofficial
28,215	GB3SX	Crowborough, England		28,250	W		1
28,217.5	VK2WI	Sydney, Australia	1	28,255	W6	CA, USA	1
28,220	5B4CY	Limassol, Cyprus		28,260	VK5	Australia	1
28,222.5	YU	Yugoslavia	1	28,265	VK6	Australia	1
28,225	VE3TEN	Ottawa, Canada		28,270	VK8	Australia	1
28,227.5	FX3	France	2				
28,230	ZL2MHF	Mt. Climie, New Zealand					

*This project is sponsored and encouraged by IARU Region 1 and organized by Alan Taylor, G3DME.

Notes:

- 1) In planning stage
- 2) Under construction
- 3) Expected to be operational soon
- 4) Being rebuilt after period of unserviceability

formation between net members. Sometimes, as in medical nets, the messages can be extremely important. Before attempting to work anyone on a service net, it is imperative that you listen carefully to determine the nature and urgency of the traffic, and who is functioning as net control. Check in with him only after it is clear that you will not disrupt the net. Briefly state your request. Absolutely obey the instructions of the net control station. Some service nets will be willing to let you work net members, but others may not, as unwanted check-ins make it too difficult for the net to carry out its essential activities. In that latter case, the wishes of the net must be respected.

Send In Information!

In the near future, it is planned to publish an

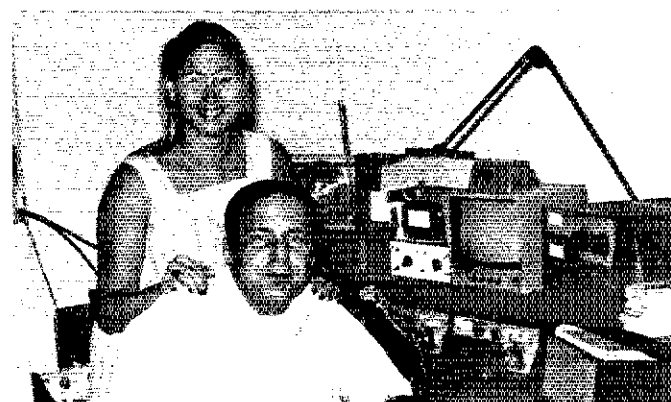
extensive list of currently active service nets, but that requires information from you. If some service nets prefer not to be listed, their request will be honored.

Newsletters and Club Bulletins

These contain a wealth of information about DX activities. Those issued weekly are especially valuable, as some activity from a rare location may develop suddenly with little advance warning. Typically, these information sources contain news of upcoming DXpeditions and operating schedules of hams permanently living or temporarily stationed at unusual places. They also have extensive lists of times and dates of reported QSOs with DX stations. These lists provide strong clues about operating patterns of stations of interest to you.

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

Suzanne and Tony Malesic, HI8XDJ and HI8XDF, during a visit by Glenn Kurzenknabe, K3SWZ.



Horacio Acosta y Lara, CX3BH, and Vic Clark, W4KFC, enjoy a visit in Montevideo.



Propagation forecasts, QSL routing information, and other DX news of general interest is also included. Here are the addresses of a few of the well-known bulletins:

The Long Island DX Association Bulletin, P. O. Box 173, Huntington, NY 11743. Published biweekly. Subscription: \$8 for U.S. residents.

Long Skip, published monthly by the Canadian DX Association, 53 Aquadale Drive, St. Catharines, ON L2N 3R9, Canada. Subscription: \$8 in Canadian funds.

Two newsletters with a European orientation are

DX News-Sheet & QSL Weekly, c/o Geoff Watts, 62 Belmore Road, Norwich NR7 0PU, England. Send an s.a.e. for subscription rates.

DXpress, published biweekly by VERON, P. O. Box 1166, Arnhem, Netherlands. Subscription: \$11 for U.S. residents.

Some bulletins have more subscribers than they can handle, and have asked not to be listed here. In any case, you should write for a sample copy before subscribing to any, to make sure the bulletin will be useful to you.

Deadlines for "How's DX?" and Newsletters

If you plan to submit news items to this column or any of the DX bulletins, remember that publications have cutoff dates well in advance of the date of issue. For example, a weekly newsletter may not accept material for a given issue less than four or five days before the day of issue. For this column, because it is in a magazine with more complicated preparation

and printing than a bulletin, the cutoff date is about five weeks in advance of issue. The deadline for this QST, for example, was around the middle of April.

In future columns, if all goes well, this general topic of "when and where" will be continued. Possible subjects include typical DX frequencies, contests, operating patterns of DX stations, and creating schedules. What other subjects do you want included?

THE DX SCENE

Caribbean DXpedition is planned by W1CDC. Proposed itinerary includes PJ8USA and VP2E during the week of July 29, and VP2MBC and VP2A or FG7 during the two weeks beginning August 6. Also on the trip will be WA1ZSW with gear for communicating via OSCAR satellites.

Chatham Island DXpedition is planned for October 28-November 7 by the team of ZL1s AD1 AJL BKL, ZLANF and WA6YQW. Operation will be on 160 through 10 meters, both cw and ssb, plus 2 meters via satellite. A special effort will be made to work Novices. Write to WA6YQW for more information.

CX3BH, widely known DXer and active on 160, was recently visited at his home in Montevideo by ARRL First Vice President Vic Clark, W4KFC.

DXPO 78, sponsored by the National Capitol DX Association, meets September 16-17 at the Ramada Inn in Tysons Corner, VA. Write to Richard Vincent, K3AO, Rte. 1, P. O. Box 230, Bryantown, MD 20617. (K4FJ)

HB0XAA third annual DXpedition will be sponsored again by Wiesbaden ARC. The operation from May 27 through June 4 will be on 10 through 80 meters, 2 meters and 70 cm. (DA1CS)

HCB, Galapagos, may be activated for a few days in June by HC5EE, who operated from there last year as HD8EE.

KA6DX continues his QRP activity from Okinawa with 1-watt output on a 15-meter vertical antenna. He needs Africa for QRP WAC. (N1DX)

KC4, Navassa Is. (new KP1), DXpedition this fall is seriously being planned by the Mississippi Valley DX Club of St. Louis. (L1DXA)

KC6MJ, active on 15 meters from Ponape in the Eastern Carolines, has a new three-element Yagi. (W4KFC)

KV4CH plans a DXpedition to Tahiti this July through September. He needs a QSL manager, especially one to help maintain order in the pileups and expedite spare parts. (KV4CH)

PY1ZDK is Kim Carr, K5TU, operating from Rio since last October, but leaving later this year. No QSL cards have been received via the PY bureau, so best route is manager WD5FAF. (K5TU)

Southeastern DX Club offers an award to DX stations who have QSOs with 10 members of the club. Matt Blender, W4MGX, 2541 Lakebrook Ct., Doraville, GA 30360, has details. (W4MGX)

VK9YS is the license issued to James B. Smith, P29JS, for his proposed operation on Cocos-Keeling from May 31 to June 14.

VK9ZM on Willis Island is expected to be active until December. (DXpress)

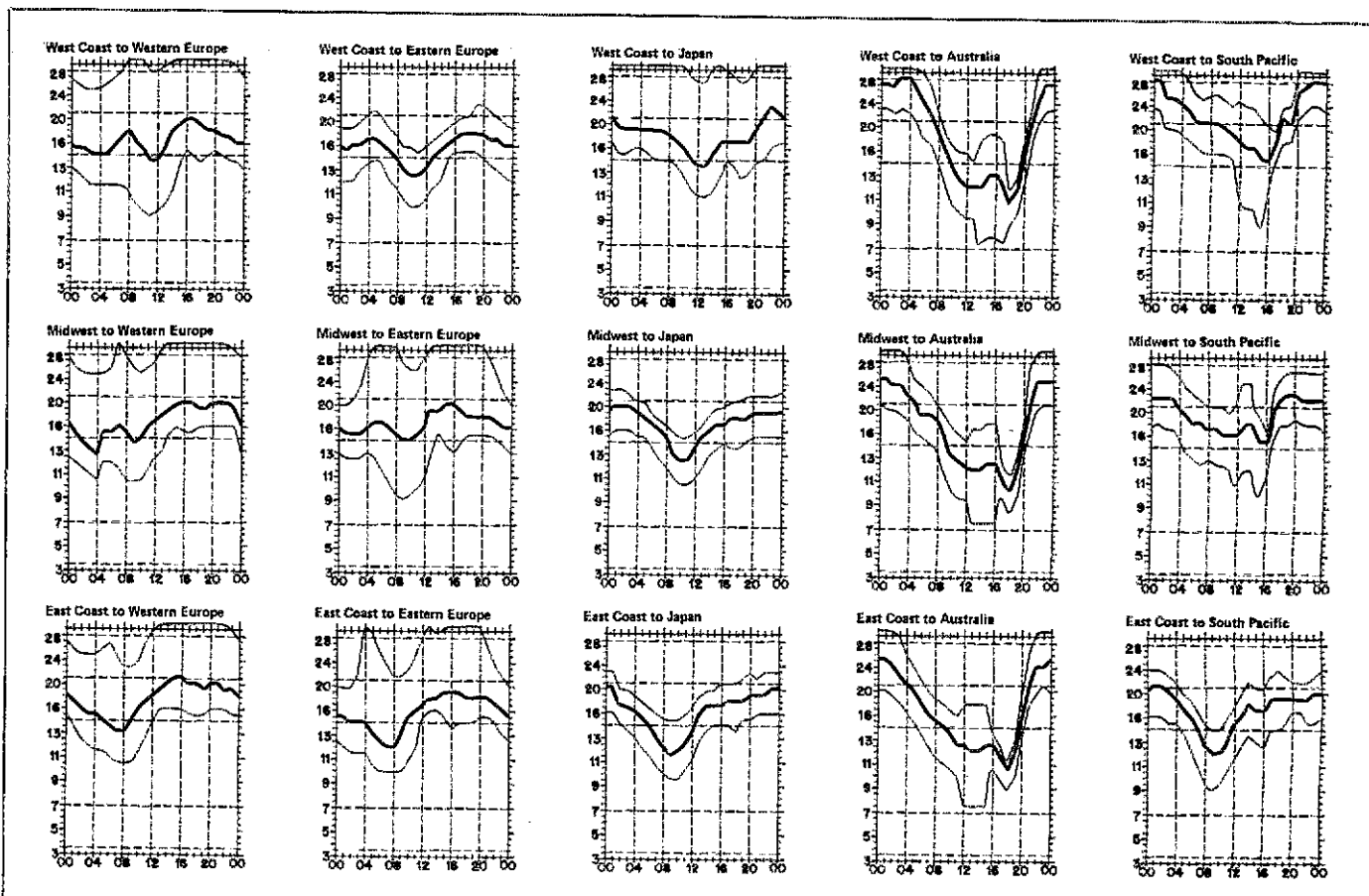
VP2LEU was operated by K6SVL from January 31 through February 7, 1978. QSL direct to his California QTH with s.a.s.e. or IRCs. (K6SVL)

VR3AH, Christmas Island, will be reactivated by KX6LA for about 18 months starting June 1, reports WB4PRU, who is QSL manager for this new operation only.

WAZ Award applications should now be sent to the new manager of the award, Leo Haisman, W4KA, 1044 S.E. 43rd St., Cape Coral, FL 33904.

ZF2AR was used by W9ABA during March 1-19, reports W4KA, QSL manager for those QSOs.

ZL4LR/A, on Campbell Island until September, favors 3.8 and 14.225 MHz from 0500-1000 UTC. (L1DXA)



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

3B8CV is closing his operation in Mauritius after nine years there. See QSL Corner for the new routing address.

3Y1VC is the license reportedly issued to LA1VC for his use during a meteorological survey expedition to Bouvet in early 1979.

6Y5HJ reports shutting down last December, hoping to reactivate ZF1HJ this spring. QSLs sent to Jamiaca will reach him eventually, but a quicker route is now via Grand Cayman. See QSL Corner.

9K2DX was recently operated by visitor Tom Hoyne, N6NI, who was greatly impressed by the tremendous number of tri-band and 20-meter beam antennas in Kuwait. (N6NI)

9M2FK seeks a QSO with anyone in CQ Zone 2 to complete his WAZ award. (W2LMO)

9M8HG is over 80 years old, but still very active on 20 cw, and QSLs all QSOs immediately by airmail, reports W6FJD.

9Q5DM has not sent logs in over a year to manager WBSOAV, who does not know where Doug is now. (WA4CTA)

QSL HELP NEEDED!

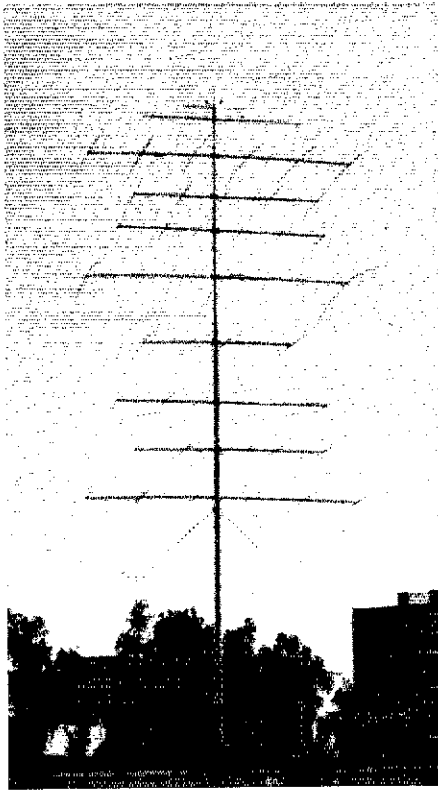
If you know the QSL routing information for any of the following, please write directly to the ham who needs the help.

5R8AG (1/73) by W1VV; PY0BLR (3/68) by W7IL; OX5BA (5/69) by K0FPC; CR7LE, GC2TR, 7Z3AB, 8R1W, 9Y4PA (all '72) by K6UGS; FO8EK, JW9WT, VR3AO by WA4JQS; 5X5IU by WB6GFM.

TU2AF, TU2BR ('72), WB5APF/KC4, S24OA ('73), 9H5F ('76) by WA3ERG; 4W1ED (10/74) and 5A5TU (10/73) by K3CBW; 5A5TL ('57) by VE3CXL; OD5AJ (11/76) by WI0PJ; 5R2AL ('76) by WA4CTA.

NEED A QSL MANAGER?

Try one of these volunteers. WA1YGA, N2JW, WA2HLP, WA2ITA, WB3JUK, WB6DPO, K8SY/WB8WRX, WD8BPH, WD0DLV.



An antenna farm in Kuwait!

QSL Corner

Administered By R. L. White, W1CW

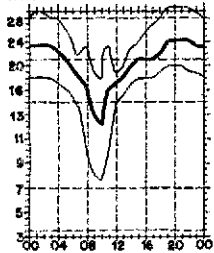
Beating the high cost of QSLing is an interesting, and worthwhile, thing to contemplate. WA2OZX mentions an idea that was passed to him by ZL3JW that would seem to have, even if not the end-all to end-alls, an interesting twist.

Standard procedure when sending one's QSL directly to a DX station is to enclose a self-addressed envelope and an International Reply Coupon. The purpose of the envelope is to make it easy for the DX station. No need for him to buy an envelope or take time to address the envelope, not to mention the possibility of the DX making a mistake on your address. The IRC is to pay the return postage. One IRC is redeemable for the surface postage on a one-ounce, first-class envelope. The hang-up on IRCs is that they have to be redeemed at a post office, not to mention that they now cost 42 cents each when they are purchased from the post office (in the U.S.).

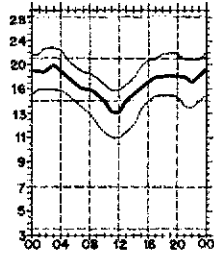
ZL3JW suggests that rather than spending 42 cents for an IRC, it might be better to buy five nine-cent U.S. stamps and send those stamps to the DX station with your card. The DX station can then put the stamps on his QSL cards, going to U.S. stations of course, addressing each of the cards, put five cards in one envelope and send them all to one of the U.S. stations, who will then drop the cards into the nearest mailbox upon receipt. Presto! Five stateside stations get QSLs for three cents more than the cost of a single IRC.

It is a novel idea and there could be some merit to it. Be sure the DX station understands the idea, though, or you may get a note back telling you he can't use

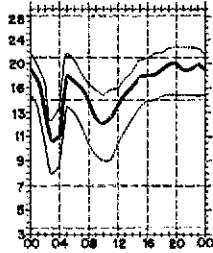
West Coast to South America



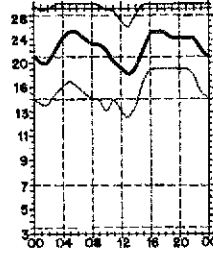
West Coast to Central Asia



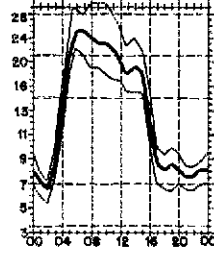
West Coast to Southern Africa



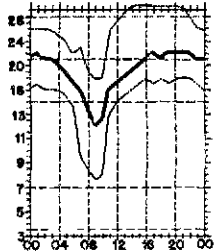
West Coast to Eastern Europe*



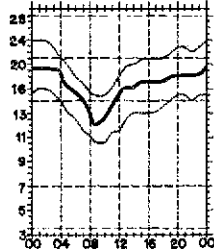
West Coast to Southern Africa*



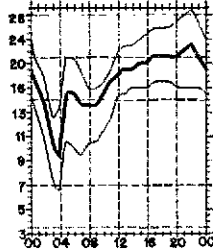
Midwest to South America



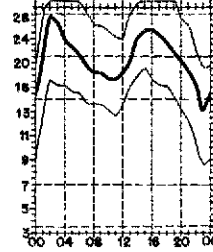
Midwest to Central Asia



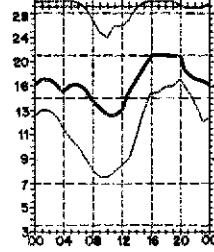
Midwest to Southern Africa



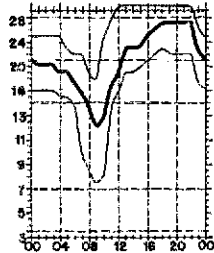
Midwest to Central Asia*



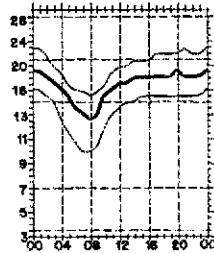
East Coast to West Coast



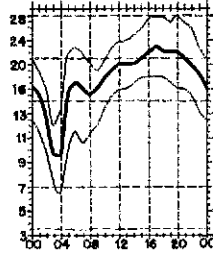
East Coast to South America



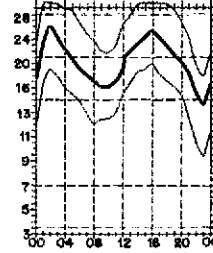
East Coast to Central Asia



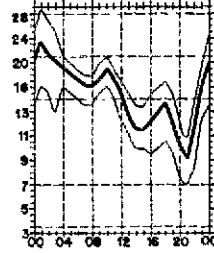
East Coast to Southern Africa



East Coast to Central Asia*



East Coast to Australia*



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 June, 1978, assume a sunspot number of 86, which corresponds to a 2800-MHz solar flux of 133.

U.S. stamps to mail things from his country.

For those of us who can't afford (or just don't want to spend the money) the cost of direct QSLs, there is always the bureau route. Speaking of QSLing by the bureau, one of the questions asked quite often is, "How do I address cards sent via the bureau?"

Cards being sent via a QSL bureau don't need to be addressed. All that is needed is the call of the station to whom the card is intended for. Putting anything more than the call in the address area doesn't do a thing toward getting the card to the station and wastes time and effort.

Before getting to this month's QSL information, a few words, for those of you who just tuned in, about the ARRL Membership Overseas QSL Service.

The ARRL Membership Overseas QSL Service is available to ARRL members only. The purpose is to provide an inexpensive way to send DX QSLs to the foreign QSL bureaus. While there is no maximum or minimum number of cards that can be sent to the service at any one time, there is a maximum usage of the service of 12 times per year. There are four requirements when making use of the service:

1) All cards sent for forwarding must be presorted alphabetically by prefix.

2) Include with the cards the white address label from the wrapper of a current QST. The label is all that is needed and shows that you are currently an ARRL member. A label that came off a six-month-old copy of QST may not indicate that you are a current member (unless you are a Life Member).

3) Include \$1 with each group of cards sent (check or money order preferred but cash is acceptable).

4) Include a self-addressed, stamped (13 cents) envelope. It will be used to acknowledge receipt of your cards, advise you when the cards are scheduled to be mailed, and to point out, if necessary, any of these four points that might have been missed when you sent in your cards.

And now back to our scheduled program, remembering that the information shown is not necessarily accurate or correct, but is passed on for what use it may be to you:

D68AD, Box 15, Moroni, Grand Comore, Rep. of Comoros

DF7GF/5H3, Box 296, Arusha, Tanzania

DX4JA, Box 118, Kurume, 830 Japan

EP2LA, Box 339, Shiraz, Iran

H2M3C, Box 501, Port-Au-Prince, Haiti

JA1PIG/PZ, SUJAFI, Box 1237, Paramaribo, Surinam

KC6MJ, Box 900, Ponape, Eastern Caroline Islands, 96941

VP5DF, 1408 Harvard Dr., Cocoa, FL 32922

W6NV/3D6, Box 3191, Johannesburg, 2000, Rep. of South Africa

WA1RFM/VP9, Tudor Hill Laboratory, FPO, NY 09560

WP4BDL, Box 50073, Levittown, PR 00950

3B8CV, 37 Boxgrove Gardens, Aldwick, Bognor Regis, Sussex, England PO21 4BB.

9G1JU, Box 1835, Kumasi, Ghana

AP2TN (WB0FL)

CSABC (WB4ZJW)

CE1BL (WB4LFM)

DT7DK (DM2DUK)

FG9DDB/FS7 (W1UQ)

FO9XA,B,C,D,E,F,H (HB9MX)

FR9HL (K9OTB)

GD5BLG/P (DJ0UP)

GJ5CGV/P (DF7FH)

H80XAA (DC0HO)

H18XDF (K3SWX)

KG4BZ (W1GHH)

KG4DS (WA4JOS)

KG4OO (K0PMZ)

KH6JLU (WB9MFC)

NZ6C/KH6 (K4MOC)

OA4ARB (WB5JJD)

OD5LX (SM0GMC)

OX5AP (WA5ZYF)

P17VL (VE3BKD)

PIY1ZDK (WD5FAF)

PT0FN (WA3HUP)

S22HF (G4GFI)

VP1AJ (WB5URN)

VP2AZB (W1RF)

VP2MUZ (WB8LDH)

VP2SAH (WB2AMO)

VP5BJN (WB4LFM)

VP5MA (WB4LFM)

VP8NJ, PU, QG (WA4JQS)

VL12KMK (W71SY)

WB6WTA/KH2 (WB6WTA)

WD9FCC/VQ9 (K9GM)

ZB2C (K2FJ)

ZF2AD (W3LPL)

ZF2AM (W8LUI)

ZL4LR/A (N4NX)

3D2DM (W4UL)

7Q7AA (WB9TSL)

8P6HD (WA4TZM)

8P6JG (WA4HOI)

8P6JV (W1ZT)

9G1RX (WB1ETS)

9H1FF (K8JID)

9J2LC (14UVA)

9K2DX (W6LV)

9L1SL/D (K7BHM)

W4BQY/297

W5DJU/345

W1HX/343

JA1ADN/328

Z66RM/324

W99XC/293

K4LSP/291

N8RF/290

W8LBM/289

W98M/289

WA5ALB/280

WA4CXZ/271

W6CF/271

W4MWT/270

N5DX/263

PY2BW/263

W8A/300

W7HP/297

W9KNI/283

K9MM/272

JA0CUV/1205

WB6ZUC/202

K8CW/192

K4FXJ/180

K6CBL/180

JA1BN/171

K6DSK/163

WB9SL/V/142

HP1AC/141

K4SE/141

K4ZVS/140

W0CAW/139

VE2EGC/138

K8WV/135

W3KFC/133

JA10ER/126

WA5VLIW/140

CT25H/135

K1KNM/134

K9RN/133

WA8SWM/129

EP2TY/127

WB9HU/122

WA4EGP/121

WB8RTY/121

H17JMBW/120

K4HH/120

KH6DL/120

W2NCL/120

WB7MUS/120

W8YU/120

WB0QW/120

W4TAC/119

VP2SV/118

W45YB/160

W8BDIV/160

W8TE/160

W8RWC/160

ZP5EF/160

WA8SWD/160

W8QXD/160

W8WEM/159

OE1BFW/197

OZ1W/185

DJ8WD/181

K5SE/181

K1LLU/180

K1MEM/180

K3HBP/180

N8AC/180

W7OK/220

N9RB/204

K3DH/203

DK16F/202

W9YRM/250

W0JK/249

JA3WBK/242

K4NJS/240

W8LLS/233

W8LJ/231

WA2BDP/225

W4VNG/225

C63GN/221

W4MWT/220

K9MD/220

P29JS/220

W1WXZ/220

W4AJT/220

W70K/220

W8EOP/202

W8XCD/202

W8WEM/199

OE1BFW/190

W8CFG/182

FJ2FF/181

4Z4M/176

N0AT/173

OK1ADP/166

W4ZHQH/165

ZL1BD/164

W8CBA/161

WA4LOF/180

WA5VJW/180

W8ASW/180

K4GK/179

K7ADZ/179

N0AT/179

H4SKN/177

W9JL/166

K1WJ/165

K2JVV/164

WA2QCH/164

WA0DK/162

VE3CP/161

K1TO/161

W1ND/161

W8ROJ/161

YU3TXU/161

N4ZS/159

F9BB/160

K9EJ/160

K9DID/160

W44WV/160

WA5TYB/160

W0RT/160

DA1RA/145

N2AC/156

XE1PF/159

WB9SL/V/154

WB9OQU/150

WA2MVQ/149

W45VLIW/140

CT25H/135

K1KNM/134

K9RN/133

WA8SWM/129

EP2TY/127

WB9HU/122

WA4EGP/121

WB8RTY/121

H17JMBW/120

K4HH/120

KH6DL/120

W2NCL/120

WB7MUS/120

W8YU/120

WB0QW/120

W4TAC/119

VP2SV/118

W8AHZ/104

VE3HYU/SU/103

WA2JUN/103

WD4MB/103

K4HG/102

K4IHN/102

K6BMX/102

PYBALX/102

WA2NHE/102

W5VJG/102

W8AHPV/102

J118Q/101

ZP5CBL/101

KH6AW/100

WA6UN/100

W5AA/100

W6AOTV/100

W0PEL/100

W8AHS/101

JR3LGB/100

K3LVO/100

K48XU/100

K5JTB/100

VE3CN/SU/100

VE3CU/100

W7JAL/100

W8DAL/100

WB2TFH/100

W7AXY/100

WB8RFN/100

W8YU/100

W89VW/104

JR6CWC/103

W4OWO/103

WB8UIA/103

K4DD/102

K8ZRH/102

W5VJG/102

W99SIW/102

WB2EZG/102

K2VCK/101

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



A New Beginning

The recent FCC action on repeater deregulation and Technician privileges is certain to have far-reaching effects on our world above 50 MHz. The first, and in the long run probably the greatest, impact will be felt on 2 meters. By the time this appears in print, operating patterns on our most popular vhf band will already be undergoing a major change. For the first time all operators will be able to meet in one portion of the band. This is what many of us have been urging for a long time as one step in increasing 2-meter activity. Now, with use of the band at probably the highest level in history, we are presented with what we have been seeking to these many years. What we make of it is up to us. Two meters can become a jumbled mass of QRM hugging 144.1, similar to what is all too often encountered on 6 meters, or it can evolve into an enjoyable place to operate with activity well spread. Which kind of band it becomes may well be determined during these first few weeks following implementation of the FCC order.

Unfortunately, human nature being what it is, no one could get very excited about working on a new band plan until the direction FCC was going to take became clear. Now it's not just clear, it's a *fait accompli* and we must get going if we are to keep 2-meter ssb, cw and a-m operation a pastime we can all enjoy. Fortunately we have an organization which is capable of collecting the views of vhfers all across the U.S. and Canada and distilling them into recommendations we all should be able to live with. That organization is, of course, the VUAC, the League Advisory Committee which deals with the interests of vhf/uhf. This group should not be confused with VRAC which deals with repeaters. Naturally, the two groups work together in many areas of common interest.

ON THE BANDS

6 Meters — By the time you read this, the old band should have already begun to put on some of its famous and exciting summertime antics. This has the potential of being one of the most fascinating Es seasons ever, what with all of the DXpeditions reported last month slated to be active. In addition, there should be a noticeable increase in the number of nearby DX countries represented by regular resident stations as a result of the F2 and TE propagation taking place in recent months. Thus Es may yield contacts from directions you might not normally expect to hear anything. This means more turning of the beam. Also, when the band is "dead," get on and make some noise. You may be surprised at what you may turn up.

Don't forget that everyone can now use the 50.0 to 50.1 segment, although it's still exclusively cw for U.S. stations. Thus brasspounders can henceforth operate

No sooner had the FCC order been announced than VUAC Chairman WIJR went into action to get a consensus from the committee members on what 2 meters should look like in the years to come. In order to properly respond, the VUAC members must have your inputs. To start the ball rolling, Joe's mailing to the group suggested the following arrangement:

- 144.0-144.05 — EME (cw)
- 144.05-144.06 — Propagation beacons
- 144.06-144.1 — General cw (including weak signal)
- 144.1-144.2 — Weak-signal ssb (including EME)
- 144.2-144.3 — General ssb (local ragchewing and nets)
- 144.3-144.5 — Satellites (required for Phase III high-altitude spacecraft due to be launched next year)
- 144.5-144.9 — Repeater inputs (144.5-144.6 reserved for linear translator-type repeaters)
- 144.9-145.1 — Weak signal and fm simplex
- 145.1-145.5 — Repeater outputs (145.1-145.2 reserved for linear translator-type repeaters)
- 145.5-145.8 — Miscellaneous and experimental modes (It has also been suggested that this area be used for a-m.)
- 145.8-146.0 — Satellites
- 146.0-148.0 — Same as at present

Various calling frequencies have been suggested in connection with this plan. WIJR proposed 144.210 while others favor 144.200. Some recommend the use of 144.110, on traditional grounds. My feeling is that this choice would lead to the crowding situation discussed earlier. Most seem to agree with the concept of conducting local ragchews and nets between 144.2 and 144.3. For purposes of definition,

in their own part of the band rather than being sandwiched in amongst the strong ssb stations. This long overdue FCC move has come just in time for some of the best 6-meter DX conditions we have seen in years.

The first F2 contacts for Cycle 21 affecting the continental U.S. have already taken place. The late afternoon of March 19 may have been the first of such openings. On that occasion, LU3EX, LU8MBL, LU7FA and CE4CP were worked by a number of stations in the West including K6ODV. But April 3 was the big day. Between 2145 and 2230 UTC LUs 3EX, 8BF, IDAU and 2BG were contacted by many stations throughout south TX, LA and perhaps AL and FL. Signals were well over S9 in both directions and WA5IYX, who conducts a careful study of such things, characterizes this F2 opening as much better than any experienced during 1971/72. LU8BF's letter about the same session lists QSOs with six different Ws. Nor was that the end of it. Beginning at 1825 UTC and lasting until 1910 April 5 both CE4CP and CE4MO were worked by WA5IYX, WB5VWW, K5GE and WD5FWP, all of San Antonio.

This should be just the beginning. Next fall is expected to produce F2 contacts for many parts of the country. One thing we can do in the meantime is talk

local probably means up to 100 miles.

Whatever calling frequency is decided upon, our new start on 2 meters gives us a fresh chance to use it right. Monitor it while around the shack. Call your CQs on it. But, once contact is established move off (up if signals are strong and down if a weak station several hundred miles distant responds). To spread activity out and reduce QRM, it would be well to QSY to the next open 10-kHz frequency. If they are all busy select a 5-kHz slot.

Your opinions on these suggestions are needed and needed soon if we are all going to get off on the right foot and give everyone a chance to work DX, engage in local ragchews or conduct nets on our "new" 2-meter band. The best way to express your views is through your VUAC member. There is one for each U.S. call area and one representing the VEs.

Presently the committee consists of Joe Reiser, WIJR, 17 Mansfield Dr., Chelmsford, MA 01824; Richard T. Knadle, Jr., K2RIW, 316 Vanderbilt Pkwy., Dix Hills, NY 11746; Anthony F. Souza, W3HMU, P. O. Box 169, Ottsville, PA 18942; Stuart G. Mitchell, WA0DYJ/4, 14761 Dodson St., Woodbridge, VA 22193; Roy L. Albright, W5EYB/N5RA, 107 Rosemary, San Antonio, TX 78227; Louis N. Anclaux, WB6NMT, P. O. Box 82183, San Diego, CA 92138; Don Roberts, W7FN, 6105 — 92nd Ave., S.E., Mercer Island, WA 98040; Ted E. Hartson, W8ULG, 2444 W. Halbert Rd., Battle Creek, MI 49017; Jack Spencer, W9YYF, RR 1, Box 60, Minooka, IL 60447; John C. Fox, W0LER, 321 — 109th Ln., N.W., Minneapolis, MN 55433; J. Leslie Weir, VE3AIB, 42 Cobham Crescent, Toronto, ON, Canada M4A 1V6; and Jim Kearman, W1XZ, ARRL headquarters, 225 Main St., Newington, CT 06111.

CU on the low end!

up 6 meters when working DX stations via the hf bands. Find out whether or not the particular country permits 6-meter operation and if so, encourage the station to get on the band. Even a simple homebrew cw transmitter and very basic receiving converter, or all-band receiver which tunes to 50 MHz would be better than nothing. If they don't have 6-meter operation in their country, suggest that they try to obtain some sort of special authority based on propagation investigation. If all else fails, urge that they attempt crossband contacts to 10 meters. Greek station SV1AB is one already known to be doing this. So far, he has hooked up with ZS3AK in southwest Africa via this method. We'll try in the next few months to come up with suggested frequencies for such operation.

Late March and early April produced some good auroras. WA0MRH noted one the evening of March 26. But the big night was April 10/11. Literally hundreds of contacts were made during that session. An interesting sidelight involves the reported reception of a KL7? by WB2MAI, Alpine, NJ, at about the time (0700 UTC) that KL7DJ, Fairbanks, AK, was unsuccessfully trying to raise several Pacific Northwest stations.

1978 promises to be an interesting year on 6. It will

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730, or call 301-384-6736 and record your message.

be even more interesting for K6KLY and about a half dozen other Bay Area 6-meter enthusiasts if greater activity were available from DE and RI. These are the last needed stations for many in the West.

CU in the SMIRK contest June 3 and the ARRL bash the following weekend.

2 Meters — Contacts by Caribbean stations with Argentina continued well into April. During the first hour after 0000 UTC on the 11th, KP4EOR worked 1 Us, 1DAU, 3AAT and 7DJZ. In addition, KP4FAL, running just 18 watts to a five over five, accomplished his first QSO with Argentina, working LU3AAT. Another Puerto Rican station participating in this fascinating mode is KP4AAN who has made several LU contacts using crossed 10-element Yagis. With at least four more KPs setting up horizontal antennas and ssb transmitters, business should get even better across this path. Upon implementation of the new FCC rules, the sked frequency has been changed to 144.180 at 0015 UTC each evening. This is preceded by 15 minutes of calling and listening on 30.110. Various south FL 2-meter stations including K4IXC, N4PZ, W4WD, WA4JID and WA4OWC are also eagerly participating in these attempts to contact stations in deep South America. Considering the number of well-equipped 2-meter stations now operational in Puerto Rico, as well as other areas of the Caribbean, there is a good chance of Es contacts with that area from the continental U.S. this summer.

With increasing solar activity, aurora has returned as a major factor in vhf propagation. Several good buzz sessions took place between mid-March and mid-April with the best one the evening of April 10/11. As an indication of the widespread nature of this opening, K2NE, SNJ, reports working 58 stations, mostly in the 8, 9 and 0 call areas plus VE1 and 3. Vince heard, but could not work, K5CM, OK. In fact he heard all call areas except 6 and 7 that evening. Even from as far south as Muskogee, OK, K5CM lists some 31 aurora QSOs with 8s, 9s and 0s as well as several 3s. Another southern station in on the fun was WB4NMA near Atlanta. This was Ron's first buzz session and he was pleased to snag W9IP and N9SS, IL, as well as W4DFK, VA. The proton flare which occurred at 1340 UTC April 11 produced another aurora on the 13/14 but not of the same intensity as the earlier one. This conductor noted buzz signals with good strengths when I turned on the receiver at 2345 April 13 but signals faded by about 0200 April 14.

Speaking of increased solar activity, WA4MVI has been observing solar flux with his 2-meter EME setup consisting of a 160-element collinear as well as noting the WWV figures. Jim feels that there is a definite correlation between the level of solar flux and increased noise on the EME path. He further notes that, for the

past several months, the peak of the sun's 27-day cycle has occurred near the beginning of the moon's northern declination, which is the time that most moonbouncers begin their most intensive activity. He speculates that this effect may have been responsible for the less than good results that K5MB, operating from KH6HI, had during the beginning of his stay; whereas Marshall's success improved noticeably toward the end.

Several accomplished 70-cm moonbouncers have joined the 2-meter EME contingent over the past few months. First there was W1JR and now YV5ZZ. Ed runs 16 F9FT 9-element Yagis and a Arcos amplifier. Success was almost immediate. QSOs were being completed with K1WHS, W4WD and K5BMG. This is believed to be the first work between the continental U.S. and South America on 144 MHz. K1WHS says that 2-meter EME activity has been growing by leaps and bounds. In Europe alone, Dave lists SM3AKW, YU2CNZ, 14EAT, GW4CQT, DK5LA, G3PIA, SM0DJW and OE3UP as new stations, most of which he has worked. One-way tests with several Russian stations have produced negative results to date but several UAs are in the process of building EME stations so it should only be a matter of time.

March 25 produced particularly good EME conditions for K1WHS. Echoes were so strong that Dave lowered his power to 31 watts and could still copy letters. Dave says that he often hears stations running just two antennas and requests more skeds. Maybe some 2-meter operators have EME capability and don't even know it!

Those wishing to work Mexico via EME should get in touch with WB6NMT at 714-222-9518. Lou and N6CA are teaming up with XE2s IO, SI, IC, RH and AZR in a major effort for the upcoming June contest which will include 2-meter EME. The QTH will be Punta Banda, 90 miles south of San Diego. The gang will have KWs on 6 and 2 and EME array consisting of eight 10-element Yagis.

The April SWOT Bulletin lists 30 nets, one of the most recent being that conducted by WB3BFK, Hagerstown, MD, at 2000 local time Wednesday evenings. This net moved from 145.110 to 144.250 beginning with the May 17 session.

1-1/4 Meters — From the Detroit area, WA8EUU writes that he, along with WB8BKC, W8BEM and WA8VPD, is active on 220.010 ssb. At present they are all running low power, but amplifiers in the 100-watt class are under construction. The group gathers at 2100 local time on Tuesday evenings. This schedule is in accord with the Activity Night plan mentioned in the February column which calls for concentration on 2-meter activity Monday evenings, 1-1/4

Tuesdays, 70 cm Wednesdays and 23 cm Thursdays.

The gang at W4BFB, well-known NC vhf contest station, is looking for 1-1/4 stations to sked during ARRL vhf contests. Interested parties may contact Jim Keene, WA4ICM, at 4124 Randolph Rd., Charlotte, 28211.

70 Cm — A fine tropo opening the night of April 7 was reported by WB4JUZ Tampa, FL. Tampa Bay area stations W4ESX, WA4LQO and he had a field day for about three hours working 70-cm stations bordering the Gulf. An appreciation for the intensity of the opening can be gleaned from some of the signal strengths: WSUCY, Pascagoula, MS, 10 watts, 60 dB over S9; K5QFI, Slidell, LA and K5JRH, Houston, TX, S9. The most distant station worked was W5LUU, San Antonio, TX, 978 miles. Jim says that the majority of the stations were running low-power OSCAR-type equipment. He says that the Tampa Bay area bunch get together every evening at 2100 local time. From the TX end of this phenomenal path, WA5HMK reports that the Houston area group meets each Wednesday evening at 2100 local time.

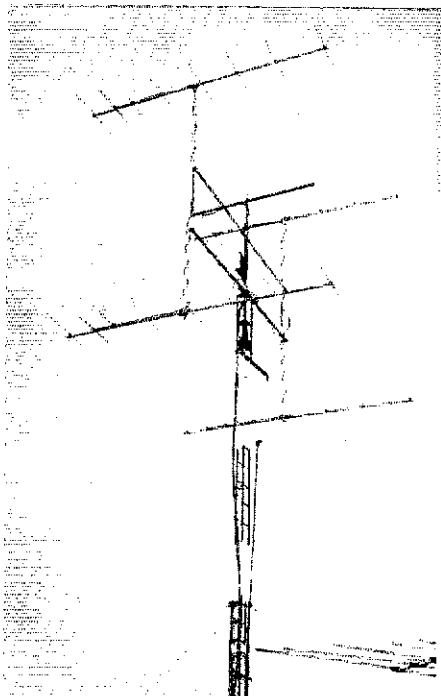
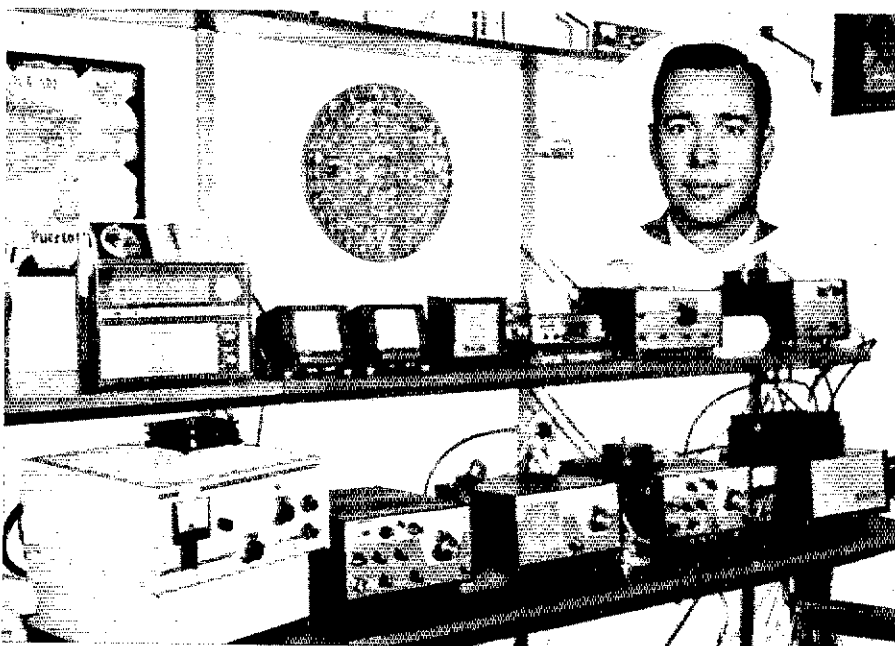
The big aurora session of April 11 was intense enough to be felt on 70 cm, although I have not yet heard of any contacts being made. However, at 0240 UTC while working K8IE/9, IL, on 2 meters, he suggested that we try 432. Upon switching over, I was able to hear him about 43A but he was unable to copy my 35 watts. We tried the same thing several hours later at 0720 UTC, unfortunately with the same results. Did anyone make any 70-auroral contacts that night?

K2UYH is planning another of his moonbounce jaunts this summer. Al plans to visit ND, SD, WY, MT and ID beginning in mid-June. He is looking for skeds as well as setup and operating assistance. Contact Dr. Allen Katz, Dept. of Engineering Technology, Trenton State College, Trenton, NJ 08625.

K1WHS reports doing well on 70-cm EME with his eight W0EYE Yagis. So far Dave has worked WSFF, ZESJJ, WB5LUA, W4WD and of course K2UYH. From the K2UYH 432-EME Newsletter comes the information that LU3AAT is about ready to go and that VE1OD has up an array of eight W0EYE Yagis. He is in the process of ironing out some bugs and should be in business soon. It has also been learned that CX8BE is now on 70 cm with low power. Maybe he too can be persuaded to join the EME ranks before too long.

A very fine 432 Newsletter, devoted to the band's terrestrial activities is being published by W0YZS. Those interested in receiving it may send Mike a \$2.50 donation to cover costs, or a stack of s.a.s.e.s. QTH is 107 NE 82 St., Kansas City, MO 64118.

The shack, operator and antenna of KP4EOR, holder of one end of the current 2-meter terrestrial record.



Green-Keys/RPT = High-Speed Traffic Handling

RTTY has been recognized as being the quickest mode of handling traffic, especially in large quantities. However, it has also been apparent that RTTY traffic nets are cumbersome animals. Fast break-in capability on RTTY is rare, and on any mode, getting all the check-ins on the same frequency is never an easy task; but on RTTY, zero beating the net frequency is very critical, otherwise continual retuning of the receiver is necessary in order to print solid, legible copy on a teleprinter. So, although successful RTTY traffic nets do exist (see the ARRL *Net Directory*), they are few because of the problems encountered.

Recently, a new breed of traffic net has appeared on the scene with all of the advantages of RTTY without all of the problems. Pockets of RTTY operators across the land have begun using vhf repeaters to handle traffic. Some groups have built their own repeaters exclusively for RTTY. (146.10/70 MHz is the most popular 2-meter repeater frequency pair for RTTY.) Others have received the permission of repeater groups to use RTTY on existing repeaters. Either way, these groups are having a great time and are performing a public service by handling a lot of traffic.

Once there is an available repeater, the possibilities are limitless. However, there is some basic equipment that makes RTTY traffic

handling more efficient and more enjoyable. A *repeater* (reperf) and a *transmitter-distributor* (TD) are necessities for serious RTTY traffic handling. The reperf makes it possible to punch messages on paper tape, either from your own keyboard as you originate traffic or off the air as you receive traffic to be relayed elsewhere. After you have punched the tape, the TD allows you to transmit the traffic at full legal speed. (Although the FCC permits hams to transmit RTTY at 60, 67, 75 and 100 wpm, most amateur RTTY operations are set up for the slower and more reliable 60 wpm.)

The reperf and TD are necessities; now let's talk about luxury. The most luxurious item that a RTTY traffic handler can possess for repeater operation is an *autostart*. Autostart is a device which automatically turns on RTTY equipment only when a RTTY signal is received. All day long, your receiver can be monitoring the repeater net frequency with the autostart on. Your teleprinter will copy all of the traffic (along with all the other messages) sent on the repeater, and you never have to be present in your shack! If enough traffic handlers are equipped with autostart on a repeater, traffic can be sent at any time to be received by stations that are monitoring on autostart. An example will indicate how the

autostart procedure works: If I have traffic to relay to another station, I first punch up my message on paper tape and then send "WIEH DE WAILOU QTC 1," followed by the traffic and "-AR- 2030Z 8 MARCH 78 DE WAILOU MONITORING ON AUTOSTART." I then shut off my RTTY equipment, leaving the receiver and autostart on. Later, my autostart will be activated and my teleprinter will print "WAILOU DE WIEH QSL YOUR NR 711 ROUTINE. 73. 2300Z 8 MARCH 78 DE WIEH MONITORING ON AUTOSTART." *Voila!* WIEH has received my traffic and has acknowledged the receipt and neither operator had to be present in his respective shack when the messages were received!

Whereas ordinary traffic can be handled expediently via RTTY, book traffic seems ideally suited for RTTY operation. For example, a book of 180 was recently relayed on a local RTTY repeater in less than 45 minutes! Compare that with ssb or cw. On a repeater, a properly equipped RTTY station can send and receive 99 percent perfect copy, which eliminates all of the fills and repeats which are common on voice and cw traffic nets. This alone saves a lot of time; when you consider that with paper tape and a TD, continuous 60 wpm can be transmitted, is there any other way to handle traffic? — *Stan Horzepa, WAILOU*

PUBLIC SERVICE DIARY

- Dillsboro, IN — January 2. A freight train derailed and its tank cars ruptured, discharging chemicals. The Laughery Valley ARC provided communications for the evacuation of farms in this rural area. (WA9JNC)
- San Antonio, TX — January 13. Operators of the WR5ABB and WR5ADJ repeaters participated in the search and rescue of WB5TOU, who had become lost in rugged terrain after his vehicle's lights failed in darkness. (W5XW)
- Guerneville CA — January 16 and 17. A flood swept through this small community and members of the Sonoma County Radio Amateurs Club provided backup communications for the only telephone that was operable during the emergency. (N6KM, SEC SF and W6CYM)
- Bastrop, TX — January 29. WA5AAO came upon a disabled recreational vehicle parked at the side of the highway with some of its passengers suffering from carbon-monoxide poisoning. He called for assistance via WR5ASC. (WA5AAO)
- Newport News, VA — January 29. During the 1978 SET, the City of Hampton (VA) ARES answered a real emergency: an automobile fire at a congested intersection. While the local fire department was summoned, WA4BRC forcibly pulled a panic-stricken passenger away from the burning vehicle. (WB4ODZ, EC City of Hampton ARES)
- Orange County, CA — February 10. Disaster struck twice — a tornado smashed down on a mobile-home park in Huntington Beach and a flood swept through Silverado Canyon. ARES provided communications assistance for the Red Cross' relief operations. (K6KNC, EC Orange Co.)
- Guyana — February 14. Hams across the U.S. came to the aid of a missionary doctor who had to perform a Cesarean section operation on a pregnant woman. Stateside doctors were put in contact with WB6MID/BR3 and identical twin girls were healthfully delivered.
- Euclid, OH — February 16. A high-pressure

natural gas line exploded, ripping a 15-foot hole in street pavement and sending a ball of fire nearly 200 feet into the air. Repeater WR8AGA was placed in "priority use" to provide communications for the affected area. (WB8JYR)

□ Waverly, TN — February 23-24. A propane gas tank car exploded and a fire raged, causing injury and loss of life. Local amateurs responded immediately and established communications for police and relief agencies via 2 and 75 meters. (WA4GLS, SCM TN and WA4LNL, EC Montgomery Co.)

□ Honolulu, HI — February 26. KH6DE and KH6EW received an SOS from the ketch *Spellbound* and relayed the information to the Coast Guard. An around-the-clock watch was maintained until the ketch was safe. (KH6EKQ)

□ Youngstown, FL — February 26. After a train derailment, local amateurs using handheld transceivers linked the site of the wreck with c.d. headquarters and answered incoming health-and-welfare inquiries. (K4RZM)

□ Greenup, KY — March 8. Amateur radio provided the only communications for state police and rescue personnel when a light plane crashed in irregular terrain. (W4CID, KY SCM)

□ Buckeye Lake, OH — March 12. Licking County ARES established communications for the evacuation of 100 families due to a natural gas leak. (W8EOG, EC Licking Co.)

□ Breckenridge, TX — March 19. While Abilene hams provided communications for a drill conducted by the Texas State Guard, a large brush fire was discovered and the drill was abandoned to assist the fire-fighting operation. (WB5SVS, EC Jones and Taylor Cos.)

□ Owensboro, KY — March 19. At the request of the local sheriff, hams assisted in the recovery of an automobile and its driver after the vehicle had crashed and submerged in the backwater of the flooded Ohio River. (W4OYI)

□ *Repeater Log*. According to the reports received to date, repeaters were used to report 117 vehicular emergencies, eight crimes, four weather emergencies, three fires, two medical emergencies, one search and rescue, and five miscellaneous incidents. Repeaters in-

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 the news media. News dies a quick death, usually within hours, so please call before, during or immediately after the newsworthy event.

