

QST

devoted entirely to Amateur Radio

February 1978 \$2.00



Radiosport Championship stresses Olympic ideal of world brotherhood.

Page 72