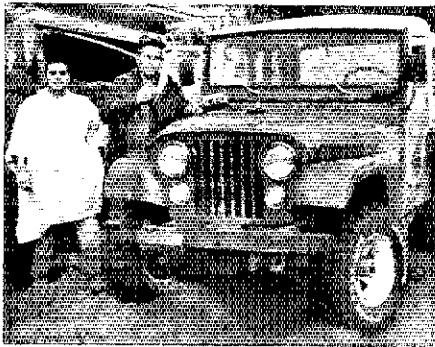
We suggest that you write down the essential details of the event before calling and when you do call, please follow the directions on the recorded message. Don't forget to supply your name, call, address and telephone number(s) where you can be reached. Names and phone numbers of other contacts in your area would also be appreciated. Remember, your story is for the public at large, who, for the most part, are 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

involved were WR1s AAC AAL, WR3ABB, WR4s AAE ACI ADH ALL AZD, WR5s ABA ABE ABY AIG, WR6s ACE ACU AII AIM ANW, WR7s ABX ACK AFJ AFT AMW, WR8s ABS AFX AGA AGR.

□ For the month of March 33 SEC reports were received, showing a total ARES membership of 14,458. Last year at this time, 28 reports were submitted, with membership totalling 11,135. Sections

reporting were Alta, Ariz, Ark, Colo, Conn, ENY, EMass, Ga, Ind, Iowa, Kans, Mich, NC, NFla, NTex, Ohio, Okla, Ont, Oreg, SV, SDgo, SF, SJV, SBar, SCV, Sask, SFla, SNJ, Utah, Va, WVa, WMass, WPa.



Typical of a score of ham volunteers is "Sam" Samworth, WA6UKI, providing communications for four-wheel driver Tim Smith, plowing through muddy roads in Hollywood Hills following devastating storm. Countless homes were seriously damaged and isolated. (Bob Jensen, W6VGO, photo)

(LA), CMEN MSN PTN SGN (ME), MDCTN MEPN (MD/DC), EMRI EMRI-SS EM2MN HHTN NENN WMPN (MA/RI), MACS M6M MITN QMN (MI), MSN MSPN MSSN MWX PAW (MN), MSBN MTN (MS), MOSSBN (MO), CHN WNN (NE), NHVTN (NH/VT), NJN NJPN (NJ), NMRRN SWN (NM), NLIPN NLIVHF WDN (NY), ARC2MN NCSBN PX SCSSBN THEN (NC/SC), BN BNR ONN O6MN OSN OSSBN (OH), OAN OFON OLZ OPEN OTWN STN (OK), ARES BSN OSN PARES WCN (OR), EPA EPAEP&TN PFN PTTN WPA WPAP&TN WPA2MN (PA), BEN HCN TEX TTN (TX), BUN UCN (UT), SVSN VFN VN VBSN VSN (VA), NTN WSN (WA), WVN WVNN WVPN (WV), BEN BWN WIN WNN WBSN WSSN (WI).

- 1 - NET
- 2 - SESSIONS
- 3 - TRAFFIC
- 4 - AVG.
- 5 - RATE
- 6 - % REP.
- 7 - % REP. TO AREA
- NET

*Incomplete report

Transcontinental Corps

TCC Certificates issued: Central Area - W4ZJY K5GM K5MC K5TTC N5TS N5YL N5YX/K8 WASHNN W9NXG W9ATNM. Eastern Area - K4BKX K8KMQ (13th annual).

	1	2	3	4	5
Eastern	126		97.6	2352	873
Central	83		93.5	1374	700
Pacific	124		94.4	1708	847
Summary	343		95.2	5434	2420

- 1 - AREA
- 2 - FUNCTIONS
- 3 - % SUCCESSFUL
- 4 - TRAFFIC
- 5 - OUT-OF-NET TRAFFIC

TCC Roster

The TCC Roster (March): Eastern Area (VE3SB, Dir.) - W1s KX NJM QYY, WA1ZAZ, K1s BA EIR GN PAD S5H XA, W2s CS FR GKZ MTA RQ, WA2ICB, N2GM, W3s PQ YQ, K3s KW NGN, N3HR, W4s SOQ UQ, K4s BKX KNP, N4KB, W8s LTA/2 PMJ, K8KMQ, VE3s GOL SB. Central Area (W5GHP, Dir.) - W4ZJY, W84SK, W5s MI RB, K5s GM TTC, N5s TS YL YX/K, W4s HNN IQU, W8SFD, W9s CXY DND FC NXG, N9TN, W0s AM HI, K0EYH, W9ATNM. Pacific Area (K5MAT, Dir.) - N5s MR NG, W5KH, K5MAT, W5ARKU, N6s GW WP, W6s EOT MLC OZ VZT, K6HW, K6HIQU, W7s DZX EP GHT VSE, K7WLD, W0s ETT IW LQ, K0s BN DJ TER, W80s OPQ TAQ, VE7ZK.

N5TC	WA8ZNC	W8YIQ	W4FMN
N6CY	W0YOH	WB9ICB	WB4ZOJ
WB6DAB	52	WB9ICB	N6GW
WA6UJZ	W4MEE	45	WB6JXK
WB0HOX	W5KLV	W1TM	W7GHT
WB0ZAL	K5TL	WA1ZXB	42
60	K6JT	K3ORW	W1HXF
N5TS	WB8WTS	K8FE	WB5AHF
59	51	44	WB4AID
N2TW	WB5LAT	VE1CH	WA4FKE
WA4JDH	50	VE1EJ	W5G5N
W4OGG	WA1YMN	VE1LOR	WA5JWD
58	WA4UYD	VE3FHZ	WB5PVM
K5OWK	NBCW	VE3GOL	WB5SDD
W6RFF	49	VE4ZU	41
WB7YDZ	VE1WF	VE4QU	WB2IDP
57	VE3DPO	W1BJ	WA2JJK
VE7DKY	VO1GW	WB1CPF	WA4IDN
K4BKX	N1RI	K1EF/9	WN4KKN
56	WA2MSO	WA1MJE	WB5FDP
W1KX	W2MTA	K1OQG	K5QEW
AA4CK	WA2YEI	WA1QFX	40
WB4OBB	K5HN	K1UZ	K1DFS
N4WA	WB5UZ	W2WHB	K1PAD
N5ES	W5A	WA22JP	WA1YUJ
W5GHP	WA2MEL	WA3NAZ/4	WB5FHA
WB5NKC	K8LGA/4	W4ANK	WA5RVT
WA5YEA	W0FT	K4EV	N6WP
N5YL	W0TF	K4JGW	WB8KWD
W6CA	K0PIZ	WD4KPG	W9HOT
WD9AUD	W0VEZ	W4LXB	34
WD9CQC	47	N4PQ	WD4LUG/N
55	WA1TBY	W5JGV	31
WA2NPP	WB3AOB	WA5JYH	WD4HCY/N
WA4NF	K3NGN	WB5LBR	28
54	W3YO	W5VMP	WA4OGV/T
W6AUC	AA4NC	K5ZSI	WB8YOT
WB6PVH	WB6FTY	WB7AAK	27
WA9QCF	WB9NXG	WB8DMX	W4MHOT
53	46	WABWVW	22
VE4PG	W53FGU	WB8YVW	WB1DXR/N
W1TN	VE3GT	N0SN	WA4MJT/T
WB8MTD	K3JL	43	WD4OVR/N
	WA6KHB	WA1HYN	WA4VKD/N
			WB8NYN/N

NATIONAL TRAFFIC SYSTEM

Certificate earners - CAN-D: WASINJ WB5SDD WB9YXN WB0VDO WB0YUA; RNS-D: W5GKY W5LITZ WASINJ W5QUV W55RNG WB5SDD W5D5GNR; RN7-E: VE7DOI VE7GY K7TQM WB7OJV; 8RN-E: W7KQU/8 W8LTA W8LYV; 2RN-E: N2EF N2JK N2TW (1st annual), K2PL N2MW W2CQB W2WHB W2WSS (2nd annual), K2SE W2SWE W2AVCJY W2AYYM W2ZJP N2YL (3rd annual), K2AV W2BIW W2ELD (4th annual), W2MLC WA2ICB (5th annual), W2ZEP (7th annual), W2TZ (8th annual), W2RQ (9th annual), W2MTA (10th annual), W2KUF (11th annual). SET results will appear in July QST.

March Reports

Area Nets

(evening sessions)
(daytime sessions)

1	2	3	4	5	6	7
EAN	31	2074	66.9	1,526	98.4	
EAN	62	697	11.2	594	90.1	
CAN	31	1317	42.5	1,046	98.9	
CAN	62	425	6.8	289	97.3	
PAN	31	1189	38.4	1,243	98.9	
PAN	31	469	15.1	332	98.9	

Region Nets

1RN	92	848	9.2	630	95.0	94.6
2RN	120	907	7.6	573	86.1	96.8
3RN*	31	151	4.9	604	100.0	100.0
4RN	120	1251	10.4	409	70.5	95.7
RN5	93	1291	13.9	431	89.7	98.9
RN6	94	797	8.5	392	95.4	98.9
RN7	124	813	6.6	435	95.0	100.0
8RN	89	565	6.3	424	88.8	94.6
9RN	93	672	7.2	493	93.0	97.8
TEN*	62	501	8.1	430	86.0	96.8
ECN						100.0
TWN	93	579	6.2	341	91.8	97.8

TCC

TCC Eastern	123	873
TCC Central	87	700
TCC Pacific	117	847

Sections: 5896 24322 4.2
Summary: 6955 41288 3.7
Record: 8316 34089 18.1

TCC functions not counted as net sessions.
Section and local nets reporting (164): BCEN (BC), MEPN MPPN MSN MTN WRSIN (MB), APN (Mar/NF), CMN GBN GBSN LN ODN OPN OSN (ON), WQV/UHF (PO), SATN (SK), AENB AEND AENM AENS (AL), ASN (AK), ATEN (AZ), AMBN APN APRN OZK (AR), NCN NEN SCN (CA), CWN HN (CO/WY), CN CORN OPN NVTN WESCON (CT), DEN FAST FMTN FPON FPTN GN NFPN PBTN QFN QFNS SPARC TPTN (FL), CGVHFN CVEN GAREC GARES GCN GSSBN NGSN WGN (GA), IMN MTN (DI/MT), LLN ILPN (IL), INTN ITN QIN (IN), 175MN TLDCN (IA), KPN KSNB KWN QKS (KS), KNTN KPN KSN KYN MKTN SEKEN (KY), LAN LRN LSN LTN

Independent Nets (March)

1	2	3	4
Amateur Radio Telegraph Society	31	630	522
Central Gulf Coast Hurricane	31	225	3093
Clearing House	31	291	589
Empire Slow Speed	31	74	353
Hit & Bounce	60	1148	468
IMRA	27	475	1040
North American SSB	27	235	224
North American Traffic and Awards	31	69	1256
Southwest Traffic	30	144	1282
Washington Region PON	17	28	288
20 Meter ISSB	27	696	512
75 Meter ISSB	31	704	1198
7290 Traffic	46	458	2617

- 1 - NET
- 2 - SESSIONS
- 3 - TRAFFIC
- 4 - CHECK-INS

Public Service Honor Roll March 1978

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

72	WA5RKU	64	N5RB	62	WB5NKN	WA1UWF
65	W8SOP	61	W7VSE	61	W4CNY	WA2ERT/1
					W1RWG	K4ZN

Brass Pounders League March 1978

BPL Medallions have been issued to the following amateurs since last month's listing: VE4JL, WB2KCG, WA2ELD, N5TC, WA6JDB, WA7EBR, W9JLJ.

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	612	1710	1964	70	4356
K3NSN	1400	310	1400	60	3170
W0WYX	52	1324	460	864	2700
WA4JDH	2	758	740	5	1505
W4MEE	4	600	543	15	1182
W3VR	361	279	412	10	1062
K0YFK	530			530	1060
WA0AUX	38	279	622		939
W9ZGO		639	2	273	914
WA3ZRY	75	355	406	14	850
K5OWK	288	54	350	8	700
W9JLJ	35	331	322	9	697
W7DZX	32	319	340	4	695
WA2MSU	64	316	288	24	692
K4TH	19	311	204	126	680
W7VSE	26	297	278	25	626
N2TW	1	275	324	1	601
K6OE	84	255	251	6	596
WA3WQP	127	167	279	11	584
K7VVA	58	330	25	117	561
W7TZK	53	314	9	182	558
W5KLV	10	322	217	7	556
N4MD	3	285	276	6	550
WD9CQC	41	212	240	34	527
WB8MZZ	1	267	239	19	526
WB9YXN	59	191	256	11	517
VE3GOL	17	213	261	20	511
WA0QIT	88	173	152	98	511
W8SOP	17	266	296	21	510
WB0MTA	34	152	252	9	507
WA1UNC	41	230	227	3	501
WB0BS (Feb.)		298	298		596
K0DJ (Jan.)	8	231	248	14	501

BPL for 100 or more originations-plus-deliveries					
K4IWT	328	WD0FGA	121		
WA3ATQ	285	WA3THT	117		
WA0HJZ	232	WD0EFB	117		
W4DUG	191	K7NTS	116		
VE3CDK	145	K4KA	114		
W75QT	138	WA1LOU	105		
W6NL	128	WD4IIO	105		
K4KDJ	124				

- 1 - CALL
- 2 - ORIG.
- 3 - RCVD.
- 4 - SENT
- 5 - DEL.
- 6 - TOTAL

Results, Fifth Annual ARRL 10-Meter Contest

Contesting on 28 and 29 MHz? Try it once and 10 to one you're hooked!

By Tom Frenaye,* K1KI

The sleeping dragon began to awaken this year with very encouraging signs of the increasing sunspot numbers. The Fifth Annual 10-Meter Contest provided a little something for everyone. Only three of the 32 division records still stand. A record-smashing 1008 logs were received, a 62 percent increase over last year and 122 more than the previous record set in 1974.

Last year's top score would not have even broken into the top ten this time. Top-ten scores were up by about 300 percent! And the sunspot cycle is only in the early stages of development!

PJ2FR managed to find 109 multipliers to lead the pack while K3EST lead the W/VE contesters with 106. Both stations

set new records, eclipsing those set by W6RR and TI2BEV in 1975.

It wasn't just the kW's and five-element beams this year though. Better propagation made those converted 27-MHz QRP transceivers and antennas more formidable contenders. The top Novice was WD9DCL/N, with more than 30k points.

A good number of people discovered 10 meters for the first time during December. Steve Joachim, WB7PZT, tells a story that many will find familiar:

What to Do When Your Beam Is on Backward

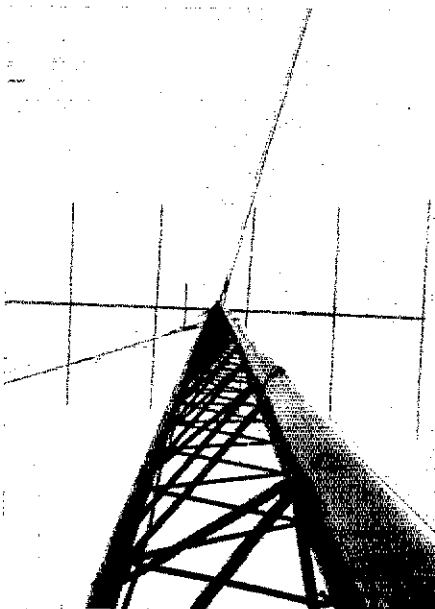
"December 9. OK frequency fans, the 10-Meter Contest is this weekend! I've got my log sheets and I think I've figured out how to fill them in. I've heard a lot of hams working contests but I never have entered one. Since 10 meters is my

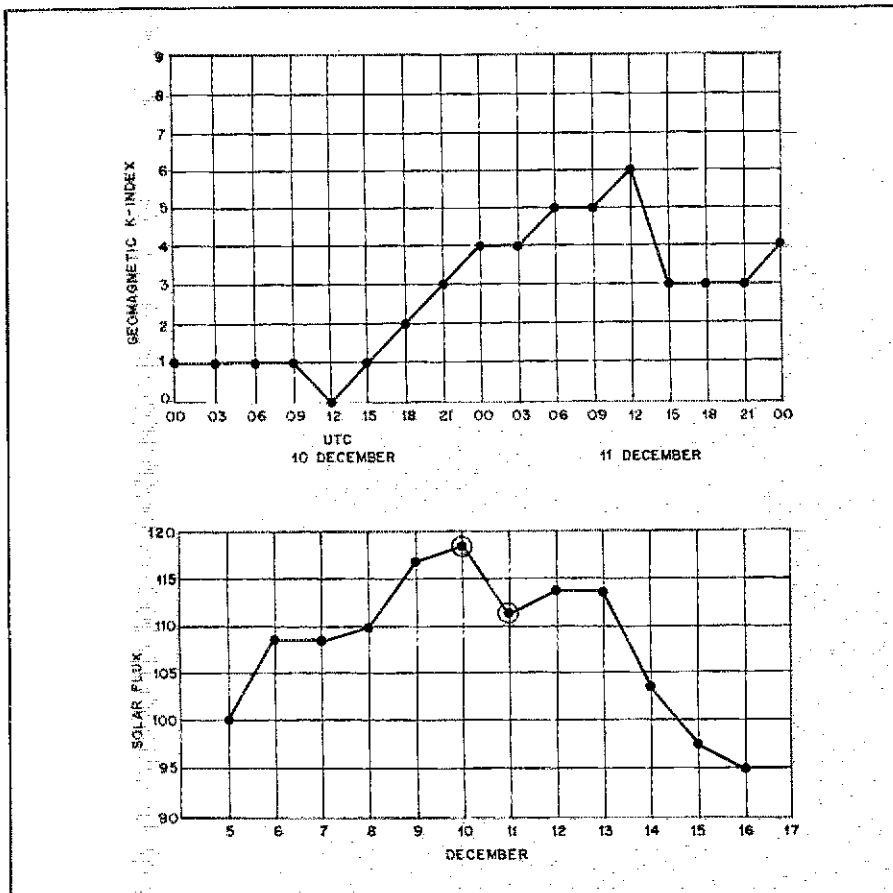
favorite band and I finally got that old Warrior amp working, now is the time. My three-element antenna is still resonant in the Novice band so I figure to crank down the tower this morning and shorten the beam a little. Down cranks the tower, off comes the beam, and with my best guess I start trimming. Hurry, hurry; crank the tower back up and go to work. All set for the contest, which starts at 4 A.M. local time.

"December 10, 3:55 A.M. — contest starts in five minutes. I warm the rig up and as I am starting some coffee, I wonder how many others are ruining their sleep to work this contest. Somehow my enthusiasm is not as great as it was yesterday. The coffee may help adjust my attitude. 4:30 A.M. — I've called CQ 20 times; nothing. I tune the band; nothing. Better rotate the antenna a little and listen

*Assistant Communications Manager, ARRL

The six-element Yagi shown below was built especially for this year's contest by the N4HH contest crew. Don, Lee, Tom and Gay (N4HH, WD4ALD, WB4EDD and N4SF respectively) were fourth in the U.S. and set a new Southeastern Division record for multiops.





This year the sun produced a wide variety of propagation effects for the 10-Meter Contest. A few long path JAs were worked from the southeastern U.S. at the beginning of the contest when the solar flux was at a peak and the K-index (geomagnetic activity) near zero. As the contest progressed, the solar flux dropped and minor geomagnetic storm conditions existed which increased absorption, producing poor east-west propagation, and a chance to try backscatter and aurora for QSOs.

some more. Rotator is stuck between SW and SE. As soon as it gets light outside I'll crank the tower down and fix the rotator. 6 A.M. — Only one signal heard: South America, but couldn't work him; pain. 6:30 A.M. — Enough light outside to see so I brave the freshly fallen snow and head out back to the tower. One look says it all: Somehow, I managed to get the beam on backwards. Spent two and a half hours yelling at Siberia; really getting those points, folks. 7:30 A.M. — Rotator works, beam is headed right and the sigs are rolling in. The band is *good*. Now I'm getting somewhere: East Coast. Great, how do these guys write so fast and enter calls on the dupe sheets so fast? The spaces are so small and they are talking so fast. I decide to forget the dupe sheets and list contacts on a legal pad; check for dupes after the contest. Better, a little faster. The band is really good right up till 4:30 P.M. when it abruptly goes out; bummer. Eat some supper, check the band, yell CQ, listen some more, more coffee, yell CQ some more; nothing. Check cw; Hissss. 10 P.M. — Nothing. 11:30 P.M. — Aurora! VE8, sixes and

sevens with funny-sounding sigs. I make a bunch of contacts on the aurora, but couldn't work the VE8 since he was ragchewing; pain. The aurora disappears and nothing at 12:30 A.M., so I crash into bed thinking I will get up at 5 A.M. and really hit it.

"December 11. 7:50 A.M. — I slept in. Short bursts of speech, in and out, rapid QSB. I work a few stations; tough going. Surprise, multiplier! Great, I suddenly realize that after calling CQ seven million times yesterday, my throat is not the same. Chair seems harder, get a pillow and more coffee. Is contesting fun? 9 A.M. — The band is gone as an occasional word pops out of the receiver as if someone were kicking the band to get it going. Switch to Kool-Aid; nothing. When will the band open? I need more multipliers, more short bursts. Only the persistent are making contacts. I got only 49 contacts today and I worked hard for every one of them. Can I put Tumtum, WA, on the map? Very, very doubtful. At the end of this, my very first contest, I realize that I am hopelessly in love with contesting. It is exciting, frustrating, fun,

Top-Ten Single Operator

W/VE Call	Score	DX Call	Score
K3EST	277,932	PJ2FR	419,650
K5RC	273,636	PJ2VD	338,375
W6RR	267,458	KZ5JM	300,366
W1RM/2	264,216	KP4DSD	299,976
N2NT	263,550	KP4WI	275,060
K1PR	237,800	KP4FGH	213,528
N4MM	233,664	PY2DMT	171,678
N4BP	211,062	PY2BU	156,200
W6RDF	209,832	YV1OB	154,224
N2GJ	208,240	ZF2AG	136,370

Continental Leaders

Africa	EL2T
Asia	JH1LBR
Europe	DJ3HJ
North America	KZ5JM
Oceania	ZL3GQ
South America	PJ2FR

difficult, exasperating and exhilarating. It also makes me very thirsty. The 10-Meter Contest is the single most satisfying thing I have done in ham radio since I became a ham about a year ago. My advice to would-be contesters? Put your beam on backward and enter the 10-Meter Contest." — *Steve Joachim, WB7PZT*

Soapbox

Rf got into the burglar alarm system loudspeaker, hidden in a garage vent. Stand in the front yard, and it sounded like an evergreen tree was calling "CQ contest." (WBSTZZ) Although I am a longtime operator (since 1954), this is the first entry of mine in an hf contest. I enjoyed it very much and found it similar to many 6-meter contests I've been in. (VK6KZ) Had a lot of fun, made a lot of contacts, and still got eight hours of sleep. (K4BF) I have been and always will be a cw contester. So, just let an OT say that he wishes more of the young sprouts wud move down and maybe give a few quick points to those of us who can still push a paddle. (KSBO) Sunday was a real lesson in backscatter. Worked all of New England with the beam pointed toward Florida. (WB8TJS) Noted quite a few vhf operators in the 10-Meter Contest. Now, if we can move some of those South American prefixes up to 6 meters! (WØRIB/4) You know that we are dedicated when we go back to school on a weekend to operate in the contest. (KØOR) Think that I'll try multiop next year. Single op will drive you bananas . . . bananas . . . bananas. . . (WB4UVV) This was my first ssb contest. Consumed a bottle of Listerine and 200 cough drops. I guess that I've been initiated! (WILJ/2) The quad vs. Yagi controversy is raging in Lubbock, TX. My quad is ahead, but not by much! (WB5KBA) Why is it that the only time a Novice or Tech hears an upper-class licensee in the Novice portion of the band is during a contest. Are they ashamed to drop down to the Novice portions of the band and hold a normal

Operating News

Conducted By George Hart,* W1NJM

What Price Integrity?

Would you believe that maintaining the high integrity of ARRL operating awards and contest activities is among the greatest of ARRL headquarters expenses? You'd better, because this is a fact that comes out more and more strongly as the years pass, and the demand for increases in the scope and extent of such services grows and grows. At one time all such service was performed as part of the function of one assistant communications manager, with a little secretarial help. Today, nine people are involved full time at subdepartmental level and considerations involved reach departmental level frequently, general management level not infrequently, and policymaking level occasionally.

Our most popular award, DXCC, has recently been calculated to now cost the League in excess of \$50,000 per year *routinely*, and rapidly rising as new awards are added to the DXCC family. No studies have been made of other programs recently, but our guess is that the contest program (including contest awards) costs at least as much and maybe more, also still rising, and that all other programs in the contest and awards classification are a considerable additional amount.

Added to this cost is the occasional litigative procedure undertaken when someone is penalized or disqualified for violation of rules or, let's face it, just plain cheating. At worst, this results in lawsuits, at best in time-consuming and expensive research and investigation. Our files contain details on a few classic cases which we can use for illustration

but in which we will divulge no names or calls or specific details, to wit:

1) A prominent amateur was accused of submitting forged cards for DXCC, after exhaustive research at Headquarters. A lawsuit was threatened but never materialized because the services of professional forgery law-enforcement agencies revealed without question that the cards had been forged. This case was all the more agonizing because the person accused had previously performed some noteworthy public service.

2) A prominent DX club protested that the Headquarters wasn't handling DXCC applications fast enough, bringing its resident director into the act. The director and club put pressure on the ARRL president, who pressured the Headquarters, involving the general manager and communications manager. DXCC was temporarily transferred to another department, which held "card parties" until processing was current.

3) A prominent DXpeditioner was alleged to have confirmed contacts from locations at which he was never actually present. He brought suit, involving Headquarters management, the League's general counsel, the president and the Board of Directors. The matter was settled out of court, but not until there had been great expense to all parties.

What, you may ask, ever happened to the Honor System? Some cynics will say that there is no such thing and never was, that any activity ever conducted on a "we trust you" basis had its high percentage of cheaters who "got away with it." Furthermore, this will always be the case, say our cynics. The only way to main-

tain integrity, they contend, is to set up regular checking procedures and prosecute actively those found cheating. Otherwise, achievements will be meaningless.

This is, alas, more than just partially true. We feel that fully 90 percent of participants in any contest or award activity are fully trustworthy in abiding by any rules set down, whether they agree with them or not; but this does not mean that only the other 10 percent can cause us administrative problems. Not by a long shot! The 10 percent may be the direct cause, but many of the 90 percent will resent any of that 10 percent getting credit for awards achieved by cheating and will demand investigation and prosecution. Their own abiding by the Honor System doesn't necessarily mean that they trust their competitors. So the suspicions and accusations fly, and Headquarters is obliged to engage in costly investigation.

You will note from the above three thumb-nail examples that of all awards, DXCC is the most involved in the big "hassles." Is it worth it? Processing the family of DXCC awards takes the full time of three people at Headquarters. Even with this many, two of them experts, they are hardpressed to keep current with applications and correspondence. About 25,000 amateurs now hold DXCC, a large percentage of whom are no longer active. It seems to some that the amount of attention devoted to this one type of award is far beyond its merit as a worthwhile or popular operating activity.

But wait a minute. There may be only 25,000 or so who now hold the award, but how many are working on it, and how many not working

*Communications Manager, ARRL

W1AW Operating Schedule (April 30, 1978-October 29, 1978)												
PDST	CDST	EDST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY		
6 A.M.	8 A.M.	9 A.M.	1300 *	Slow'	Fast'	Slow'	Fast'	Slow'				
7	9	10	1400 *	Cw Bulletins'								
8	10	11	1500 *	RTTY Bulletins'								
1 P.M.	3 P.M.	4 P.M.	2000 *	Fast'	Slow'	Fast'	Slow'	Fast'	Slow'	Slow'		
2	4	5	2100	Cw Bulletins'								
3	5	6	2200	RTTY Bulletins'								
4	6	7	2300	Slow'	Fast'	Slow'	Fast'	Slow'	Fast'	Fast'		
5	7	8	0000	Cw Bulletins'								
6	8	9	0100	RTTY Bulletins'								
6:30	8:30	9:30	0130	Phone Bulletins'								
7	9	10	0200	Fast'	Slow'	Fast'	Slow'	Fast'	Slow'	Slow'		
8	10	11	0300	Cw Bulletins'								
9	11	12	0400	RTTY Bulletins'								
9:30 P.M.	11:30 P.M.	12:30 A.M.	0430	Phone Bulletins'								

*Slow code practice on cw bulletin frequencies, 8 minutes each session: 5, 5, 7-1/2, 7-1/2, 10, 13, 15 wpm.
 *Fast code practice on cw bulletin frequencies, 8 minutes each session: 35, 30, 25, 20, 15, 13, 10 wpm.
 *Cw bulletins, 18 wpm, on: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz.
 *RTTY bulletins 60 wpm/170-Hz shift on 3.625, 7.095, 14.095, 21.095, 28.095 147.555 MHz.
 *Phone bulletins on 1.835, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.
 *W1AW will beam 45° for these transmissions on Mondays, Wednesdays and Fridays during June 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 (all local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Note: ARRL office-visiting hours are 8 A.M. to 5 P.M. Monday through Friday. Maps with local street detail are available upon request. Please note that all footnoted frequencies are approximate. If you wish to operate when visiting, you must have your original operator's license with you. (Schedules can also be arranged to work W1AW.) The station will be closed May 29, July 4 and September 4. Staff: Chief Operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Stan Gibilisco, W1GV.

In a communications emergency monitor W1AW for special bulletins as follows: *phone* on the hour, *RTTY* at 15 minutes past the hour, *cw* on the half hour.

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy on certain tapes, note the UTC dates and QST text to be sent in the 0200 practice from the issue of QST two calendar months past: June 2, It Seems to Us; June 6, World Above; June 12, League Lines; June 22, Public Service; June 28, Happenings; June 30, Operating News.

on it have aspirations to some day do so? How many now studying for licenses have eventual achievement of DXCC in mind, or how many not now contemplating it will gravitate toward it once they get on the air? These are imponderables, but there is no doubt about one thing: DXing is among our most popular operating activities, if not *the* most popular, and is likely to remain so as long as we have bands on which it can be worked, and as long as we keep emphasizing and encouraging it.

What about other contest and award activities? We have already pointed out ("Contest Troubles," September 1977 *QST*, page 89) that an estimated 25,000 amateurs take part in ARRL-sponsored contests. This number shows no sign of decreasing — quite the contrary. All awards show decided increases, as of the end of 1977 averaging about 20 percent. Three full-time people handle contests, and all are kept more than busy.

Some of our other awards (Code proficiency, WAS, WAC, A-1, OTC, RCC) are handled by another branch of three people. These awards have a lower integrity factor (i.e., applicants are pretty much on the Honor System), but they are nonetheless popular. No one gets a chance to sleep in this branch, either.

Nine people to handle contests and awards. Contrast this with the two people trying to cope with the entire Public Service program. Rightly or wrongly, logically or illogically, this is the way the priorities dictated by membership demand seem to lead.

Indications point strongly to the probability that a great majority of members are interested in seeing the present contest and awards programs maintained at least at their present level of integrity. Are they willing to pay for it? Most of them assume they are already doing so, with their membership dues; but this is an oversimplification, and not strictly true. So the next question is, how much does it cost and in what shape or form would any assessment to pay this cost be made? As intimated above, it costs *plenty*, but at this point we cannot give anything approaching an exact figure, or prognosticate the method of payment — other than dues, of course.

There are alternatives. One is to have some of the awards processed in the field by affiliated clubs or other volunteer groups, with Headquarters doing nothing but the issuing and recordkeeping. Another is to decrease the extent of processing, trying to maintain integrity by investigating only when a question arises. We have already discussed reverting completely to the Honor System, letting cheaters receive their punishment in those nether regions of fire and eternal damnation rather than in the here and now. Still another is to pay the cost of maintaining and even increasing the integrity of our contest and awards programs by returning to the system of charging fees.

ARRL is an organization run by its membership. You, the members, may have to decide in the not-too-distant future which of the above alternatives you prefer.

SCM ELECTION RESULTS

The following were elected for two-year terms of office beginning July 1, 1978:

Uncontested

Illinois	E. A. Metzger, W9PRN
Indiana	J. M. Kell, W9LTU
Maine	B. Mann, W1KX
Manitoba	P. Guenther, VE4PG
Santa Clara Valley	J. B. Hill, W6RFF
Vermont	R. L. Scott, W1RNA
Wisconsin	R. Pedersen, K9FHI

OSCAR 7

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
16203B	1 June	0115	76.3
16215A	2 June	0014	61.2
16228B	3 June	0108	74.7
16240B	4 June	0008	59.6
16253A	5 June	0102	73.2
16265B	6 June	0001	58.0
16278B	7 June	0056	71.6
16291A	8 June	0150	85.2
16303B	9 June	0049	70.1
16316B	10 June	0144	83.6
16328A	11 June	0043	68.5
16341B	12 June	0137	82.1
16353B	13 June	0037	66.9
16366A	14 June	0131	80.5
16378B	15 June	0030	65.4
16391B	16 June	0124	78.9
16403A	17 June	0024	63.8
16416B	18 June	0118	77.4
16428B	19 June	0017	62.2
16441A	20 June	0112	75.8
16453B	21 June	0011	60.7
16466B	22 June	0105	74.3
16478A	23 June	0005	59.1
16491B	24 June	0059	72.7
16504B	25 June	0153	86.3
16516A	26 June	0053	71.1
16529B	27 June	0147	84.7
16541B	28 June	0046	69.6
16554A	29 June	0141	83.2
16566B	30 June	0040	68.0
16579B	1 July	0134	81.6
16591A	2 July	0034	68.4
16604B	3 July	0128	80.0
16616B	4 July	0027	64.9
16629A	5 July	0121	78.5
16641B	6 July	0021	63.3
16654B	7 July	0115	76.9

OSCAR 8

Ref. Orbit	Date (UTC)	Time (UTC)	Long. W.
1218	1 June	0048	51.5
1232	2 June	0053	52.8
1246	3 June	0058	54.1
1260	4 June	0103	55.4
1274	5 June	0109	56.8
1288	6 June	0114	58.1
1302	7 June	0119	59.4
1316	8 June	0124	60.7
1330	9 June	0130	62.8
1344	10 June	0135	63.4
1358	11 June	0140	64.7
1371	12 June	0002	40.2
1385	13 June	0007	41.5
1399	14 June	0013	42.8
1413	15 June	0018	44.2
1427	16 June	0023	45.5
1441	17 June	0028	46.8
1455	18 June	0034	48.1
1469	19 June	0039	49.4
1483	20 June	0044	50.8
1497	21 June	0049	52.1
1511	22 June	0055	53.4
1525	23 June	0100	54.7
1539	24 June	0105	56.9
1553	25 June	0110	57.4
1567	26 June	0116	58.7
1581	27 June	0121	60.6
1595	28 June	0126	61.3
1609	29 June	0131	62.7
1623	30 June	0137	64.2
1637	1 July	0142	65.3
1650	2 July	0004	40.8
1664	3 July	0009	42.1
1678	4 July	0014	43.5
1692	5 July	0020	44.8
1706	6 July	0025	46.1
1720	7 July	0030	47.4

NOTES

Have you listened to OSCAR 8 yet? This newest of amateur satellites is available to anyone with a good-quality, 10-meter receiver. To track it, you'll need an OSCARLOCATOR and reference-orbit information (available on W1AW bulletins). It orbits the earth every 103 minutes; the morning and evening passes occur at approximately the same times each day. Decoding the telemetry from the beacon is a simple matter using the ARRL OSCAR telemetry forms, available from Hq. for an s.a.s.e. When you return it, we'll send you a colorful OSCAR 8 QSL card.

To keep abreast of the latest developments, tune in to the regular phone and cw bulletins over W1AW, AMSAT bulletins transmitted around 29.440 MHz on Mode A, 145.960 MHz on Mode B, during A-O 7 reference orbits, and AMSAT nets (East Coast at 0100 UTC Wednesdays on 3850 kHz Isb; Mid States at 0200 UTC; West Coast 0300 UTC).

- 1) All time and date references are in UTC.
- 2) The times and longitudes are for OSCAR's first equator crossing each day, which is called the reference orbit.
- 3) A-O 7 will operate Mode A only on days of the year fully divisible by three (June 2 is day number 153, for example), and the other two days in between will be Mode B.
- 4) All Monday orbits are reserved for QRP use only. Use a maximum of 10 watts erp. Wednesdays are reserved for special experiments. Schedule A-O 7 experiments thru AMSAT, A-O 8 thru ARRL.
- 5) The OSCAR 7 Mode B and OSCAR 8 Mode J transponders invert signals. Upper sideband into the uplink becomes lower sideband on the downlink.
- 6) A-O 7 progresses an average of 28.737478 degrees west per orbit in a period of 114.945207 minutes. A-O 8 progresses 25.80867 west in a period of 103.23162 minutes.
- 7) A-O 8 modes of operations are Monday, Tuesday, Thursday and Friday — Mode A. Saturday and Sunday — Mode J. Wednesdays are for experimental use only.

Spacecraft Frequencies

Spacecraft	Uplink	Downlink	Beacon
A-O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz
A-O 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.100-435.200 MHz	435.095 MHz

This schedule of orbits for OSCAR 7 and OSCAR 8 is a regular feature of *QST*. Tune in W1AW bulletins for updated reference orbit data. Further information on the radio amateur satellite program can be obtained free of charge from ARRL Hq. Also, the popular and informative series of *QST* articles for the beginner has been reprinted in book form. *Getting to Know OSCAR — from the Ground Up* covers OSCAR 6, OSCAR 7, the newest satellite, OSCAR 8, launched in early March, and the exciting Phase III program scheduled for late 1979. It includes the OSCARLOCATOR, a tracking device that lets you know which passes you can access and where the satellite is in the Northern Hemisphere at any given moment. The book is available for \$3 postpaid (\$3.50 outside the U.S.), from the ARRL. The OSCAR 7 and OSCAR 8 OSCARLOCATOR plastic overlay is available free from ARRL. Send your request with a 9 x 12 s.a.s.e., please.

Operating Events

JUNE

3-4: PVRC On-the-Air Reunion, an annual operating event sponsored by the Potomac Valley Radio Club of the greater Washington area. PVRC members who are no longer listed on the active PVRC rolls are encouraged to send name, call and mailing address to W3UO, PVRC Secretary, 17927 Archwood Way, Olney, MD 20832, for a package of entry materials. **Minnesota QSO Party**, sponsored by the Heartland Amateur Radio Club, from 1800Z June 3 to 2359Z June 4. No mode or time restrictions. Only one transmitter is allowed in operation at any one time; no crossband. Novices compete with other Novices, Techs with other Techs. Exchange: MN stations send RS(T) and county. Others transmit RS(T) and ARRL section. DX stations use DXCC country. Score one point per phone QSO, 2 points per cw QSO. Novices/Techs count five points. (They must identify their license class when sending their call as /N or /T.) MN stations multiply total of points by the number of sections plus DX countries (W/VE excluded). Others multiply QSO points by the number of MN counties worked. (maximum of 87). Phone and cw are considered to be the same contest, please score as such. If you make 50 or more contacts, your entry must include a check sheet for each band/mode used. Logs must include date/time (Z), bands, modes, exchanges. Contacts with the HARC club station WB0TTZ count 10 points per QSO on separate bands. Net QSOs not valid. Awards. (Also county awards to MN stations with 10 or more QSOs.) S.a.s.e. required for returns of awards and summary. Usual disqualification criteria. Logs must be postmarked by June 30. Send to HARC, c/o Steve Scott, W0EPE, 801 Sixth St., North Staples, MN 56479. **Jefferson Davis Monument Award Activity**, sponsored by the Pennyroyal Amateur Radio Society; from 1400Z June 3 to 0500Z June 4. Frequencies to be monitored are: Novice, 3740 21140 28140; General, 3970 7270 14310 21370 28610. The award will be issued to any amateur presenting written confirmation of contact with a PARS member during the QSO period; or any ten Kentucky amateurs during the year. Awards may be obtained by sending \$2 and your QSL cards to PARS, P. O. Box 1077, Hopkinsville, KY 42240. Your cards will be returned with the award. **Eleventh World Youth Festival**, sponsored by the Federacion de Radioaficionados de Cuba, June 3-4 and 10-11; full 48-hour UTC periods both weekends; 80-10 meters; both phone and cw on both weekends. Call "CQ 11th Festival" on phone. "CQ XIF" on cw. Exchange RS(T) and consecutive serial starting with 001. QSO points: three points for stations on different continents, one point for stations in different countries on the same continent. Stations may be worked on different bands and modes for a possible total of 10 QSOs per station. QSOs with special station CL2XIF count 10 points, with club station CL2FRC five points; other CM/CO stations (including those using the special CL prefix) two points. Multipliers: one per CQ zone, and one per different country worked on each band. Awards, trophies/plaques/Cuban handicrafts. All entrants will receive a certificate of participation. Usual log format: time (Z), indicate zones and country when new country worked; log each band separately. Mail entries by July 15 to the Federacion de Radioaficionados de Cuba, Box 1, Havana, Cuba.

8: West Coast Qualifying Run (W6OWP prime, W6ZRJ alternate) 10-35 wpm at 0400Z (Universal Coordinated Time, abbreviated UTC, with Z used as a time designator), on approximately 3590/7090 kHz. This is 2100 PDST the night of June 7 (9 P.M. PDST). Please note that dates are always shown at least two months in advance and times are always the same local "clock time." Underline one minute of the highest speed copied, certify that the copy was made without aid, and send to ARRL for grading. Include your full name, call (if any) and complete mailing address. A large, addressed, stamped envelope will help to expedite your award/endorsement.

10-11: VHF QSO Party (rules in the May issue of QST). **KZ5 QSO Party**, sponsored by the Canal Zone Amateur Radio Association, from 0100Z June 10 to 2400Z June 11. All bands, all modes. Exchange RST plus consecutive serial number starting with 001. Non-KZ5 stations will also transmit state, VE province or country. Separate awards for KZ5. Score for KZ5s is based on QSOs times the number of different states,

provinces and countries. Non-KZ5s can earn the Balboa Award for 5 KZ5 QSOs; the KZ5 Award for 25 stations (endorsements for 50, 75, 100). Have your log extract certified by another amateur. Send your entries to CZARA, Box 407, Balboa, Canal Zone, no later than July 31.

14: WIAW Qualifying Run at 0200Z, 10-40 wpm, transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 and 147.555 MHz. This is 2200 EDST (10 P.M. local Eastern time) the night of June 13. Follow the additional instructions under the June 8 listing.

17-18: All-Asian DX Contest phone, (at press time no changes to these 1977 rules had been received and we believe the contest will take place as follows), sponsored by the Japan Amateur Radio League. The 30-hour period from 1000Z June 17 to 1600Z June 18 (cw will take place August 26-27). All bands below 30 MHz may be used. Entry classifications: Single-op., single band; single-op. multiband; and multi-multi. Note cw only on 160 meters. W/VEs call CQ AA. Exchange RST plus two figures denoting the age of the operator, YL operators use 00. No crossband contacts permitted. Only one signal per band regardless of category. Scoring: Non-Asians count one point for each complete contact with an Asian station. The multiplier is the number of different Asian prefixes worked on each band. Note: Only JDI stations on Ogasawara (Bonin & Volcano) count for Asia. Contacts with KA stations do not count. (They are considered military rather than amateur.) Scoring: Multiply the sum of contact points on each band by the sum of multipliers on each band. Log separately for each band and use a complete summary, note the first time a new prefix is worked on each band. Awards. Usual disqualification procedures. The JARL Asian countries list: A4 A51 A6 A7 A9 AP BV BY CR9 EP HL/HM HS HZ/7Z JA/JE/IF/JG/JH/JI/JJ/JR JD1 (Ogasawara) JD1 (Okino Torishima) JT JY OD5 S21 TA UA/UK/UV/UW/9-0 UD6/UK6C-D-K UF6/JK6F-O-Q-V UG6/UK6G UH8/UK8H U18/UK8A-G-I-L-O-T-Z UJ8/UK8J-R UL7/UK7 UM8/UK8M-N VS6 VS9M/8Q6 VU VU (Andamans) VU (Laccadives) XU XV XW8 XZ YA YI YK ZC4/SB4 IS(Spratly) 4S7 4W 4X/4Z 70 (Yemen) 70(Kamaron) 8Z4 9K2 9M2 9N1 9V1 and Abu Ai. Contest results may be obtained by enclosing one IRC and an addressed envelope with your entry, which must arrive no later than September 30 (for phone) or November 30 (cw). Send to: JARL, Box 377, Tokyo Central, Japan. **West Virginia QSO Party**, sponsored by the West Virginia State Radio Amateur Council, from 2300Z June 17 to 2300Z June 18; no time limits. Rules: The same station may be worked on different bands for additional points. Only one contact of each station per band may be counted for scoring. Exchange QSO no., report, and county (if in WV), state or country. WV stations may work each other. Out-of-state stations multiply no. of WV QSOs by the number of different WV counties worked. Then use a power multiplier of 1.5 if dc input of 200 watts or less. Awards only to single ops. Suggested operating frequencies are 35 kHz inside each cw band and 10 kHz inside the General class portion of each phone band. Logs must show date/time, QSO no., calls, exchanges, county/state/country, mode/band. To be eligible for an award logs must be received no later than July 15. Send to: West Virginia QSO Party, Box 299, Dunbar, WV 25064. **"Tin Lizzy" International QSO Party**, commemorating the 75th anniversary of the "Tin Lizzy," sponsored by the Ford Amateur Radio League the full 48-hour period UTC. Open to all amateurs (participation certificates to all entrants). No time limit. Official logs require 40 QSOs per page noting date/time(Z), stations, QSO no., exchanges, location code, state/province/country, QSO points. Separate logs for each band; 160-10 meters, single op. only. Stations may be worked once per band per mode; successive contacts with the same station by changing modes/bands not allowed. Two categories: member stations are amateurs employed by or retired from Ford; non-members all others. Member and nonmember stations may work anyone, but multipliers can only be earned by contacting member stations. General call: "CQ Tin Lizzy" on phone, "CQ TLC" cw. Nonmember QSOs count one point, member QSOs one point, retiree member QSOs five points. Calculate score by band and then overall total. Club station K8UTT contacts earn a bonus of 100 points to be added to final score, an additional 50-point bonus for running 300 watts or less dc input. Multipliers are the number of location codes or international prefixes plus the number of states/provinces/countries. Nonmembers send report, QSO no., state/province or country. Suggested freqs.: cw, 1805 3575 7075 14075 21075 28050; phone, 1821 3915 7250 14280 21360 28750; Novice, 3725 7125 21125 28125. Postmark entries by Aug. 31 and send to Tin Lizzy Contest, P. O. Box 932, Dearborn, MI 48121. Include a no. 10 s.a.s.e. with 26 U.S. postage or IRC for results and another "package" for entry forms.

21: WIAW Qualifying Run at 1300Z (9 A.M. EDST). Other details per the June 14 listing.

24-25: FIELD DAY (rules May QST).

JULY

1-2: Binghamton Amateur Radio Association, W2OW, will be celebrating its golden anniversary; offering a certificate for QSOs made during the period. Check 3.925 MHz phone, 3.650 MHz cw, and 50.110 MHz; operating also planned for the Novice bands. Send your QSL and a no. 10 s.a.s.e. to Gina Ramsey, WB2GXX, RD 1, Box 318, Port Crane, NY 13833. **Seven-Land QSO Party**, first annual, sponsored by the NAS Whidbey Island Amateur Radio Club, open to all, from 1200Z July 1 through 2400Z July 2. Categories are single transmitter, either single operator or multipoint operator. Stations outside of the seventh W/VE call districts QSO as many seven-land W/VE stations as possible in a maximum of 30 hours out of the total 36-hour contest. The same station may be worked on each band. Seven-land stations will be located in Alaska, Arizona, British Columbia, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming. Seven-land stations score one point per valid QSO (including QSOs with other seven-land stations). All others get five points per valid QSO with a seven-land station (nonseven-land QSOs do not count). All W/VE stations (including KH6/KL7) transmit RS(T) and state or province. Others transmit RS(T) and consecutive serial number starting with 001. On each band, seven-land stations get one multiplier for each of the 50 states and one for each VE province. On each band all others get one multiplier for each state or province worked on the seventh W/VE district (see above). Power multiplier: 500 watts dc input or more \times 1, 300-499 watts \times 1.25, 100-299 watts dc \times 1.5, less than 100 watts dc input \times 2. QSOs times points times sum of all multipliers times power multiplier equals claimed score. Entries must include logs, summary with usual info. Dupe sheet required for each band for those making 100 or more QSOs. All entries must include a business-size s.a.s.e.; DX stations enclose two IRCS. Entry deadline is August 1. Mail to NAS Whidbey Island ARC, Bill Gosney, WB7BFC, 4471 40th N.E. St., Oak Harbor, WA 98277.

2: North American CW Sprint (also Sept. 10), rules in July.

4: Straight-Key Night, the full 24-hour period. This is a friendly meeting on the air, using straight keys; from 0000-2400 Z. Suggested areas of operation on 80, 40 and 20 are 60-80 kHz up from the bottom edge of the cw band; 10 kHz up from the bottom of each Novice segment. When participating, please use SKN in lieu of RST, preceding the three-digit report, to clue in "passersby." Following SKN, send a list of the calls of the stations you worked plus your vote for the best fist heard that period (not necessarily one you've worked). This is not a contest and we aim to keep it that way! Vote too for the most interesting QSO of the period. With your report include any interesting, appropriate photos for consideration. Check page 75 of the April issue for a bit of flavor from January running of SKN. The period is long enough to permit DX participation. Unless reported participation increases, SKN may become Silent Key Night!

5: West Coast Qualifying Run.

8-9: Radiosport Competition (rules May QST).

13: WIAW Qualifying Run, 0200Z.

15-16: Space Net Contest, Ten-Ten QSO Party, HK Contest.

22-23: Rhode Island QSO Party; National Blueberry Festival W8IGV Operation.

25: WIAW Qualifying Run, 2300Z.

29-30: County Hunters Contest, New Jersey QSO Party.

AUGUST

5-6: UHF Contest.

SEPTEMBER

9-10: VHF QSO Party.

OCTOBER

14-15: CD Party, cw.

21-22: CD Party, phone.

NOVEMBER

4-5: Sweepstakes, cw.

18-19: Sweepstakes, phone.

Station Activities

SCM 5 AREC 5 ORS 5 OVS 5 SEC 5 OBS 5 TCC 5 OO 5 NTS 5 WAC 5

CP 5 A-1 OPR 5 EC 5 DXCC 5 CLUBS 5 RM 5 OPS 5 RCC 5 PAM 5 WAS

CANADIAN DIVISION

ALBERTA: SCM: Sydney T. Jones, VE6MJ — SEC: VE6XC. PAM: VE6AFO. VE6ASA gave a very interesting talk at the Mar. meeting of the Calgary ARC on video recorders. VE6NI, EC for Calgary has his organization well under way. SCM, VE6MJ attended the CARA meeting on Mar. 27 and will be visiting Medicine Hat and Grande Prairie clubs during the month of Apr. VE6AGT and XYL flew south during the Easter break to bask in the warm sun. Weather would appreciate the news items for inclusion in this column. Club activity and items of personal nature will be most welcome and should reach me no later than the 5th of the month. Traffic: VE6AMM 37, VE6AAT 33, VE6XC 18, VE6ABC 12, VE6XD 11, VE6YW 10, VE6AFO 7, VE6BM 3, VE6BBL 4, VE6MJ 4, VE6AKY 3, VE6CFO 3, VE6ISA 3, VE6CJT 2, VE6EC 2, VE6PZ 2.

BRITISH COLUMBIA: SCM: H.E. Savage, VE7FB — VE7ZK is our Asst. Dir. and with his years of experience in traffic handling and general knowledge of League affairs we should do our best to support him. VE7GY Net Manager BCEN reports month of March the best for QNs for years. We are now looking for a PR man. If you know of one let us know. VE7DB and XYL lost everything in a fire. OO, VE7TT, nice QSO with Clipperton Island and Tom Christian on Pitcairn. Traffic: VE7ZK 253, VE7DQY 151, VE7COA 95, VE7COB 96, VE7BLO 56, VE7BOT 34, VE7CDF 29, VE7FB 26, VE7BLS 12.

MANITOBA: SCM: Peter Guenther, VE4PG — Asst. SCM: VE4UL. RMs: VE4GJ, VE4DS. PAMs: VE4JP, VE4TE. VE4VJ. Attendance at the Portage Amateur Radio demo well attended, had good coverage. Congrats to VE4OJ on his 50th anniversary. All nets very active, new stations checking in. We welcome VE4TR as our new SEC. An ARES net now in operation after the evening phone net. Contact VE4TR for details. Contact your local clubs for coming FD activities. MEPN 31 sess., QNI 1442, QTC 41, MTN 31 sess., QNI 286, QTC 73, MMN 31 sess., QNI 415, QTC 16, MSTN 20 sess., QNI 147, QTC 33, WRSIN 4 sess., QNI 52, QTC nil. Traffic: VE4PG 86, VE4RO 84, VE4I2 63, VE4QU 40, VE4ABB 21, VE4UL 12, VE4LU 9, VE4FK 8, VE4ID 8, VE4JP 8, VE4L3 7, VE4NE 7, VE4AAD 5, VE4A1 5, VE4A11, VE4OR 3, VE4J1 3, VE4XQ 3, VE4NC 2, VE4YQ 2, VE4DT 1, VE4OD 1, VE4TY 1, VE4XN 1.

MARITIME-NFLD: SCM: Aaron D. Solomon, VE1OC — Asst. SCM: VO1FG. SEC: VE1DI. PAM: VO1JN. RM and 1st Mgr: VE1WF. RM and NTN Mgr: VO1GW. Silent Keys: VE1BEE, VE1AEP, Hosts: VE1BJ, BJR SV 2P. VE1 Contest Winners: CW-VE1AUN, Phone-VE1ACB, SARC Ex. VE1BNB, pres. VE1S tk AKL, VP: VE1AVX, secy. KCARC Ex. VE1BEP, pres., VE1AFL, VP: VE1BHH, secy. VO1LP now VE1HK; VE1AJ now VE1XT; QIs are VE1S BNC AVY. New amateur IS VE1BNH. Mar. Ski Tour used VE1PD repeater in Feb. 60 amateurs attended NS VHF Assn. Meet Hfx. Airport. VE1ASW rec'd Cert. of Merit from ARRL. Congrats. Ex. VE1EY signing VE3GXM Mar. Phone Net nitely. VE1AH and VE2RLX/VE1 operated FPBBG Easter weekend. VE1s ACB BCG sporting new rigs. ARN sess. 31, QNI 141, QTC 101/89. Feb. NTN sess. 22, QNI 90, QTC 4. Hfx. (Mar) VE1VE 200, VE1LCR 62, VE1ST 48, VE1HJ 46, VE1CH 40, VE1ABG 20, VE1AMR 16, VE1BGA 8, VE1KR 5; (Feb.) VE1EJ 25, VO1GW 7.

ONTARIO: SCM: Larry Thivierge, VE3GT — Asst. SCM: Noreen Nimmons, VE3GO. Another FD has rolled around. June 24 and 25 are the dates for this years event. A properly serviced message sent to your SCM will add an additional 50 bonus points to your score. The 18th CARTG RTTY DX contest is set for Oct. 21 and 22nd. Vice-Director VE3AR addressed the Niagara Peninsula ARC, and the Georgian College ARC where he also presented an ARRL Certificate of Merit to VE3SAT. VE3ISW active on 2 meters. Amateur station VE3JW, permanently installed in the National Museum of Science and Technology in Ottawa celebrated its 4th anniversary. Initiator of the project, VE3GX wishes to thank all those who over the years have operated the station and assisted in other ways. New calls from the Windsor area are: VE3s JLT JLU and JLV. VE3BZR received his 30 wpm sticker, and is active on Kenora repeater VE3LWR. VE3s RL HJ HWU HGN and EGO have all received the attractive Thronlein Award. Univ. of Waterloo repeater VE3RRR active on 147.90/30 MHz is owned and operated by the Southern Ont. Computer Amateur Repeater Group (SOCARG). This group also operates the VE3SS repeater in Brampton. 79 members and guests attended the Lakehead ARC's 44th anniversary dinner where VE3ARN was honored with a Life Membership. VE3ILN new mgr. of BCARS. VE3 is the special prefix assigned to the CNIB in commemoration of their Diamond Jubilee. VE3BS now relocated to Western Canada. Welland Co. ARC's amateur of the year was K6GMU/VE3. New members of the Hamilton ARC are VE3s JTM DBL and JUN. VE3JCM has his Advanced. ECs submitting SET reports were VE3s APK AYR DVE FHQ GFN and GNV. Thanks to all those who sent participation messages. VE3ODK, following up on VE3AYZ's successful project, earned a BPL award for handling traffic from the Parkwood Senior Citizens Home and the Sunrise Nursing Home. Traffic: (Mar.) VE3GCL 51, VE3ODK 45, VE3BS 279, VE3DRP 217, VE3ISW 210, VE3HGU 181, VE3JGJ 155, VE3JRT 84, VE3FGU 77, VE3VED 75, VE3GT 70, VE3CYR 59, VE3FHZ 58, VE3FZG 57, VE3ATR 54, VE3BZR 46, VE3DVE 38, VE3GJF 36, VE3GNW 33, VE3EBC 31, VE3HSF 23, VE3JFP 21, VE3GCE 18, VE3HCS 17, VE3APK 4, VE3FHQ 4, VE3DZH 1. (Feb.) VE3HSF 28, VE3APK 4. (Jan.) VE3HSF 36.

QUEBEC: SCM, Ed Sieb, VE2BAQ — Not too much news this month. I guess the winter doldrums have finally caught up with Quebec amateurs, even though it is late spring. Increased activity on ten has aroused the interest of many Montreal area amateurs, who are using converted CB SSB radios on ten meters. Some of the fellows are VE2s AED FCX NI DIT SG FY and FFS. Most

popular frequency is apparently 28.600 MHz. Oh yes, I'm included there too. VE2BT, has been appointed Pres. of the St. Maurice Valley Radio Assn. Remember, Field Day is coming up soon, so let's get prepared: whether your efforts are for contest, or for public relations, good luck to all. Traffic: VE2UN 282, VE2EC 30, VE2APT 10.

ATLANTIC DIVISION

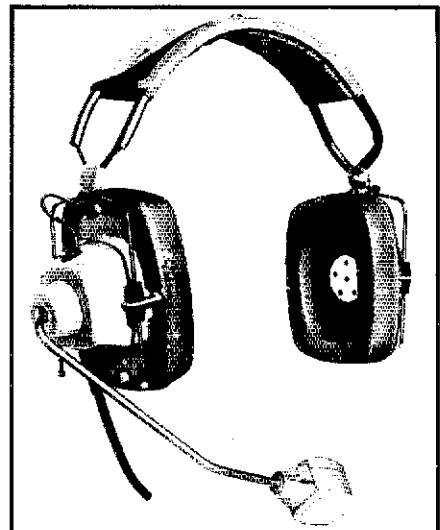
DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PQ. RM: W3QQ. PAM: W3WD. PSHR: K3JL 46. We have been missing our PAM, W3WD who has been in New York at St. Luke's Hospital where XYL Barbara underwent extensive open heart surgery. As we to press she is making a slow recovery. WB3FUO is also recovering from a stay in the hospital. WB3GXD made WAS when he worked NH for state no. 50. WB3FTN, age 14 from Denton, Md. has been helpful in picking up the DTM ARC on several occasions recently. W3DKX needs reports from all Del. stations handling traffic, preferably over the air. DTM: QNI 68, QTC 7. Traffic: W3DKX 34, K3JL 31, WA3WIY 19, WB3DUG 16, WB3ANC 12, WB3ENF 7, WA3DUM 3.

EASTERN PENNSYLVANIA: SCM, Geo. S. Van Dyke, Jr. W3HK — RMs: K3NGN, K3KW, WA3PZO, W3IAZ. Net reports: PTTN QNI 399, QTC 138; EPA QNI 631, QTC 244; PFN QNI 383, QTC 621; EPAEPTN QNI 326, QTC 102; CMTN QNI 19, QTC 2; AREC QNI 13. OBS reports: W3TI, K3NSN, W3ID, OVS reports: WA3NDO, WA3BJQ, WB3GTM, W3GOA. OO reports: W3NC, WA3RPG, WA3TMR, K3NSN, BPL: W3CUL, K3NSN, W3VR, WA3ZRY, WA3WQP, WA3ATQ, WA3THT, PSHR: K3NGN, WA3PZO, WA3RPG. Fairs keeping W3CUL and VR busy. WA3ZRY doing a fine job on DE. WA3ATQ reports still lots of snow. W3TI reports a new batch of Novices (10). WA3NDO now has big E. WA3TMR and WB3JES are going to tie the knot in April 79! W3GKM finding most of the parts he needs for his new antique station! W3WRE still on the speech circuit. W3EU smoke testing new gear. WB3HND & WA3OVZ back on PTTN welcome back to WA3OVZ. New officers: TASBAR: K3NB, pres.; K3SRQ, vice-pres.; W3CMA, treas.; W3TI, secy.; Mid Atlantic Radio Club: W3Y3Z, pres.; WB3ELA, vice-pres.; WA3UJC, secy.; W3IQS, treas.; W3DZI, policy; WB3GYV, PR; WA3PZO, pub. svce; WB3AYT, social; K3RZD, tech. PR; at-large. Club papers looking real good, be hard to pick a winner! I'm looking for an SEC. Have had several turn downs so far but I'm still trying. Anyone interested should give me a buzz. I have a few irons in the fire but no real prospects yet. Lets get EPA up where it used to be in AREC activities. Traffic: W3CUL 4356, K3NSN 3170, W3VR 1062, WA3ZRY 850, WA3WQP 584, WA3ATQ 463, K3NGN 332, WA3THT 302, K3KW 271, W3IPX 121, WBLTA/3 78, K3YL 70, WA3PZO 38, WA3ADE 37, WB3BKV 33, N3EG 23, W3TI 22, W3DP 17, WA3NDQ 15, W3ID 14, WA3TMP 8, WA3RPG 5, W3VA 4, W3HK 3, WA3BJQ 2, W3GKM 1, W3GOA 1, W3WRE 1, W3EU 1.

MARYLAND-DISTRICT OF COLUMBIA: Karl R. Medrow, W3FA — With the March nets: Net/Mgr Sessions/TFCC/DCI/Net Mgr: M3WV/3APRV, W3R7/24-1. OO percenters K3ORW, WA3ZRY. Others: W3DKX, W3APRV, K3WJ and W3ZYFM. MDCTN/K3ORW 17/28/16.9. Top honors to WB3AOB, WA3ZRY, W3DKX, K3ORW and WB3CES. WR PON/W3DFW 17/28/16.9. MDC PON/W3OY 5/14/22.2. Feb. MDD/W3OQ 50/167/6.3. Top Brass N3CL, N3QA, N3CL, N3IT and WB3CGJ just missed PSHR. Find our Winners listed! The MEPN now has 71 members. Congrats to WB3AOB and W3IKA top rung Extras. WA3EHK is very active from the new QTH. K3ORS is mending quite well. WB3CES has run on 2 mtr. rpters. W3FZY spent a tranquil month. N3CL had a busy month. W3CDQ started with a bang, but stopped to do battle with the flu bug. M3RL is getting the exciter overhauled. W3IKA helping W3UO set up a new rig. W3WJ makes ARES/RACES and MDD. WB3AOB has gotten the hang of CW nets. WB3CGJ likes his new rig a KWM2. WA3HEM is Montgomery's new EC. N3IT worked Clipperton. W3QA reports WB3KMX is a new one in Queen Anne's. N3RC has a new Ten Tec. WA3YSW is Asst. Net Mgr for TAN, Teenage American Net. W3ECN sports a new working quag. W3WBY is working 10-meter DX, and planning a FL trip. W3JPT is planning an eight-element XY Ant. for OSCAR. OO-W3MR was busy during Clipperton activities. WA3JSZ opts for W4MLR/3. The 1978 FAR Scholarship announcements are in the mail. Don't forget the MDD/MEPN-MDCTN Picnic Sun. Aug. 20 McKeldin Area no. 501 Patapsco State Park. Traffic: (Mar.) N3CL 282, WB3AOB 240, W3FA 93, N3QA 76, W3FZY 29, K3ORW 25, N3IT 23, WA3EHK 19, WB3CGJ 11, W3IKA 9, N3RC 7, W3ECN 6, N3RL 6, W3ZNW 4, WB3CES 1. (Feb.) WA3YSW 6.

SOUTHERN NEW JERSEY: SCM, Raymond F. Glancy, WB2GTE — WA2SEA EC Gloucester Co. had a page one write-up and photo in the Times headlined "Natural Ham, if disaster strikes he's READY." W2HOB SEC reports WA2MJJ new EC Mercer Co. Jersey Shore ARS fine paper "KA Chunker" has W2OK on cover photo. WA2KWW, pres. and K2BSG active on 2M. SJRA's pres. W2GJS receives long letter from W4MGT. W2OM W2VX are Silent Keys. Congrats to WB2DQJ, pres. of Riverfront Wireless Assn. on being an ARRL affiliate. RCA-Astro Elec. ARC's WB2PKG tells RCA CB rigs are changed to 10M ham rigs. N2CW reports Old Barney ARC plans FD activity. K2JOC nw K2YY helped operate Marconi stn KM1CC. Delaware Valley RA adds 5 members this month. Salem Co. RC novice class progresses well. K2KI is a contest bug. SPARC's K2MY5 WB2PRX WB2IQI conduct license class of 30 and club adds 6 members. WA2EMY nw K2OG. Upgrades to General, WA2RAN, WA2JEC, WA2JQH, WA2VDR. Advanced WA2KNZ, WB2JF. Extras WB2EAF, K2OG, WA2RJD, WA2NBM. New Tech WA2RUQ. Gloucester Co. ARC now boasts 100 members. NJPN, Sess., QNI, QTC, QSP, MINS.; Eve., 31, 531, 329, 241, 746. Sun. AM, 4, 61, 25, 17, 44. Traffic: W2MJJ 124, WB2LCC 57, W2IU 39, WA2UNJ 24, WB2JFS 21, W2HOB 13, W2PU 2.

WESTERN NEW YORK: SCM, Joseph M. Hood, K2YA —



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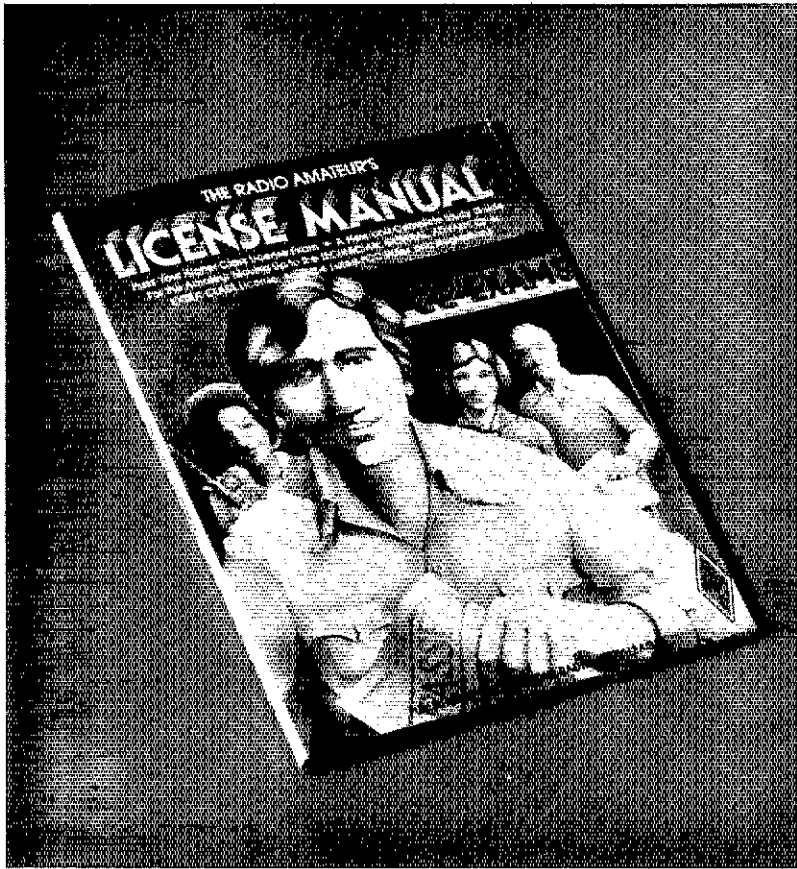
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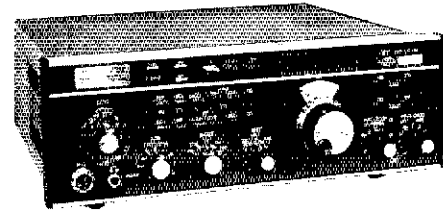
Get the answers and more in the 76th edition of the License Manual. For those looking to upgrade their ticket, study material is presented in a logical step-by-step method. Practice questions are in the multiple choice format as used by the FCC in the Technician, General, Advanced and Extra class exams. A complete copy of FCC amateur regulations is included for reference.

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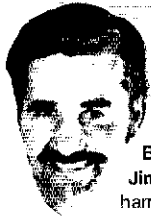
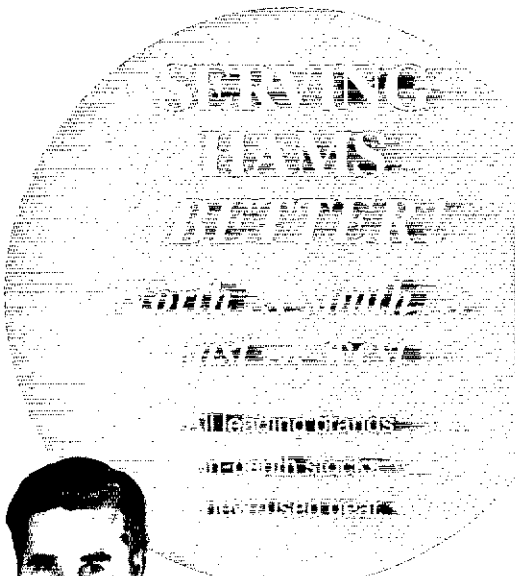
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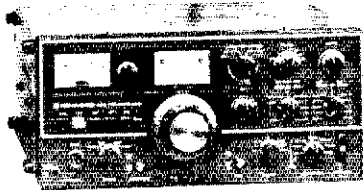


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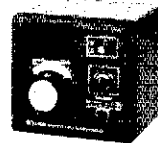
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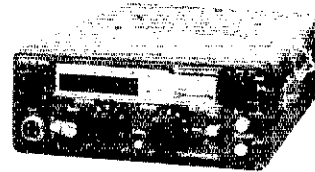


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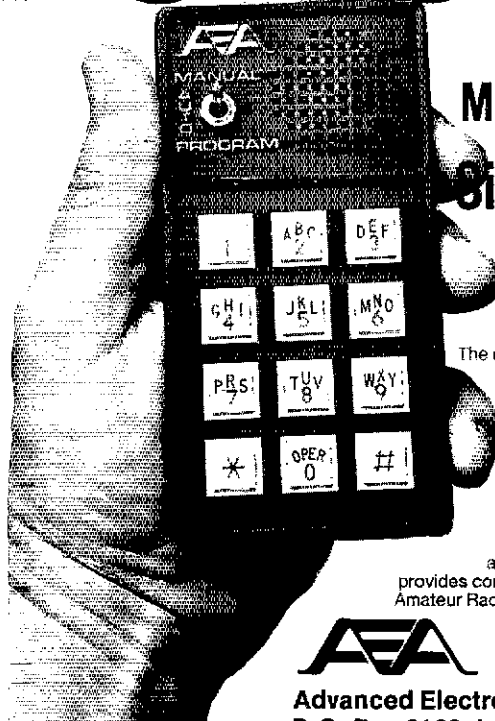
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Asst. SCM: W2MTA, SEC: N2JC. Welcome to the Northern Catskills VHF Assn. and the Hookles Amateur Radio Club who have recently become ARRL affiliates. Speaking of affiliates, several WNY affiliated clubs have not completed their annual reports to ARRL have been placed on the inactive list. RAGS have set the date for their next hamfest as Oct. 7, 1978. Regret to report that N2BM and K2DF are Silent Keys. K2ZR will coordinate the RAWNY Field day effort this year. Phone traffic handler WB2KHT who got her Advanced ticket closely followed by a case of meningitis was rescued by her DM WB2LMS who got his General in the nick of time. W2FSB is now W4OVK. N2DM just relocated his shack and put up a new 5 band trap dipole. The antenna for the WR2AEI 28/88 repeater has been returned from repair at the manufacturer and should be in place before the Rochester HAMfest. The Buffalo Area DX Club are looking for new members. Anyone interested should contact WA2AOG or WA2ECA. W2CEQ W2Z0J and WA2MFV are new ORS appointees. Congratulations to WA2MSU on first BPL and to N2TW for BPL again in Mar. Traffic: WA2MSU 892, N2TW 601, W2MTA 93, W2ZR 82, WB2KHT 7, W2PZL 82, WB2LMS 53, W2TZ 54, WB2WCE 39, KN2MDO 36, K2VR 27, WA2AIV 28, W2CEQ 26, WB2NFB 21, WA2ZJP 20, WB2ELB 18, WA2ECA 4, N2DM 2.

WESTERN PENNSYLVANIA: SCM: Donald J. Myslewski, K3CHD — SEC: WA3VUP, Asst. SECs: K3SMB WA3LJW, PAM: K3SMB, VHF PAM: W3GQJ, RMs: K3AT W3NEM W3KUN.

Net	KHz	Time/days
WPA CW Traffic	3585.0	7:00 PM Dy
WPA Phone Traffic	3983.0	6:00 PM Dy
PA Traffic & Training	3610.0	6:30 PM Dy
WPA RACES	3990.5	9:00 AM Su

This will be my last Station Activities column as SCM. I want to take this opportunity to thank each WPA member and those dedicated appointment holders for your continual support over the past four years. Also, the cooperation of the Communications Department of the ARRL was excellent in all respects. Again, thank you for the opportunity to serve you. Your new SCM will be John T. Fleming, W3GQJ, 2275 Trolist Drive, North Huntingdon, PA 15642. Please make arrangements to mail your monthly reports and newsletters to W3GQJ by the 5th of each month. The WPA CW Traffic Net had 31 sessions, 451 QNI and 179 QTC. The WPA Phone & Traffic Net had 31 sessions, 344 QNI and 95 QTC. The Butler County Traffic Net had 31 sessions, 230 QNI and 41 QTC. The WPA (Ph) 2 Meter Traffic Net had 31 sessions, 507 QNI and 79 QTC. PSHR credits W3YO 47 and N3EE 36. Traffic: K3HI 234, W33HGL 223, W3YO 213, W3EGJ 150, N3FM 121, WA3VEQ 76, W3EYV 73, WB3DKT 52, K3SMB 44, W3GQJ 41, W3RUL 40, W3KUN 30, W3SN 28, K3HCT 24, W3DHF 22, K3CHD 20, N3EE 20, W3UNX 20, W3ATQ 15, W3GZR 15, WA3QNT 11, W3EYH 9, K3VQV 5, K3KAP 4, W3UT 3, WA3UDZ 2, W3AS 2.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU, SEC: W9AES, RM: W9NJP, PAM: WA9KFK, Cook County Exc. W9HPG.
Times/Day: 1c Sess.
ILN 3690 0030/0400 Dy no report
Ill Phone 3915 2245 Dy 182 31
NCPN 3915 1200/1700 MS 189 54
IEN 3940 1400 Su 16 4
INTN 3710 1300 Dy no report

Many amateurs lost power and antennas during the ice storm which hit Central Ill. Amateur emergency communications the only modes of access between communities and the inhabitants. Many amateurs participated three to four days in manning shelters and establishing radio contact between them and Red Cross, Civil Defense and other organizations. A new Contest Club has been created for the Ill., Wisc. and Ind. areas. The name is Ill-Wind Contesters and full information may be available for K3JK (WB9LIX). The Mt. Prospect Amateur Radio Club has been approved by the League's Executive Committee for club affiliation and declared the club a duly affiliated society. CAND for Mar. is 415 messages in 62 sessions and IX RND is 98.3 percent and IL stations checking in are W9MXG W9HOT and W9JLJ. The Ninth Regional Net (Daytime) handled 143 messages in 31 sss. wd W9JLJ W9HKG K9MUIH and W9HOT. W9BAGG now W9BGC worked the DXCW contest on one watt. K9MX has been selected to appear in Marquis Who's Who in the midwest. The newly elected officers of the Montgomery County Amateur Radio Club are WA9SXX K9KYW and WD9CZL. This column's sympathy to the families and friends of WA9JO W9HXW and K9EMS who have recently joined the ranks of Silent Keys. W99PEH N9TW WB9SSJ and W9YZE are the new officers of the Egyptian Radio Club, Inc. W9PX was presented a trophy commemorating his transition from Novice to Extra Class in 8 months. WB9JCL presented a see-in-the-dark device at the Mar. meeting of the Metro Area Club. WB9FRJ has a new Kenwood TS-700A on two meters. WA9WME has upgraded to General Class. The new officers of the Kankakee Area Radio Society are WA9LSD WB9SVY WB9RDI and WD9CSA. The Jacksonville Area Amateur Radio Club, Inc. officers for the following year include WA9UQC WA9GUJ WA9NZF and WB9CEB. WD9DDW is planning to work OSCAR with a new 8/8 antenna. WB9JBB is portable F (in school) in France. WD9BJP is a new general and WB9AMY an Advanced Class licensee. The Florida Area Radio Club's annual hamfest will be held on Sun. Sept. 17. W9JLJ is the only ARRL recipient for the month of Mar. Traffic: W9JLJ 897, W9HKG 244, WB9JFS 182, N9TN 158, W9OK 145, W9HOT 93, WB9ZED 86, W9QBS 85, WD9DEX 76, W9NJP 71, K9EEA 68, WA9VGW 62, N9BT 53, W9LNO 46, K9BVE 36, W9YCE 30, K9MX 29, WA9AQN 28, N9DR 27, W9OYL 26, K9DAC 26, N9MX 23, WA9YZR 16, W9PRN 16, K9EI 15, WB9SGK 15, W9HBI 15, W9HPG 10, WB9RFC 10, K9WMT 8, W9RYU 8, WD9GSD 3, WB9NEH 2, W9VY 1.

INDIANA: SCM, M. P. Hunter, W9LF — Congrats to W9LTL who has been elected as your new SCM beginning in July. If he does anywhere as good with this as he has done with QIN, you have no fears at all. The net has surely come alive during the past few years of his tenure as manager. The coal strike has had its impact on ham radio as well. Several clubs were forced to cancel meetings, and power cutbacks in some areas made meeting difficult. Ind. did, however, become victim to its annual siege with ice storms and the resulting antenna damage. WB9LTY, who has had his share of antenna problems in the past made up through this one with no problem. Rumor has it that he spent the entire



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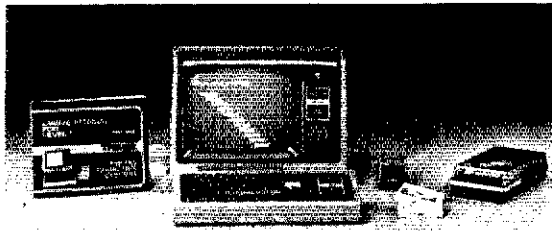
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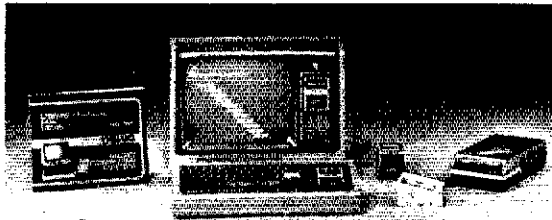
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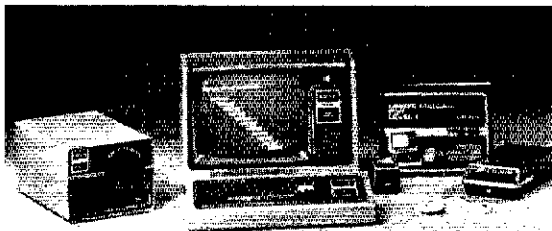
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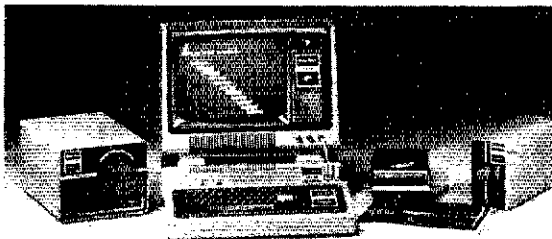
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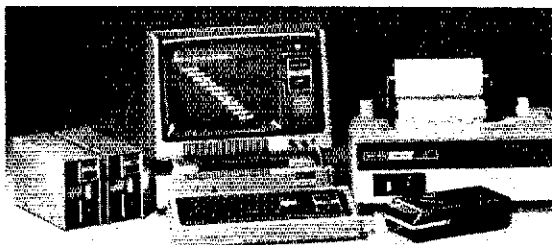
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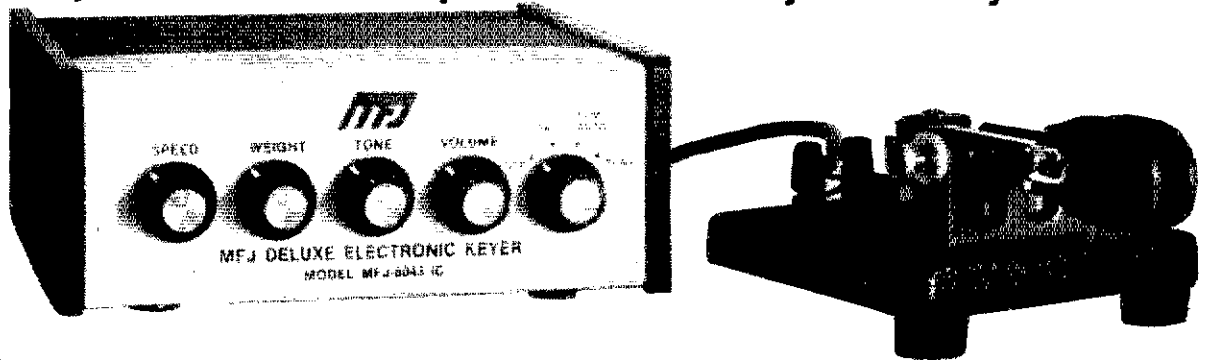


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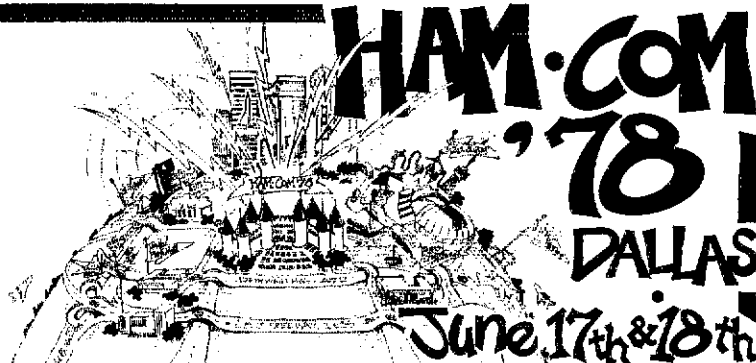
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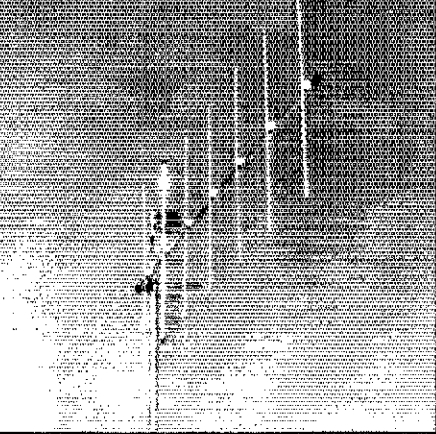
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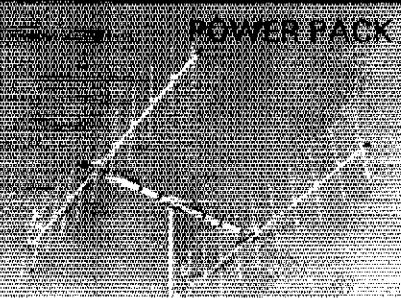
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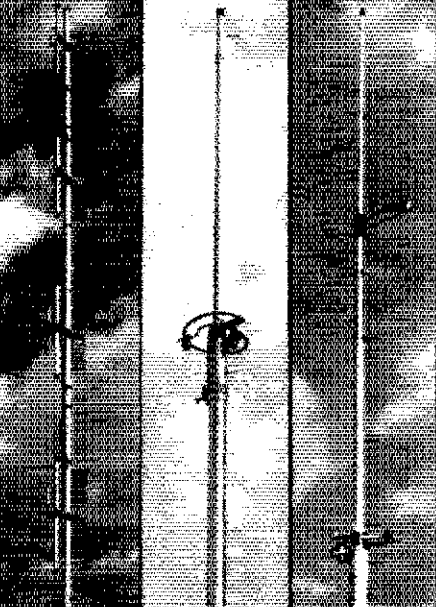
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storm on his tower with a blowtorch melting the ice. Congrats to Cass Co ARC on their recent ARRL affiliation. Several people have commented to me about my statements concerning the snow emergency net operation. As W9UMH can tell you, the comments aimed at him were in fun but the comments concerning net operation were dead serious. I hope this clears up some questions about my intents. NET TFC: ICN 49, QIN 358, Hoos VHF 32, ITN 321, INTN 50, IPON 2 (I always did know the cw nets would rise again!!!) Traffic: WB9YXN 517, W9QLW 307, WB9HUF 152, W9EI 126, W9LTU 126, W9ZV 108, W9JUU 101, W9TG 97, W9OCF 89, W9DLF 72, K9IK 57, WB9DIX 50, WB9SKA 50, K9WVV 49, WB9EZ 37, W9SOK 31, K9YBM 23, W9IOH 22, K9RPZ 20, K9EGT 19, W9PM 18, K9DCL 12, WB9YJE 12, K9CGS 11, W9CMT 11, W9AZK 11, W9SOTX 9, W9BDP 2.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: W9FZC. PAMA: W9AYK K9LUT W9IEM. RMs: WB9ICH K9KSA W9SFL K9LGU K9EN. Nets, Freq., Time, QNI, QTC, Mgr.: BWN, 3985, 1245Z M-S, W9AYK; BEN, 3985, 1800Z Dy, W9IEM; W9BN, 3985, 2300Z Dy, K9LUT; WNN, 3725, 2245Z Dy, WB9ICH; W9SN, 3662, 0030Z M-W-F, K9KSA; WIN-E, 3662, 0100Z Dy, W9SFL; WIN-L, 3662, 0400Z Dy, K9LGU; WRN, 3662, 0130Z S, K9EN; WEX PO, 3925, 1801Z M-F, W9A9NIX. W9DAUD has Extra. W9DIMV has Tech. WB9KXP appointed RM for WIN-E effective Apr. 1. Thanks to W9SFL for his fine job as RM. New Generals in Sturtevant area: W9DCC, W9BFC. New contest club for Ill. Ind. and Wisc. ARRL-affiliated WB9SAD, pres.; W9GT, vice-pres.; K9JK, secy-treas. Are you all set for Field Day? WNA Picnic at Oshkosh July 9, lets have a good turnout for this fine get together. Severe weather is on its way, are your communications all set up? W9HSY is Vice-Chairman of WAR. K9BBL passed General. W9EMR W9ESB passed Advanced. W9BN certificate to W9AJA. W9ZGQ W9CQC made BPL. New Techs in Wisconsin Rapids area: W9VAH WB9ZEK WB9ZEM W9D9ICP W9BHLG W9GHLH. New Generals in Rapids area: W9HGX W9D9HHE W9D9MG. Traffic: (Mar.) W9ZGQ 914, W9CQC 527, K9EFL 329, W9ND 288, W9SFL 288, W9DAUD 133, K9FHI 121, W9IEM 121, W9BDHF 108, W9AGJ 83, W9EQAQ 73, K9LGU 73, K9LUT 57, W9RRU 51, WB9ICH 46, W9PY 45, W9AYK 44, W9HW 41, W9BMPF 39, K9AKG 36, W9ABF 32, W9BRE 31, N9TD 31, W9YL 29, W9AWO 28, W9DUW 26, K9KSA 23, W9BUEP 23, N9CP 22, K9ANV 19, W9AJA 15, K9CPM 13, W9ABF 12, W9MYZ 8, N9JW 5, K9TYO 5, W9LWJ 3, W9FTC 2, W9ROE 2. (Feb.) WB9KXP 84, N9CP 38, K9ASC 2.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, WB9HOX — SEC: W9SA.

Net	Freq.	Time/Day	QNI	QTC	Mgr.
MSN 1	3685	6:30 P	283	147	N9HY
MSN 2	3689	10:15 P	128	46	K9PIZ
MSPN N	3945	12:05 P	678	120	WB9JYT
MSPN E	3929	5:45 P	661	532	W9DUW
PAW	3925	9-12/1-5	3915	297	W9YVT
MSSN	3710	5:30 P	220	26	WB9ZAL
MWX	3925	6:15 P	288	225	WB9UKI

Congratulations to recent upgrades: Gen. to Advance WB9WJE WB9B WB9ZAL WB9VLU and Novice to Tech. WB9ZAL. Our sincere sympathy is extended to the family of WB9HJ who became a Silent Key in Mar. W9BAMA now W9BHEB. WB9MBD gave a presentation on Amateur Radio to a group of Cadet Girl Scouts. Congrats! W9QIT WB9ZAL and W9EFG planned an SET in Lake Co. they did a bang up job for Public Relations. When WB9ZAL called the Fire Dept. to report an imaginary fire, she was surprised to find 25 volunteer firemen all on their phones! Congrats to W9EFGA on making his first BPL. to W9EFG for his second month and W9QIT for his 4th consecutive month. It was gratifying to me to see so many of the Rochester 2-meter club standing by on freq. to give a helping hand to the rescue squad if they were needed. Thanks to all. Traffic: W9QIT 511, WB9HOX 375, W9EFGA 264, W9EFG 247, W9YUA 157, W9YVT 150, K9PIZ 147, W9JYT 126, W9SYT 112, W9DUW 107, N9HY 97, WB9UKI 86, WB9ZAL 80, WB9PKG 78, W9TFC 63, K9CSE 42, K9L 40, WB9ONK 36, W9RIG 35, K9ZBI 34, K9JTW 32, N9DL 31, W9HKF 23, W9THZ 21, W9HZU 20, W9ARKV 17, W9PNE 16, W9BNZB 13, W9OPX 11, N9JP 9, K9RMX 9, W9BXD 5, K9HJC 4, K9FLT 1, K9TK 1.

NORTH DAKOTA: Mark J. Worcester, WA9WLP — WB9HBN has 29 states on 2 meters from Fargo. WA9HNB is only SSV in N. Dak. K9JRW WA9LIA 6 meter rep. on in Fargo and assisted Red Cross in flood survey work. K9AL worked Clipperton Is. for country no. 29. WA9LPV fell from a ladder while putting up an antenna and ended up in the hospital. Grand Forks, Bismarck, Dickinson, Minot, Carrington, are all working on their repeaters. W9HFV new Novice in Minot. K9YST talking of moving to New Ulm, MN. With deep regret we announce the passing of K9PYZ and W9AKS.

Nets	kHz	CST/Days	Sess	QNI	QTC	Mgr.
Goose River	1990	0900	M-F	4	38	W9CDO
YL Wth	3955-50730	S-S	31	196	800	W9BRWM

Traffic: W9BRWM 1200, WB9OAJ 14, W9CDO 74, WB9WIB 53, WB9WSQ 39, W9DM 5, W9SUF 2.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5UAW — SEC: W5VNV. PAMA: W5POH W5ZWZ K5MEA. RM: W5MYZ. Nets, kHz, Time/Day, QNI, QTC, Mgr.: OZK, 3760, 0000Z Dy, 145, 20, W5MYZ APN, 3937, 1100 M-S, 961, 48, W5POH M-Bird, 3928, 2130M-F, 759, 13, W5ZVZ, ARN, 3995, 2330/Dy, 1094, 106, K5MEA, SCARC, 28.7, 0200/S, & 0130M 76, 6WB5ZCW, WB9DQJ EC for Carroll Co. W5DGTM EC for Poinsett Co. New repeater at Harrison. WB9CYK rpt 148, 19/79. The NAARS of Harrison has set up an emergency unit with 50 crankup tower on trailer, a 4BTV trap vertical HF & VHF equipment and emergency power. A new club at Little Rock Air Force Base, Jacksonville ARC WB9GGU, pres.: W5FXW, v.p.: W5VH, secy.: W5UAW, treas.: Officers SCARC K5NE, pres.: W5EJL, V-P: W5B5GKW, secy-treas. PSR WB5FDP 41, W5POH 39. Traffic: WB5FDP 121, K5MEA 67, W5POH 25, W5UAW 20, WB5PSD 10, W5WVA 10, W5GQH 7.

LOUISIANA: SCM, S. T. "Tom" Losey Jr., K5TL — Asst. SCM: Lionel Oubre, K5DPG. SEC: WB5YH. RM: N5TS. PAM: N5ES. VHF PAM: W5VBX. N5ES new PAM/LTN Net Mgr. Shreveport Hamfest to be July 8th and 9th. ARCOS ready to put 145.76-145.16 repeater back up on Channel 12 TV tower. New club in Jonesboro very active. K5MJC

Put TEN-TEC At The Top Of Your Accessory List

It figures that the leader in solid-state HF technology would be the leader in solid-state HF accessories. So, when it's time to add to your operating equipment, look to the leader — TEN-TEC.

A. NEW TEN-TEC Model 247 Antenna Tuner — \$69

So unique there is a patent pending, the 247 features a 47-tap toroid with silver plated 18 gauge wire, silver plated tap selector and 1kV variable capacitors in a universal Transmatch circuit. Matches 50-75 ohm outputs to a variety of load impedances, balanced and unbalanced (built-in balun). Antennas such as dipoles, inverted "V"s, long random wires, Windoms, beams, rhombics, mobile whips, Zepp, Hertz and similar types can be matched from 1.8 to 30 MHz. Power rating: 200 watts, rf, continuous duty. Attractive aluminum case with black end panels.

B. NEW TEN-TEC Model 277 Antenna Tuner/SWR Bridge — \$85

Same unique features of model 247 above plus built-in SWR bridge and meter that shows ratios up to 5:1. Handsome black and gray styling. Matches Century 21.

C. TEN-TEC KR50 Ultramatic Keyer — \$110

The keyer you control. Dual memories, individually defeatable, for operation as full iambic (squeeze) keyer, with single memory, or as conventional keyer. Self-completing characters. Adjustable automatic weighting (50 to 150%) determined by speed setting, paddle force (5-50 gms), speed (6-50 wpm), and 500 Hz side-tone level (to 1 v.) 117 VAC, 50-60 Hz or 6-14 VDC.

D. TEN-TEC KR20-A Electronic Keyer — \$69.50

Speed 6-50 wpm. Factory adjusted paddle return force and weighting. Self-completing characters. Adjustable side-tone level. 117 VAC, 50-60 Hz or 6-14 VDC.

E. TEN-TEC KR5-A Electronic Keyer — \$39.50

Same as KR20-A less side-tone and power supply. 6-14 VDC.

F. TEN-TEC KR1-A Deluxe Dual Paddle — \$35

Same paddle as KR50; for iambic or conventional keyers.

G. TEN-TEC KR2-A Single Lever Paddle — \$17

Same paddle as KR20-A; for "TO" or discrete character keyers.

H. TEN-TEC 206-A 25/100 kHz Crystal Calibrator — \$29

Pulsed output for easy identification. 9-12 VDC.

I. TEN-TEC 208 CW Filter — \$29

Four stage audio active filter provides 150 Hz bandwidth centered at 750 Hz.

Two selectivity switch positions. 9-12 VDC.

J. TEN-TEC 244 Digital Readout/Frequency Counter — \$197

Six digits show transmitted and received frequencies to hundreds of Hertz. LSI circuitry. 9 MHz preset information.

Mode Switch selects freq. band or counter operation.

12-14 VDC.

K. NEW TEN-TEC 262M AC Power Supply with VOX — \$145

Solid-state; built-in ammeter. Output: 13 VDC $\pm 0.5V$.

to 18 A. Regulation better than 1%. Electronic circuit breaker.

Mic. input: 2 megohms. VOX gain and delay control.

Adjustable delay, 0.1 to 1 sec.

L. NEW TEN-TEC 252M AC Power Supply — \$119

Same as 262M except less VOX.

M. TEN-TEC 215P Ceramic Microphone — \$29.50

Use hand-held or at desk with matching stand included.

Optimum articulation, smooth response free of power limiting

peaks, impervious to temp. or humidity extremes. PTT switch,

cable and 3-circuit plug. Black and gray.

N. TEN-TEC 210 AC Power Supply — \$34

Solid-state. Output: 13 VDC, $\pm 0.5 V$, to 1.2 A. Regulation better than 1%.

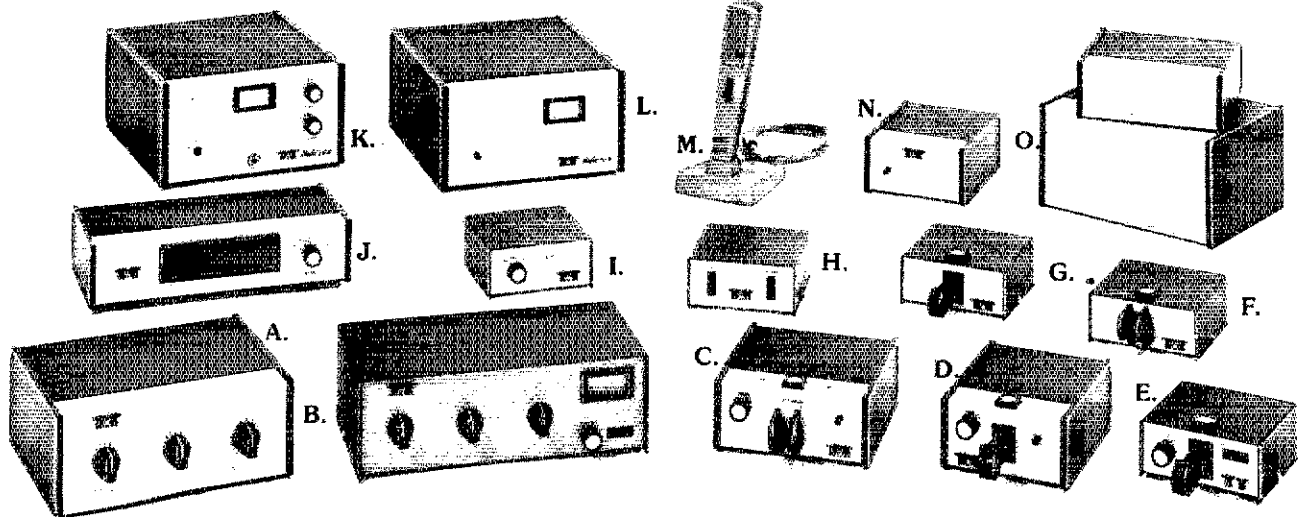
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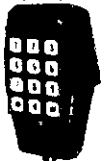
All Solid State-CMOS PL digital synthesized - No Crystals to Buy! 5KHz steps - 144-149 MHz-LED digital readout PLUS MARS-CAP and MULTIPLE OFFSET.*

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Regulated AC/PS
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FMMC-1* Micro-
phone with Built-in
Touch Tone Pad.

WHY BUY LESS?
THE FMCC-1
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- New! Auto key up
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- **FREQUENCY RANGE:** Receive and Transmit: 144.00 to 148.995 MHz, 5KHz steps (1000 channels) INCLUDING NEW BAND 144.5-145.5MHz + MARS-CAP and MULTIPLE OFFSET.*
- **LED DIGITAL READOUT.**
- **4 CHANNEL RAM SCANNER WITH IC MEMORY:** Program any 4 frequencies and reprogram at any time using the front panel controls—search for occupied (closed) channel or vacant (open) channels. Internal Ni-Cad included to retain memory (no diode matrix to wire or change).
- **MULTIPLE FREQUENCY OFFSETS:** Three positions A,B,C, provided for installation of optional crystals: EXAMPLE - 1 MHz offset. Duplex Frequency Offset Built in - 600 KHz PLUS or MINUS 5 KHz steps, plus simplex, any frequency.
- **INTERNAL MULTIPURPOSE TONE OSCILLATOR BUILT IN:** 1750Hz tone burst for "whistle on operation" and sub-audible tone operation possible by simply adding a capacitor across the terminals provided. Internal 2 position switch for automatic and manual operation, tone burst or sub audible tone PL - adjustable 60-203Hz (100 Hz provided).
- **AIRCRAFT TYPE FREQUENCY SELECTOR:** Large and small coaxially mounted knobs select 100KHz and 10KHz steps respectively. Switches click-stopped with a home position facilitate frequency changing without need to view LED's while driving and provides the sightless amateur with full Frequency Selection as standard equipment.
- **FULL AUTOMATIC TUNING OF RECEIVER FRONT END AND TRANSMITTER CIRCUITS:** DC output of PLL fed to varactor diodes in all front end RF tuned circuits provides full sensitivity and optimum intermodulation rejection over the entire band. APC(AUTO POWER CONTROL) - Keeps RF output constant from band edge to band edge. NO OTHER AMATEUR UNIT AT ANY PRICE has these

features which are found in only the most sophisticated and expensive aircraft and commercial transceivers.

- **TRUE FM:** Not phase modulation - for superb emphasized hi-fi audio quality second to none.
- **RIT CONTROL:** Used to improve clarity when contacting stations with off frequency carrier.
- **MONITOR LAMPS:** 2 LED's on front panel indicate (1) incoming signal-channel busy, and (2) Transmit.
- **FULLY REGULATED INTEGRAL POWER SUPPLY:** Operating voltage for all 9v circuits independently regulated. Massive Commercial Hash Filter.
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- **ACCESSORY SOCKET:** Fully wired for touch tone, phone patch, and other accessories. Internal switch connects receiver output to internal speaker when connector is not in use.
- **MULTI-PURPOSE METER:** Triple Function Meter Provides Discriminator Meter, "S" Reading on receive and Power Out on Transmit.
- **RECEIVE:** Better than .25uv sensitivity, 15 POLE FILTER as well as monolithic crystal filter and AUTOMATIC TUNED LC circuits provide superior skirt selectivity - COMPARE!
- **HIGH/LOW POWER OUTPUT:** 15 watts and 1 watt, switch selected. Low power may be adjusted anywhere between 1 and 15 watts. Fully protected-short or open SWR.
- **OTHER FEATURES:** Dynamic Microphone built in speaker, mobile mount, external 5 pin accessory jack, speaker jack, and much, much more. Size 2 1/2 x 7 x 7 1/2. All cords, plugs, fuses, microphone hanger, etc. included. Weight 5 lbs.

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First in the world with an all solid state 2 meter FM transceiver.

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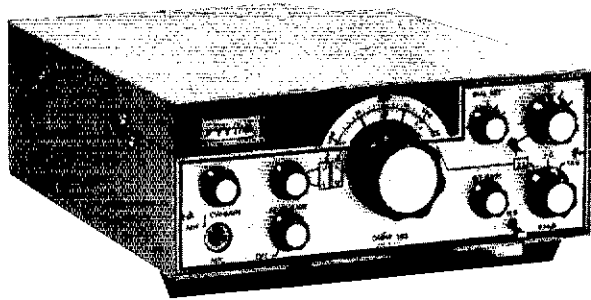
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ALDA 103 HF TRANSCEIVER

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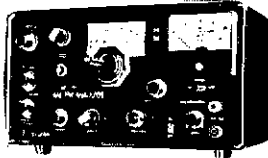
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- Superior Audio Quality!
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NEW! SIGMA MODEL AF250L DEVIATION/MODULATION METER

Introductory Price

\$169



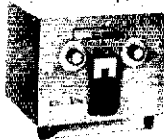
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SPECIFICATIONS: Frequency: 1.8MHZ-520MHZ/3 range select (A,B,C,EXT), A range: 26.5 MHZ-40MHZ, B range: 48MHZ-60MHZ, C range: 140MHZ-156MHZ (generous overranges), EXT. range: 1.8 MHZ-520MHZ (Need Signal Generator) ● Input level: (1) Through type input 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.

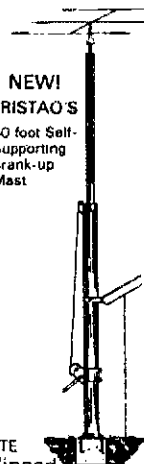
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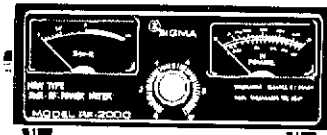
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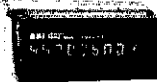
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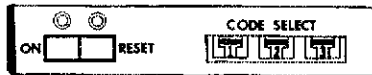
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SPECIAL INTRODUCTORY PRICE \$75.00

Touch tone pad (encoder) actuated. Quiets your receiver until other station sends private 3 digit code, selected from front panel. 999 Channels. Receiver can be muted or opened manually or remotely with a touch tone pad. Bright led's indicate muting and reset. State of the art digital circuitry. Works with the KDK FM2015R or any 2 meter rig. 5 pin din plug supplied. Size 5½"D x 6½"W x 1"H. Wt. 12 oz.

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FMSS SUPER SCANNER 1000 Total Scanning Capability	\$99
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Mounting Bracket (Extra)	\$6.00

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NEWS Update

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TR-7 SYSTEM:

The new TR-7 System is an addition to the Drake line. The Drake C-Line with its accessories is continuing to be produced.

The TR-7/DR-7 features continuous reception from 1.5 thru 30 MHz and transceive 160 thru 10 meter Amateur Bands. For reception from 0 thru 1.5 MHz use the optional AIX-7 Range Program Board and an RRM-7 Receive Module for each 500 kHz segment to be covered. Each RRM-7 plugs directly into the AIX-7 board and is selected from the front panel.

Out-of-band transmit for MARS, etc., is accomplished by plugging an RTM-7 Transceive Module into the AIX-7 for each 500 kHz segment to be covered. Proof of license is necessary to purchase transceive modules.

The MN-7 Antenna Matching Network covers the Amateur Bands from 160 thru 10 meters; matches balanced lines, long wires, and coax-fed antennas; features a built-in RF Wattmeter/VSWR Bridge; and has complete switching functions.

The MN-4C Antenna Matching Network offers the same features, but is styled to match the 4-Line/C-Line.



UV-3 SYSTEM:

The UV-3 System is fully synthesized to 5 kHz on each of the bands it covers. Among other firsts, it is presently the only rig in the world synthesized on 440 MHz fm.

There is a separate SO-239 Coax Connector for each band, so a choice of antennas may be used.

Extra fixed channels and special offsets are diode-programmable, so crystals are not necessary at all.

These thoughts of interest are provided by Drake, "The Newsmakers"

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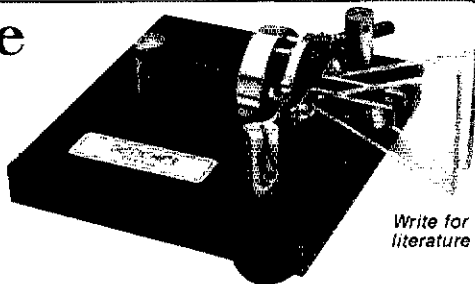
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living in Fort Worth. DRN-5 Mgr. reports W5YJLJ K5BLV N5YL WA5TQA W5MAV W5GKV W5BYVW and W5LBR active on DRN-6. W5ZED appointed chmn. of the 1978 New Orleans Hamfest-Computerfest. Jefferson ARC graduated 15 Novice-General from class ending in Mar. K5EF W5SVJG K5EJO W5SMUL and W5BMUM all instructors. Officers Kenner ARC: W5ZEC, pres.; W5GKJ, vice-pres.; W5GGH, secy.; W5MEU, treas. W5ZDE now K5HN. Baton Rouge ARC working hard toward the National Convention in 1979. Monroe planning a two day hamfest this year. W5KPY active on Shriner Net.

Net	Freq.	Time/Days	QNI	QTC	Mgr.
LAN	3615	7:10 Dy	405	171	N5TS
LTN	3910	6:30 Dy	582	96	N5ES
LSN	3703	8:30 M-F	96	15	W5SOOM
LRN	3587.5	6:30 Su&W	7	3	N5RB

Traffic: W5GHP 229, N5TS 187, N5YL 145, W5MI 116, K5TTC 100, N5ES 85, K5TL 61, N5RB 54, K5BLV 45, W5LBR 41, K5HN 19, W5YN 12, W5IKT 1.

MISSISSIPPI: SCM, E. Ed Robinson, W5XT — SEC: W55FXA. Good news for all MS hams — we got our "Ham tag" law passed in Mar. and now you can get your tags for "passenger cars, pick-up trucks and other non commercial motor vehicles. Many thanks to all who worked on this. Again, please note you get SCM's call change from W5YU to W5XT. The Upsilon ARC is reorganizing interested hams in that area contact W5WQI. Kessler ARC enjoyed Mar. meeting and special visitor Mr. Bob White W1CW (W88FBN/5 Chris). WA5DYH reports good meeting of Jackson ARC. Hattiesburg ARC and Laurel ARC both having Skywarn programs in progress. Tnx to W5LFG. CAND, W5KLV, 62 sess., QTC 425, DRNS Rep. 100 percent by Mississippi Station W5GMR. DRNS, W5CDX, 31 sess., QTC 342 Ms. Rep. 81 percent by K5ONE W5EDT W5GMR K5GY W5SEKX W5BNGF. CGCHN, K5WOB, 31 sess., QNI 3093, QTC 225, MSBN, W5SBNB, 31 sess., QNI 2228, QTC 147, KTN, W5SFA, 21 sess., QNI 158, QTC 52, MN, WA5JWD, 28 sess., QNI 410, QTC 13, Traffic: N5RN 178, W5GMR 157, W5SFA 141, W5EDT 71, W5SBNB 56, K5OAF 28, W5XT 25, W5OKI 23, WA5JWD 15, K5AKM 10, W5BW 10, W5BVB 10, WA5GIT 7, W5BNGF 3, K5MK 1.

TENNESSEE: SCM, O. D. Keaton, WA4GLS — SEC: WB4DYJ, PAM: WB4PRF, RM: WB4DJU. Congrats to WD4CZM for achieving WAS, WAC & 20 wpm code proficiency. Correction for Apr. issue: Crossville ARC should have read Plateau ARC. The East Tenn. Severe Weather Net will be operating at 9:00 P.M. EST on WR4AGJ 146.2/82. This net covers a 19 county area. Contact WB4GJR for more info. Jackson ARC starting a training class. Oak Ridge ARC elected WA4OBH pres., WB4SOI vice-pres., WA4GYI, secy., treas., I each. Chmn; WB4OBE, pub. chmn. they have just completed a Novice class and plan to start another soon. ORARC is really a training center for Novices. ORARC is donating an additional plaque for use in the TN QSO Party awards this year. K4IMX appointed to replace N4WF on the Nashville area Coordinator and WB4YPO has been appointed to replace W4LQE for the Knoxville area on the TN. Repeater Coordinating Advisory Committee. Welcome new licensees: WD4LGF, WD4LNE, WD4LSH, WD4LYA, WD4KDW, WD4DQF, WD4EPI, WD4KJA, WD4MVG, WD4MCM, WD4MVR, WD4MYO, WD4LGA, WD4KVC, CW nets report a QNI of 416 & QTC of 204. TN phone nets report a QNI of 6705 & QTC of 750, a total of 15 nets reporting. It seems so repetitious to list each net in every issue so send me other news that will be more interesting. Will list nets either quarterly or semiannually depending upon other news items. Traffic: K4CNY 296, WA4CNY 230, WA4NIF 166, W4OGG 103, WB4PRF 93, WA4IDN 84, WB4BKF 83, WB4ZSF 69, W4ZJY 55, WA4GLS 48, K4XE 34, WA4DKC 32, W4TZG 32, K4JSE 25, WB4YPO 21, W4CYL 18, W4TYV 16, W4RUW 12, W4VJW 8, WA4CGK 6, WA4TYN 6, K4VIG 6, W4EWR 5, WB4BXG 5, WB4MYZ 4, WA4WVW 3, WB4YBL 3, W4CSY 1, W4MEA 1.

GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID — SEC: WB4ZML. March net reports:

Net	QNI	QTC	Net	QNI	QTC
KRN	304	38	KYN	252	99
MKPN	1066	96	KSN	166	58
KTN	1446	162	KNTN	368	147
KPON	48	2	SDARES	79	10
			SEKEN	14	0

Louisville hamfest now two days — Sept. 30 and Oct. 1st at state fairgrounds. This fest is all under roof and is a real FB event. WB4YAF graduated from UK with honors and is moving to FL. K4AVX reports the Hazard repeater is back in operation on 07.67. The new des plan is taking shape with our ECs working with the area development district directors in formulating communication plans. Traffic: WA4IGS 110, WA4AVV 108, WB4NPD 101, WA4WSM 79, W4CID 59, WD4ITJ 49, WB4AUN 35, W4BAZ 34, WA4YPO 23, WA4JTE 22, WA4TKI 20, WA4FAF 18, WA4EFG 15, W4KIC 12, WD4LX 11, K4AVX 9, WA4AGH 8, K4AVX 4, W4CDA 4.

MICHIGAN: SCM, Stanley J. Briggs, W8MPD/K8SB — Asst. SCM: Aileen Gagnon, W4DHB. SEC: WA8EFK. RMs: W8JYA W8BNC. PAMs: W8SOP K8LNE W8WVW (VHF).

Freq.	Time/Days	QNI	QTC	Sess.
OMN	3663	2300/0300 Dy	1202	386
MACS	3953	1800 Dy	1011	293
MITN	3932	2330 Dy	507	231
GLEN	3932	0230 Dy	859	89
UPEN	3922	2200 Dy	926	76
WSBN	3935	0000 Dy	1214	69
BR	3930	2230 M-S	464	56
MEN	3930	1800 Su	151	2
MNN	3722	2230 Dy	102	23
Mi6M	50.7	0000 Su	13	25
VHF PAM	9 reports	678	6	36

I am pleased to announce the appointment of an Asst SCM for the U.P. WA8DHB of Gladstone. The Mich. Trt Net's 1st month of operation was a success. New affiliated club: Amateur Radio Public Service Assn. in Sturgis with W8QOE Pres. Club elections: DARA WBHOL, pres.; WA8SDC, vice-pres.; W8FBH, secy. K8DYI, treas. Appointments: K8ZJU OPS, WB8XJ OPS, WB8SEZ EC for Monroe Co. WB8HYD EC Bay Co. WB8TPR EC Benzie, Grand Traverse & Leelanau Cos. WB8ALQ EC for Lapeer Co. OO reports from K8AT, WB8IKJ & K8JH. OVS reports from W8GJZ & W8BYN. I am sorry to report the following: K8BNZ, W8BCY, upgrades: W8MGA, W8BMGK, W8BWT, to Adv. W8BIAD, W8BIAE, W8BSEW, W8BPKW, W8BZKC.

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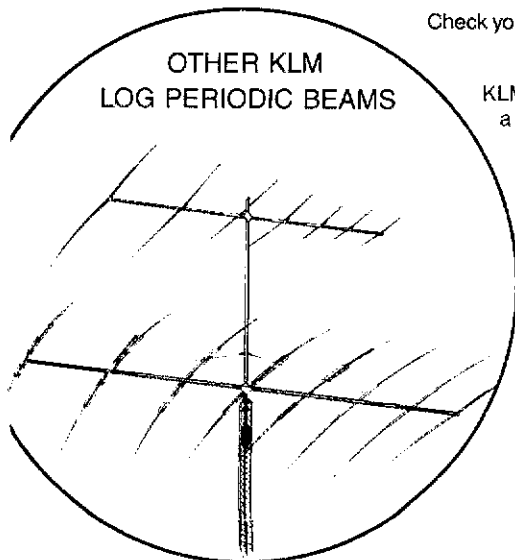
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Now enjoy peerless performance, **long-term** . . . 20-15-10 meter operation **plus** MARS and any other frequencies within the broad range of 10 to 30 MHz.

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KLM-35-130-15LP,
KLM-108-152-12LP.

KLM HEAVY DUTY
ROTATOR

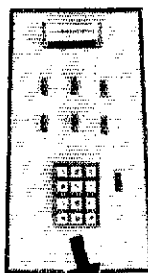
Ideal for rotating antennas and arrays where high torque and/or heavy weights are involved. Fits inside towers w/12" sides such as TRI-EX LM-470.



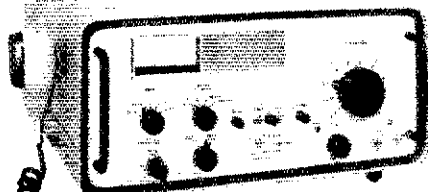
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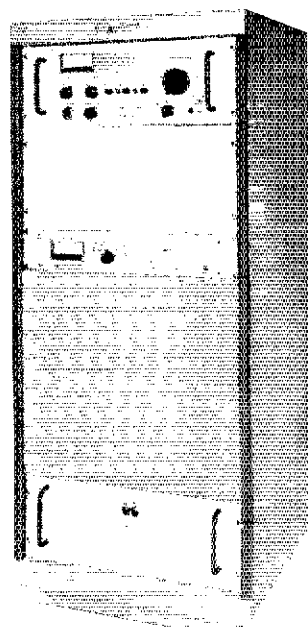
Internal Keyboard
And Display



SR-240 100 Watt

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- Synthesizer to generate up to 10 channel frequencies
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BELDEN COAX CABLE: 9888 double shield RG8 foam coax, 100% braid, suitable for direct bury 39c ft. 8237 RG8 21c ft. 8214 RG8 foam 25c ft. 8448 8-wire rotor cable 16c ft., 8210 72 ohm kw twin-lead \$19/100 ft., 8235 300 ohm kw twinlead \$12/100 ft. Amphenol PL-259, silverplated 59c. UG175 adapter 19c. PL-258 dbl female \$1.00 BNC female chassis mount 59c ea.

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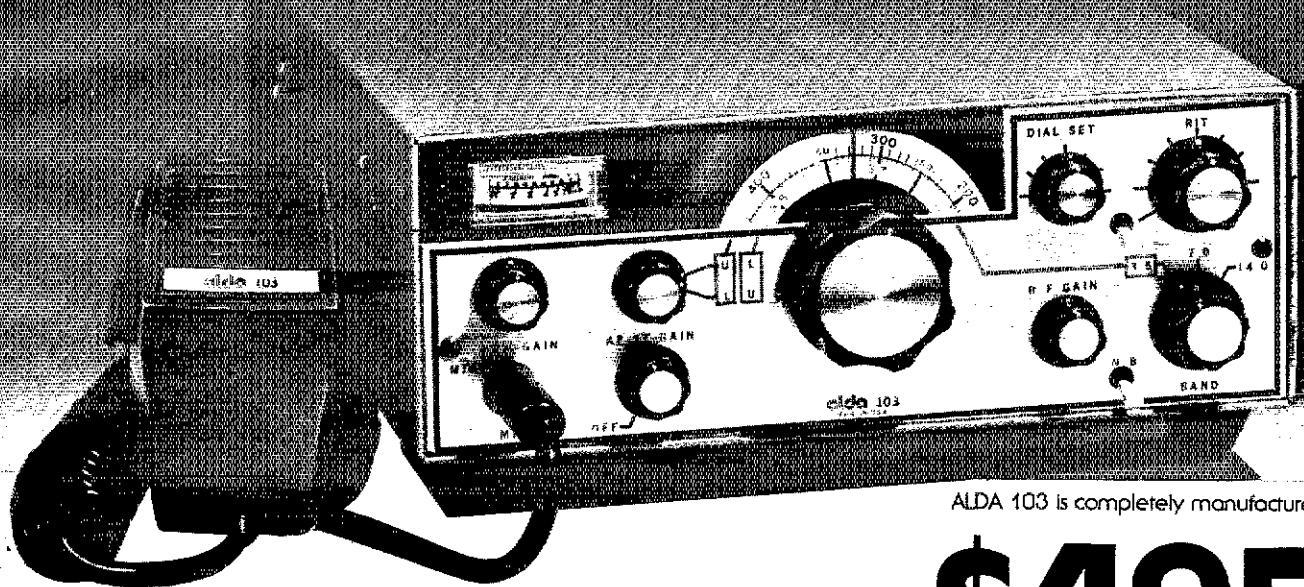
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only 3 1/4" high x 9" wide x 12 1/2" deep • less than 8 1/4 pounds

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.

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for CW operation. And with your general license, just plug in 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!



ALDA 103 is completely manufactured in the U.S.

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 — 260 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

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including microphone and mobile mount, too.

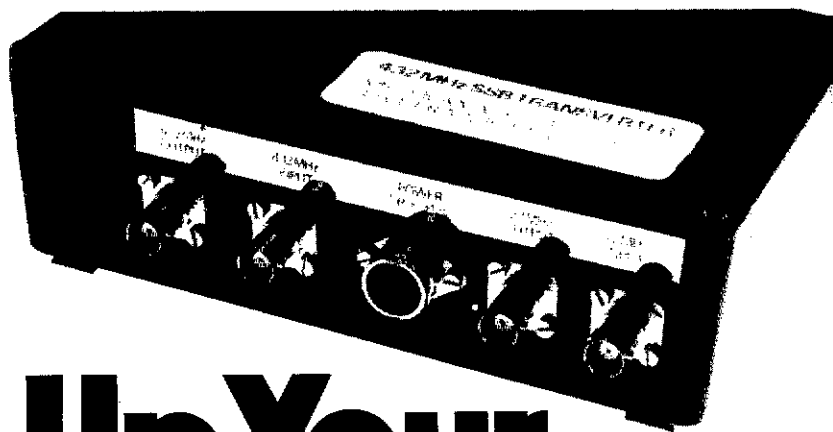
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 Current consumption: 250 mA quiescent 2.1 Amps peak
 RF connectors: 50 ohm BNC sockets
 Power connector: 5 pin DIN socket
 Size: 187 x 120 x 53 mm
 Weight: 900 grams

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MODEL	FREQ. RANGE (MHz)	WEIGHT (lbs.)	LENGTH (ft.)
2040B 9 ft	144-148	4.2	11
20116 16 ft	144-148	9.7	21
20421 21 ft	432-436	5.7	16
2018B 9 ft 19 ft	Oscar 144-148 432-436	5.6	11

WDBKZX WDBJRL to Gen. WDBPOV WDBQOV WDBKTB WDBPLU to Tech. WDBLYI reports his long wire helps coverage on MNN. W8CC made his 10,000th DX QSO during March! W8LCU reports the formation of a new QRP club. The Southern Mich. ARS obtained top score in 3A Batt class last Field Day. Can anyone beat them this year? Radio classes are showing very good results. The Port Huron area Novice classes have had 28 pass code tests and the Motor City Radio Club reports 18 so far with more on the way. Good luck to all in Field Day 1978! Traffic: (Mar.) WBSOP 510, WBBMTD 303, K8KMQ 241, K8RV 225, K8LNE 190, WBBTT 183, W8BYDZ 156, K8FE 146, W8MPD 123, K8DD 117, K8DYI 97, W8BYRY 75, WA8DH 72, W8BPOL 72, K8WRJ 68, W8N80 64, WA8WZF 63, W8DSE 60, W8SCW 59, W8BAPM 58, W8BZNS 51, W8BZCY 49, W8BCSA 46, W8BLRT 46, K8CN 40, K8KC 40, W8HX 35, W8BNNY 33, W8YIO 33, W8BHN 30, W8DCA 29, W8CAF 28, W8BRI 27, W8DMX 24, K8GXV 24, W8LDS 24, WA8MAM 24, W8POZ 22, K8BUE 21, K8JLU 21, K8JED 17, K8BZL 16, W8MFC 16, W8UOD 16, W8LYI 14, W8BSE 13, W8DCN 13, W8BDS 13, K8CBZ 13, K8AXL 12, W8LX 12, N8NA 12, W8BSYA 12, W8BVPW 12, K8DTG 11, W8SEU 11, W8RNO 11, W8BDF 10, W8DBD 10, W8BNA 10, W8WVL 10, W8YIG 10, W8BIX 9, W8PBO 9, K8TAK 9, W8BOM 9, W8EOI 8, W8BUZ 8, W8CUP 7, W8BJRX 7, W8BWW 7, W8BAFO 5, W8BAPN 5, W8BGB 5, W8VZ 5, W8QBE 4, W8BNC 1, W8BWO 1, (Feb.) WA8TBL 107, K8DAC 82, W8BGB 26, W8POZ 14, W8BOM 12, W8PSZ 8.

OHIO: SCM, Hank Greeb, W8CHT/N8XX — Remember Ohio TrafficKers Picnic, July 30, 1978, Columbus, Ohio. Contact W8BYL for details. Net reports (March):
 Net QRT Sess
 Net Times
 QSSBN 2704 929 93 1430/2000/2245 3,9725
 BN 637 317 61 0300/2245 3,577
 OSN 233 108 30 2210 3,577
 BNR 111 150 27 2230 3,605
 D8mN 392 55 31 0100 50,16
 ONN 161 67 31 2230 3,708

Congratulations to W8BVM on passing the Extra Class exam; W8BUB & W8BYJS on Advanced; W8BLY & W8BYF on General; & W8BPQT & W8BQGD on Technician. W8BWT reports doubling the OMN roster within the past two months. W8BMM, W8BZD, N8CW, and W8CHT researched affiliated club mailing addresses via the section/local nets. If you belong to a non-affiliated club please supply name, call, and mailing address to be added to section mailing list. New ECs include WA8CZS, Muskingum; W8DMF Tuscarawas; W8BOEX Fairfield; & W8BVEG Licking County. K8DL W8ERD W8BHW W8BNIY K8LT K8ND W8NTR W8BRUT W8BVR have been nominated for Official Emergency Station. Remember, OES is available to those interested and active in emergency communications preparedness upon recommendation from your Emergency Coordinator and presentation of application to K8AN Traffic. W8BZ 384, W8BEN 393, W8BKK 19, W8BVT 17, W8TH 154, N8CW 152, W8BJG 127, WA8ZNC 124, W8DIL 117, W8CZK 109, W8BYJ 107, WA8GH 108, W8IQ 103, W8BOM 98, W8BSS 85, W8BCDA 79, W8BSIQ 73, W8BYV 65, N8XX 64, W8BBD 63, W8BMTV 63, W8BUB 62, W8GGX 61, W8EK 60, N8TM 59, W8BUU 57, W8BVM 57, W8BVR 55, W8BML 52, W8FN 51, W8MCR 51, W8BVM 49, W8BMR 48, K8DL 47, W8BPI 45, W8TP 45, W8BGG 42, WA8ED 42, W8BDI 38, W8WEG 38, K8TX 37, W8BYO 33, K8JE 31, W8KAN 31, W8BQB 28, W8BDC 29, W8WLU 29, W8BHT 28, W8BCH 28, W8BMP 26, W8BNZF 26, W8BMO 25, WA8TSX 24, W8LZE 23, W8BAM 20, W8OUU 20, N8JR 19, W8BZX 18, W8BAJC 16, W8DDJ 16, NAVY 16, W8IM 14, W8RG 14, W8BHM 13, W8BYGW 12, W8ARW 11, K8BYR 11, W8BSSR 11, W8BGR 10, K8HF 7, W8DLI 7, W8FVD 6, W8ZM 6, K8CKY 5, W8BLWY 5, W8BDM 3, W8BUD 3, K8BNL 2.

HUDSON DIVISION

EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV — SEC: ASCM, W2VUK, ASE: K2AYQ, RMs: W2CS K2CYG, W2WSS, PAM: N2YL, W2ASPL, NYS: NYSPON 5PM-7PM; ESS (60) 6PM-3590; NYSPT, 8PM, 3525; NYS 7PM & 10PM; 3877. Appointees with new calls wanting new certificates pls send in old & will oblige. WA2YYM now K2XV. Got card from W2WSS/4 at Disney World. Message was either Mickey Mouse is QLF or QLF is Mickey Mouse. Can't remember. W2WJF sez buried under by various duties. Wants shovel. WA2EQW keeps thinking about putting up TH8DX. WA2MKQ gets the tiny award for 1000 word station report on back of post card. Good active month. RPI Radio Club & W2SZ getting verry active. By the way, who is the Great Zed? Overlook Harmonics carrying in beginners column. Send your truth can read it. Special congrats to new General WA2JDF. Way to hang in there. More upgrades etc. Congrats to all. Extra: K2RRR W2KNN, Advanced: K2LNG WA2KNO WA2AXH W2BSHC. General W2COGN WA2TQW WA2IZW W2BLUB WA2LHN W2BSHB WA2BHH. Tech: WA2GTY WA2GYS W2ZYK WA2MRL WA2LFZ. Nov: W2WQN WA2YBM WA2YDG W2BWM W2BYPY. New appointments: PAM: WA2SPL, ORS: W2KDC W2EUF, OPS: W2KDC, PSHR: N2YL WA2SPL W2CS W2SZ. Traffic: WA2SPL 550, N2YL 361, W2CS 29, W2YJR 147, K2XV 139, W2EUF 93, W2EQW 92, K2AV 83, W2JJK 50, W2ZJK 50, WA2QZ 41, WA2MKO 23, WA2FFX 20, K2DN 19, K2HNV 17, WA2CYJ 16, W2EUF 11, WA2PAU 10.

NEW YORK CITY-LONG ISLAND: SCM, John Smale, K2IZ — SEC: K2HTX, PAM: WA2YEI, RM: W2EUF. The following are traffic nets in and around the section:

Net	kHz	Time/Day	Mgr.
NLI*	3630	1900/2200 Dy	W2EUF
NLI Phone*	3928	1730 Dy	WA2YEI
NLS*	3725	1745 Dy	W2JAY
ESS	3590	1800 Dy	W2WSS
NYSTPEN	3925	1800 Dy	W2RSP
Clear House	3925	1100 Dy	W2AEK
Mic Farad	3925	1300 M-S	W1DT

*Denotes section nets all times are local, please try to help by checking in. W2EUF is the new RM. I want to say thanks to W2IDP for the fine job that he did. WA2AFJ is now N2FP, WA2FBX now N2RC, W2GQN is now K2BS, K2QPF now K2MZ, CARP is looking for more volunteers, contact N2WS (ex-WA2OHN), K2VGD now K8K, W2IMX now has a TS-520, W2PWZ has a Kenwood 7500. Congratulations to W2TE who not only ran in the L.I. Marathon, but finished all 26 miles 385 yards. Welcome to the newly ARRL affiliated Knickerbocker ARC of Knickerbocker Yacht Club, Officers for the Staten Island ARA are WA2BE, pres.: K2PR, sec.: W2NHB, treas. Congrats to W2BZZ who has been ac-

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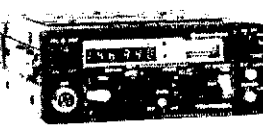

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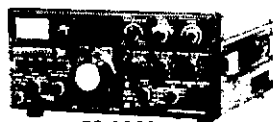
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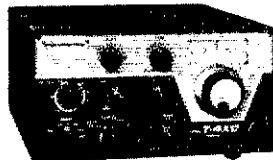


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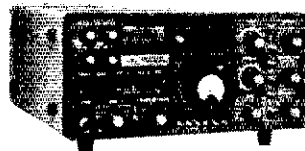


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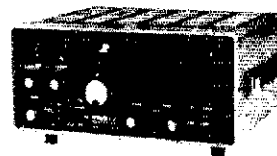


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SPECIFICATIONS

ELECTRICAL: 2 MHz bandwidth, 1.5:1 SWR - 146/148 MHz, 30 watts max.
MECHANICAL: 56" long with 6" co-ax and connector attached

MODEL	CONNECTOR TYPE	PRICE
101-PLC	PL-259 TYPE	\$7.95
101-SMP	2.5 mm Subminiature Phone Plug - (Standard)	\$7.95
101-MPP	3.5 mm Miniature Phone Plug - (Midland)	\$7.95
101-FC	"F" Type - (Wilson 2W)	\$7.95
101-BNC	BNC - (Genave, Wilson MK II & MK IV)	\$8.95
101-TNC	TNC - (Wilson 5W)	\$8.95
101-RCA	RCA / Phono Type	\$7.95
101-MBC	MB - (Hy-Gain)	\$8.95

RF

OMNI-1

A new 1/2 wavelength two meter antenna utilizing a fiberglass housing and a PVC base that weather-proofs the enclosed radiator and matching section. The radiator is silver plated copper for maximum radiation efficiency and is shunt fed (DC grounded). The design does not require ground plane radials that interfere with other adjacent antennas. Three models suitable for base station, marine, or vehicular installations. Choice of black or white in two of the three models.

For base station or marine use, the OMNI-1 features light weight and low wind loading which reduces the size and strength requirements of the mounting structure.

Except for the co-ax connector, the exposed surface of the OMNI-1 is non-metallic and is therefore excellent for marine installations. Accessory mounts available for marine use, models 199-501 & 199-502.

For vehicular use the OMNI-1 is ideal where 1/4 or 5/8 wavelength antennas will not operate due to an irregular or non-metallic ground plane surface (fiberglass vehicle). It also minimizes performance loss at highway speeds due to whip flex as encountered with small stainless steel whip antennas. A quarter turn disconnect model is available which can be readily removed for storage.

SPECIFICATIONS

ELECTRICAL		MECHANICAL	
Frequency Range	145 - 148 MHz	Length	66 inches
SWR	Less than 1.15:1 at resonance	Weight	6 oz. (190-201) 8 oz. (190-202)
Bandwidth	3.5 MHz (1.5:1 SWR)		11 oz. (190-203)
Power Rating	100 Watts	Surface Area	27.34 square inches
		Connector	SO-239 type

MODEL	DESCRIPTION	PRICE
190-201	Base or sailboat with co-ax connector at antenna base, white fiberglass.	\$17.50
190-202	Vehicle or power boat with 3" co-ax and 3/8" - 24 male stud, specify white or black.	\$20.50
190-203	Vehicle use, 3" co-ax and quick disconnect with 3/8" - 24 male stud, specify white or black.	\$21.50

RF

Antenna Mounts

199-501	A two piece snap - in white PVC sailboat mast mount. Designed to accept and offset the model 190-201 type antennas. Offset is 5 1/2 inches and may be varied to suit individual installation requirements. Installation is made by mounting the two mounts 6 inches apart with the stainless steel screws supplied.	\$7.50
199-502	A white plastic totally adjustable ratchet mount for power boat antenna installation. Locks antenna in the upright as well as the down position and may be mounted on the deck or bulkhead. Accepts 3/8" - 24 or 1" - 14 antennas and includes stainless steel hardware.	\$16.50

RF

HT Antenna Adaptor Cables

Small flexible 4 foot co-ax cable assemblies primarily intended for interfacing between a hand held transceiver and a base or mobile antenna amplifier. In-line SO-239 connector on one end for antenna / amplifier connection and the required HT connector at the other end.

195-011	2.5 mm Subminiature Phone Plug - (Standard)	\$7.95
195-012	3.5 mm Miniature Phone Plug - (Midland)	\$7.95
195-013	"F" Type - (Wilson 2W)	\$7.95
195-014	BNC - (Genave, Wilson MK II & MK IV)	\$8.95
195-015	TNC - (Wilson 5W)	\$8.95
195-016	RCA / Phono Type	\$7.95
195-017	MB - (Hy-Gain)	\$8.95

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capted to SUNY Stony Brook, WB2SRF now has an IC 211. WA2YEI now has a Hallcrafters SX-71, and a new inverted V for Ten. Jim would also like to know where the 6M activity is in the section. Contact him on the NYCLI Phone Net if you can help. Thanks to WB2ZFG and WB2SHZ, who are Cardinal Hayes HS Alumni. There are 6 new Novices on the air: WB2WRE WA2TYX WB2TYV WA2WU WA2WVA WB2WVZ. WA2UTR upgraded to Gen, WA2YUS upgraded to Advanced. Make your plans now for the HARC Convention, Nov. 10, 11, 12, at the Playboy Club and Resort at Great Gorge, N.J. If you missed the last one make it to this one you will enjoy it. LIMARC had George Meade, WOR's airborne traffic reporter as the guest speaker at the Apr. meeting. As more info becomes available we will report for now many thanks to WB2MIY and N2FP (WA2APJ) for the really great job they did with the Marathon. I'm sorry to say that the section is losing one of the few voices in the Bronx, W2HXT will be moving to MD on June 1, we all wish you luck. Traffic: (Mar.) W2GKZ 130, WA2JKG 125, W2HXT 114, WB2HIQ 84, WB2IDP 56, W2MLC 51, K2GCE 38, WA2CZY 30, WA2YEI 26, N2LI 13, WA2YUS 11, K2JFE 4. (Feb.) N2LI 11.

NORTHERN NEW JERSEY: SCM, Bob Neukomm, WA2MVQ - SEC; WB2VUF, RM; W2XD, PAMS; WB2LCC WA2OPY (VHF), RM RTTY; W2PSU, RM NJSN; N2MV, Net Mgr. Freq. Time/Days Sess. QNI QSP
 NJN W2XD 3655 7:00 P Dy 31 424 206
 NJN W2XD 3659 10:00 P Dy 31 229 89
 NJSN N2MV 3730 8:15 P Dy
 NJPN WB2LCC 3950 6:00 P Dy 31 531 241
 NJPN WB2LCC 3950 9:00 A Su 4 81 17
 NJRTTY W2PSU 147.51 7:00P Dy
 NJ2Mtr WA2OPY 145.5 8:30 P Dy 31 54

Please note "new" 220 frequency! 223.34/224.94 Dy 8:00 P. The NJ QSO party date has been changed to: July 29-31 and starts 2000Z July 29 until 0200Z July 31. Frequencies: 1810, 3535, 3905, 7035, 7135, 7235, 14035, 14280, 21100, 21355, 26100, 28600, 50-50.5 & 144-146. See "Operating Events" for further details. The combined NJNYLI picnic will be held at Shark River State park, July 22nd. WA2MVQ SCM gave a talk on traffic handling at the Tri-County Radio Assn. W2CVW worked 2 more new ones on 80 towards his 5-Band DXCC. W2ISA is a new Novice and back on the air from the early 50s. The following are new Advanced: WA2DLZ WB2TLZ and WA2OAC. New General is WB2EB. WA2JRG just returned from 8 months in Spain and also bought a Drake C line. N2GJ added a Yaesu memorizer to station; and also added a new "jr. op." WB2NJV is looking for a manual for the FX-50 and NC-183. Tune to WR2ABC 147.075/675 Mercer Co. HF Net Sat. at 0330Z Rutgers ARC officers for 78-79: N2SIV, pres: WB2QOO, vp: WA2MLY, secy: WB2TDI, treas: K2MS, stn mgr: WA2SOU, comm. mgr: WA2SNJ, QSL mgr: CW ops please note: New Net - New Jersey - New York Slow Net (NJNYN) meets daily 4 PM on 3.735 MHz and the net mgr is WA2LHV. W2SWE has a new QTH: 31 Hedwood Drive, Toms River, NJ. W2PSU has a new TS-820. WA2MVQ has the new Drake twinnos. WA2LNL has a new Atlas-210. WA2JUJ who has been a "ham" over a year without her first QSO made it to Clipperton with FOAXB. Nice one for a first! N2WVJ left a "head" for another set of Drake twinnos. WB2RTG advised that the Oakland "Raven Net" operated during the recent flooding conditions in the Wayne area reporting the river levels at Oakland with K2RK as chief operator. Traffic: (Mar.) W2RQ 242, W2CQB 199, WA2MVQ 177, W2WHE 158, WA2NPP 133, WB2MSO 105, W2SWE 89, N2GJ 77, N2GM 66, W2LTP 59, K2OP 51, N2TM 43, WB2DMB 41, WB2NSV 40, W2QNL 31, WA2LHV 30, WB2HSG 28, WA2EPK 22, W2QNL 19, K2ZF 18, WA2XB 17, W2XJ 8, K2SE 17, W2CC 18, WB2KLF 10, WA2DLZ 8, WB2JVE 8, W2CVW 4, W2UH 4, WA2LBW 1. (Feb.) W2RQ 150, W2CVW 4.

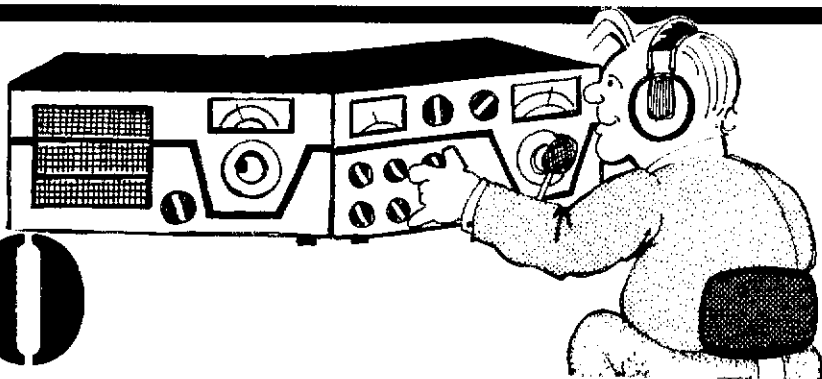
MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF - Many thanks to WB0AVV for getting the traffic totals last month while I was in 7-Land. FCC exams given to 175 at special session by Cedar Valley ARC, June 3rd in Harboree at S. Soc City. Congrats on upgrading to: K0RLT WD0AWH WD0GDL WD0GDN WD0AWP WD0AWG WD0FCA WB0ZXU WD0AWL WD0AWM WB0WVW WD0EYU WD0BPO WB0TZD WA0VTR and a special congrats to W0GNJ for his new General ticket after 25 years of trying. W0WP and W0SR made WAZ and WB0YUJ made DXCC in less than 6 months as a General. WB0RWJ going to low 50s. WB0GDN again on QTH. W0GDN on QTH. W0SLS, K0EVB, WB0CZA, WB0YS, W0YX, N0SM, K0EYU, WB0GX, WB0NS, WB0RVN and WB0YRH. WB0JEU now N0JE. K0LKH has new TR2200A, W0EIT new KDK-FM2015R and WB0SEL new MLA-2500 and 155 countries. 31/91 is now on at Muscatine, BI-State VHF Teleprinter Soc. meets Wed. and Sun. at 8 P.M. 145 700 shift 850 WPM 60 and will have 146.100/700 RTTY repeater soon. K0ES with WB0TJU and WB0BCY now live in TX. I'll be looking for your Field Day message. Nets: Ia. 75M, 3970, 1730Z M-S. K0JW Mgr. QNI 1860, QTC 192, sess. 27. 2300Z K0RN Mgr. QNI 118, QTC 82, sess. 27. Ia. Gen. (I) QNI, 550 P. 2300Z, W0YLS Mgr. QNI 426, QTC 124, sess. 82. Traffic: WA0AUX 939, K0EYH 178, W0YLS 170, N5YX 156, W0SS 99, WA0CZA 65, WB0KHO 62, WB0AV 29, W0JJP 20, W0VEZ 14, W0DFCI 11, K0GP 8, W0GDL 5, W0BW 4, K0LKH 3.

KANSAS: SCM, Robert M. Summers, K0BFX - The past month has been rather hectic at this QTH. My brother passed away after open-heart surgery. Spent time in helping his family. I also had the flu. Dec. '77 traffic results as follows: OKS-QS QNI 142, QTC 57; KWN QNI 755, QTC 363; OKS-QS QNI 554, QTC 345; KPN QNI 209, QTC 39; KSNB QNI 1290, QTC 277; CST QNI 1010, QTC 139 and CSTN for Nov. '77 QNI 988, QTC 72. Several clubs operated Message Day Centers during Dec. 25 Ops of the Lawrence group handled 290 QTC and 42 Great Bend Ops. Handled 195 QTC. I am recommending qualified stations for OES appointments to W0KZ. AFES stands 815 members currently registered. ECs reporting W0NYG W0DSY W0PSN W0WBJ W0OAG W0KL, is your EC still awaiting your call to help him? Get activity going in your zone. Mar. net reports: KSNB QNI 1348, QTC 137; KPN QNI 231, QTC 21; KWN QNI 836, QTC 383; CSTN QNI 1197, QTC 116; OKS QNI 557, QTC 229; W0KL notifies all of shift in time for EC Net to Tue. 7 PM on 3920 kHz. Traffic: WB0CSH 265, WB0VEZ 154, W0AM 124, W0CYH 113, W0HI 105, W0CHJ 89, W0IX 87, W0FR 82, W0ALB 70, W0T 61, W0WVA 42, W0BN 35, W0FF 27, K0KD 21, W0RBO 19, W0KDE 15, N0IN 14, K0BFX 13, W0KL 13, W0BP 11, W0HGG 9, W0OQA 8, W0PSEV 7, W0B9Y 6, K0FPC 6, W0BSZ 6, W0NYG 4.

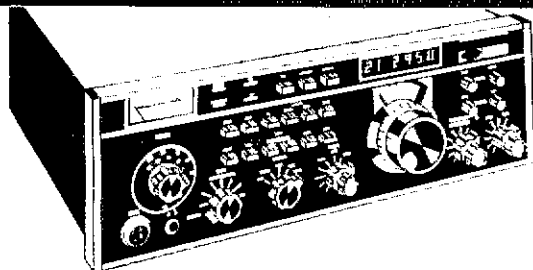
MISSOURI: SCM, L. G. Wilson, K0RWL - Asst. SCM:

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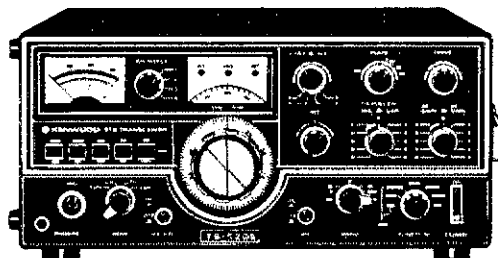
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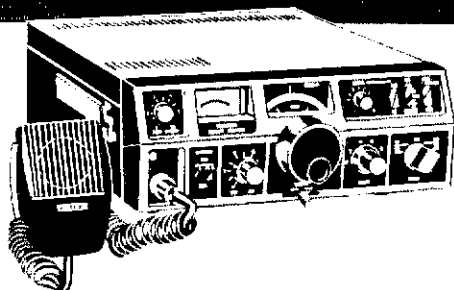
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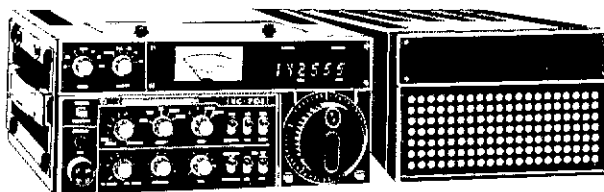
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VISA

Long's Electronics



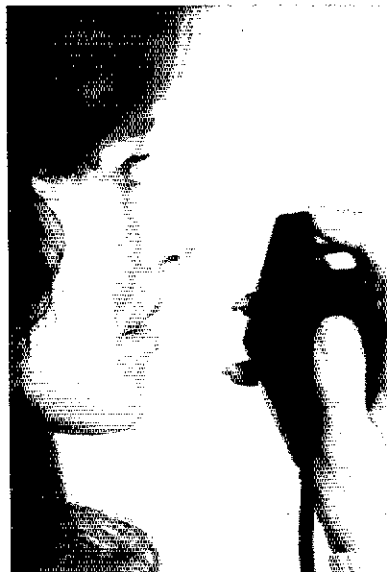
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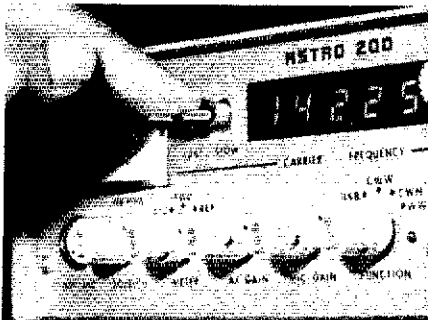
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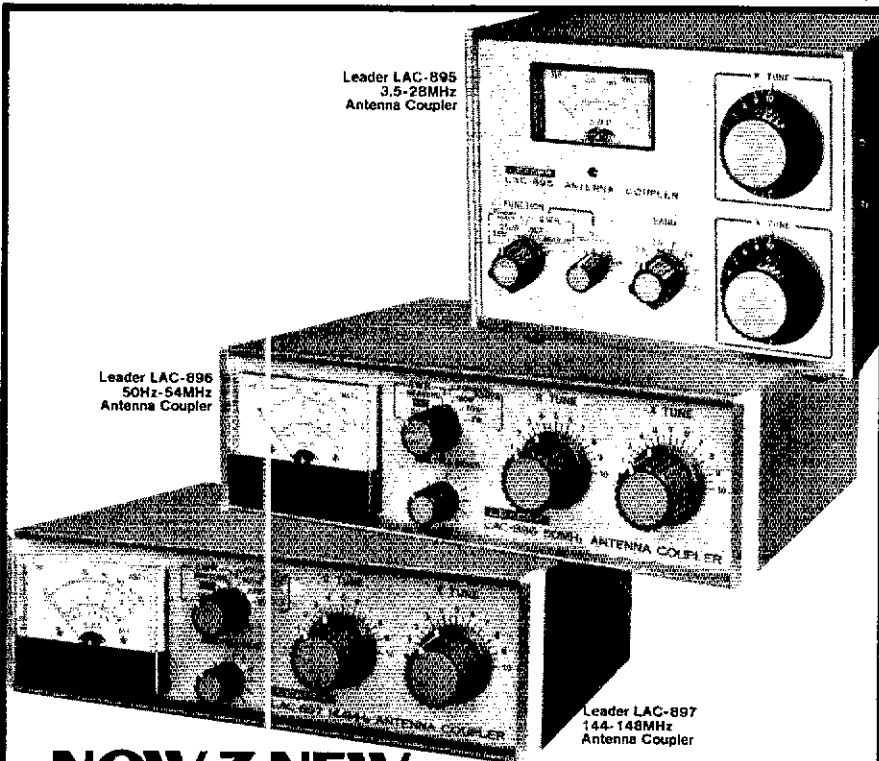
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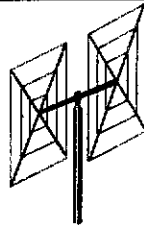
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Two element quads with full wavelength driven element and a reflector. Gain is equal to that of a three-element beam and directivity is exceptional! ALL METAL construction (except the insulators). Totally complete with boom, aluminium alloy spreaders, sturdy universal type boom mount, wire and all hardware; uses 52 ohm coaxial feed; no stubs needed; full instructions for simple assembly and installation included; assembled weight 25 lbs; a fool-proof quad that always works with great results. This cubical quad is the antenna used by the DX champs and it will do a wonderful job for you.

Now check this super price: 10/15/20 quad, complete, ready for simple assembly... JUST \$69.95.

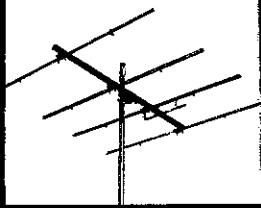


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In an age of compromise, Gotham beams stand out offering championship performance at modest prices. Adjustable to any frequency within band, at lowest SWR, these beams are built strong to resist adverse weather conditions. Each beam is full size for full size performance. Not mini beams, or trapped beams; including boom, all hardware, and gamma match; requires 52 or 72 ohm coaxial feedline; 7/8" and 1" aluminium alloy elements for maximum strength and low wind loading.

12 EL 2M Beam \$66.95 4 EL 10M Beam \$49.95
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FREIGHT PREPAID on 2', 6', and 10M beams shipped to the 48!



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Effective low angle, omnidirectional radiation, easy assembly and operation, no guy wires needed, occupies little space, can be installed at ground level, exceptionally rugged, broad banded, low initial cost, no maintenance, proven and tested design. Guaranteed Gotham quality at low Gotham prices. One of the best antennas for the price. LOADING COIL INCLUDED. Absolutely complete.

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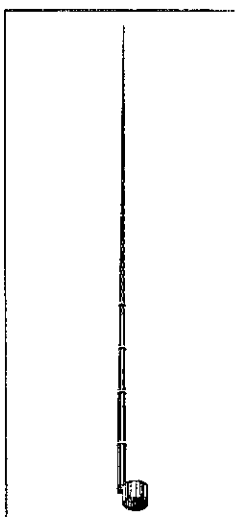
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Joe Flowers, W0TF. SEC: WB0FKY. The Kansas City DX Club has had VS5DX as a special guest recently. WB0RET W0VVV and WA0AGN scored well in the recent DX contest. Deepest sympathy to the families and friends of WB0ZSF and W0GQR who recently joined the ranks of Silent Keys.

Net	QNI	QTC	Net	QNI	QTC
NEMOE	127	73	MON 2	109	48
HBN	239	34	MEOW	387	42
MON	180	130	MOSSBN	1051	102

Congratulations to the following: Novice - W0DS GJP GJW GJZ GKC GKP through GKV GLO GLA GLF through GLJ GMV GNA through GND GNG through GNI GNL GNT through GPV GQZ GOA GOE GOF GOX GPO GPT through GPW GPY GPZ GOX GOY GRJ GRU GRV GSD GSM GSN GSY GTO GTI GTR GTW GUL GUO GUT: Advanced - W0B0VQ; Extra - W0B0JD and W0B0DX. Traffic: K0ONK 412, W0BMA 193, W0HH 157, W0BVHN 139, K0SSN 131, W0BV 91, W0ULD 67, W0OTF 65, K0SI 64, W0BFKY 55, W0BLFY 46, W0VDD 42, W0BVL 34, W0BEP 27, W0BOKK 27, W0B0KD 22, N0JL 18, K0RWL 11, W0QAU 5.

NEBRASKA: SCM, Ed O'Donnell, W0GWR - Congrats to the Kearney RC for a successful 2nd Ham Spring Convention, Apr. 1st. 180 Mtr WX Net deactivated Mar. 31st, will re-open this fall with return of Central Standard Time on 1995 kHz at 7:30 CST. ARES 2 Mtr nets active throughout state because of floods and tornadoes. Public officials are becoming more aware of the efficiency of the nets and the unselfish public contribution of Hams. 180 Mtr WX Net, QNI 304, QTC 53; Cornhusker Net, QNI 1950, QTC 103; Mid-Nebr ARES 2M Net, QNI 337, QTC 7; Morning Phone Net, QNI 1541, QTC 25; Nebr 75M Sun, ARES Net, QNI 206, QTC 0; Nebr Storm Net, QNI 1299, QTC 40; Pawnee ARC 2Mtr FM Net, QNI 157, QTC 0, Platte Valley 2 Mtr Net, QNI 39, QTC 2; PM Net, QNI 406, QTC 215; OCWA Net, QNI 54, QTC 0; Western Nebr. Net, QNI 503, QTC 11. Traffic: W0FQB 320, K0AIE 70, W0VEA 68, W0HOP 54, W0EUT 48, W0HTA 48, W0CBJ 35, W0ZNI 20, W0AJH 17, W0NIK 16, W0VXY 12, W0QEX 11, W0B0GWR 8, K0BDG 7, W0B0RQ 7, K0SFA 6, W0BSYV 6, W0YFR 6, K0HNT 5, W0ATU 4, W0PCC 4, W0BRJK 4, W0AGHZ 3, W0B0GM 3, W0BEE 1.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, John McNassar, W1QVT -- SEC:

Net	Freq	Time/Days	Secs	QNI	QTC
W1XX	Rm	K1EIR, PAM, K1EIC, VHF	WA1ELA		
CN	3640	1900/2200 Dy	62	370	220
CPN	3965	1800 M-S	31	571	230

VHF-2 28/88 2130 DY 31 392 93
CORN 147.75/15 RTTY 24 Hrs. 1 6 89
WESCON 147.78/18 2030 M-F 22 545 139

High QNI: CN W1KV K1GF, CPN W1NQO WA1TFP K1BSB, VHF-2: K1DFS. SEC W1XX requests information covering Public Service Activities of your club. Director W1HHH encourages clubs to promote Novice activity as an asset to upgrading. There are now over 14,000 APRL Life Members. Traffic operators contact K1OQG or WA1HYN for copy of Conn. Comm. Gazette. Fairfield ARA takes member color slide pictures to produce "inside FARA Shacks" for club program. Shoreline ARC had Heathkit Store Slide Show. Southington ARA had ARRL Field Day Slide Show. Meriden ARC held Heathkit Computer Session. Stamford ARA invites all clubs to 3:910 at 11:30 AM Sun. 8 meters active, "800 Club" Award available -- also Satellite "1000" Award. Congratulations to: WA1LOU for Mar. BPL; WA1ULD and WB1EON for Extra Class; Enfield RA Group an ARRL affiliation. Life Members: Traffic operators contact K1OQG or WA1HYN for copy of Conn. Comm. Gazette. 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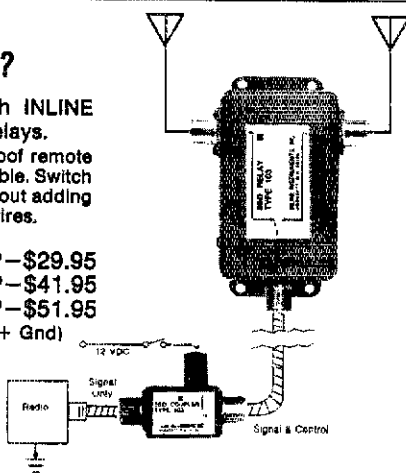
Type 101*—DC to 550 MHz—2500W PEP—\$29.95
Type 103 — 20 to 550 MHz—1000W PEP—\$41.95
Type 105 — 1.5 to 180 MHz—2500W PEP—\$51.95

*not coax cable controlled—control with 1 wire + Gnd)

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TEN-TEC, Inc.

Gentlemen:

Comments on my new 544:

This is the finest rig I've owned (including Kenwood, Drake, Collins, Atlas, Hallicrafters, etc.) that combines truly excellent audio fidelity and a sharp skirted SSB filter. I bought the rig for my wife, WB9WZJ, to use on CW, but in one weekend of operating, I'm spoiled! My TS-820S and Drake C-Line sit idle, due to the simplicity of operation and the listenability of the receiver section. I've had many unsolicited good audio quality reports on the transmitter as well.

The QSK feature is really neat, especially after adding that effective CW filter.

I'm also pleased at how the finals don't balk when faced with a 3:1 SWR as so many of the broad-band rigs do. Also, the amount of average output on SSB was more than I expected . . .

Seems as though most of my dollars went to pure performance and quality rather than to the "frills and thrills" that some of the other manufacturers offer . . . In addition to an obviously fine product, I would like to thank you for your personal answer to my original letter (a reply which was neither requested or expected) and for the follow-up question-reply sheet and operating hints which were sent. Such service will not be forgotten!

All-in-all, I am extremely pleased with the TRITON IV Digital. It is every bit the rig your ads claim it to be, and more! I'll be anxiously watching TEN-TEC for future advances in the State-of-the-Art in Amateur radio equipment.

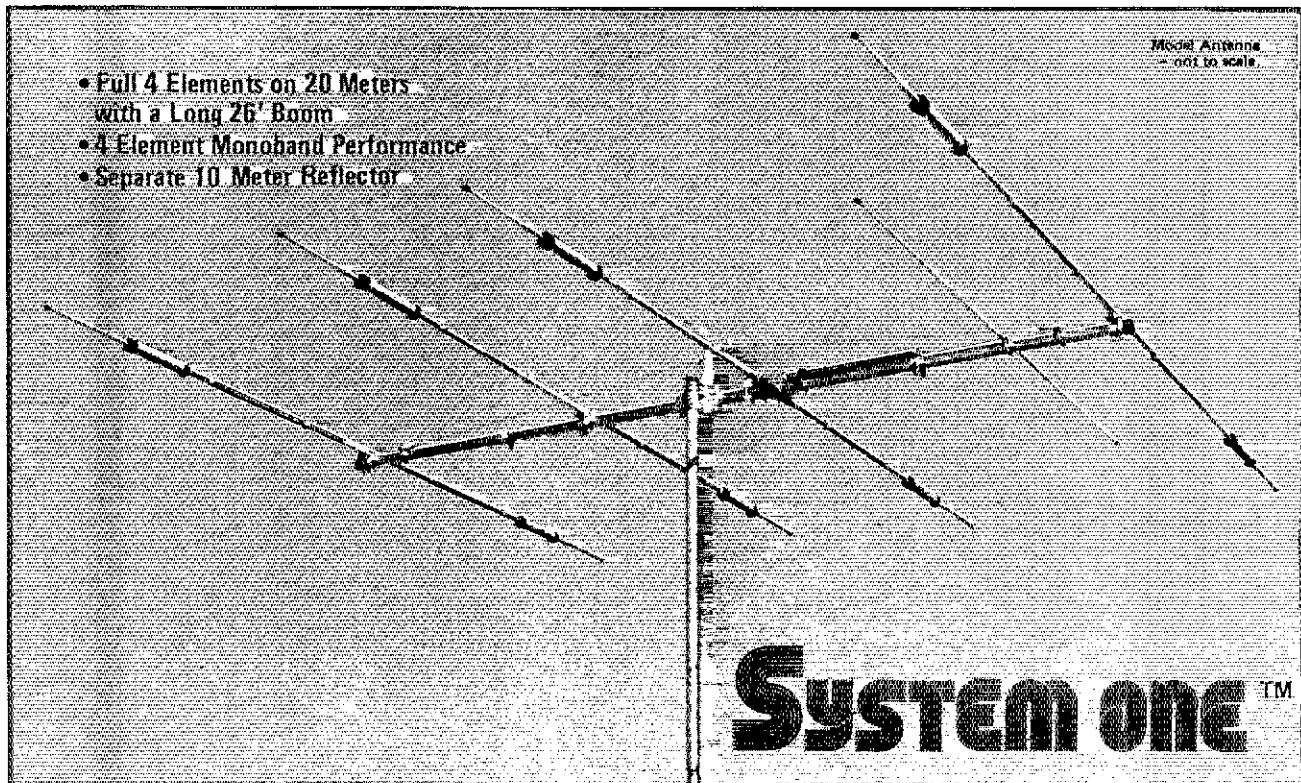
Sincerely,
Bill Gode, WA9NHQ

Number 6 of a Series

TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862
EXPORT 5715 LINCOLN AVE., CHICAGO, ILL. 60648

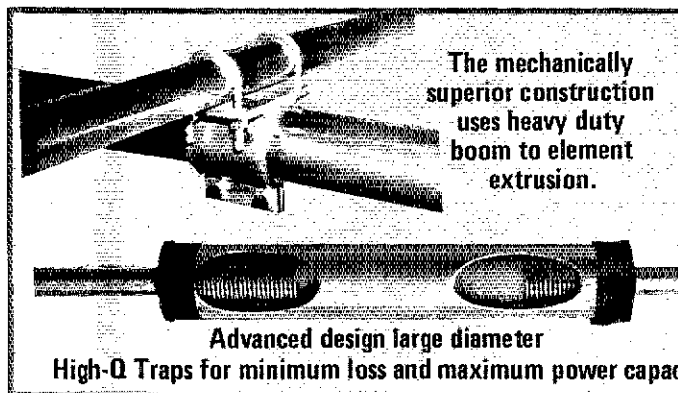
THE NEW INDUSTRY STANDARD OF PERFORMANCE... IS THE **Wilson SYSTEM ONE!**

A DX'ers delight operating 20 meters on a full 26' boom with 4 elements, 4 operational elements on 20-15-10, plus separate reflector element on 10 meters for correct monoband spacing. Featured are the large diameter High-Q traps, Beta matching system, heavy duty taper swaged elements, rugged boom to element mounting . . . and value priced! Additional features: • SWR less than 1.5 to 1 on all bands



- Full 4 Elements on 20 Meters with a Long 26' Boom
- 4 Element Monoband Performance
- Separate 10 Meter Reflector

System One™



The mechanically superior construction uses heavy duty boom to element extrusion.

Advanced design large diameter High-Q Traps for minimum loss and maximum power capacity



Insulated driven element with precision Beta match and heavy duty element mounts.

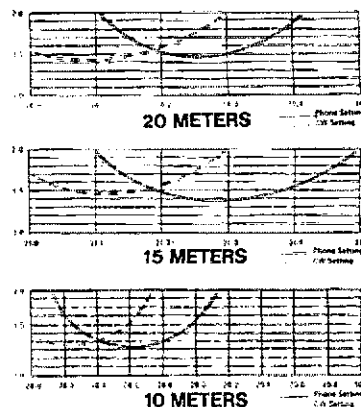
Shown with Wilson's new optional Toroid Core BN-50-A Balun.

SPECIFICATIONS: SY-1

Matching Method Beta
Band MHz 14-21-28
Maximum Power Input Legal Limit
VSWR (at Resonance) 1.5 to 1
Impedance 50 ohms

Boom Length 26'
Boom Diameter 2" O.D.
No. of Elements 5
Longest Element 26' 7"
Turning Radius 18' 6"

Required Mast Diameter 2" O.D.
Surface Area 8.6 sq. ft.
Windload at 78 mph 215 lbs.
Shipping Weight 65 lbs.
UPS Shipment in 2 Cartons



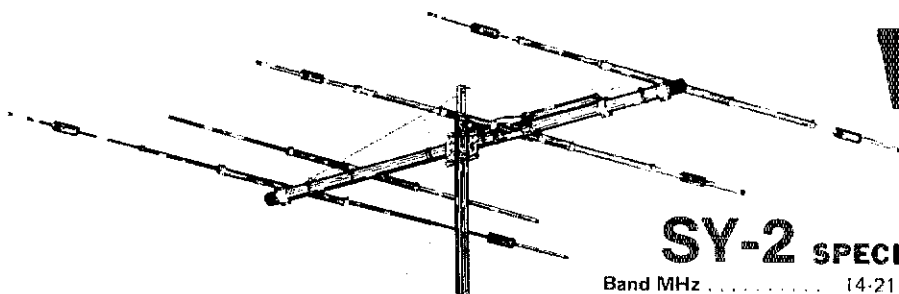
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Top Performance for 20 - 15 - 10 Meters!

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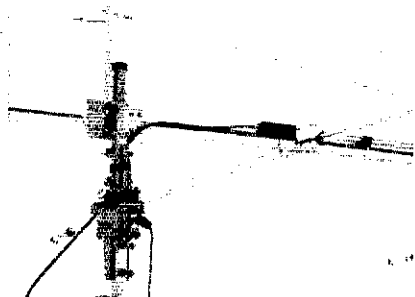
SY-2 SPECIFICATIONS

Band MHz	14-21-28	Boom Diameter	2" O.D.
Maximum Power Input	4 Kw	Surface Area (Sq. Ft.)	6.15
VSWR (at Resonance)	1.5:1	Wind Loading	153
Impedance	50 Ohms	at 80 mph	153
Boom (O.D. x Length)	2" x 18'6"	Assembled Weight	47
No. Elements	4	(Lbs. - Approx.)	47
Longest Element (Ft.)	27' 2"	Shipping Weight	50
Turning Radius (Ft.)	16' 5"	(Lbs. - Approx.)	50
Req'd. Mast Diameter	2" O.D.	Matching Method	Beta

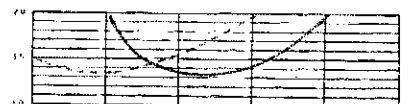
Only One Feed Line Required

SHIPS BY U.P.S.!!!

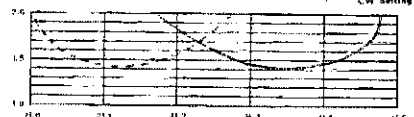
Delivers outstanding performance on 20, 15 and 10 meters. Features Wilson's large diameter High-Q Traps, feeds with 52 ohms coax, a beta match method presents tapered impedance which provides most efficient 3 band matching and DC ground to eliminate precipitation static. The result is SWR less than 1.5 to 1 at resonance on all bands and maximum front-to-back. An added feature is the separate 10 meter reflector for correct monoband spacing. Add to this the rugged boom to element mounting, heavy duty taper swaged elements, and you have



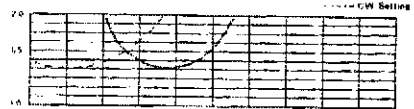
Wilson's WR-500 Rotor and SST-64 Crank-up Tower used with System Two. Recommended Balun: Wilson BN-50A.



20 METERS - MODEL SY-2 — Phone Setting
— C.W. Setting



15 METERS - MODEL SY-2 — Phone Setting
— C.W. Setting

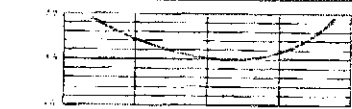


10 METERS - MODEL SY-2 — Phone Setting
— C.W. Setting

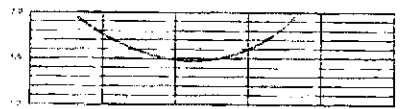
System Two™

. . . space efficient, high performing, cost effective new tribander.

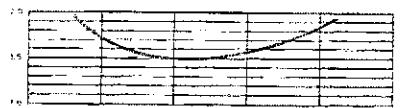
40 THRU 10 METERS VERTICAL TRAP



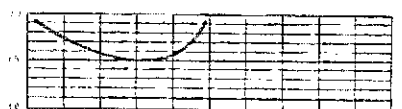
40 METERS - MODEL WV-1



20 METERS - MODEL WV-1



15 METERS - MODEL WV-1



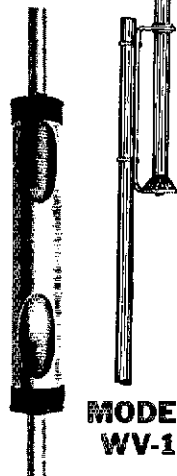
10 METERS - MODEL WV-1

WV-1 WILSON VERTICAL TRAP ANTENNA

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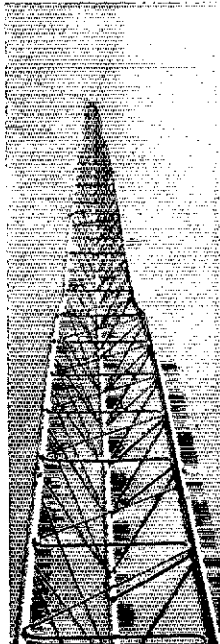
SPECIFICATIONS

Input Impedance: 50 Ohms • Powerhandling capability: Legal Limit • Two High-Q Traps with large diameter coils • Low Angle Radiation Omnidirectional performance • Taper Swaged Aluminum Tubing • Automatic Bandswitching • Mast Bracket furnished • SWR: 1.5:1 on all Bands • 1½" O.D. Heavy wall aluminum tubing • Does not require guying • Overall length: 19' 3".



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P-6	C-6	6	P-354	C-354	35, 40
P-68	C-68	6, 7, 8			
P-81	C-81	9, 10, 11			
P-10	C-10	10			
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W1EMG 48, W1NF 48, WA1LAD 42, WB1DXR 41, WA1ZXB 32, WA1YWK 31, WA1OWG 24, K1BZD 18, W1XA 18, WA1YUJ 17, WA9NEW 17, WA1FE 16, W1DGD 11, K1GK 11, K1LCO 10, K1ES 8, WA1YMD 8, WA1X7 7, WA1QNZ 6, W1SR 6, WA1OAJ 5, WA1FNM 2, W1MNK 1. (Feb.) WA1YUJ 137, WA1TBY 102, WA1DA 33, K1ES 13, WA1MUF 11, WA1YOJ 8, W1UC 6, K1LCC 2. (Jan.) WA1IDA 15.

MAINE: SCM, Bill Mann, W1KX — PAM: K1GUP, RM: W1RWG, New OVS: W1DA, Central Me, flood drill Mar. 25 saw 41 stns. active and 59 msgps. to and from Androscoggin Co. EOC. BCEP actively involved. Pine State ARC working on Bangor area emerg. plan and system for finding downed aircraft. Portland AWA Flea Market at 0930 and Banquet 1730 on June 10. Congrats to Aroostook ARA on ARRL affiliation. New 147.8303 rpt. on at UM Orono. Contact WA4UJ/J1 to help with comms. for Brunswick NAS Air Show June 11. Sandy River ARC officers: WA1QIK, pres.; WB1QXX, vice-pres.; WA1LZR, secy; W1HTG, treas. WB1FNG, act. mgr. Sess. QTC-QNY PTN 31/14325. SGN 27/144122. MSN 12/1552. CMEN 14/19152. MSA 27/17. BYN 27/37144. Traffic: W1KX 235, WA2ERT/139, W1RWG 120, N1RP 82, W1HDC 58, WA1QFX 55, WA1JZP 30, W1JTH 28, W1BJ 26, WA4UJ/J1 22, WA1SMY 20, WA1YJY 20, K1JGX 19, W1ISO 15, W1AHM 12, W8BUHU/1 10, K1TZH 8, WA1JCN 7.

NEW HAMPSHIRE: Robert C. Mitchell, W1SWX/W1NH — SEC: K1RSC, RM: N1NH, PAM: W1TN. Endorsed W1JSM as OVS. The 34/94 repeater net meets daily at 2030 local. W1HD worked rare F00XC on Clipperton Island. K1NH worked 2 new ones in the DX test. The Saddleback Repeater Assn. (40/00) officers: WA1QWV, pres.; W1GWU, VP; WA18HR, secy/treas. The NHVT Net had 242 check-ins, 118 traffic. K1RSC W1YJ & K1ACL were on emergency power during the SET. W1BYS back from FL. It is sad to report W1ACL a silent key. WA1UNN now Advanced. WA1RLD/WB1FUR now Extra awaiting 2 letter call. The Keene Machine 975/375 kept going by WA1UNN WB1FUR and W1FYR. New OVS is W1RXR. W1BYS received another PS award. WB1ELP enjoying ham radio traffic after shipboard retirement. W1JY and XYL vacationing in CA. K1OX won the 160 test for NH. K1H's inverted V became an 1 antenna in the last storm. W1WUO is also WB1ESQ and an active OBS. N1JH a new Yaesu. Two NH OOs provided information to authorities on "Hunchback" the protane voice of 7.9 Channel 19. Traffic: (Mar) K1PCS 889, W1TN 173, W1HXR 49, K1ACL 44, W1KX 34, K1NH 22, WB1FNO 14, W1WGT 10, WA1PEL 6, W1SWX 5, W1BYS 1. (Feb.) N1NH 128, K1NH 48, W1GUX 40, W1BYS 2.

RHODE ISLAND: SCM, J. Titterington, W1EOF — RM: N1RI, PAM: N1DM, RIEM 2-Mtr. Net, WA1CSO, mgr, QNI 182, Tfc 37. EMRI Slow Speed net, N1RI mgr, QNI 71, Tfc 30. W1YNE had bout with pneumonia & reports new Coventry repeater on 223.26-224.86. N1RI & N1DM active on OSCAR 8. Fidelity ARC operates Sat. Night Net on 147.51 simplex. EBAWA makes field trip to FAA at Quonset. G4EYA visits N1RI. N1RI makes CW-DXCC. WA1NXW new Extra. WB1DET is new General. K1UZ chasing DX on 10 mtrs. WA1RXI enjoys tlc nets. K1PNI & W1CJ held meeting of Federation of Amateur Clubs at their QTH. K1JF, pres., Newport ARC resigns, leaving area. K1PTV, new reg. K1JF made Life Member. NARC. Traffic: K1UZ 106, N1RI 70, N1DM 22, WA1RXI 21, W1EOF 18.

VERMONT: SCM, Bob Scott, W1RNA — W1UXX reports several new Novice operators, who received training in classes at Mt. Anthony High, club station WA1LCH; WB1s GRH GTM GTN GTO & GTP. BARC news notes upgrading of W1HRG W1BKZ WA1s QGR UWG STL ZRR WB1BWV & WB2JSJ. Congrats to all, also to those who may not be listed here. BARC is going ahead with plans to put up a 450 MHz repeater on the mountain. WA1NSY has new 2 mtr "Y" rig. Correction: VTRFD on 3909 Sun 2300 UTC. GMM 27/6057. Carrier 27/583/51. VTSB 31/48477. VTPR 4/7. VTRFD 4/8/173. Traffic: K1BOB 146, WB1AFY 29, W1RNA 18, WB1BZR 12, WA1GVU 3.

WESTERN MASSACHUSETTS: SCM, Bill Lowe, W1TM — SEC: WA1DNB, PAM: WA1MJE, SCM temporary RM.

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WMFN 3935 4:30 P Weekdays SECTION SSB
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SCM currently revising appointment lists. SEC completed revision of AREC list. All stations invited to be active in NTS and AREC. Excellent way to improve your operating skill and keep abreast of ARRL activity. W1ZT/MM voyage EA8 to 8P5 took 25 days. Enroute he completed 41st phone patch with W1KX. W1KX active. EAN 1X. Welcome new stations: WB1s GLN, GMQ GMR GNG GOZ GOA GQB GQC GUY. WMFN: 23 sess., QNI 288, tlc 49. WMN: 31 sess., QNI 215, Tlc 114. Traffic: W1TM 214, WA1MJE 197, W1KX 93, K1SBH 77, WB1AUV 59, W1DOY 41, W1BVR 38, WA1OPN 35, K1NMM 29, K1JY 26, W1ZPS 26, WB1EHS 18, K1PUG 6, WB1CWH 5.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davie, KL7CUK — I am very sorry to report another Silent Key in this section. KL7EOK was killed in a hang glider accident. Bob held several world records. KL7E reports an attempt to establish a net on 60 MHz by USB every 15 min. Bob is looking for a new EC for the greater Anchorage area. He replaces KL7FSE. KL7GAG is his asst. Doug advises that we now have a new repeater for ARES use only. The input is 147.90 out put is 148.30 MHz. Tone access only. KL7HDS reports working considerable DX on the 10-meter openings. KL7HOV reports 1259 ck-ins for the ASN this month. KL7JDI reports into 4 separate nets now handling QTC. KL7JFJ is also reporting into several of the National Traffic System nets. If anyone is wondering what the National Traffic System Routing is, look on the back of the "Public Service Communications Manual." If you do not have one, let me know and I will mail you one. Traffic: KL7JFJ 44, KL7JDI 35, KL7JDI 34, KL7HDS 5.

IDAHO: SCM, Ed Hamlin, W7KDB — The Pocatello ARC doing well with Novice class. WB7RXM in charge. They also have a special class of YLs. Idaho Falls has phone patch repeater on 148/04 146/84. The net meets on Tue. at 9 PM. The Eagle Rock Club planning a CD drill in Aug. The Boise Club had a demo of hydrogen emergency by WB7UDV. W7OHM now K7SD. W7ASA moving his QTH. K7UBC's brother is K7EHN. W7NNX has new two meter rig. The new Nampa Club prexy is W7VQV. WA7NSW studying for bar exam. WA7NR active with OSCAR. W7GHT has enough brownie points for PSHR. W7AXL active on the ID CD Net. WA7GSM had bone graft on his leg. WA7HS designing two meter antennas. W7CTX now

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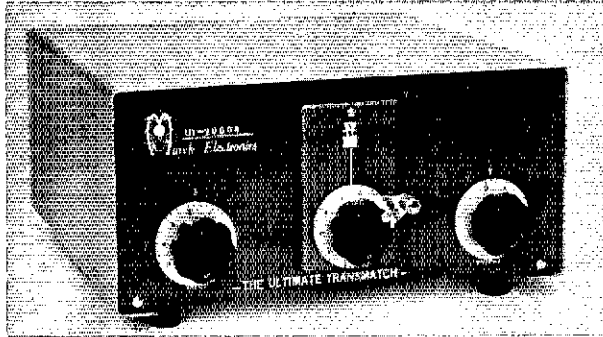
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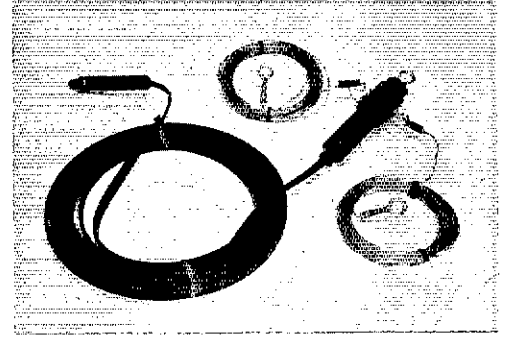
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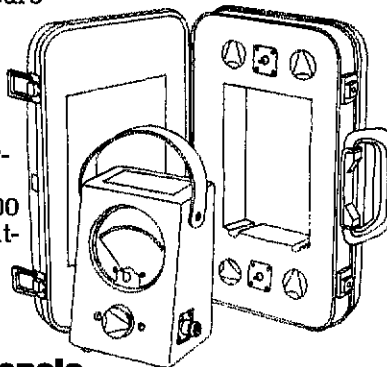
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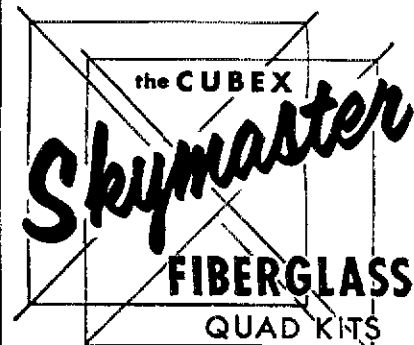
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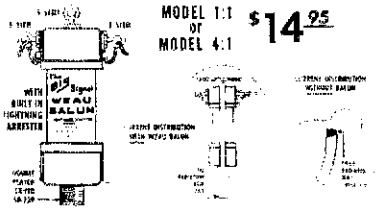
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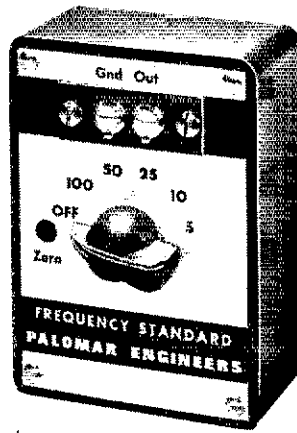
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IMN	23	170	76	3835	W7GHT

Traffic: W7GHT 224, W7LLM 70, W7GBO 62, W7KDB 53, W7Y1 3.

MONTANA: SCM, Robert Leo, W7LR — W7DB sends ARRL bulletins and joins QICWA net. 14 new Havre Novices, & 12 going for General. W7IDK got 35 wpm code certificate. W7WYG uses 2-meter scanner. W7PCZ proposing MT Novice traffic net. WA7OBH now 168 countries. Good OD reports from WA7OBH & WA7JUN. W7LYR Hamilton new OO-11 & EC. W7LR & WA7OBH send in Intruder Watch info. W7EJS QNI IMN & RN7. IMN QNI 170 QTC 78. WA7KKN moves to W. Yellowstone. Bozeman hams furnished communications for annual Bozeman to Yellowstone snowmobile race. MT VHF hams study 20 KHz 2-meter band plan. Most MT clubs doing well & exchange newsletters. Several MT hams QSO Clipperton. Traffic: W7IXD 41, W7PCZ 39, W7NEG 17, W7EJS 16, W7LR 8, W7DB 4, WA7OBH 2.

OREGON: SCM, Dwight J. Albright, W7HLF — SEC: W7LBH. NM BSN: WA7GFE. NM OSN: N7NO. NM WCN: WA7YPJ. ARES NM: WA7RWM. PDX ARES: K7WVV. RN7 NM: W7VSE. N7SC NM: ARES (Jackson): K7WVV. PDX NM: ARES 3993, 697 QNI 118 QTC 62 sess. ARES (PDX) QTC 37, 26 QNI 193 QTC 193, QTC 179, 31 sess. BSN 39DB, QNI 659, QTC 53, 69 contacts, 8 OST, 31 sess. WCN 3702, QNI 385, QTC 100, WA7YPJ, ARES JC, 147.06, (no report local), ARES Linn-Benton, 707 QNI, 41 QST, 8 QTC, K7UGF. I wish those who are running SSVT would let me know how many stations you have worked and where. SSVT is exiting to watch also to tape record blind then take the recording to some one who has a monitor and see what you have, it will surprise you also the bug will bite too. ATV on 420 MHz band possible through OSCAR. A 1676 net was tried for awhile but K7VKN didn't have the time to keep it going. We notice several trying for the Novice in the last couple of months are ending out. When ever we hear a little hard than that. Theory doesn't cover all that is needed, or they just don't read the questions before trying to answer. As a teacher I've tried to cover all bases but still have failures? (Not in code) so we'll try again. Traffic: (Mar.) W7VSE 626, K7NTS 416, K7IWD 226, W7AAK 91, WA4HRG/7 54, W7HLF 52, K7QPW 35, N7NZ 34, K7OUF 29, K7WVV 20, WA7ZAP 18, K7KPT 14, W7LT 14, W7GCB 2. (Feb.) K7OUF 43.

WASHINGTON: SCM, Bob Klepper, W7IEU — NTN, QNI 1653, QTC 75. NWSSB, QNI 815, QTC 41. WSN, QNI 319, QTC 71. With the new FCC changes coming quite frequently I again urge all OBS to make more of an effort to copy the bulletins direct from W1AW instead of waiting for the mail. When ever we hear a little hard than that. Theory doesn't cover all that is needed, or they just don't read the questions before trying to answer. As a teacher I've tried to cover all bases but still have failures? (Not in code) so we'll try again. Traffic: (Mar.) W7VSE 626, K7NTS 416, K7IWD 226, W7AAK 91, WA4HRG/7 54, W7HLF 52, K7QPW 35, N7NZ 34, K7OUF 29, K7WVV 20, WA7ZAP 18, K7KPT 14, W7LT 14, W7GCB 2. (Feb.) K7OUF 43.

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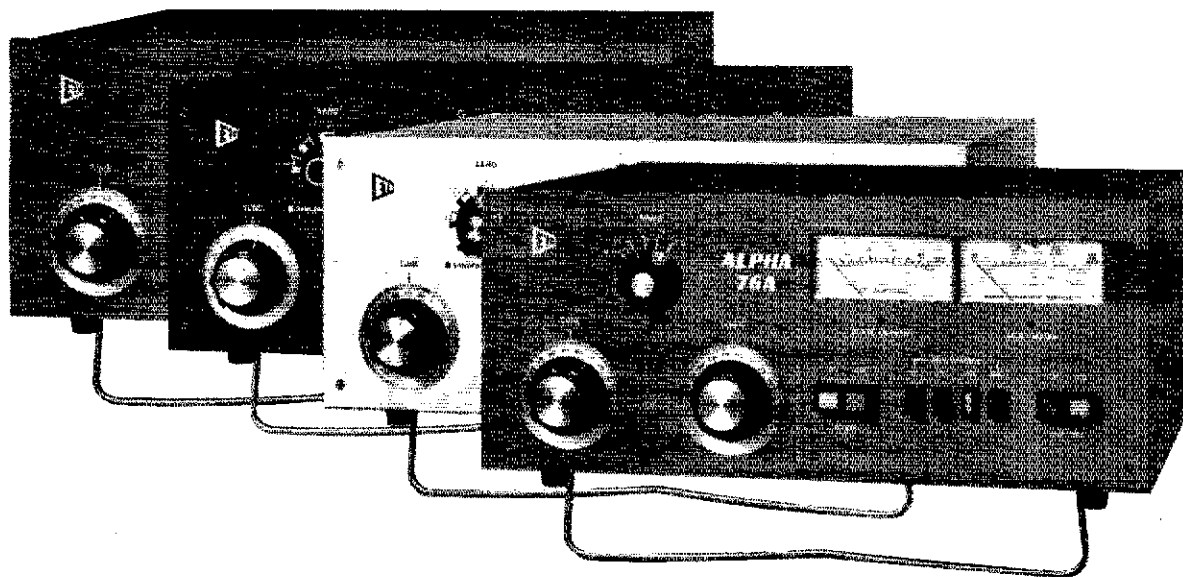
W7YFCG working hard at building up the ARES in the Spokane area. Don't forget the Wenatchee Hamfest June 3&4 and Field Day 24&25. W7CKZ, NW PRA, established the Washington Amateur Radio News Service (WARNS) net Sun. 12 PM on 3940 kHz. He is also looking for PR chairpersons and members for a speaking bureau. W7CYW W7CM W7OO K7THJ W7TND and W7QHI have become Silent Keys. WA7TWB taking his new Novices on into the General Class. My apologies to the Radio Club of Tacoma for including them as the Tacoma Radio Club. WB7CLU WB7PMT WB7OPP WA7YIM and WB7AZW have upgraded. WA7ZWG is the new Chairman of the MBARC Repeater Group. K7MF has added a TS-820S to his station. WB7CWC has been working hard on Public Service communications in Snohomish County. Island County ARC has applied for League affiliation. Island County RACES call is WC7AAR. WA7KG1 waiting for his 5-Band WAS Certificate. Spokane Dial Twisters members take advantage of good band conditions to work their Sister City, Nishinomiya Japan. WA7AB back again on the CW nets. WB7FDE is looking for EC for Clark and Skamania Counties. N7RV and WA7LVN purchased an antenna farm and will live in their motor home until the new ham shack gets built. Please get your reports into me before the 7th of the month so I can get mine sent in on time. Members of the WWARA voted to adopt 20 kHz spacing on 145-148 if an odd numbered repeater disappears on you in the near future look up or down 10 kHz for it. Traffic: W7DZX 695, K7GXZ 188, K7CTP 104, WA7BDD 82, W7APS 78, W7BUN 88, N7AJ 66, W7IEU 65, WB7QJV 46, W7LG 38, W7EBN 33, WA7LQV 32, W7LQ 31, WA7OUI 27, W7YH 18, W7IXF 16, W7RV 14, WA7RCV 14, WA7XT 10, WB7EOK 9, K7VSZ 9, WA7GYB 6, WA7KGT 4, WB7OXA 2.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W6RGG — EC: W6IHH. Congratulations to new Advanced Classers WA6KWX and W6BCGS, and new General Class WB6YWC. NKN Honor Roll overflowing with these East Bay activists: N6CY W6ECMU N6IG W6JXK WA6JJC WA6NTI WB6MSU W6CA K6OE K6PMG WA6SKG W6BMT W6BUZK WB6VEW WB6VOM WA6YUJ. W6CBF getting ready for a trip to Europe. WA6JUZ nearing DXCC after catching 24 new ones in the WPC test. K6C trying his first W6-club. WA6D00 back in the traffic system. I recently attended a meeting of the Northern Amateur Relay Council of Calif. (NARC) as a club representative. There were over 100 groups represented, and I was very impressed with the degree of professionalism shown by those in attendance. Groups such as this surely reinforce the self-regulating image of the Amateur Radio Service. Traffic: (Mar.) K6HW 418, K6OE 282, W6JXK 226, W6OA 200, N6CY 182, WB6UZ 39, WB6MT 31, WA6D00 12, N6NE 10, WA6VEF 8, K6PMG 5, WB6VEW 5. (Dec.) K6OE 598.

NEVADA: SCM, Leonard M. Norman, W7PBV — SEC: K7ZAU. ARRL Pacific Division Convention at Reno, NV Aug. 11, 12, 13. Holiday Inn. Las Vegas RAC officers are: W7IKT, pres.; K7LYR, v. pres.; W7IZU, secy.; W7ILX, treas. SNARS officers: WA7VJ, chmn.; W7FA, v. chmn.; W7LZU, secy.; W7ES, treas.; W7A, K6CD K7VY & L7E, dir.; W7TA, trustee; W7AA, editor; W7TDI, asst. editor. K7TDQ in the flower business. WR7ANW on 81/11 has autopatch, located on Dagget Pass above Kingsbury grade elevation near 7,000 msl serving the 544, 541 and 588 exchange areas. LAS RAC enjoyed a tour of the Coast Guard LORAN Station near Searchlight, NV after treating their YLs to dinner at the Railroad Pass Casino. Traffic: W7ILX 211.

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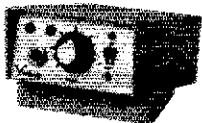
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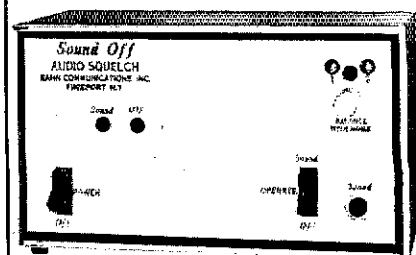
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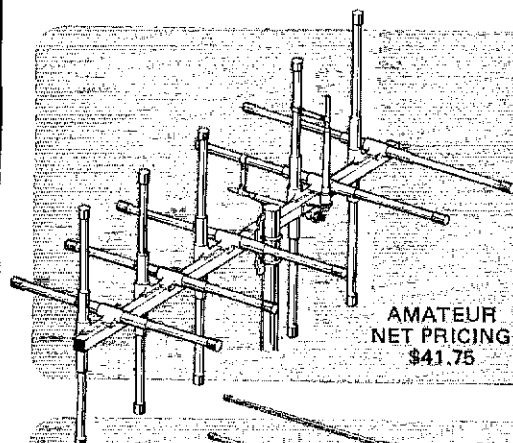


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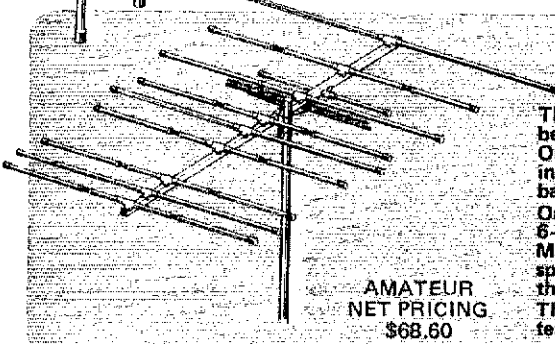
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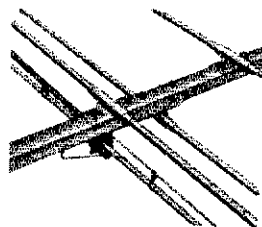
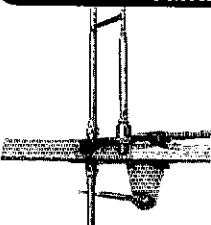
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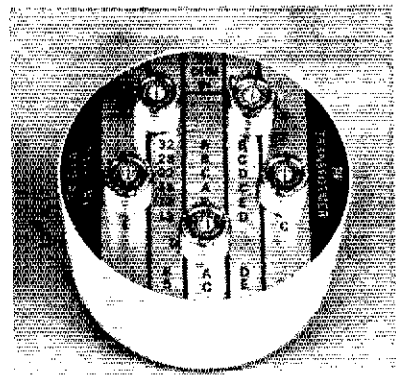


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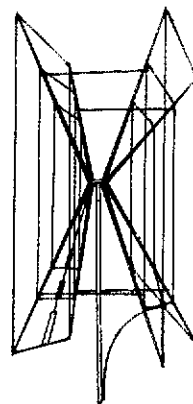
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PACIFIC: SCM, George Morton, N7HRKH6 — SEC: KH6JMK, KH6JHP scored a first from Hawaii: 432 EME W/K2UYH! KH6JHR has AMSAT checking their records his latest OSCAR QSO may be a new distance record, Island UHF activity up, an even dozen now on 432. KH6DE and KH6EW cited for recent comms asst with MV Spellbound, and nominated for public service awards. W3PK hosted to dinner by KH6J after OSCAR success. In attendance: KH6AN KH6BZ7 KH6JHP KH6JHR WA3YXW & your SCM.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — The entire section owes a great debt of gratitude to W6SMU who has served as the SEC. As Ted feels that he can no longer devote the necessary time, he has requested that another be appointed. Until that position is filled the SCM shall also act as SEC. Affiliated clubs and individuals are asked to make recommendations for this post. W6RSP is now the NCS for NCN/2 on Sat. nights. W6DEF has been doing traffic work for the city of Auburn with regard to their annual Balloon Festival. Congratulations to W6BJRT on making Advanced Class. W6CQF has a new Atlas 350XL. N6JV pounded his trusty straight key to a 1.1 million point score in the ARRL CW DX Contest. The North Hills RC are feeling like Sisyphs in their search for permanent meeting place. Traffic: W6RSP 54, W6DEF 31.

SAN FRANCISCO: SCM: Mark Nelson, AA6DX — Late rpt for Jan. Dec. NARC reports repeater frequency coordination for sanctions take 15 to 45 days. Congrats K6SSJ on election to BOD of NCDXC! W6BTFX in new hilltop home chasing 2M DX. W6BAGR has resigned a Mendocino EC. Humboldt ARC and Far West RA newsletter called "Rain" — Radio Am. Info. and News, thank to WA6ICB! HARC's officers for 1978: W6BSXJ, pres.; W6NBBG, vice-pres.; W6BGR, secy-treas., who is also editor for Rain! Good work by FWRA during hurricane in Dec. HARC holding Novice classes at OES hqtrs. Contact W6BSXJ. A well-planned SET by Marin ARC at 3 shopping centers took amateur radio to the people. K6TP operated SET batter QRP. K6FB antenna down from storm. W6BRT monitoring FWRA during "wee" hours. Traffic: Jan. K6TP 255, W6RNL 183, W6NL 125, K6PB 102, W6BRT 7, W6BUPV 6, W6GGR 5, WA6NBJ 4. (Dec.) W6NL 237, W6BUPV 28, W6GGR 2, WA6NBJ 1.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — Asst. SCMs: WA6YAK WA6HIN W6TRP. SEC: WA6YAB. New officers of the Sierra ARC of the High Mojave are: W6DCSV, pres.; WA6KZV, 1st VP; W6BSOJ, 2nd VP; Stan Sanders, secy.; Bill Maraffio, treas. The club now an ARRL affiliate. Congrats. The Kern Co. RC has a transmitter hunt on the 3rd Fri. instead of its usual meeting. The 1st Fri. the regular meeting day. It is my sad duty to report WA6LJ and W6CHT are members of the Silent Key. W6BIV and W6BIRY are members of the Advanced. W6BGT General. W6BCXZ and W6JUP are FT227Rs. WA6HWA has a TR22C. W6DPD and WA6JDB made NCN Honor Roll for Feb. W6BFXL has an IC 230. The Western San Joaquin Valley FM Net meets on 147.93/147.33 at 7 PM on Wed. Field Day the last weekend in June. The Pacific Division Convention will be Aug. 12-13, 1978 in Reno. Plan now for the Cal QSO Party on Oct. 7-8, 1978. Let's have all counties in the SJV on the air for this event. WA6CPP has DXCC-22 phone. Traffic: (Mar.) W6DPD 29, WA6ICZ 7, WA6YAB 6, WA6KMW 1. (Feb.) W6BWM 20. (Jan.) W6BWM 38.

SANTA CLARA VALLEY: SCM, Jim Maxwell, W6CF — SEC: W6BIZ. RM: W6RFF. W6CF off on biz trip to DL. Land. W6RFF submitting for W6HAD worked all ten JA call areas and now eagerly awaits the confirmations. WA6UC busy with several QCWA and 100F Lodge nets each week. W6DJI busy on SJN, MTN and Navy Mars nets. Pres. of Nor-Cal QCWA is K6DZU. PAARA meets the 1st Fri. of each month at 7:30 PM at the Menio Park Recreation Center. NCN "Relay" reports the following, in SCV, on its honor roll: W6GJZ W6ICU W6KZJ W6RFF and W6B5HD. W6B5HD is active on all three NCN sessions and sends OBS bulletins on the net. Ex-SCV'r W6DEF passed the 20 year milestone on NCN this month! The Pacific Division Convention to be held in Reno, NV in Aug., see you! WA6LIP ORL as a volunteer fireman, student pilot, night-school student, Jeep restorer and studying for Advanced Ticket — is there that many hours in a day? W6RFF planning to raise his tower and beam soon at his new QTH. W6ZRJ busy with many non-ham activities, but still manages to check into NCN and handle traffic. Doc was one of the original members of NCN some 20 odd years ago. W6QIE continues to provide code practice daily, except Mon. at 8 PM on 3590 kHz. Don has provided this service for many years and holds classes at his home. A "Elmer." Now SCM of active July 1, 1978. Is W6RFF Traffic: W6B5HD 208, W6YBV 164, W6AUC 84, W6RFF 68, W6KZJ 95, W6DJI 15, WA6HAD 13.

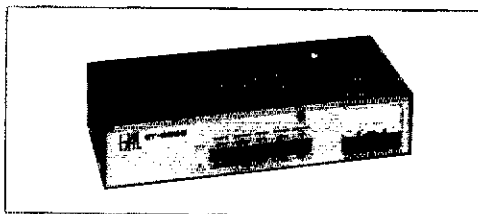
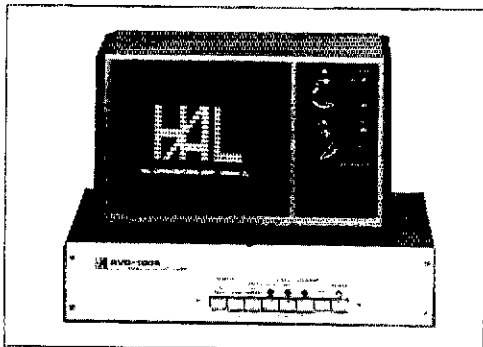
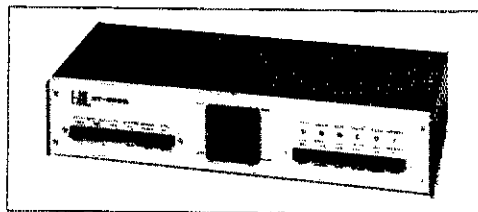
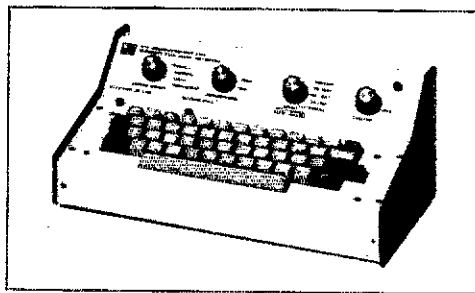
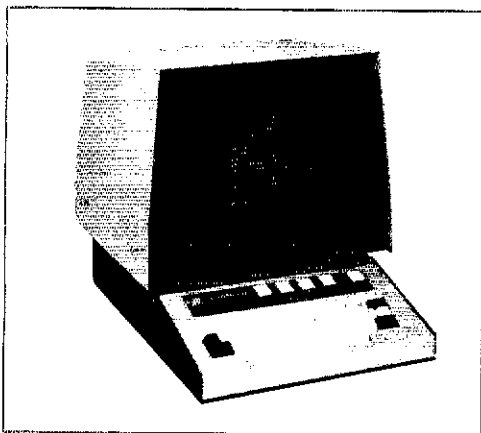
ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, K4GHR — SEC: W4EHF. PAM: W4OFO. RM: K4MC. WD4MBC reports Carolinas Training Net (CTN) off to a good start on 3737 kHz each night at 2230Z, drop in and learn more about traffic handling procedures. Mecklenburg ARS(Charlotte) reports 8000 at the Roanoke Division Convention/Metrolina Hamfest this year. Good sessions conducted by W4EHF, N4UE, G8NFD and W4ET at the 84th Field Day. Our club out this year. Also, fire up your VHF/UHF rig and get involved in the VHF Contest June 10-11. Next FCC exams in NC are June 7-8 in Winston, write Norfolk for appointment. W4BRT now Honorary Life Member of Raleigh ARS. WA4NUO printing terrific club bulletin for WCARS (Asheville) using his minicomputer and new DECWRITER II. WCARS group also sponsoring frequent transmitter hunts. BARC (Greenville) now has over 60 members, and big plans shaping up for Field day. WD4CNS now active chasing DX on 15 and WA4KWC reports having fun chasing DX on 10. WB2SD/4 says his low band rig will be ready for smoke test soon. Congrats to recent ARRL appointees: WD4CNS, OBS: WD4COE EC Franklin, WB4EMG EC Davidson, WA4ACP OBS, WB4HCC EC Transylvania. See you on FD. Traffic: W4EAT 193, AA4NC 184, W4FMN 152, WD4FJM 124, K4FTB 119, WD4MBV 114, WB4MXQ 104, K4MC 98, WB4ZIQ 90, N4UE 70, WA4LZD 63, N4ZJ 60, WA4SRD 58, WD4HCY 57, WA4OQS 52, W4OFO 51, WD4DKF 41, WA4WQR 33, WA4CY 28, K4GHR 28, K4VHT 26, WA4UC 23, WB4CVI 17, WB4VHI 15, WB4TOP 14, WD4CNS 11, K4AIH 10, WD4CQ 10, W4IZ 10, W4EHF 8, W4OZ 8, K4AI 6, WB2SD/4 2.

SOUTH CAROLINA: SCM, Tom Luffkin, WA4DAX — Asst SCM: WA4MDP. SEC: WB4TNS. Chief PAM: W4MTK

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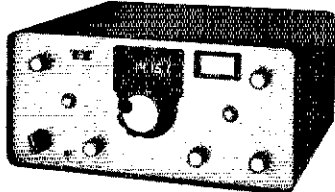
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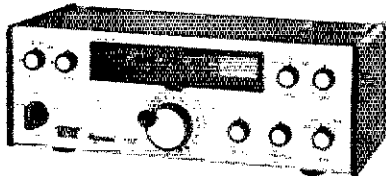
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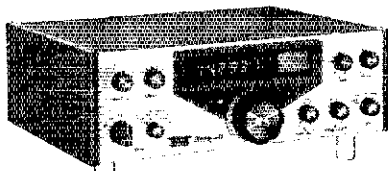
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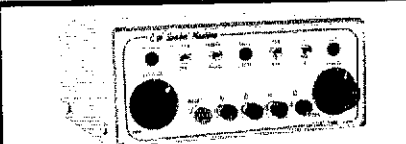
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PAM: WA4DZG, RM: WB4CAK. Everyone reports enjoying the Greenville Hamfest and ARRL state convention, WD4AEU winner of grand prize, FT101. My heartfelt thanks to the Greenville group for their efforts on our first ARRL state convention. Well done! My upgrading successes reported at the hamfest. Hope to see everyone at the County (May 20 & 21), and Charlestowne (July 8 & 9). The FCC will be giving exams at the Charlestowne hamfest so start getting ready. Don't forget your amateur license plates this year. Now that Novice license is five year renewable they are eligible for the tags also. If you have an appointment and would like to have and endorsement let me know on your next activity report. SCSSB QNI 1654, QTC 140; Anderson 2mtr QNI 589, QTC 26; PX QNI 147, QTC 38. Traffic: N4PO 394, K4ZN 282, W4AMK 145, W4NT0 64, W4MTK 44, W4FMZ 43, W4FV 41, K4FRX 36, W4BUDK 31, W4OXC 26, W4BJNE 14, W4YAF 8, N4EE 5.

VIRGINIA: SCM, Robert L. Follmer, N4RF - SEC W442NB. PAMs: WB4OZ(VSBN), W4JK(VSNN), RM: K4BK(XV), A4CK(XSN), W4SHJ(4RN). Writing this month's column winds up my activity as your SCM. Please give ur new SCM, K4BKX, your full support. Also at this time I take this means to thank the hundreds of supporters and well-wishers for their complimentary remarks in relation to my tenure. Hear by all the reports that the Roanoke Division Convention was a big success. Sorry that I was unable to attend. W4BDBK made honor roll at college and still made a fine fine, count! SPARK Radio Club hosted a fine banquet, and get-together in Hampton. VP W4KFC, N4RF, K4BKX, W45HJ and AA4CK represented the League by their attendance. W4KB finally got up to low class and got beautiful results. Also, the VFN is holding their Hamfest June 17/18 at Blacksburg. WA4UD finally made PSHR, FB1 K4GR says "almost flying w/x agn, went out yesterday and today - but not quite". W4CYX activities were cut somewhat by school work and related activities. WA4STO rpts spending lots of time with prospective Novices and probably learning more from them than they from him! Putting RTTY stn together but space at a premium. Says sewing machine may get pushed off the deep end! W4NWV got the hole dug for the tower BUT much water! K4DHB acquired 2M "brick" but now has to think-up conversation, hi. W4AQO's low-band rig temp-off. W4OVR rpts the following nets, times, and frequencies, of 10 Novice Nets. Code Practice anyone? You may wish to pass this word around in your club meetings and other get-to-gethers. Here's list.

WVNNVNN	2215/2200	3730/3740
CNN/NTN	2230/2330	3718
NNN/TNN	2330/0000	3708/3710
AEND/ERN	2330/1100	3725/3715

BPLs: K4KDJ K4KA, WA4NTP acquired Dentron ML4-1200amp and MT-2000A tuner. Says it makes pleasant diff in DX contests and 75 mtr tic nets. W4COL trying to write history of local club (SVAR) and it's "aint easy" sez Pete WA4FTJ my writing for DXCC with 1 wait, or less. Also graduated one Novice class and begins another one in Apr. Traffic: (Mar.) W44CCK 325, K4KPN 284, K4KDJ 259, W4BDBK 238, K4KA 234, K4BKX 211, WAUC 191, AA4CK 176, W4LXB 160, N4NK 147, WA4UYD 123, W4SQQ 117, W4AFLT 117, K4LGA 116, K4GR 114, W4B4DQZ 113, N4RF 108, W442NB 89, W4CYX 88, W4JK 85, WA4STO 78, WA4YU 74, W4BKIT 71, K4JM 65, W4Y9Y 52, N4FM 49, W4BPNY 47, W4NWV 45, K4DHB 37, W4SHJ 36, K4EJ 31, W4DIQF 30, W4SUS 27, W4DOYV 25, N4LE 25, W4ANTT 22, W4COL 21, W4AFTJ 17, W4DVR 16, W4OZ 14, W4AIT 12, W4DY 11, W4DWB 8, N4OT 7, W4HBA, W4KKE 4, N4DR 2, W4DM 1, Feb., N4FM 44, W4A0DZ 42, N4UY 12, WA4HY2 2, W4DKUK 1. WEST VIRGINIA: SCM, Donald B. Morris, W8JM - Our deepest sympathy goes to the family and friends of K4BAHG and W8FMU who became Silent Keys. W8EL and W8BNT have upgraded to Extra. Huntington-Tri State ARC annual dinner, largest ever, 102 present with 12 members upgrading during Mar. New Techs in Fairmont area, W8BPFH W8DMZW, W VA Chapter of QGWA held spring meeting in Bridgeport. Fall meeting Charleston 1 Oct. State Radio Council held fall meeting before 1978 State ARRL Convention at Jackson's Mill. See write-up under Conventions.

Net	Freq	Time	Ok-in	TFC	Sess
Novice	3720	23 Dy	187	86	30
WVNV-CW	3587	0000 Dy	194	45	31
Phone	3990	1700 Dy	580	96	30
Phone	3990	2300 Dy	974	182	30
Phone	3990	0500 Dy	341	36	28
Hillbilly	14290	1700 Su	174	52	4

Traffic: W8LZ 53, W8BWPV 41, K8KT 32, W8BMYJ 32, W8BJYM 31, W8BVAZ 31, K8BT 30, W8BHI 30, W8BJM 20, K8MS 19, K8ZDY 14, W8BCDQ 10, W8B8HA 10, W8JWJ 10, W8DKX 10, K8MZM, W8BJY 8, W8BYT 8, W8BEGW 5, W8GFS 4, K8MHR, K8BZV 4, W8BTJY 4, W8BDM 3, W8BCNN 3, W8BZP 3, W8BANX 3, W8BRT 3, W8BYU 2, W8BHC 2, W8CUL 2, W8BHZ 2, W8BET 2, W8CKX 2, W8LYV 2, W8AHZ 2, W8EII 2, K8YL 2, W8BLA 2.

ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Clyde O. Penney, WA0HLQ - SEC K0FLQ. RM: K8CER. PAMs: K8CNY, W8QZC. K8SPI reports handling 4 H&W messages for patients in Pueblo hospitals. Pueblo Ham Club Net check-in averaging 35 each week. Congrats to W80YKH who received his WAC award in Mar. Major Tic. Nets in Colo Section are: CRRG, 146.0787, Sun., 1000 local; H8NOR, 146.0787, Sun., 0800 local; H8NOR, 146.0724, Tu., 1200 local; PON, 3965, Sun., 0815 local; WX Net, 3945, Du., 0700 local; Columbine, 3989, Mon.-Sat., 2000 local; IWN, 3570, Dy., 1930 & 2230 local; CWN, 3715, Dy., 0130 UTC. PHC, 146.34/94, 0100 UTC. Net Tic. for Mar. SSN QNI 160, QTC 54, informals 44, QNF 718; Hi-Noon QNI 1103, QTC 96, informals 208, sessions 30, QNF 1221. Columbine QNI 1353, QTC 150, informals 434, QNF 1151. Traffic: (Mar.) W8VYX 2700, K0YFK 1080, W8BMTA 540, WA0HJZ 479, W8BQZG 238, W8BQZG 168, W8BPTV 117, W8IWI 88, W8LAE 72, W8DQC 69, W8DAIT 43, W8MDM 39, W8HXB 32, W8GCO 10, W8BFR 10, K8BFR 10, W8BYD 8, W8BZP 8, W8BIBS 596, W8DJ 31, W8BPN 48, W8BEX 31, K8RTO 30, W8LCE 2, (Jan) K8DJ 501, W8MA 72.

NEW MEXICO: SCM, Joe T. Knight, W5PDY - SEC W5ALR. PAM: K5IKL, RM: K5KPS. Southwest Net (SWN) meets daily on 3585 kHz, at 1915 local time and handle 204 msgs with 232 stations reporting in. New Mexico Roadrunner Net (NMRN) meets daily on 3940 kHz & 1800 local and handled 96 msgs with 943 stations reporting in. New Mexico Breakfast Club meets daily on 394 kHz at 0700 local, handled 75 msgs with 677 check-ins

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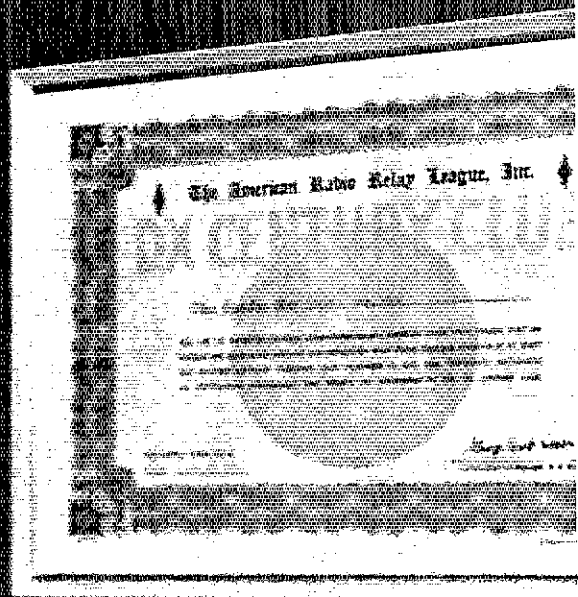
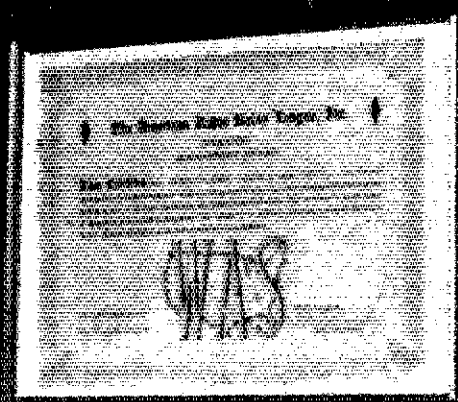
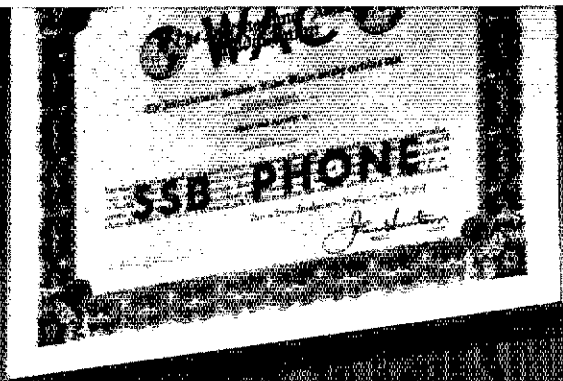


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Radio Trade Supply Co.

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Salina
Electronics Inc.
Wichita
Amateur Radio Equipment

KENTUCKY

Ashland
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Louisville
Mobile Communications

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Mel-Comm Electronics, Inc.

La Vale

J & M Electronics

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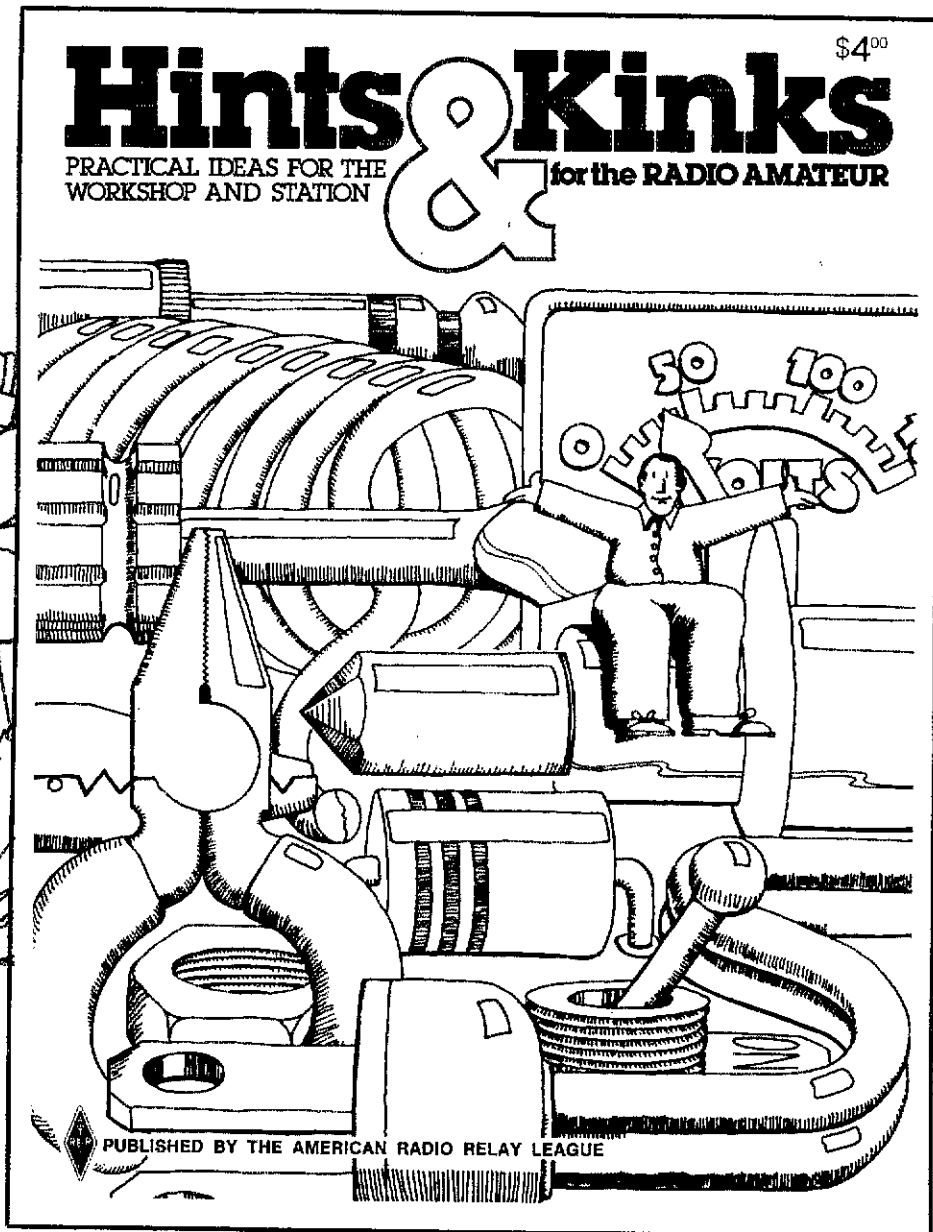
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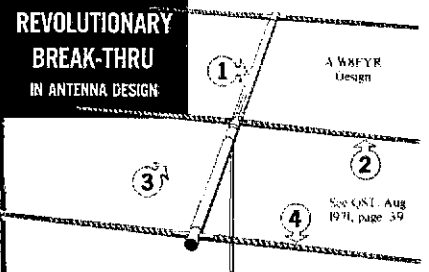
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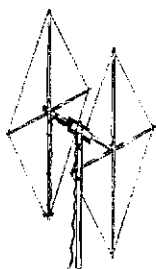
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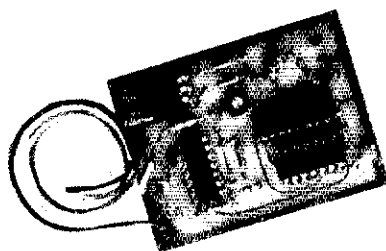
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W5KSJ and all his wonderful committee doing super job on New Mexico Ham Directory to be ready for distribution at Las Cruces Ham Feed. Good turnout at GCWA dinner meeting at Elks Club. Also good attendance at monthly breakfast at Sanbo's. W5FOP WA5WYV doing nicely after hospital stays. W5FPB doing FB on NM Repeater directory. Traffic: W5UH 367, N5NG 326, W5JOV 288, WD5AHH 138, K5KPS 138, WA5MIY 22, K8TE/5 18.

UTAH: SCM, Carl R. Ruthstrom, W7GPN — Enjoying new 2-meter transceivers are WA7VNO W7MVK and W7UR. W7UTM reports light activity on 220. He monitors daily on 223.5 MHz. K7ZOF is moving to Salt Lake City. W7OCX, BUN mgr. reports 31 sess. 1301 check-ins. BUN has been in operation for over 20 years. First net certificates issued in 1958. During early growth the net met once a week. Current members total 73. The freq. is 47.2 kHz, time 1930Z. W7BE reports UVHFS road and weather net closed for the season. It will reactivate if conditions warrant. Check-ins for the month 1996. UCN has new support from W7XC in Vernal and WB7TBU in SLC. WB7ECL earned UCN certificate. A final reminder, the UT Hamfest is June 17, at Taylorsville Park in SLC. Traffic: WA7MEL 60, W7OCX 22, WB7DMI 14, W7BE 12, WB7TSS 11, W7UTM 8, W7FYR 4, WA7VNO 2.

WYOMING: SCM, Chester C. Stanway, W7SDA — The WY Hamfest will be held at the Diamond Guest Ranch 13 miles southwest of Chugwater, WY July 15 and 16. By the time you read this most clubs and individuals should have your plans made for your 1978 Field Day operations. WB7NHR will be assuming management of the WY Cowboy Net when K7SLM retires in July. Net reports are always needed, if you can help please volunteer as net control for the evening. A new K7SLM reports WY Cowboy net held 24 sess., 901 QNIs, 54 QTCs. I would like to have more station activity reports. Traffic: K7VWA 561, W7TZK 558, W7SQI 428, WA7SGG 38, W7SDA 12.

SOUTHEASTERN DIVISION

ALABAMA: SCM, Frank S. Brown, W4LNN — SEC: K4WYT. RM: N4MD. PAM: K4JLE. Appointments: WB4VZV OBS, WN4KKN OBS. Enterprise ARS receives affiliation charter. WA4YQT completed his 3rd Novice class. Huntsville ARC furnished communications for American Diabetes Assn. Bike-a-thon. AEND Novice Net now has liaison with NC and TN Novice Nets. Muscle Shoals ARC enjoyed picnic for members and families. WB4TKJ had with new linear. W4EF getting better reports after antenna repairs. N4KC active on the green keys. WA4YAD upgraded to General and WD4KAK to Tech. WB4BFJ WB4BFO again attending hamfests in the comfort of their motor homes. K4UMD WA4ASW WB4TNI doing well after stay in hospital. W4DFE joins Old Old Timers Club. WB4ZWF WB4ZAG WA4WYA WB4CXD AA4AF install a permanent 2-mtr transmitter in the Birmingham National Weather Service. N4KC reports OSCAR 8 has good signals for better than 15 minutes on close passes over Birmingham. WA4JYU NM AENM Sun. morning session now has forty check-ins. New Enterprise repeater operating on 147.8424. WA4ZPZ enjoying a new transceiver. Traffic: (Mar.) WA4JDH 1505, N4MD 550, WN4KKN 142, WA4VKD 100, K4AOZ 86, WA4RND 71, W4LNN 37, K4ZM 24, WB4EKJ 22, WA4RMP 12, WB4TVY 9, WB4AYO 8, WB4KSL 8, W4EF 6, WB4TKJ 5, N4KC 4, K4KJM 2, WA4VER 2 (Feb.) WB4EKJ 55, WB4KSL 19, WA4ZPZ 21, (Jan.) WA4ZPZ 21.

GEORGIA: SCM, A. H. Stakely, K4WC — SEC: K4YRL. RM: N4UZ. PAM: K4JNL. Congrats to K4EV WA3NAZ14 and WB4ZOJ making PSHR. Congrats to WD4DEV making Advanced, WB4TYF making General, and WD4IBV and WA4CKK making Tech. Congrats to WB4TZ now members of QTH CW operators club. WA4VDF now N4WV. Cedar Valley hamfest on Aug. 13 at Polk Co. fairgrounds, Cedartown. K4SMX gave DX program at Charlotte, NC hamfest. W4IO active on ISSB net. WD4BMV's helper teaching theory in Albany. K4RRI going to Japan. Feb. GSBN report QNI 2042, QTC 183, WB4ZOJ net mgr. West GA ARES. W4GARE now has CW session 3.725 at 2000Z Sat. Cntrl GA VHF net QNI 87, QTC 5. W4GAARES QNI 12, QTC 1 CW, and QNI 88, QTC 7 on tone. W4BIA fixing up RTTY for W1AW bulletins. W4JMJ planning new antennas now that DX is better. W4JRF working OSCAR 7 regularly. Albany 2m net having two huts. W4PIM WA3NZ14 WA4A N4UZ WA4E1 WA4CZK K4EV. K4JGW WB4TEK K4NGI K4FDN K4NM and WB4ZOJ quite active in GSN according to FB bulletin in N4UZ. WB4DHC WB4FAS WD4IVC and WA4POX quite active on GTN according to FB bulletin by WB4FAS. GA ARES Net QNI 104, QTC 1. CVEN no. 1 QNI 70, QTC 2. CVEN no. 2 QNI 917, QTC 64. NVSN QNI 50. After having done the best job ever K4YRL is resigning as SEC. This is a tough blow to emergency preparedness in GA. Thanks, Doug, for a great job well done. On Apr. 4 with K4AEJ as net control WD4AHH, W4ACYB, WD4DEV, W5COL, W4YRT, K5PRE, W4PZR, WA4PZD, W4BVG, K4SWJ, K4UJW, K4WV and WB4ZOJ responded to request from Atlanta police and searched in vain for a missing 11 year old girl with radio and TV coverage on Atlanta stations. Traffic: (Mar.) W4FCE 330, W4PIM 203, WA3NAZ14 107, WB4ZOJ 54, W4HON 37, WB4HDC 32, K4YRL 26, W4BIA 21, K4WC 13, K4EV 11, WD4EV 10, K4VHC 9, WA4OOQ 6, W4BZT 4, W4JM 4. (Feb.) W4HON 45, K4NM 37, W4AAQ 26, K4YRL 21, K4JNL 12, WA4PZD 2.

NORTHERN FLORIDA: SCM, Frank M. Butler Jr., W4RH — SEC: W44WBM, RM: WB4GHU. PAM: WA4TNC/75. WA4FKE/40, WB4BSZ/VHF. New/renewed appts. WB4HXS as OES; WB4HKK as ORS/OPS. SDCs earned by WB4AOY WA4AZW WD4BRB WA4DXV WA4HHG WB4JRP WA4JUC WB4MHH WA4SJK WB4WAO and WA4WAO. W4VLT on W4VLT on 67NS and Ala. Net. "D" and by WD4NYY on MITN. N4UF now Assn. NM of FMTN, replacing W4ZJ. WB4QBB active on D-RNS and CAN-D. WD4LUGIN made PSHR. Upgraded this month WA4BZV to Extra; WD4EYU to Advanced; WD4JPH and WD4PEU to Tech. New officers of Pensacola FM Rpt. Assn: WA4IZM, K4HYV, and WB4PKR. WA4VLT conducting CW training net daily at 0030Z on 3703 kHz. Okaloosa County ARES was put to test with LP gas facility exploded and burned, causing evacuation of large area. Comm. was provided to State CD and to evacuation shelters. W4GGU and W4AAVY working fast-scan ATU in Panama City. Tallahassee ARC worked comm. for March of Dimin. Walkathon, with 17 stations active. W4AJSJ planning a 6-meter repeater. WB4RIS up to 30 wpm cw and working on Extra. N. Fla. DX Assn. collecting electronic books for Haiti — contact W4ORT if you can help. W4QCP organizing club in Palatka/San Mateo area. CFRA plans to set up a

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TS-323/UR Frequency Meter	175
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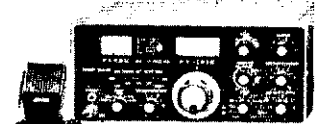
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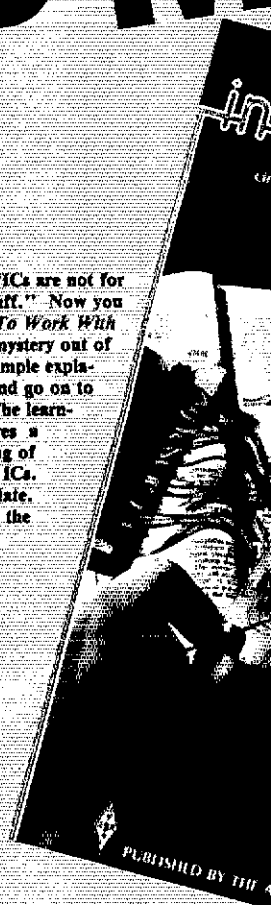


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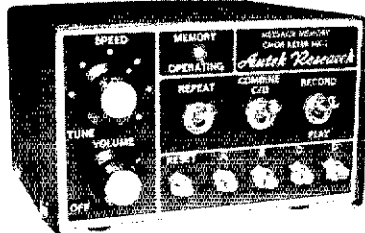
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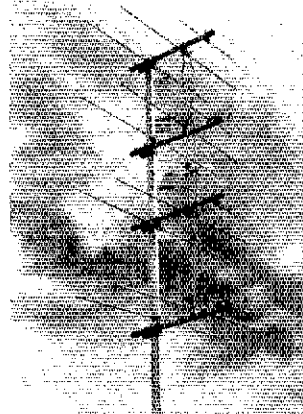
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awards program for public service. N4KF has a new Ten-Tec 405 linear. K4YX donated an addressing machine for QFN Bulletin. Pam finding it rough to be a schoolgirl again! W4FZX hospitalized for a few days. Daytona Beach Rpt Assn updating their 3494 repeater. W4LDY voted "YL of the Year" by DBARA; WB4JCP won the QM award. K4FLV and WB4YPS invite you to check in to a new 2m AM net - 145.3 nights at 0100Z. WD4MPL new YL from Interlachen. Traffic: WB4OBB 412, N4PL 364, N4WA 328, WD4JIO 219, WA4FKE 163, WB4TZR 143, W4KIX 126, WB4FAJ 124, WB4DTS 95, WB4GHU 92, W4JL 85, WA4VLT 72, W4MGO 66, K4YX 66, N4SS 64, W4LDM 56, K4VEY 54, WD4LUG 52, W4RH 49, WD4NYY 45, W4D7U 43, WB4RIS 43, WA4TNC 42, WD4HIF 41, W4FZX 27, WB4YKV 25, WB4NJI 20, W4MVG 18, WB4VAP 18, W4DFV 14, WB4HKK 14, WA4EYU 13, WA4HHC 13, K4IEY 12, WB4WYX 12, K4RNS 8, WA4CRI 6, WA4BZV 3.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst. SCMs: WB4AID, W4KJG; SEC: WB4ALH, RM: W4MEE, Pams: WB4AID, WA4NBE. Net Managers: JFN WB4GHU to be relieved by W4AJPY July 1st; FMTN WB4AID, FPN WB4YPS, GM: W4MEE, QFN: W4AJV, W4NJI, WB4NJI, FPN: WB4GCK, SPARC: W4AKCR, SWFTN: WB4KYE, PEN: K4SCL, DEN: WA4CCP, MEN: WB4PIB. New appointments: W4KJG Asst. SCM, N4BU and N4XR ORSs. Net certificates issued: FMTN — WA4UON, NFPN — WD4ABT, K4EUC, WD4FWP, WB4HDX, WA4RLV, PEN — WD4BAJ, W4CSH, WA4CZW, WD4PHY, K5IHH/4, WB4LXH, WA4MJT, W4MUV, WB4OAT, WB4PEL, K8PX/4, WA4WKO, K4WYN. Space Center ARC elected new officers: AA4MI, pres.; W4MPZ, vp.; K4VTY, secy. treas. WB4AID will represent your SCM at Key West Conchfest May 20-21. W4IYT reports 750,000 visited Dade County Youth Fair, with K4ONY as Fair Coordinator. All Miami area clubs gave excellent support. Tampa ARC had another very successful year at State Fair. Tampa WB4YKS reports Southwest Florida Traffic Net going great on the Fort Myers 28/88 repeater at 15000 GMT daily except Sun., with Irlason to FMTN. Traffic total for the Section 7154 this month is about 40 percent higher than normal and near a new record. Keep up the good work, gang, and get those reports in to me! We had 4 stations earning BPL: W4MEE, K4TH, K4IWT and W4DUG. Your SCM missed it by one message! Had known, I surely could have handled one more. W4DL continues as our most outstanding OBS, with 36 bulletins scheduled, typically 3 to 4 bulletins per schedule. How about you other OB stations trying to match that — then report what you do! W4ZR takes "Well Done" as our most outstanding OO this month. N4KB can't stand retirement — took a part-time job as TV repairman. WB4LXH has a new 2-meter beam and HWB ORP all bands. W4GPL reports outstanding propagation Mar. 18 thru 25 with DX stations GRMing each other. Welcome to N8GG, stationed in St. Petersburg with Coast Guard. Got a long letter from "Marilyn", WA4CTM's home computer. She says she is running Larry's ham station, under his watchful eye of course sending bulletins, answering questions, etc., especially for the 6-meter RTTY crowd. She claims she and her lil' will soon be doing most of the household chores, allowing her mortals to distinguish in leisure. Household chores maybe okay, but operate my ham gear? Never! I love to do it myself. Traffic: (Mar) W4MEE 1162, K4TH 600, K4SCL 499, W4DUG 387, K4IWT 361, K4S, JH 276, WB4N, JU 273, WB4WYG 262, WB4AID 232, WA4PFK 185, WA4, JPV 152, W4IRA 148, WA4NBE 146, W4WYR 142, WA4GYR 126, WA4EJC 120, N8GG/4 116, WA4SCK 109, W4DVO 108, WB4KRSJ 108, W4DBEZ 101, N4KB 97, W4DCOL 88, WB4KPG 88, W4YCL 84, K4NAN 83, WB4AL 81, WB4PIB 76, K4SLM 74, W4KRYV 73, W4AL 69, W4TW 58, WA4MNS, W4KMN 45, W4GPI, 44, WB4KYE 42, K4EUK 41, N2CR/4 36, W4WQU 35, W4ARLV 34, W4IYT 32, W4AQV 32, W4BK 28, W4APV 24, WB4GSV 23, N4ET 21, K8PX/4 21, W4GDK 14, W4AKCR 13, W4ROA 12, W4ABA 11, WB4SNX 10, WA4MJT 9, WD4LOW 8, N4XR 8, W4QM 7, W4MML 6, W4SMK 6, W4TJM 4, WB4LXH 2. (Feb.) N4KB 123, W4ESH 96, K4GRM 59, N2CR/4 12.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DOS — RM: W7EP, PAMS: W7UQQ, W4TKQE. New officers of the ARCA (Amateur Radio Council of Arizona) are: K7JHW chmn., W7GCD, vice chmn., W7NY, treas., WB7JLU secy. The report to the ARCA GST listed other amateurs as new officers of ARCA. That report was received from a member radio club, not from the ARCA secy.; the SCM regrets the confusion. The ARS at ASU is now an ARRL affiliated club. WB7TPY is pres. Officers of the Motorola ARC at Phoenix are: W7ER, pres.; WB7NUR, vice-pres; N7RF, secy.; WB7NYX, treas. In Arizona Repeater Assn. compiling a list of emergency equipment owned by members for use in the next emergency. Members of Explorer Post 599 supplied communications for the Jaycees Rodeo parade. Nets (Mar.)actus 221, ATEF 100, SWN 204. Traffic: (Mar.) W7BY 168, K7UYB 173, W7HR 39, K7NW 37, KNMO 20, WA7VEB 19, W4TKQE 18, K7JKM 12, W7DQS 8, W7PIT 8, W7CZL 4.

LOS ANGELES: SCM, Perry Masterson, W6RHS — Reports received for the month of Mar. were mighty few. I was pleased to receive the OO reports. It appears that the OOs have been on the job again this month. The ORS appointees have also been on the job and doing FB. The OBS appointees have not filed a report for some time now. I need a copy of transmission schedules for all OBS stations. I understand N6PZ has a new TEN-TET Triton IV digital added to his shack. W6INH reports working Clipperton on two bands. As a commercial radio operator in 1938 he landed on the same island. K5ASK reports the Boy Scout program is keeping him busy. He reports building anew koyer with his own memory design. K5DVI reports the ARTS Net meets daily on 7060 kHz at 1800Z for those who are available at that time. W6RIQ now with Bendix. We wish Don the best in his new job. W6RHS has a new 50-foot tower and a 33 classic beam to install as soon as the wind will permit the pouring of the foundation. Due to deadline in writing this column please send all reports to me by 5th of the month. Be sure to check your schedule for Mar. The amateur convention sponsored by the Lockheed group has another great time planned. Traffic: W6OE 180, N6PZ 152, K6CL 99, K5DY6 79, W6INH 61, W6QA 48, K6EA 28.

ORANGE: SCM, Wm. Heitritter, WB6AKR — Asst. SCM: K6KNC, SEC: W6KJ, K6JT; EC: W6GPK, W6GPK, K6GGS, W6LKN, K6KNC, W6WPP, W6WYV, K6JT reports Co. Calif. Net will include a VHF sessio starting May 1 on W6R6AK 147.045/147.645 daily at P.M. W6BIKH reports ARES net being conducted Tue.

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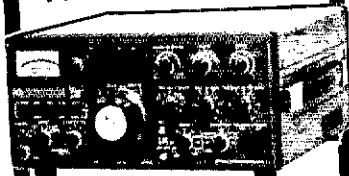
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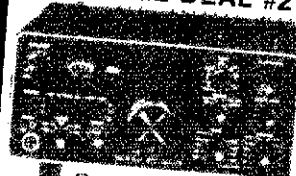
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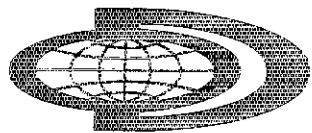
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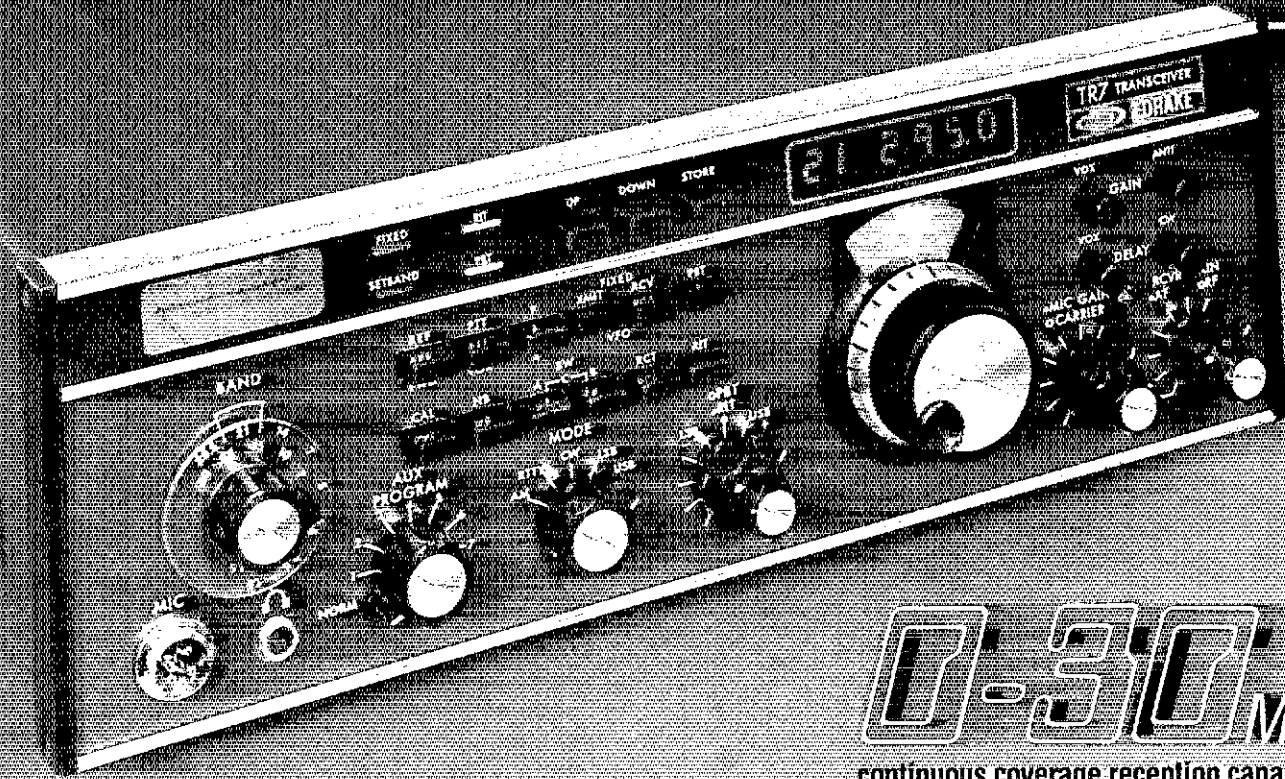
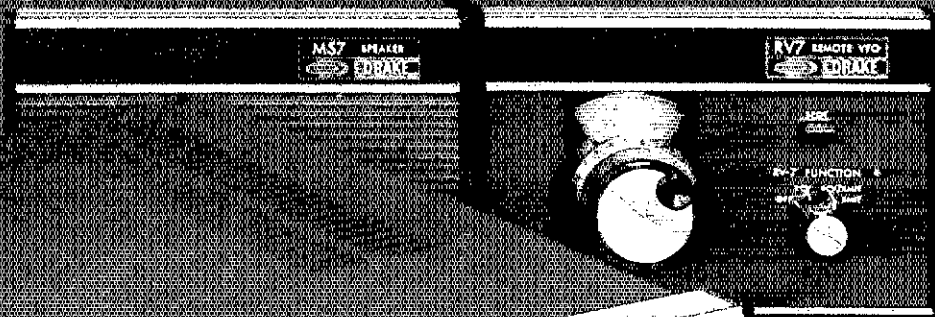


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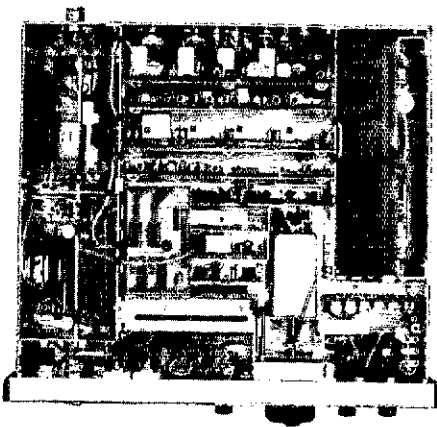
In 1963 Drake led the way by producing the first commercially available transceiver that employed the now widely copied 9 MHz i-f frequency. Even today, 15 years later, many major competitive transceivers are still being introduced using i-f's in this range.

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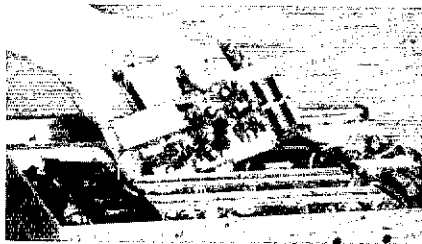
The TR-7 System is the result of one of the most extensive engineering and development programs in the history of the R. L. Drake Company, and provides the user with many innovative design features.

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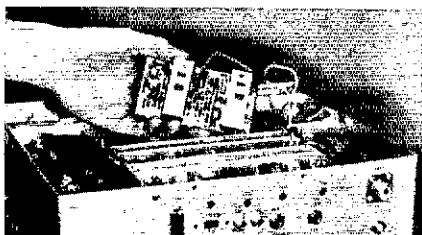


Broadband, Solid State Design—100% solid state throughout. All circuits are broadbanded so there is no need for preselection tuning or transmitter adjustments of any kind.

Synthesized/PTO Frequency Control—A Drake exclusive: Special high performance synthesizer, combined with the famous Drake PTO, provides smooth, linear tuning with 1 kHz dial and 100 Hz digital readout. 500 kHz up/down range switching is pushbutton controlled.



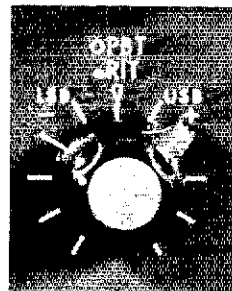
Continuous, Wide Range Frequency Coverage—The TR-7/DR-7 provides reception from 1.5 thru 30 MHz—continuously, and zero thru 30 MHz continuously with the optional Aux-7 Range Program Board. The highly advanced Drake Synthesizer makes this possible, and is an industry first. The TR-7/DR-7 provides transmit coverage for all Amateur Bands 160 thru 10 meters. With the optional Aux-7 Range Program Board, diode-programmable out-of-band transmit coverage is available for MARS,



Embassy, Government, and future band expansions in the range 1.5 thru 30 MHz.* The Aux-7 Board provides 0 thru 1.5 MHz receive coverage and crystal-controlled fixed channel operation for Government, Amateur, or semi-commercial applications anywhere in the hf range. The TR-7 w/o DR-7 and Aux-7 provides coverage of the Amateur Bands 160 thru 15 meters and the 28.5-29.0 MHz range of 10 meters. The Aux-7 Range Program Board is also useable in the standard TR-7 for extra range coverage as noted.

State of the Art Receiver Design—The Drake TR-7 introduces another industry first for amateur transceivers: "Up-Conversion," in combination with a special uhf high level double balanced mixer for superior strong signal handling, spurious and image response performance. The first i-f of 48.05 MHz places images well outside the receiver passband, and provides for true general coverage operation without i-f gaps.

True Passband Tuning—The TR-7 employs the famous Drake Full Passband Tuning instead of the limited range "i-f shift" found in some other units. The Drake System tunes from the top edge of one sideband, through center, to the bottom edge of the other sideband. In fact, the range is even wider to accommodate RTTY. Full passband tuning greatly improves receiving performance in heavy QRM.

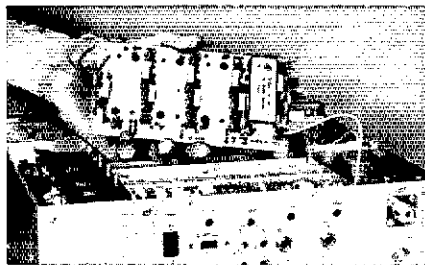


*Note: Out-of-band transmitter coverage for MARS, Government, etc. is available only in ranges authorized by the FCC, Military, or other government agency for a specific service. Proof of license for that service must be submitted to the R. L. Drake Company, including the 500 kHz range to be covered. Upon approval, and at the discretion of the R. L. Drake Company, a special range IC will be supplied for use with the Aux-7 Range Program Board. Prices quoted from the factory. See operator's manual for details.

(TR-7 features continued on next page)

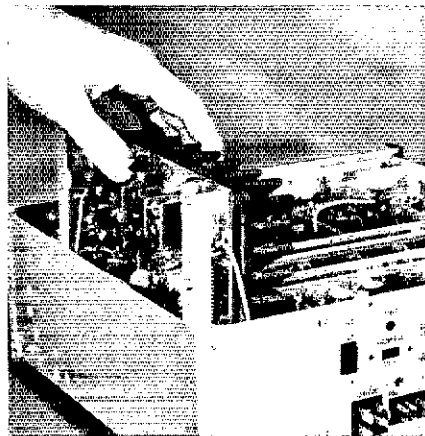
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Unique Independent Receive Selectivity—Optional receiving selectivity filters can be installed internally and pushbutton-selected from the front panel. These may be selected independently of transmit mode and provide optimum response for various conditions of ssb, cw, RTTY, and a-m. You may also transmit cw while receiving ssb, or vice versa, or even transmit one sideband while receiving the other. The standard filter is 2.3 kHz for ssb. You may choose from optional 300 Hz, 500 Hz, a special 1.8 kHz for crowded ssb, or 6 kHz filter for a-m.



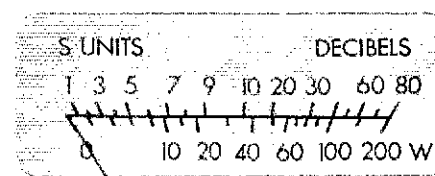
Effective Noise Blanker—This accessory is custom engineered to provide true blanking performance.

Special High Power Solid State PA—A Drake custom-designed diagonal heat sink provides for an internally mounted power amplifier with nothing mounted outboard subject to physical damage. The unique air ducting effect of this amplifier allows an optional rear-mounted fan to provide continuous duty on SSTV/RTTY. Continuous ssb/cw operation is available without the fan, due to the excellent heat sink design. The optional Drake PS-7 Ac Supply is rugged,



rated for continuous duty, and will easily handle power requirements. The System is rated 250 watts input—in any of its modes. Fully VSWR protected.

TR-7 Internal Test Facilities—As well as the standard "S" meter function, the TR-7 metering includes a built-in rf Wattmeter/VSWR Bridge. Also, the DR-7 digital counter reads frequencies to 150 MHz for test purposes. Access to the counter is from the rear panel.



Receiver Incremental Tuning (RIT)—Complete RIT flexibility is provided for both the TR-7 and RV-7 remote VFO for maximum convenience. The RV-7 also includes a special "spot" function for easy zero beating.

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7 P.M. on WR6ANP 443.35/448.35. WBRE has added to OBS schedules Calif./Hawaii net 17992 14.340 MHz Mon. and Fri. Full ARC reports W6RUP upgraded to Advance and W6SFOA a new Novice. Victorville ARC reports upgrades: W6GADH to Advance, W6AZCI to General, W6TUE to Technician. W6VSK has received WAS SSB award. Palm Springs ARC (Desert PATS) reports the following assisted in search for lost boys in the mountains: W6BPG W6SQE W6ORV W6CXD. Citrus Belt ARC (San Bernardino) editor W6WVDZ/6 has relocated to Mich. K6LL new address is 2750 West 22nd. Street, Yuma, Ariz. 85364. The new officers of the Orange County Communicators Club are: W6LGGZ, pres.; W6ZKX, operations/training officer; W6T5U, tech officer; W6HUG public info. officer. W6HQV and W6AKR are now on 450 MHz. W6BVK reports being back on the air using a Drake TR-3 and mobile antenna with car in car port. W6VOZ reports improved mobile performance with 5/8 antenna on 2 meters. Anza repeater has changed to 147.795 in/147.195 out to eliminate problems with the Mt. Baldy repeater. Traffic: W6EIG 390, W6AKHB 224, W6RE 61, W6BSXR 49, W6DAB 42, K6JT 22, W6QBD 9, W6A9WS 5.

SAN DIEGO: SCM, Arthur R. Smith, W6INI — Only three months to the National Convention in San Diego, Sept. 22-24, 1978. SD DX Club feted the Clipperton DXpedition crew at Pinnacle Pete's upon their return to San Diego. June 12 is starting date for licensing class at Mira Costa College. Contact W6VYD for details. W6BTA and W6DLU provided communications for Oceanside Red Cross during flood evacuation. W6BQV also assisted. Southwestern Net each Sun. at 1700 PT on 3907 kHz. To make my deadline for this column, I need reports from appointees by 4th of month. No reports for three consecutive months will terminate appointments. Upgraded: W6EJH to Advance. Call sign change: W6WVX to W6TKK. ARES field drills on last Sun. of each month are increasing in activity. Contact ECs NEAT W6GLW W6INI W6UAZ W6UFY for info. New ARES members: (Central) W6VUL W6WJK, (Eastern) W6DLD W6AGC W6HFC W6AIRJ W6OQV W6TLZ W6VSL W6BYSQ, (Northern) W6BRT W6BRU W6LSR W6MNH W6QCC W6BTAW, (Southern) K6AVX W6BSS W6DDCI W6DDQ W6BMLL W6OAM W6BQYZ W6GINY. Traffic: (Mar.) W6PVH 268, W6UAZ 162, W6BFTY 150, W6GW 93, NEAT 90, K6HAP 80, W6HJL 47, N6RD 45, W6SKU 40, W6LJFY 24, W6TSLA 17, (Feb.) N6RD 97, W6UFY 35, K6LKW 15, W6CDE 2, W6VTT 1.

SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — N6MW active in the ARRL DX contest. W6BKM sent 44 bulletins and W6ZRR sent 33. W6BNH a new OBS. K6RCL/W6SB have new Triton Fours. K6YD heard on SCN. W6SXV a new IC 22S. W6ZRR transmits bulletins Tue. at 1900 on 22/82, Wed. at 1900 on 146.40 and Thur at 1800 on 146.70 RTTY. Upgrades include W6ZYL W6BEN W6BSX to Gen. W6BNA W6LSS and W6ZBJ to Adv. and W6T5U to Extra. New Novices are W6BIM W6DEP W6GZN. Lompoc ARES activated early Mar. to provide flood watch utilizing W6AVI and W6A3J and HF. W6KPS coordinated a group to link repeaters in north section. W6BWWZ active as EC coordinating with neighboring sections and Search and Rescue in Lompoc. Section net meets on 3935 Sun. at 12 noon and is averaging 25 QNT reports mgr W6BLS. SCN VHF session held on WR6AKV 147.045/045 at 1930 daily. W6YCF and W6BQLY and W6BPDY have been ill. Sorry to report W6KLF a Silent Key. N6MA spoke at Bunker Ramo ARC. The Ventura County club swapfest successful. Remember the Satellite ARC Santa Maria Picnic June 18. Contact W2KVA for info. W6AB provided Comms for the OSCAR 8 launch. Remember the SBARC Bazaar July 15. W6AMBZ has his tower at 89-ft and is back on the nets. PSHR, N6MR 34, N6WV 40, K6WI 34, N6MA 30. Traffic: (Mar.) N6WP 197, K6WI 152, N6MR 82, W6AMBZ 57, W6SXV 42, N6MA 16, W6BKM 14, K6SZS 12, W6BWWZ 1. (Feb.) N5MR 136.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Ted Heithecker, W5EJ — Asst. SCM/SEC: K5PC. RM: W5GN. PAM: W5GSN. W5AKZA/EC sporting new Gal. V Mk.3 and new emergency plan for Lamar & Red River Co's. K5BGV now K5XO, with new QTH-Olney. W5QPX/OO noted 44 no-no's in Mar. KWID/OVS into VHF antenna experimenting, reports new TX antenna installed at WR5APD. W5AUBK has new TS-520S and M. W5COF active NTS. New 84/24 machine in Graham. com. W5COF active NTS. New Novice school; planning Hopkins Co. area repeater in near future, along with his EC duties W5BDC upgraded to A; heavy into NTS work. K5PC writing all ARRL members in Sect. that have no EC in county on recruiting drive. We desperately need ECs in Ector, Midland, Howard, Ellis, Lubbock and McLennan Co; please contact K5PC. K5SOR has windpowered stn. W5TI had nice trip to FL; putting up new dipoles for 7-14-21 MHz. Club bulletins reflect Field Day planning well underway. PSHR for Mar. W5SLAT 51, W5VMP 44, W5GSN 42, W5SPWM 42, W5SSD 42; Congrats! Don't miss "Ham-Com" '78 in Dallas June 17 & 18, at Royal Coach Inn; 10k & crowd expected. Good luck on FD. Let us have your tales and pix! ECs reporting: W5TZB W5UHO K5MWC W5SLAT W5LYK W5AKZA W5BCB K5JJP K5OKM W5KTD and W5SLT. K5BGV now K5XO. Extra Class, has moved to Olney. He is active in the North TX-Central OK Weather and Emergency Training Net on 146.34/94 MHz in Wichita Falls. Traffic: W5SSD 325, W5TI 216, W5BDC 99, W5VMP 91, W5SLAT 84, W5GSN 83, K5PC 72, W5AINJ 65, K5SOR 60, W5SPWM 49, W5SAJ 47, K5OKM 25, W5YK 16, W5AYX 11.

OKLAHOMA: SCM, Leonard Hollar, W5F5N — Asst. SCM: W5BEC. SEC: W5SMLT. RMs: W5RB & W5NKD. PAMs: K5CAY W5A5OLV & W5SRLR. Our congrats to W5UYH on being commended by the Tulsa WX Bureau for help given them from his area. Visited with a fine group at Hugo on Mar. 13. Certainly glad to see all the activity in SE. OK. I will have to submit the Foster family of Boynton as having the most amateurs in one family; Mr. & Mrs. Foster, 3 sons, 3 daughters-in-law and 1 daughter, all licensed. 3 hold 2 letter calls. All are active DXers. We met this fine family on a recent trip to club meeting at Okmulgee. Have heard some good openings on 2 meters due to WX fronts passing thru. With the predicted increase in sunspot activity, we could use some more QVS appointees to help report on the activity. Traffic reports are up again this month. Perhaps we need to set up more stations at "Fairs" etc. How about a booth at both Oklahoma City and Tulsa State Fair? Looking forward to "Ham Holiday" July 29th and Texoma Hamarama Oct. 28th. Traffic: K5OWK 700,

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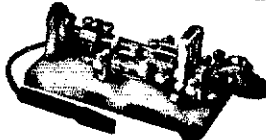
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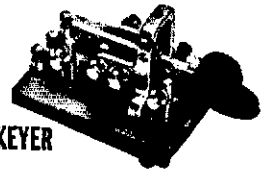
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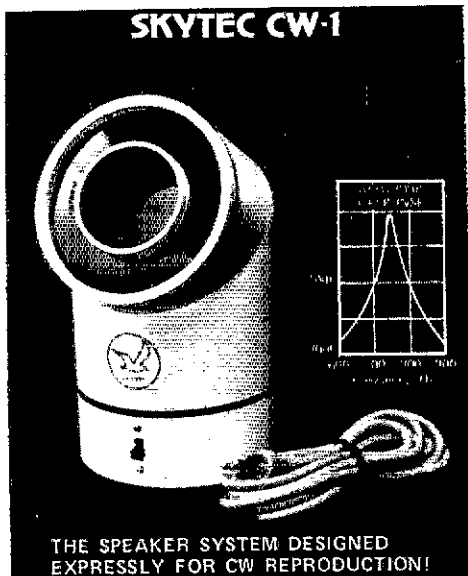
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SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR --- Asst. SCM: N5TC. SEC: W5LHK, PAM: N5TC. RM: W5ARKU. OOs reporting this month: K5DL, OVB reporting this month: N5AF. N5TC reports W5YOT enjoying DX in Extra Class segments. Congratulations! QRS W5-JYH says DX great except on DX contest weekend. OPS/Asst. EC W5ARVT reports he and W5FZO talked about emergency communications with Sweeney city officials; he has been active on CW nets; worked bunch of European stations on ten during WPX SSB contest; says W5AAH and son W5BKI upgraded to General. Great going! QRS W5AIR enjoyed trip to K6-Land; worked 2-meter contacts with all islands. N5FN is new call of EC/OBS W5TNN and also has new Murch transmatch reports W5IPH upgraded to General. (Real swell!); says Brazosport ARC presented a set of ARRL publications to Brazoria County Library. OVS N5AF reports W5JBD is new ham, with W5DFY as his Elmer. EC W5ACF reports newly-formed Brazos Valley ARC has 22 members with W5HQJ, pres.; W5VMD, vice-pres.; W5SGU, secy.; W5UVD, treas. Club is in full swing with 15 students in Novice class with K5DL W5VME and WN5TEN teaching. W5HQJ has new T5920S; W5UVD upgraded to Advanced and has new call --- W5AJC; W5VMF changed call to WN5TEN; W5GRU upgraded to tech.; W5ILD is new YL Novice. OBS W5DOE reports W5AC had busy Amateur Radio PR month with walk-in display of Amateur radio in Memorial Student Center and another operating display at MSC all-nite fair; the fair demonstrated Amateur Radio and handled much message traffic. K5MW has 15 new members in license class and W5AC radio club has several new members. New TH6DX antenna is up 90 feet; horizontally polarized thirty-two element active on 2-mtrs, several new verticals on other bands; new elevation rotor on OSCAR antennas; so many people helped that individual mention not possible but faculty advisor N5TC has been tremendous help; MSC Radio Committee now in 51st year of ARRL affiliation. Traffic (Mar.) W5KLV 658, W5VEA 305, K5HZR 298, N5TC 285, W5RRKU 197, K5ZSI 72, K5GM 56, W5JYH 51, W5BGE 50, W5ARVT 50, K5QEW 44, W5KR 23, W5BHO 19, N5FN 19, W5AIR 3, K5RVF 2. (Feb) W5AC 470, K5GM 133, K5HXR 26, W5TNN 19, W5SPD 11, K5GE 2.



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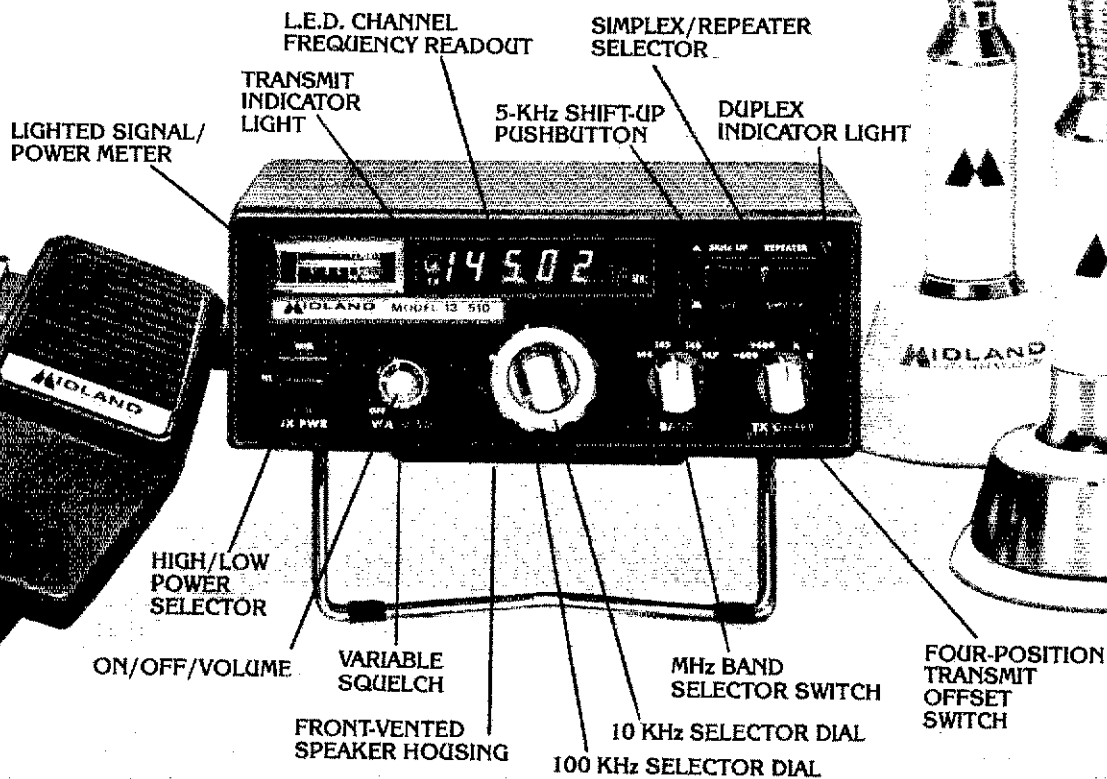
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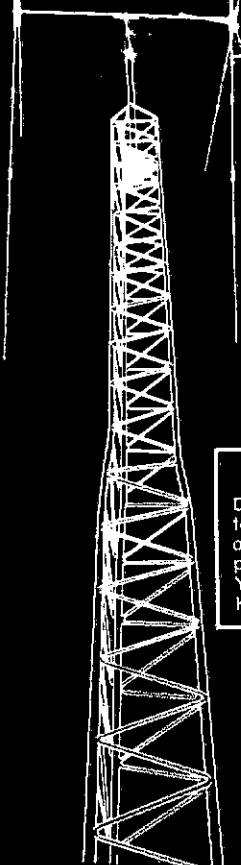
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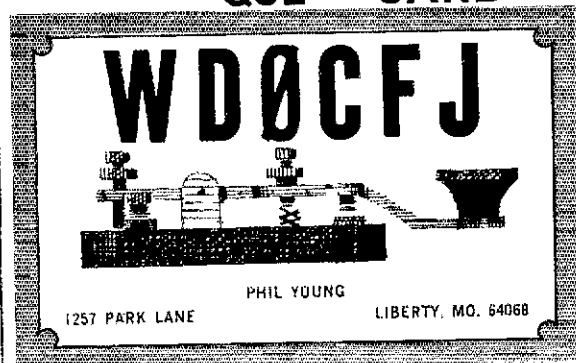
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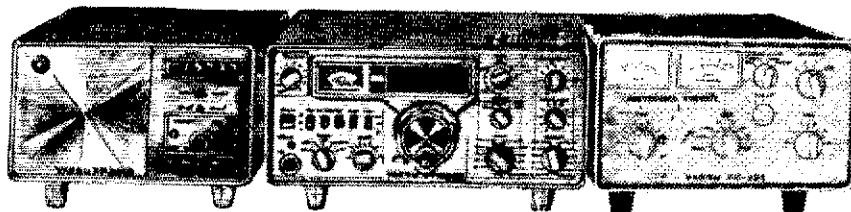
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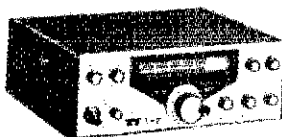
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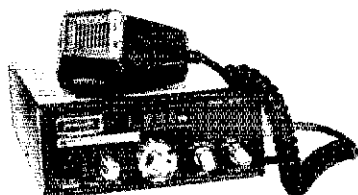
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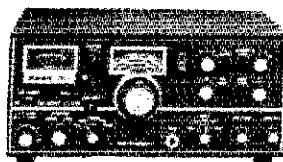
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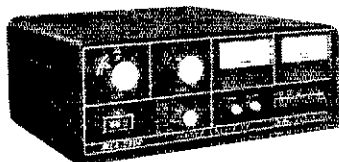
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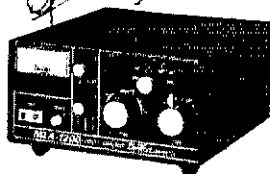
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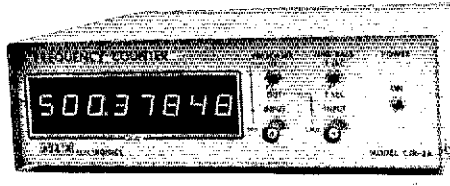
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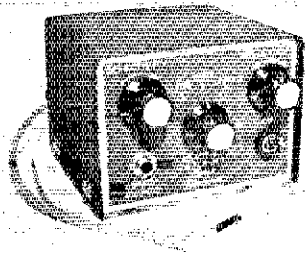
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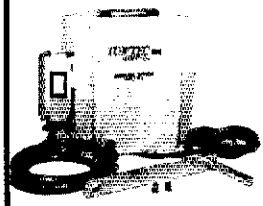
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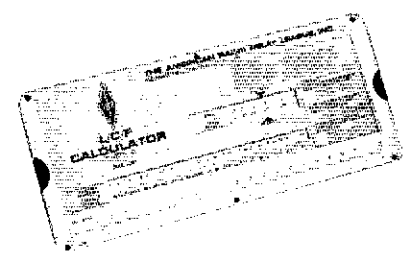
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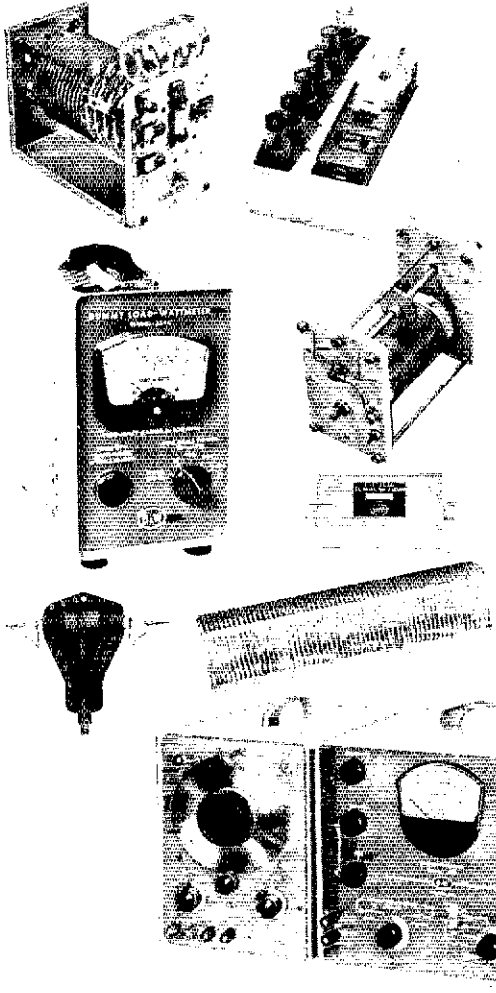
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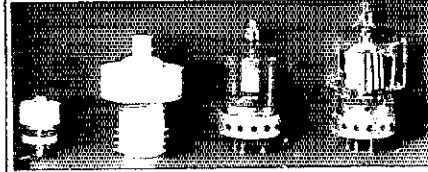
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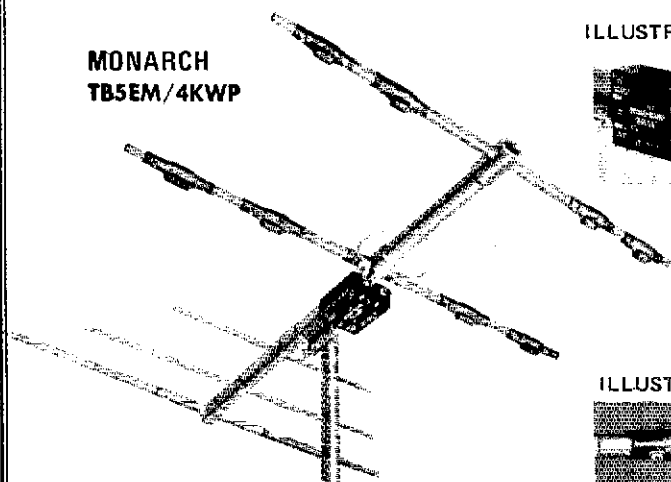


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July 29 and 30, 1978

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(2) The Ham-Ad rate is 60 cents per word. A special rate of 20 cents per word applies to hamfest and convention announcements, to individuals seeking to dispose of or acquire equipment, and to other advertising which, in our opinion, is noncommercial in nature.

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(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

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Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information: Q.C.W.A. Inc. 1409 Cooper Drive, Irving TX 75081.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't., police etc. invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE Sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P. O. Box 173, Huntington NY 11743.

EDITING a club paper? Need public relations help? You should belong to the Amateur Radio News Service. For information write: Doris Dennstaedt, WA3HEN, 303 N. Hamonds Ferry Rd., Linthicum Heights MD 21090.

QST AND CQ 1950-1975 issues for sale. Send s.a.s.e. for ordering 73, Ham Radio, or other QST and CQ issues. One dollar minimum order and all issues cost 25c each including USA shipping. Send chronological list and full payment to W6LS, 2814 Empire, Burbank, CA 91504. Available issues and refund sent within one month.

HAMFEST — Egyptian Radio Club, Inc., W9AIU, Granite City, IL, Sunday, June 11, 1978.

JUNE 4, 1978, Starved Rock Hamfest, Bureau County Fairgrounds, Princeton, Illinois. Advance registration \$1.50 if postmarked before May 25, after that \$2. Large s.a.s.e. please for registrations, map, information, etc. W9MKS/W9R9AFG/SRRRC, RFD no. 1, Box 171, Ogleby, IL 61348. 815-667-4614.

RADIO Museum now open. Free admission, 15,000 pieces of equipment from 1850 telegraph instruments to amateur and commercial transmitters of the 1920s. Amateur station W2AN. Write for information: Antique Wireless Assn., Main St., Holcomb, NY 14469.

AMATEUR Computing 78, Washington, DC, July 22-24. Personal computing, amateur telecomputing, commercial exhibits, seminars, club activities and amateur displays. Registration at door \$5. To preregister send check for \$4 payable to AMRAD to P. O. Box 688, McLean, VA 22101. For hotel reservations, call 703-821-1900 or write Sheraton National Motor Hotel, Columbia Pike and Washington Blvd., Arlington, VA 22204.

RADIO Expo '78. Special dates, this year only, are September 30, October 1. Lake County, Illinois Fairgrounds, between Chicago and Milwaukee. Over 4000 attended last year. Dozens of manufacturer and distributor exhibits, indoor/outdoor flea market areas, seminars. Free camping. Flea market open Friday to set-up. Tickets \$2 advance, \$3 at gate. Exhibitor space still available. Call the Expo answering machine (312-890-1177). For tickets and info, write: Radio Expo '78, P. O. Box 305, Maywood, IL 60135.

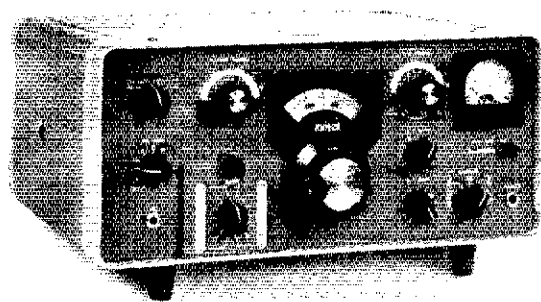
WARREN, Ohio Hamfest — Sunday, August 20, 1978. Trumbull K.S.U. Campus, Route 45 at Warren, Outerbelt 21st Big year with the famous flea market. All close-parking; lakes and parks nearby. Commercial display talk-in stations. \$2 door registration. Arrowsigns from 1-80; 1-20; Ohio Routes 5, 11 & 45. Details? OS Hamfest, Box 809, Warren, OH 44482.

BROOKLYN, New York, Kings County Radio Club League Chartered 1967, now reorganized. Many activities: Field Day, hamfest, fleamarket, Ham clinic. Novice and upgrading classes now forming. 212-859-3030.

HAMFEST — Canton, Ohio, Hall of Fame Hamfest July at Stark County Fairgrounds. For advance registration WA8SHP Box no. 3 Sandville, Ohio 44671. \$2.50 advance — \$3 at gate. Mobile check in 52/52 or 146.1979.

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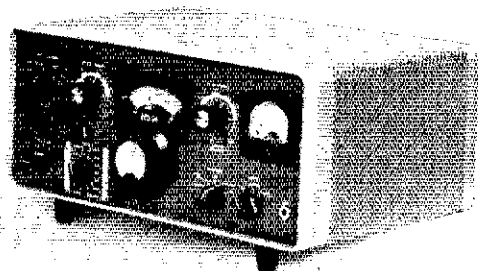
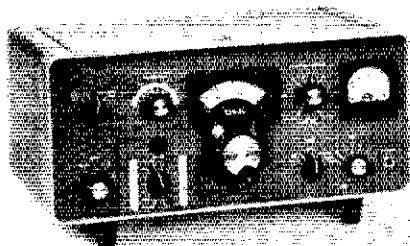
If you work mainly voice, and just dabble in CW, RTTY, or SSTV, build your station around our KWM-2A Transceiver. The unit is compact and lightweight, designed for portable as well as fixed operations.



You're not limited to SSB voice communication, though. The KWM-2A's CW features include break-in and sidetone monitoring circuits. And with the optional 516F-2 Power Supply and external cooling air, you can operate RTTY communications as well.

But if your communications interest is varied and you want maximum voice, CW, RTTY or SSTV capability, we recommend the Rockwell-Collins 75S-3C Receiver and 32S-3A Transmitter.

Optional filters, rejection tuning and variable BFO on the receiver, plus features like carrier reinsertion on our transmitter, give you as much control of your equipment as possible.



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HERE IS THE RECEIVER AUDIO ACTIVE FILTER THAT MAKES ALL OTHERS OBSOLETE

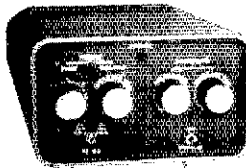
The Electronic Research Corporation of Virginia Model SL-55 Audio Active Filter adds unequalled versatility in receiver audio processing for SSB and CW. This filter was designed, produced and made available to the amateur community only after painstaking research and field testing of its effectiveness in minimizing QRM. Check these features:

Continuously tunable bandpass filter (not lowpass) so that the passband may be positioned anywhere from 200 to 1400 Hz, 3 dB bandwidth is continuously adjustable from 14 to greater than 2100 Hz (20 dB bandwidth from 140 to 2100 Hz).

Audio input and output impedance is eight ohms with one watt output capability.

Dimensions — — 5.5 X 7.5 X 3.5 inches.

Available in gray or green tones.



Positioning of simultaneous notch filter is continuously variable from 300 to 1400 Hz with FINE and COARSE position controls. Notch depth is fixed at nominally 30 dB. Notch tuning is independent of bandpass tuning and may be completely disabled.

Bypass switch restores the receiver audio output path to its original configuration.

Power Requirements — — — 115V ac at less than 1/16 amp. No batteries needed.

Who is ERC? The Electronic Research Corporation of Virginia Consists of a group of engineers with years of experience in military communications systems. Several are active hams who know and understand the needs of the amateur and how to apply state-of-the-art techniques to amateur communications.

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The gold braid on the black bill with the 3-color Amateur Radio Emblem was created especially for the Amateur Radio Operator.

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This 3-color cloth emblem is available for sewing on your shirt, jacket, cap, etc. Size 2" x 3".

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5. HP 608 Signal Generator \$325
6. HP 524/Northeastern Counter Base Unit \$100
7. Gertsch FM-3 freq. meter (20-1000) MC \$225

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32ND ANNUAL Turkey Run hamfest. Vigo County Fairgrounds mile south I-70 on U.S. 41. For overnight campers only — open Saturday July 15, 12 noon EST. For general public, open Sunday, July 16, 8:00 EST. Free outdoor flea market, covered flea market \$3 — some available, food and refreshments, giant shopping mall nearby. Advance sale tickets \$1.50 4 for \$5, gate tickets, \$2/3 for \$5, children under 12 free. Talk-in 25/85 and 52 simplex. For tickets and information s.a.s.e. to WVARA Hamfest, P. O. Box 81, Terre Haute, IN 47808.

NEW YORK City — 2 flea markets bigger and better than ever indoor-outdoor rain-shine. Sunday June 18 and Sept. 10 9 A.M. to 4 P.M. The municipal parking lot, 80-25 126th St., Queens, NY one block off Queens Blvd. Free parking for 1000 cars. Refreshments, fun. Sellers \$2, buyers \$1. Talk-in: 52/52, 40-00 Info: 212-699-9400 days. Spons. By Hall of Science Amateur Radio Club, WB2TBC.

TRI CLUB Hamfest July 18 Allentown. Information s.a.s.e. K3AI, Rt. 1, Box 104, Emmaus, Pennsylvania 18049.

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QSLs with class! Unbeatable quality, reasonable prices. Samples, 50c refundable. QSLs Unlimited, 1472 SW 13th Street, Boca Raton, FL 33432.

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QSLs — The late Rogers K9AAB collection again available. Send no. 10, 24c, s.a.s.e. for samples and prices. Marv W8MGI, 2095 Prosperity Ave., St. Paul, MN 55109.

QUALITY QSLs, samples 35c 1313 Willow, Chippewa Falls, WI 54729.

"QSLs-Top Quality-Samples 25c-Includes Rubber Stamp info-Ebbert Graphics-Dept 3, Box 70, Westerville OH 43081."

General

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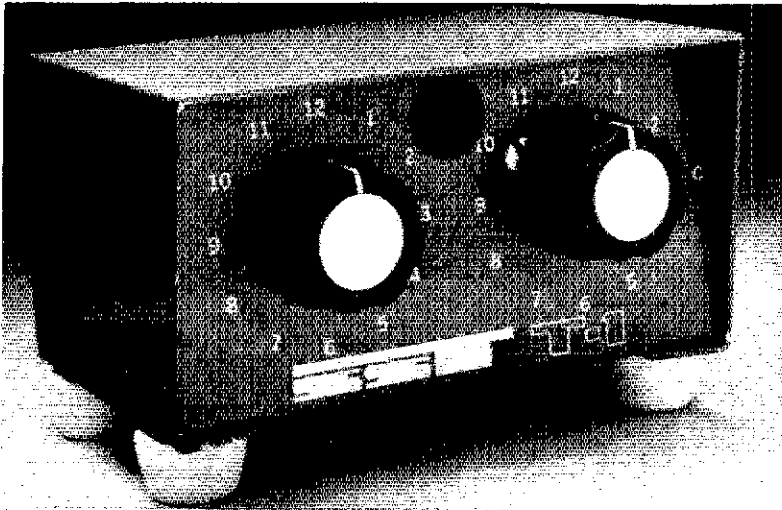
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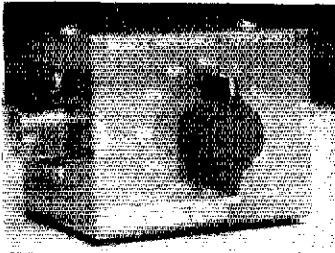
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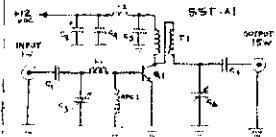
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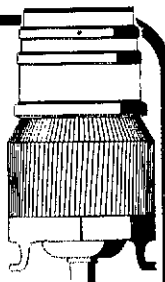
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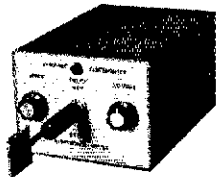
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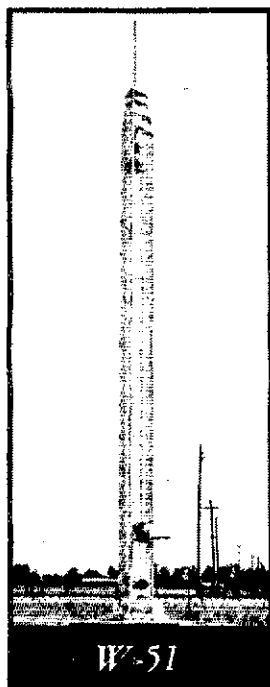
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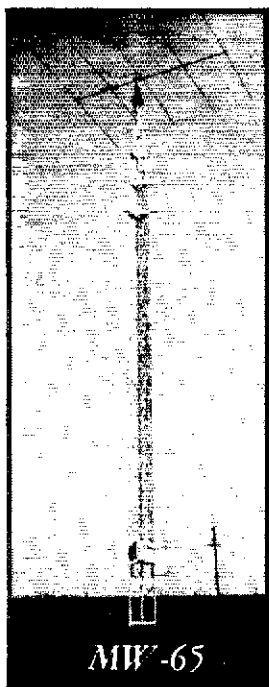
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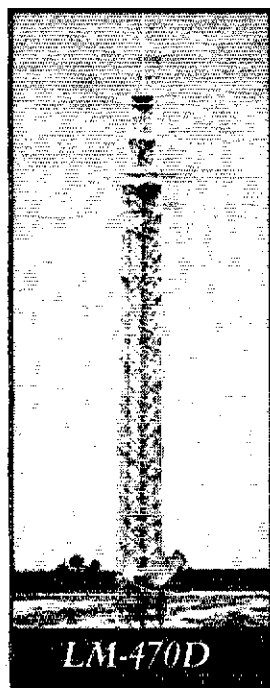
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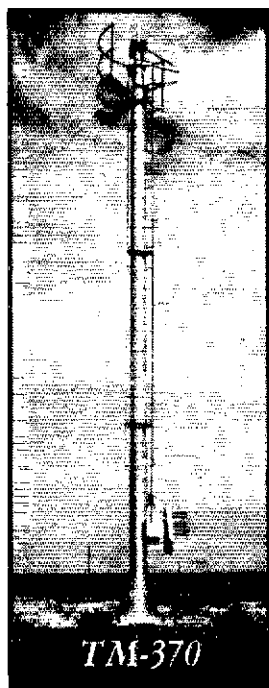
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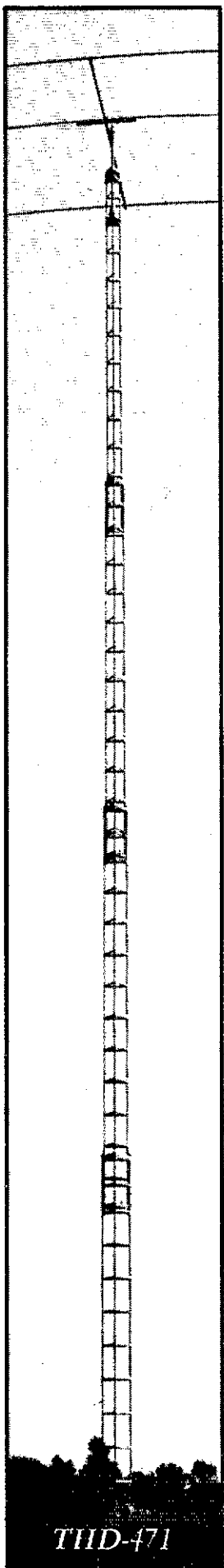
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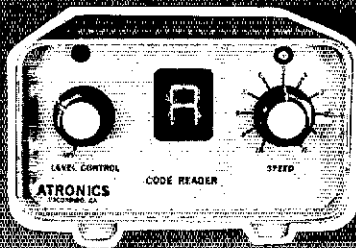
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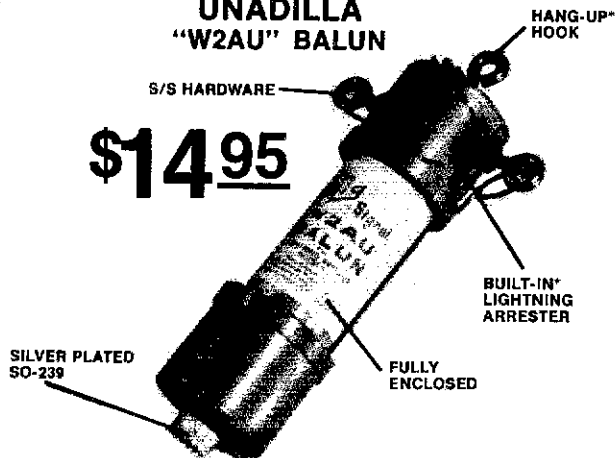
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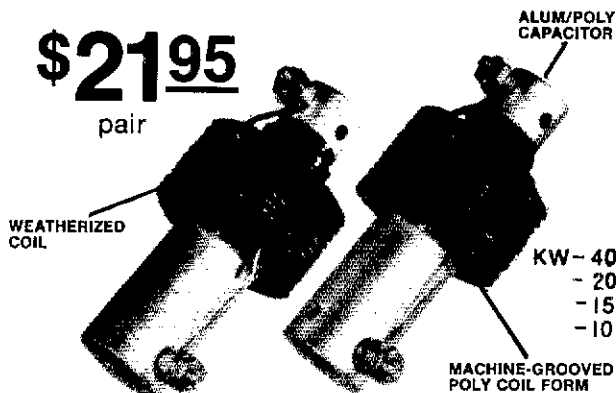
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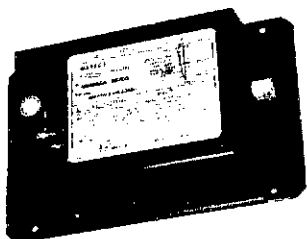
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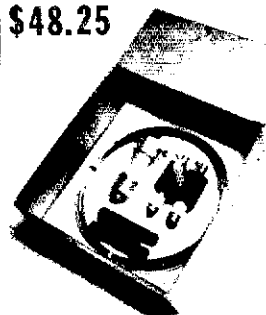


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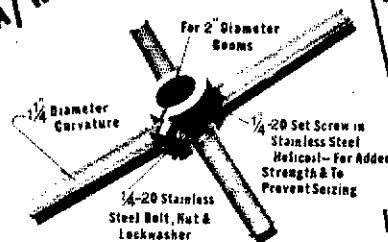
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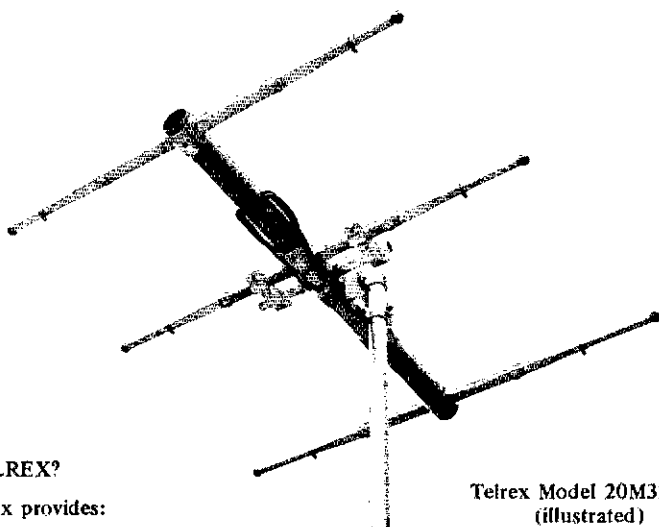
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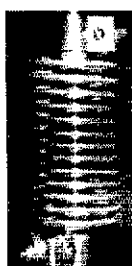
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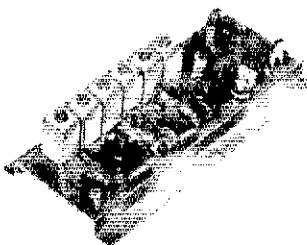
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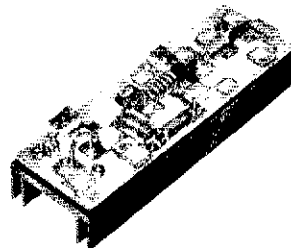
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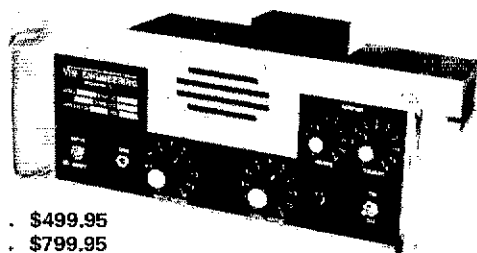
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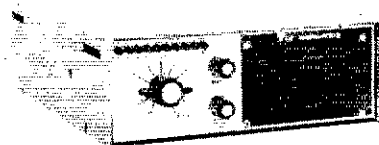
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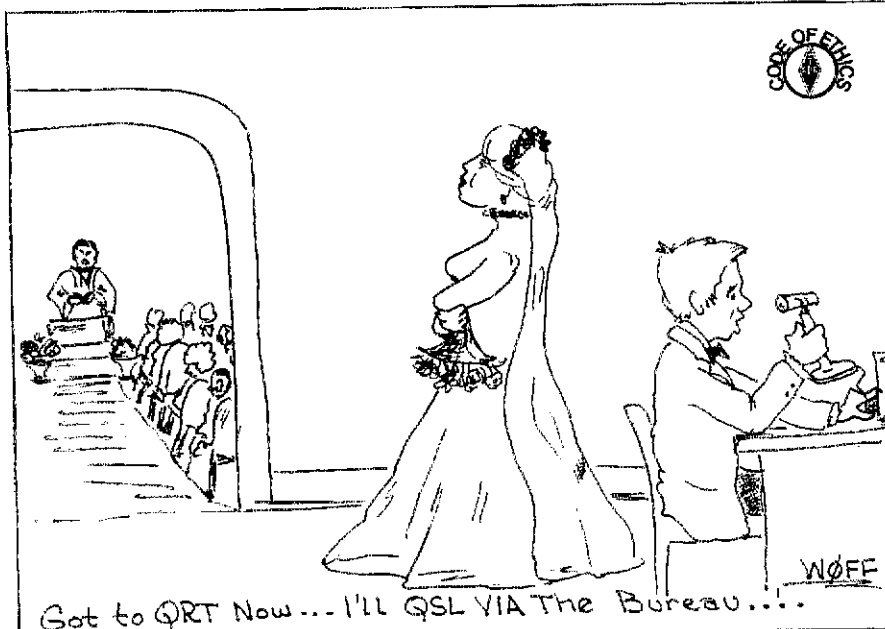
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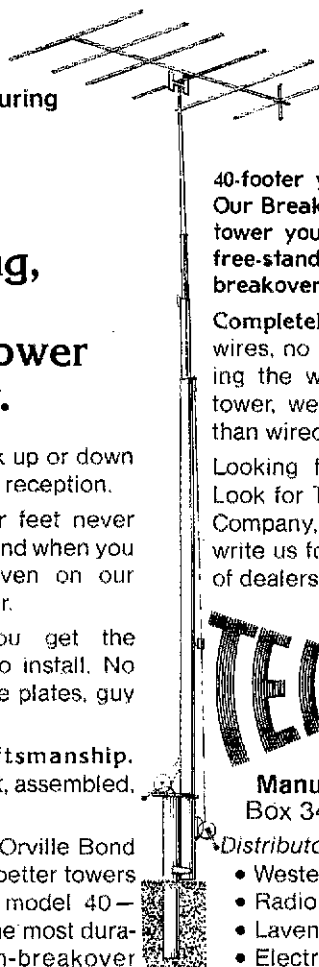
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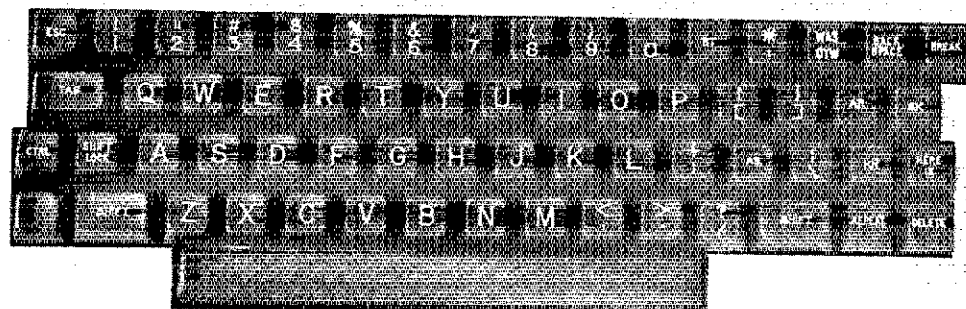
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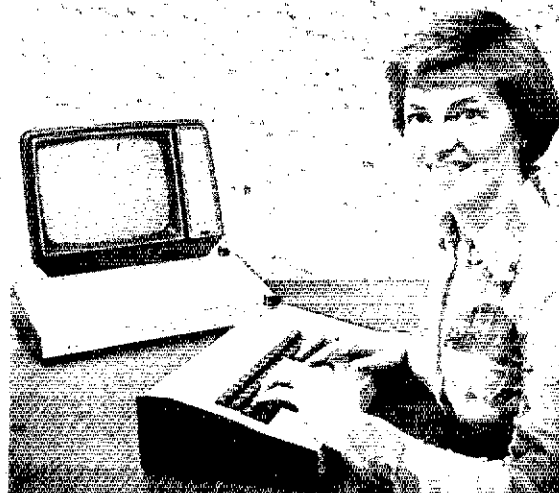
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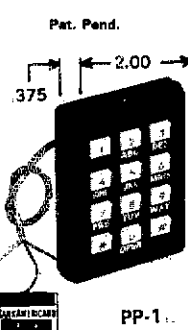
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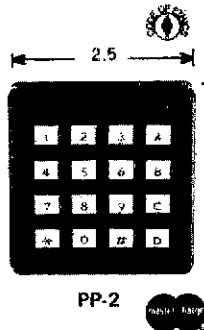
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SELL: Mint Argonaut 509, \$280. Or swap for 80-10M xcvr or 2 meter fm xcvr, MFJ 40T QRP rig, \$20. Mario Filippi, 9 Harold Ct., New Rochelle, NY 10801 914-632-4255.

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SASE for lists of old tubes, mags, lit. misc. for sale or trade. K6OVN, 1157 Palms Blvd., Venice, CA 90291.

WANTED: HRO-80 coils and scales. Louis, K5DAH, 2731 Hearne, Pasadena, TX 77502. 713-941-1792.

HEATH — HW-101 — power supply — cw filter — speaker — manuals, factory tuned 10/27/77, WD4DDA, Preston Shute, 1783 Main St., Apt. 138-Q, Dunedin, FL 33526. 813-736-2137, \$290.

WANTED: Collins 75A-2, Hallicrafters SX-28A, HRO-7 Condition, mods if any, accessories and best price first letter. Replies to all correspondents. WA9MHM, 4033 North Bartlett, Shorewood, WI 53211.

VHF Engineering RPT144 repeater. Tuned and completely operational on 146.07/67. Used fourteen months; working well. Includes all manuals, \$400 (certified) delivered UPS. S.a.s.e. with questions, please. Anthracite Repeater Association, Box 982, Hazleton, PA 18201.

SSTV: For Sale — Robot 70A monitor, 80A camera, macro lense, calibration tape and manuals \$460 WA2-QVI/5 24 Sheraton Oaks, North Little Rock, AR 72118 501-835-5748.

FOR SALE: 75S-3B winged s/n 15904, includes 2.1 kHz, 800 Hz & 500 Hz filters and 312B-3 speaker unit. \$550 or best offer. Also new 4CX1000, Tom, K1KI, Box 62, Unionville, CT 06085.

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FOR SALE: Central Electronics Scope Model MM2 1-603-472-3033. W1CPI.

YAESU FT-101EX, cw filter, fan, used one hour \$650. Midland 13-505 new sealed carton \$200. WA4TFE, P. O. Box 340, Winfield, AL 35594. 205-487-2060.

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SWAN 250C — 117XC — 14X supplies. Mint, original cartons, \$460 firm. 216-352-1690. WA8TNG, 425 Bulton Ave., Painesville, OH 44077.

WANTED: 450-512 MHz transceivers, any type, WB5FXI, 601-475-8740.

SELL or trade: Input & display system, Burroughs model B9351/B9353, plus tech manual; 17" CRT monitor unit; keyboard unit; and control unit which houses logic circuits, memory and power supplies. Very good cond. Make offer or trade; Tel. 904-877-7417 exts., John WA4GCT, 706 Apache St., Tallahassee, FL 32301.

WANTED: SB-401 with crystal pack or SB-401/SB-303 combination. WD0BVF, 2936 S. Roanoke, Springfield, MO 65807.

COMPLETE 2KW Drake station: R-4C, T-4XC, L-4B, FS-4, MN-2000, MS-4, AC-4, 3 filters, mint, little use, package only, \$2295. Hallicrafters, HA-2, HA-8, two P-26 ps, mint, manuals, \$250. No shipping, K1CM, 617-773-4421.

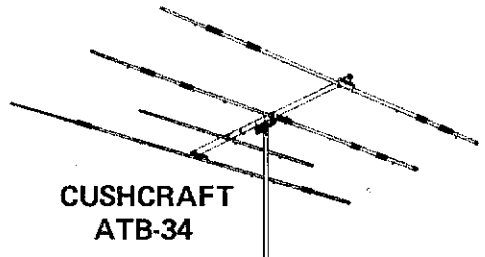
FOR SALE: Kenwood TH-2200A, 10 sets crystals, 2 mics, Ringo, case, d.c. cords, charger, nicads, \$250. WA2ALT, Steve Schwartz 212-996-0862.

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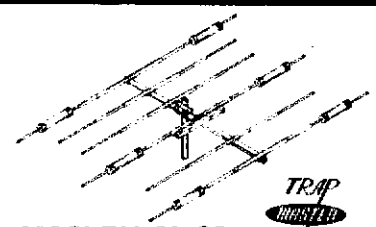
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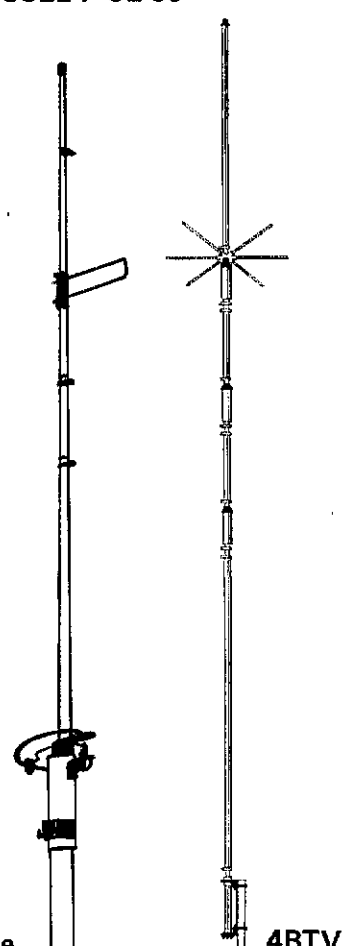
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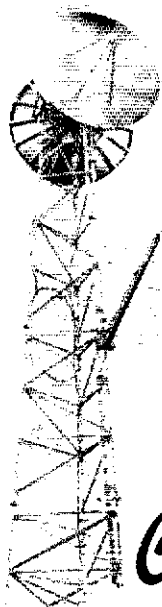
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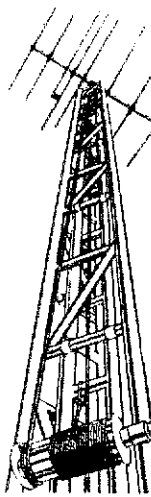
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VLF Receivers wanted such as the Navy RBA-7, Rycrom 2174. Pick-up within 150 miles. Carmody, K2BZC, RD3, Canandaigua, NY 14424.

SPEECH processor -- details "Ham Radio," Aug. '77, p. 48. Board only \$5.60 pp. Board and components, you add case and switch, \$17.95 pp. Instructions included. Getz Engineering, 685 Farnum Rd., Media, PA 19063.

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NCX-500 with ac supply, mike, mobile mount, etc. Excellent condition, first check for \$225 takes it. K1THS 31 Stockade Path Duxbury, MA 02332.

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DRAKE SSR1 revr. Mint condx. \$200 prepaid. W3FYW 9 Diane Drive, Malvern, PA 19355.

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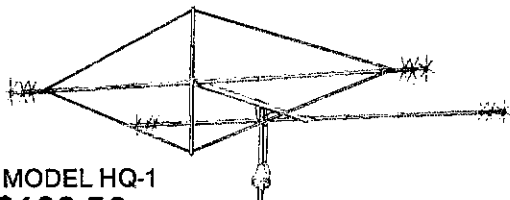
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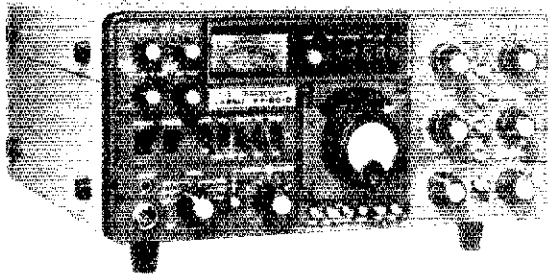
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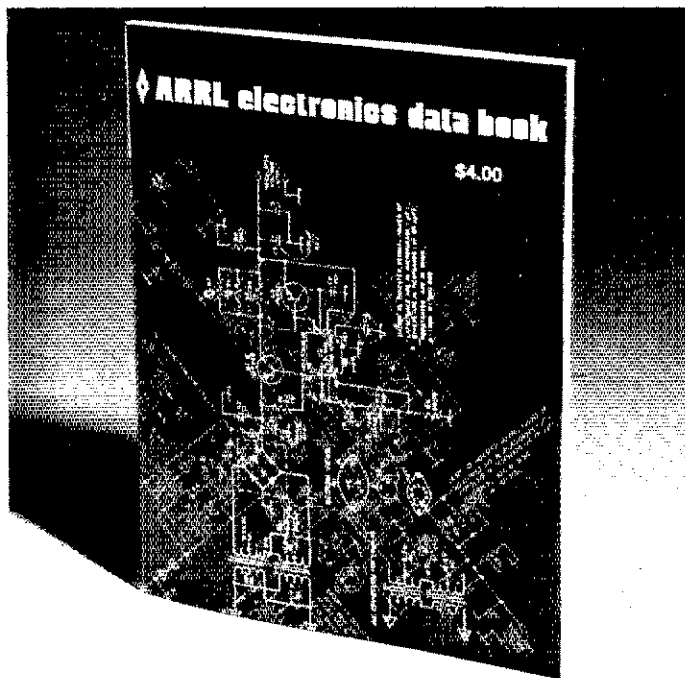
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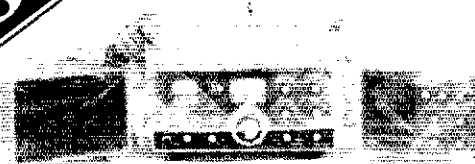
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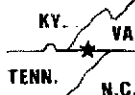


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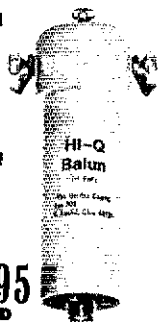
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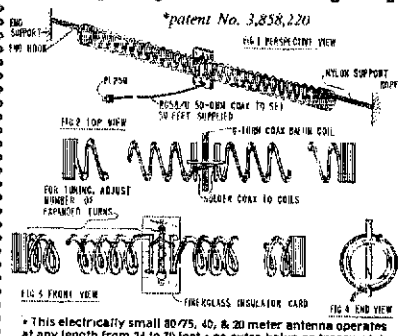
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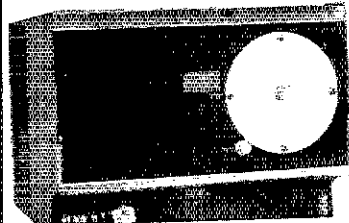
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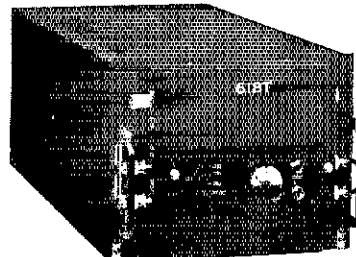
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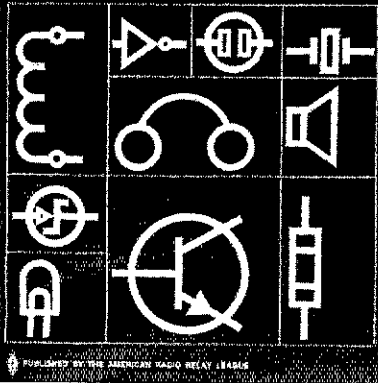
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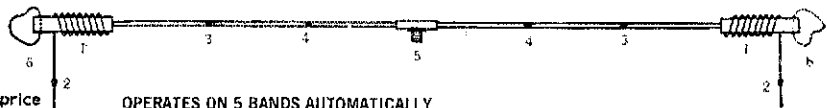
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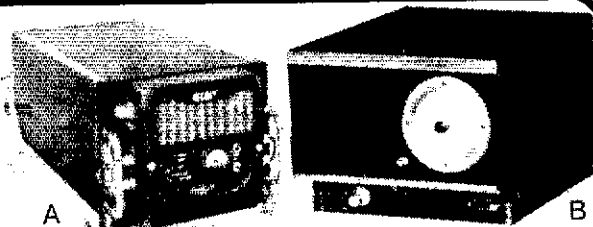
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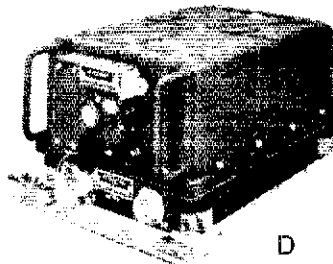
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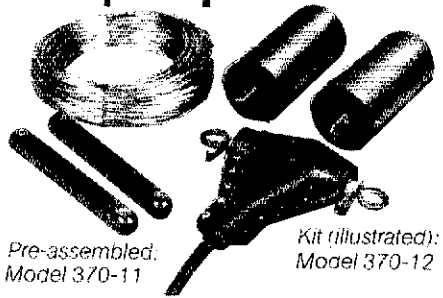
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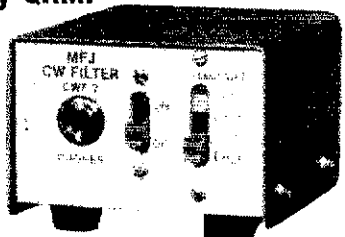


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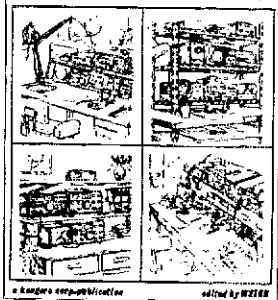
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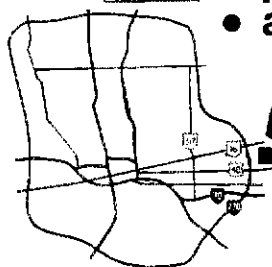


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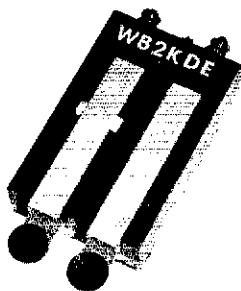
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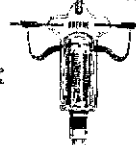
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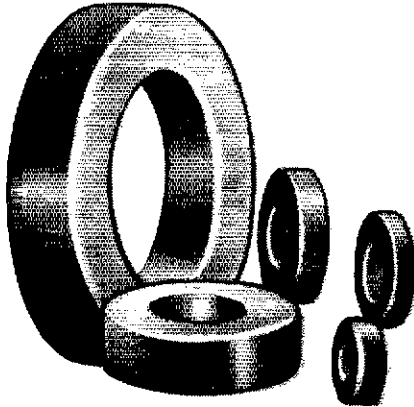
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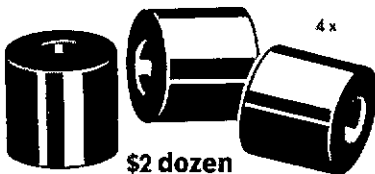
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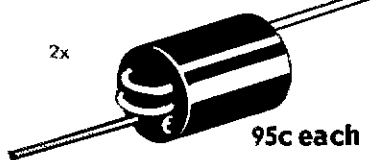
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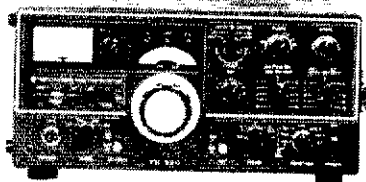
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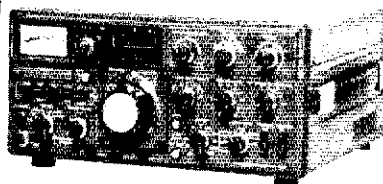
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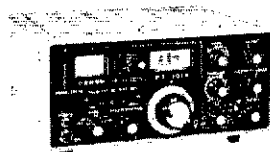
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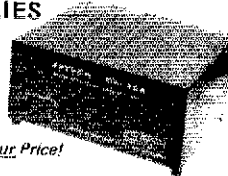
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FT-101E, 160 thru 10M \$799.
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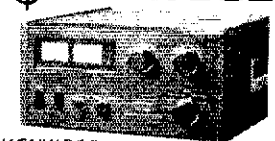
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RS-35A
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KENWOOD



KENWOOD
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KENWOOD
TX T-599D \$549.
RX R-599D \$549.
Call for Your Price!



KENWOOD FM/SSB TS-700SP \$729
Call for Your Price!



KENWOOD 2M FM TR-7400A \$399.
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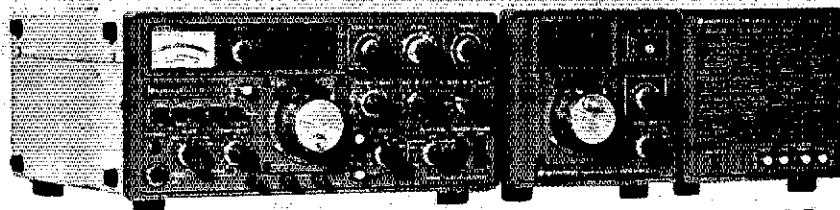
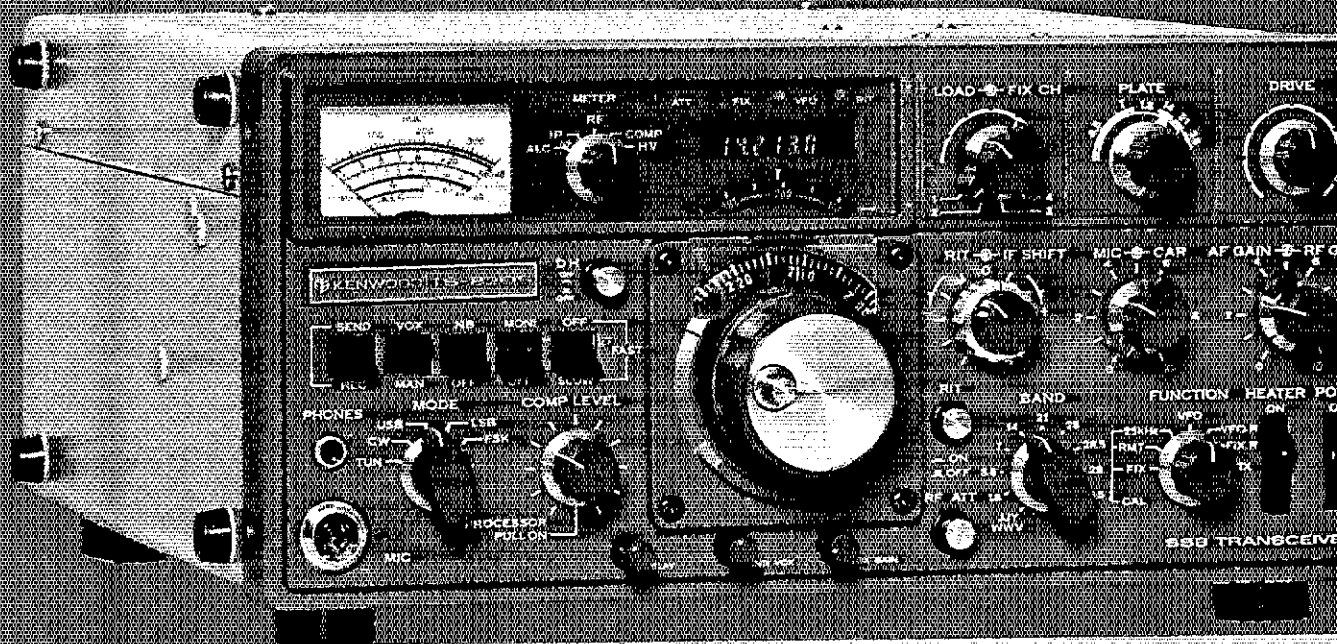
KENWOOD
the pacesetter in amateur radio

The TS-820S... known worldwide as the Pacesetter. Amateur Radio Operators universally respect its superb quality, proven through all 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.

You can always tell who's running a TS-820S... superb quality stands out from all the other rigs in the band... and when the QRM gets heavy, the TS-820S's adjustable RF speech processor, with a 455-kHz circuit to provide quick-time-compression, will get the message through. Negative feedback is applied from the final to driver to improve linearity, and third-order products are at least -35 dB. Harmonic spurious emissions are less than -40 dB and other spurs are less than -60 dB. RF input power is 200 W PEP on 160 W DC on CW, and 100 W DC on voice. Receiver sensitivity is better than 0.25 μ V for 10 dB S/N. The TS-820S is known for its superb receiver selectivity, and its famous IF shift eliminates heavy QRM. That's why the TS-820S is the DXer's choice.

See your local Authorized Kenwood Dealer today.

TS-820S



TS-820S VFO-820S SP-820

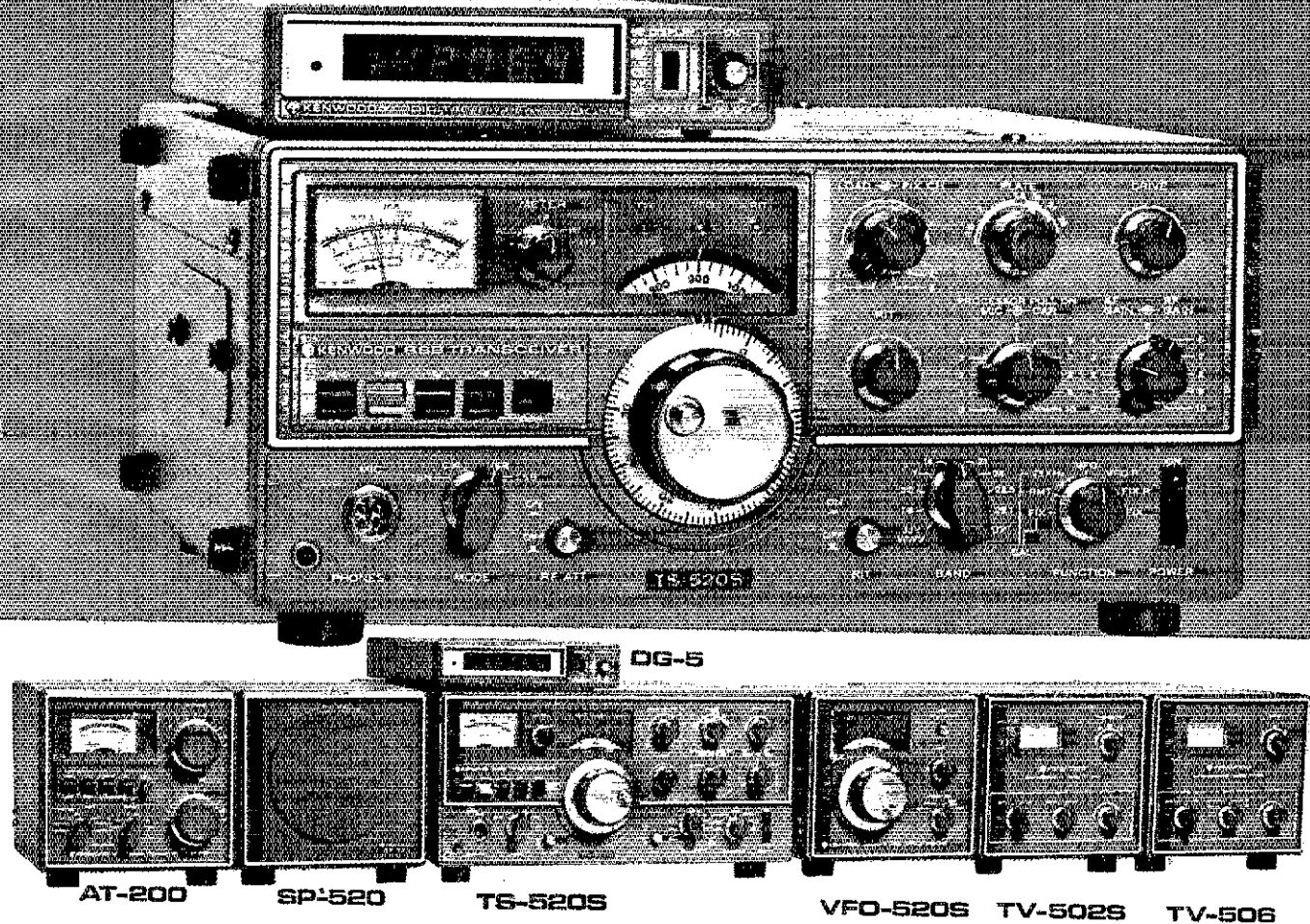
Kenwood's unbeatable combination. The TS-820 solid state remote VFO adds greatly to the versatility of your TS-820S. It has its own circuit and control switch and is a perfectly matched accessory. The SP-820 deluxe speaker includes audio filters for maximum versatility on receive and two audio input

The TS-520S... the most popular Amateur Radio transceiver in the world... provides a foundation for an expanding series of accessories designed to please any ham... from Novice to Amateur Extra.

The TS-520S transceiver provides full transmit and receive coverage of all Amateur bands from 160 through 10 meters. It also receives 15.0 (WWW) to 15.5 MHz and another 500-kHz range of your choice in the auxiliary band position. With the optional DG-5, you have a large digital frequency readout when transmitting and receiving, and the DG-5 also doubles as a 40-MHz frequency counter. The TS-520S includes a built-in AC power supply, and, with the addition of the optional DS-1A DC-DC converter, it can function as a mobile rig. It features a very effective noise blanker, RIT, eight-pole crystal filter, 25-kHz calibrator, front-panel carrier level control, semi-break-in CW with sidetone, built-in speaker, heater switch, 20-dB RF attenuator and easy phone-patch connection. RF input power is 200 W PEP on SSB and 160 W DC on CW. Carrier suppression is better than -40 dB and sideband suppression is better than -50 dB. Spurious radiation is less than -40 dB. Receiver sensitivity is 0.25 μ V for 10 dB (S+N)/N. Selectivity is 2.4 kHz at -6 dB/4.4 kHz at -60 dB and, with the optional CW-520 CW filter, is 0.5 kHz at -6dB/1.5 kHz at -60 dB.

See your local Authorized Kenwood Dealer for more information, and a super deal!

TS-520S



A great station... at an affordable price! The TS-520S with its companion accessories... including two new units. The AT-200 antenna tuner provides a versatile tool in any station. The other is the TV-520S, Kenwood's 2 meter transverter for SSB and CW operation from 14.0 to 14.3 MHz.



The 599D "Twins" are offered to the discriminating Amateur who appreciates the advantages of operating a separate transmitter and receiver.

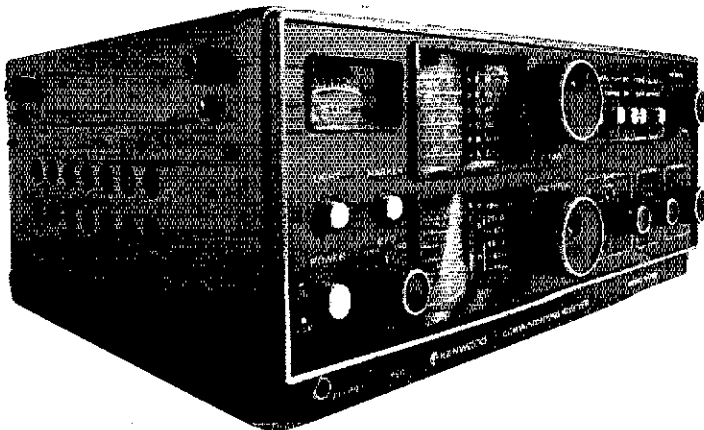
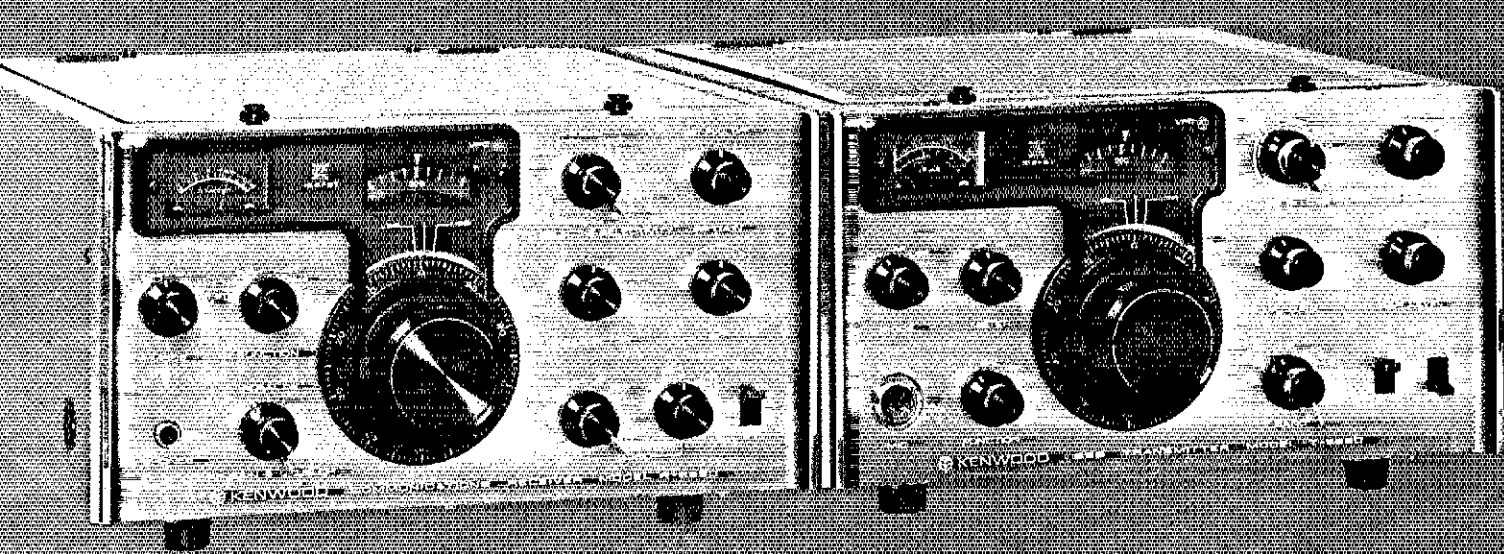
The R-599D receiver and T-599D transmitter provide greater flexibility with more features than found in a transceiver.

The R-599D receiver is all solid-state, covering all Amateur bands from 160 through all of 10 meters, as well as auxiliary band and WWV (10-MHz). With optional converters it also receives 6 meters and 2 meters. Modes include LSB, USB, CW, AM, and FM. A 2.7-kHz eight-pole filter is built-in for SSB, as well as a 500-Hz eight-pole CW filter and a 5.0-kHz six-pole AM filter. An optional 14.0-kHz six-pole FM filter is available. Also featured are an AGC control (slow/fast/off), 25-kHz calibrator, RIT, noise blanker, ANL (AM), squelch, monitor, VFO selector, and RF gain control which does not affect S-meter reading.

The T-599D transmitter is solid-state except for the driver and final tubes. It covers the 80 through 10-meter Amateur bands on LSB, USB, CW, and AM. An AC power supply is built-in. Also included are VOX, anti-VOX, PTT, semi-break-in CW with sidetone, ALC, transverter terminal.

Enjoy split frequency control in four separate/transceive combinations with the 599D "Twins". See your local Authorized Kenwood Dealer for more information.

R-599D/T-599D



R-300

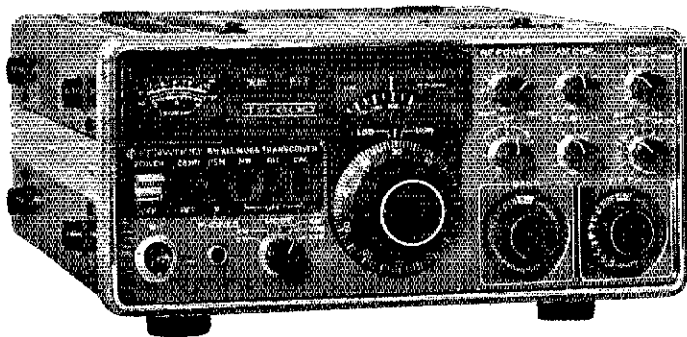
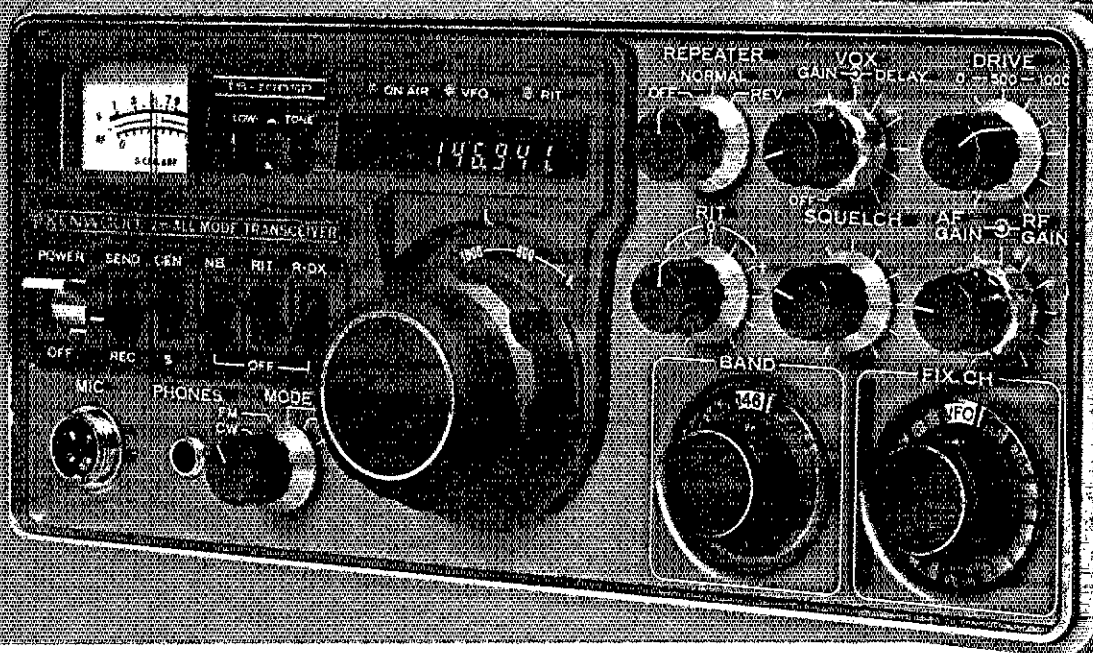
The R-300 all-band communications receiver covers the following ranges: (A) 170-410 kHz; (B) 525-1,250 kHz; (C) 1.25-3.0 MHz; (D) 3.0-7.5 MHz; (E) 7.5-18.0 MHz; and (F) 18.0-30.0 MHz. It receives AM, SSB, and CW. The receiver features large, easy-to-read drum dials. Bandspeed is calibrated for 10 foreign-broadcast shortwave bands, and a replacement bandspeed calibration is available for the 80-10-meter Amateur bands. Included is a three-way power supply (AC/batteries/external DC). Wide and narrow ceramic filters are employed for high selectivity. Also included is a 500-kHz calibrator.

STILL THE SAME FINE, TIME-PROVEN RIG. BUT NOW WITH THE SIMPLE ADDITION OF A PLUG-IN CRYSTAL, THE TS-700SP WILL BE ABLE TO UTILIZE THE NEW REPEATER SUB-BAND (144.5 to 145.5 MHz) STILL FEATURES ALL OF THE FINE ATTRIBUTES OF THE TS-700S: A DIGITAL FREQUENCY DISPLAY, RECEIVER PRE-AMP, VOX, SEMI-BREAK IN, AND CW SIDETONE. OF COURSE, IT'S ALL MODE, 144-148 MHz, VFO CONTROLLED... AND KENWOOD QUALITY THROUGHOUT.

Features: 4 MHz band coverage (144 to 148 MHz) • Automatic repeater offset capability on all FCC authorized repeater subbands including 144.5-145.5 MHz • Simply dial receive frequency and radio does the rest... simplex, repeater or reverse. Same features on any of 11 crystal positions • Transmit/Receive capability on 44 channels with 11 crystals • Operates all modes: SSB (upper and lower), FM, AM and CW • Digital readout with Kenwood Blue™ digits • Receiver pre-amp • Built-in VOX • Semi-break-in on CW • CW sidetone • All solid-state • AC and DC capability 10 watts RF output on SSB, FM, CW • 3 watts on AM • 1 watt FM low-power switch • 0.25µV for 10 dB (S+N)/N SSB/CW sensitivity • 0.4µV for 20 dB quieting FM sensitivity

10 watts RF output on SSB, FM, CW • 3 watts on AM • 1 watt FM low-power switch • 0.25µV for 10 dB (S+N)/N SSB/CW sensitivity • 0.4µV for 20 dB quieting FM sensitivity.

TS-700SP



TS-600

The luxury all-mode transceiver for 6 meters. All solid-state. SSB, FM, AM, and CW.

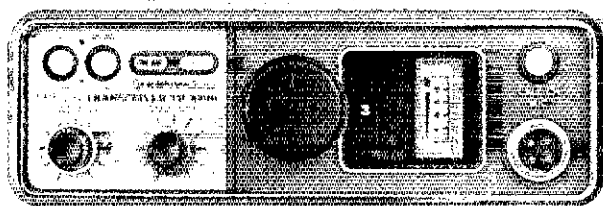
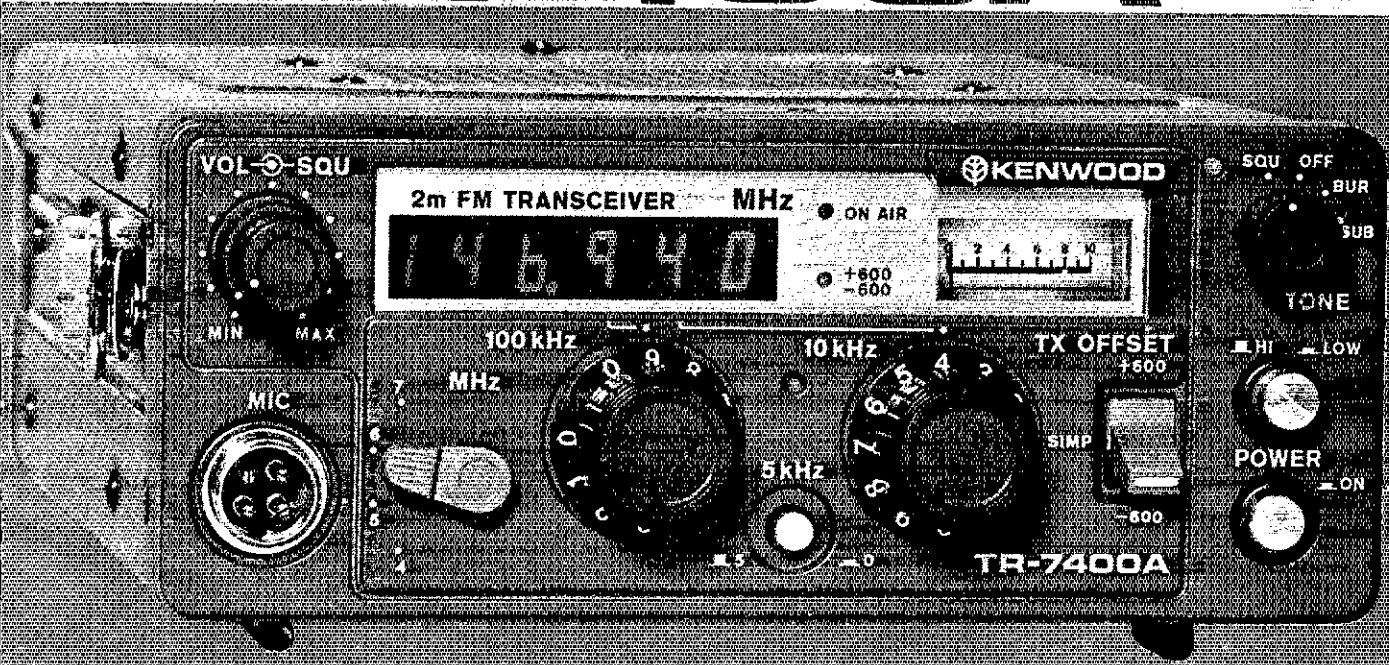
It's easy to work VHF DX on 6 meters with the TS-600 all-mode transceiver. The 10-watt, solid-state rig covers 50-54 MHz, with built-in VFO and 20 fixed channels. The main tuning dial is calibrated every 1 kHz for precise tuning. The built-in AC/DC power supply allows base and mobile operation. Other features include a noise-blanker circuit and RIT (receiver incremental tuning).

The fully-synthesized TR-7400A 2-meter FM transceiver operates on 800 channels and features repeater offset over the entire 144-148-MHz range, dual frequency readout, six-digit display and subaudible tone encoder and decoder. RF output is at least 25 watts!

The TR-7400A 2-meter FM transceiver provides fully synthesized operation, including 600-KHz repeater offsets over the entire 144-148-MHz range. It can operate on any of 800 channels, spaced 5 kHz apart. RF output is at least 25 W and typically 30 W. A low-power position produces 5-15 W (adjustable). Included is a dual frequency readout with large six-digit LED display plus a dial readout. The subaudible CTCSS signaling feature may be used on transmit and receive, or transmit only. Optional tone-burst modules are available. Receiver sensitivity is better than 0.4 μ V for 20 dB quieting. Large, high-Q helical resonators minimize interference from outside the band. A two-pole 10.7-MHz monolithic crystal filter provides excellent selectivity. Optional active filters are available for 15-kHz split operation. Intermodulation distortion is down more than 66 dB, spurious rejection is better than -60 dB, and image rejection is better than -70 dB.

See your local Authorized Kenwood Dealer today for a demonstration of the fantastic TR-7400A.

TR-7400A



TR-8300

FM transceiver for 70-cm Amateur band. 23 crystal-controlled channels (three supplied). Transmitter output is 10 watts.

The TR-8300 450-MHz FM mobile transceiver provides 10 watts output (switchable to 1 watt) on 23 crystal-controlled channels (three pairs of crystals supplied). The transmitter covers 445 to 450 MHz, and the

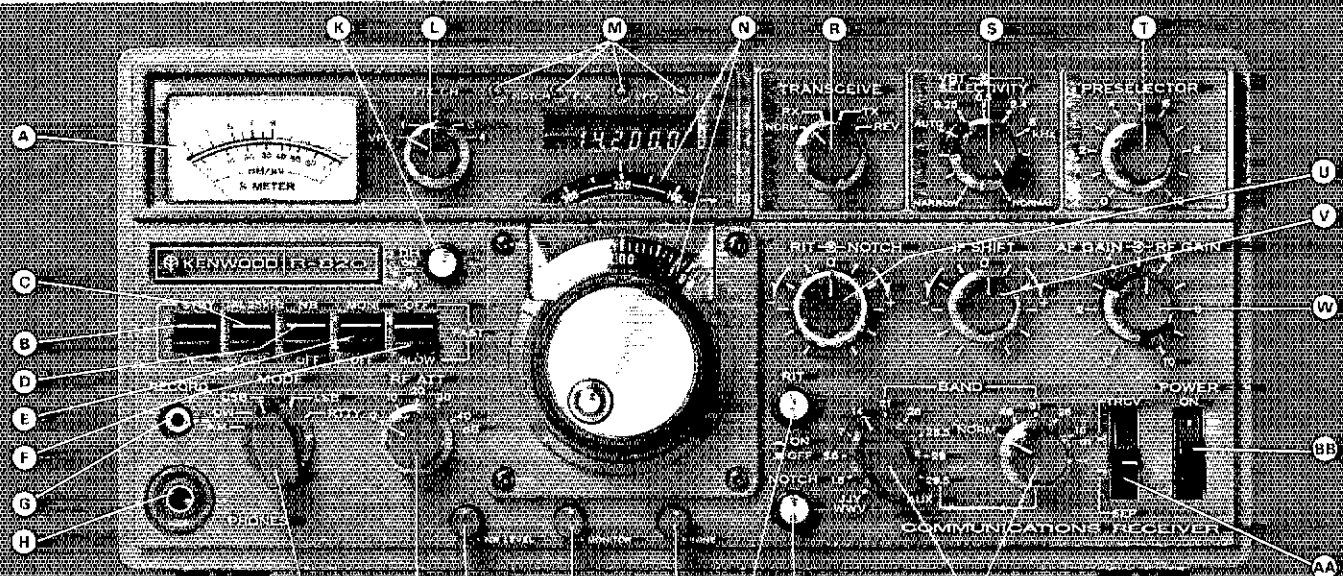
receiver covers 442 to 447 MHz. The receiver includes a five-section helical resonator and a two-pole crystal filter in the IF for improved intermod rejection. Sensitivity is 0.5 μ V for 20-dB quieting. A front-panel switch may be used to activate tone-signaling or other user-provided function. An LED indicates receive crystal functioning. A monitor circuit allows user to listen to his own modulation.

INTRODUCING THE ULTIMATE IN RECEIVER DESIGN ... THE KENWOOD R-820

With more features than ever before available in a ham-band receiver. This triple-conversion (8.33 MHz, 455 kHz, and 50 kHz IFs) receiver, covering all Amateur bands from 160 through 10 meters, as well as several shortwave broadcast bands, features digital as well as analog frequency readouts, notch filter, IF shift, variable bandwidth tuning, sharp IF filters, noise blander, stepped RF attenuator, 25 kHz calibrator, and many other features, providing more operating conveniences than any other ham-band receiver. The R-820 may be used in conjunction with the Kenwood TS-820 series transceiver, providing full transceive frequency control.

R-820

- A** S-METER Easy-to-read, calibrated to 50-μV/10dB full scale and dB, μV
- B** STANDBY/RECEIVE SWITCH Disables audio circuits during transmit mode with associated transmitter
- C** CALIBRATOR SWITCH Built-in crystal calibrator, adjustable to WWV provides signal every 2.5 kHz
- D** NOISE BLANKER SWITCH A specially designed crystal filter eliminates noise pulses such as ignition noise interference
- E** MONITOR SWITCH RF sampling allows user to hear his own voice when using automatic transmitter
- F** AGC SWITCH Automatic gain control circuit switchable to slow or fast response, or completely off
- G** RECORD JACK Makes recording of the air simple
- H** HEADPHONE JACK Provision for plugging in headphones
- I** MODE SWITCH Selection of AM, CW, upper or lower sideband or RTTY
- J** RF ATTENUATOR SWITCH 10 dB steps of attenuation from 0 to 40 dB to prevent overloading from nearby stations, and for precise signal comparison
- K** DIGITAL HOLD Locks counter and display while VFO is tuned to another frequency. Helps return to "hold" frequency
- L** VFO/CRYSTAL SWITCH Permits VFO control or crystal control on four selectable frequencies
- M** LED INDICATORS Light-emitting diodes indicate activation of notch filter, crystal-controlled reception, VFO control, and RTT
- N** ORS DIAL Satin-smooth VFO tuning dial system provides easy analog frequency readout (useful when digital hold is activated). LSB, USB, and CW frequencies are accurately read from the same pointer
- O** NOISE BLANKER LEVEL CONTROL Controls level of blanking, for maximum effect in eliminating noise interference
- P** MONITOR CONTROL Adjusts level of RF sampling
- Q** TONE CONTROL Varies audio-output frequency response
- R** TRANSCEIVE SWITCH Selects frequency tuning from either the receiver or TS-820 series transceiver
- S** VBT/SELECTION CONTROLS Separate controls on the same shaft provide variable bandwidth tuning as well as selection of four IF filters, 250 Hz, 500 Hz, 2.4 kHz, and 6 kHz* (optional). CW filters function in 455-kHz IF for superior shape factor
- T** PRESELECTOR Peaks tuned circuits in RF amplifier stage for increased selectivity and sensitivity. RF amplifier coil is dual-tuned
- U** RIT/NOTCH CONTROLS RIT allows receiver to be tuned off frequency, while not affecting transmit frequency, when in transceive mode with TS-820. Notch control tunes notch within IF passband for eliminating interference. Notch frequency remains the same, even when IF shift is utilized



- V** IF SHIFT Varies (shifts) IF passband away from interfering signal.
- W** AF GAIN/RF GAIN Separate controls adjust volume and RF gain.
- X** RIT SWITCH Allows tuning off frequency with RIT control, and return immediately to VFO frequency by pushing switch.
- Y** NOTCH SWITCH Takes variable notch filter in and out of circuit.
- Z** BAND SWITCHES Selects frequency bands from 15 MHz (WWV), 160 through 10 meters, the 49, 31, 25, and 16-meter shortwave broadcast bands, and an auxiliary band.
- AA** TRANSCEIVE/SEPARATE SWITCH Enables receiver VFO to control the receiver and TS-820 (or TS-820S) frequency (or the TS-820 VFO to control both), or both can function independently.
- BB** POWER SWITCH Turns receiver on and off.

R-820 PERFORMANCE SPECIFICATIONS

Frequency Range:

160 meters (1.8-2.0 MHz)
80 meters (3.5-4.0 MHz)
40 meters (7.0-7.5 MHz)
20 meters (14.0-14.5 MHz)
15 meters (21.0-21.5 MHz)
15 meters (21.0-21.5 MHz)
10 meters (28.0-28.5 MHz)
10 meters (28.5-29.0 MHz)
10 meters (29.0-29.5 MHz)
10 meters (29.5-30.0 MHz)
19 meters (15.0 (WWV)-15.5 MHz)
49 meters (5.9-6.4 MHz)
31 meters (9.4-9.9 MHz)
25 meters (11.5-12.0 MHz)
16 meters (17.7-18.2 MHz)

Auxiliary band

Modes: AM, CW, USB, LSB, RTTY

Sensitivity: 160-10 m, 19 m, SSB, 0.25 μV at 10 dB S+N/N
 AM, 1.5 μV at 10 dB S+N/N
 49, 31, 25, 16 m, SSB, 0.5 μV at 10 dB S+N/N
 AM, 3.0 μV at 10 dB S+N/N

Selectivity: CW (with optional 250-Hz filter) 250 Hz (-6 dB), 500 Hz (-60 dB)
 CW (with optional 500-Hz filter) 500 Hz (-6 dB), 850 Hz (-60 dB)
 SSB (2.4-kHz filter), 2.4 kHz (-6 dB), 4.4 kHz (-60 dB)
 AM (6-kHz filter), 6 kHz (-6 dB), 12 kHz (-60 dB)

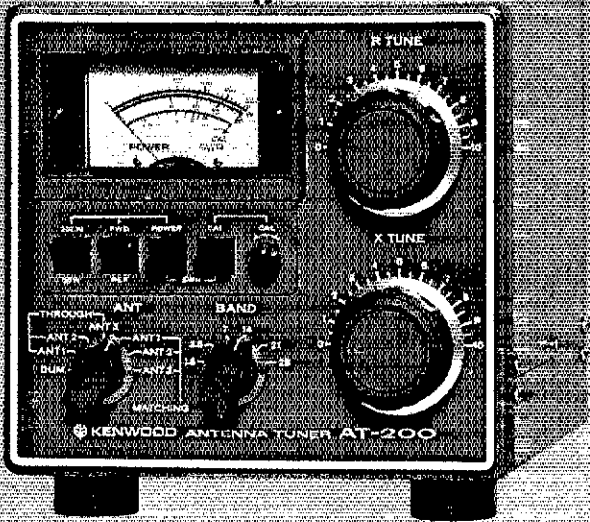
Image Ratio: 160-10 m, 19 m, 80 dB
 49, 31, 25, 16 m, 60 dB

IF Rejection: 160-10 m, 19 m, 90 dB
 49, 31, 25, 16 m, 50 dB

Power Requirements: 100/120/220/240 VAC 50/60 Hz, or 12-15 VDC

Dimensions: 13-1/8" (333 mm)W x 6" (153 mm)H x 13-3/16" (335 mm)D

Weight: 26.4 lbs (12 kg)



AT-200

The AT-200 is an antenna tuner, but it's also much more. It's an antenna switch, an SWR bridge and an in-line wattmeter. The AT-200 reduces the clutter and increases the operating efficiency of your station... and at a surprisingly moderate price.

The AT-200 features a seven position rotary switch that selects 1 of 3 antennas and connects it through the antenna tuner circuit or directly to the transceiver. The 7th position allows you to connect a dummy load directly to your transceiver for tune up and testing. Two of the antenna inputs are fitted with SO-239 type coax connectors. A third input allows for easy hook up of a wire antenna with an impedance of 10 to 500 ohms. The AT-200 may be used on

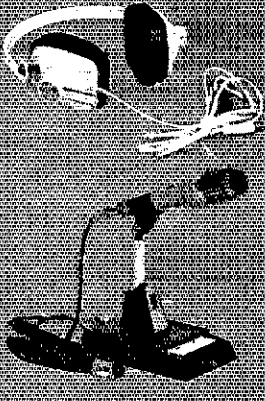
all HF amateur bands from 160 to 10 meters. It's handsomely styled to match the TS-820S and TS-520S Series (and TS-820 and TS-520), but can also be used with any HF transceiver or transmitter with less than 200 watts output.

Frequency coverage: Amateur bands 1.8 to 30 MHz • Input impedance: 10 to 500 ohms • Maximum power capability: 200 watts • Insertion loss: 0.5 dB • Power meter: 20 watt/200 watt full scale • SWR meter measures up to 10:1 • Dimensions: 6-1/2"W x 7-3/8"D x 6-9/16"H • Weight: 6.2 lbs.

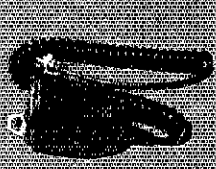


TV-502B
The TV-502B 2-meter transmitter produces 10 watts on SSB and CW. Simply plug it into your TS-520 or TS-820 Series transceiver. It works with most other transceivers, too.

TV-502S
The TV-502S 2-meter transmitter produces 8 watts on SSB and CW. It easily hooks up to the TS-520 and TS-820 Series transceivers.



HS-4
The HS-4 headphone set is comfortably padded and is completely adjustable. An extended variety of ear frequency response is designed for Amateur communications (300 to 3000 Hz). Impedance is 8 ohms.



MC-305
The MC-305 dynamic microphone is perfect for any ham shack, and is ideal for all Kenwood equipment as well as many other brands. It includes P-T and LOCK switches, as well as a microphone plug wired for instant connection to any Kenwood rig. It is easily converted to high or low impedance (100 Ω or 600 Ω).

MC-355
The MC-355 and MC-355 dynamic mobile microphones provide 150-5000 Hz frequency response (150-4000 Hz when operated as noise-cancelling microphones). The MC-305 impedance is 500 Ω and the MC-355 is 600 Ω.

OTHER KENWOOD PRODUCTS
ACCESSORIES FOR TS-820 Series 160-10-m transceiver
DG-1 digital frequency display
VFO-820 deluxe remote VFO
CW-820 500-Hz CW filter
DS-1A DC-DC converter
SP-820 external speaker with audio filters

ACCESSORIES FOR TS-520 Series 160-10-m transceiver
DG-5 digital frequency display
DK-520 digital adaptor kit for TS-520
VFO-520 remote VFO
SP-520 external speaker
CW-520 500-Hz CW filter

ACCESSORIES FOR 599D Series 160-10-m transmitter and receiver
S-599 external speaker
CC-29A 2-m converter
CC-69 6-m converter
FM-599A FM filter

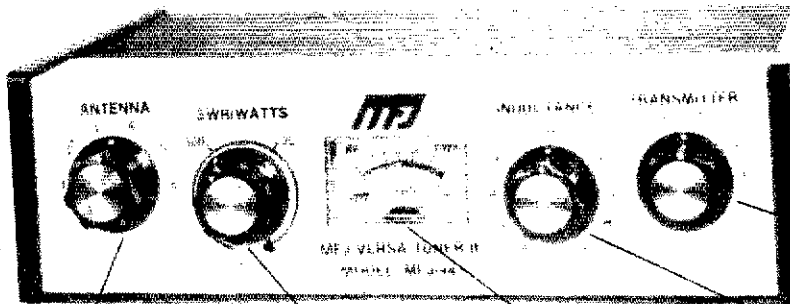
ACCESSORIES FOR TS-700SP 2-m all-mode transceiver
VFO-700S remote VFO
SP-70 matching speaker
Other products:
PS-6 power supply for TR-7500 and TR-8300
PS-8 power supply for TR-7400A
VOX-3 VOX for TS-600/TS-700A
Active filter elements for TR-7400A



TRIO-KENWOOD COMMUNICATIONS INC.
1111 WEST WALNUT/COMPTON, CA 90220

This NEW MFJ Versa Tuner II . . .

has SWR and dual range wattmeter, antenna switch, efficient airwound inductor, built in balun. Up to 300 watts RF output. Matches everything from 160 thru 10 Meters: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balance lines, coax lines.



BRAND NEW

\$79⁹⁵

Antenna matching capacitor. 208 pf. 1000 volt spacing.

Sets power range, 300 and 30 watts. Pull for SWR.

Meter reads SWR and RF watts in 2 ranges.

Efficient airwound inductor gives more watts out and less losses.

Transmitter matching capacitor. 208 pf. 1000 volt spacing.

Only MFJ gives you this MFJ-941 Versa Tuner II with all these features at this price:

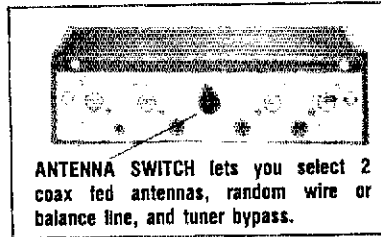
A SWR and dual range wattmeter (300 and 30 watts full scale) lets you measure RF power output for simplified tuning.

An antenna switch lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

A new efficient airwound inductor (12 positions) gives you less losses than a tapped toroid for more watts out.

A 1:4 balun for balance lines. 1000 volt capacitor spacing. Mounting brackets for mobile installations (not shown).

With the NEW MFJ Versa Tuner II you can run your full transceiver power output — up to 300 watts RF power output — and match your



ANTENNA SWITCH lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

transmitter to any feedline from 160 thru 10 Meters whether you have coax cable, balance line, or random wire.

You can tune out the SWR on your dipole, inverted vee, random wire, vertical, mobile whip, beam, quad, or whatever you have.

You can even operate all bands with just

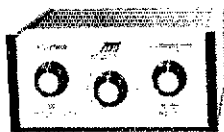
one existing antenna. No need to put up separate antennas for each band.

Increase the usable bandwidth of your mobile whip by tuning out the SWR from inside your car. Works great with all solid state rigs (like the Atlas) and with all tube type rigs.

It travels well, too. Its ultra compact size 8x2x6 inches fit easily in a small corner of your suitcase.

This beautiful little tuner is housed in a deluxe eggshell white Ten-Tec enclosure with walnut grain sides.

SD-239 coax connectors are provided for transmitter input and coax fed antennas. Quality live way binding posts are used for the balance line inputs (2), random wire input (1), and ground (1).



\$59⁹⁵

BRAND NEW

MFJ-901 VERSA TUNER

New efficient air wound coil for more watts out.

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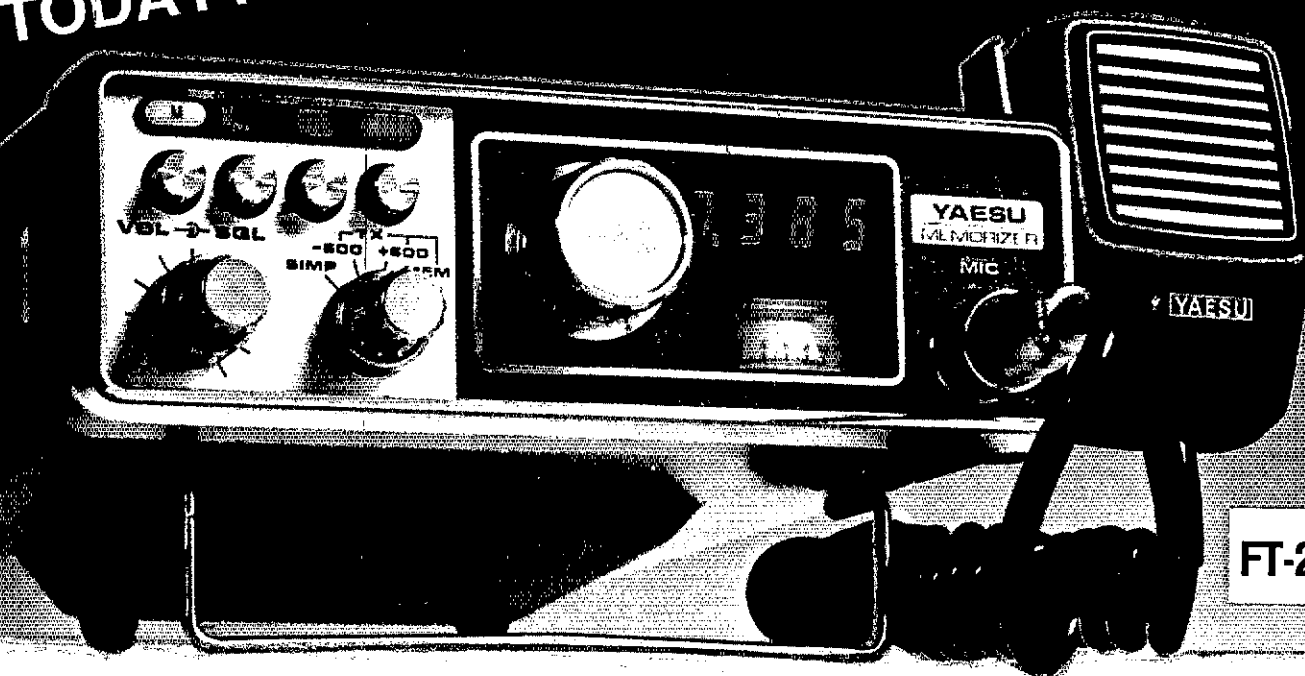
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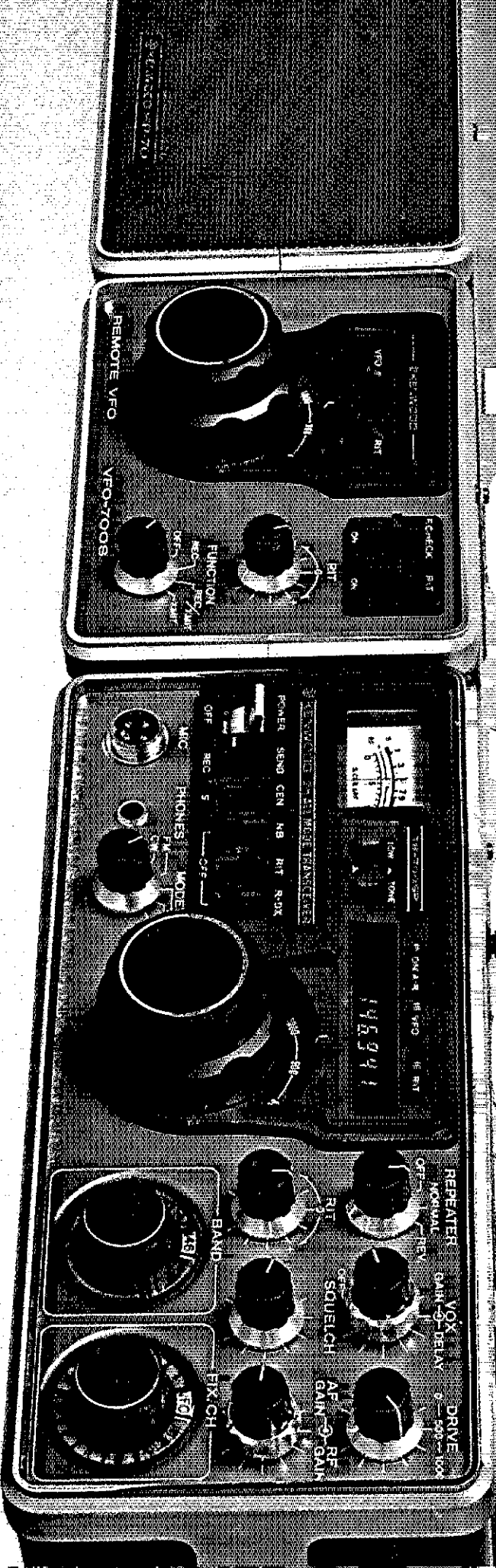
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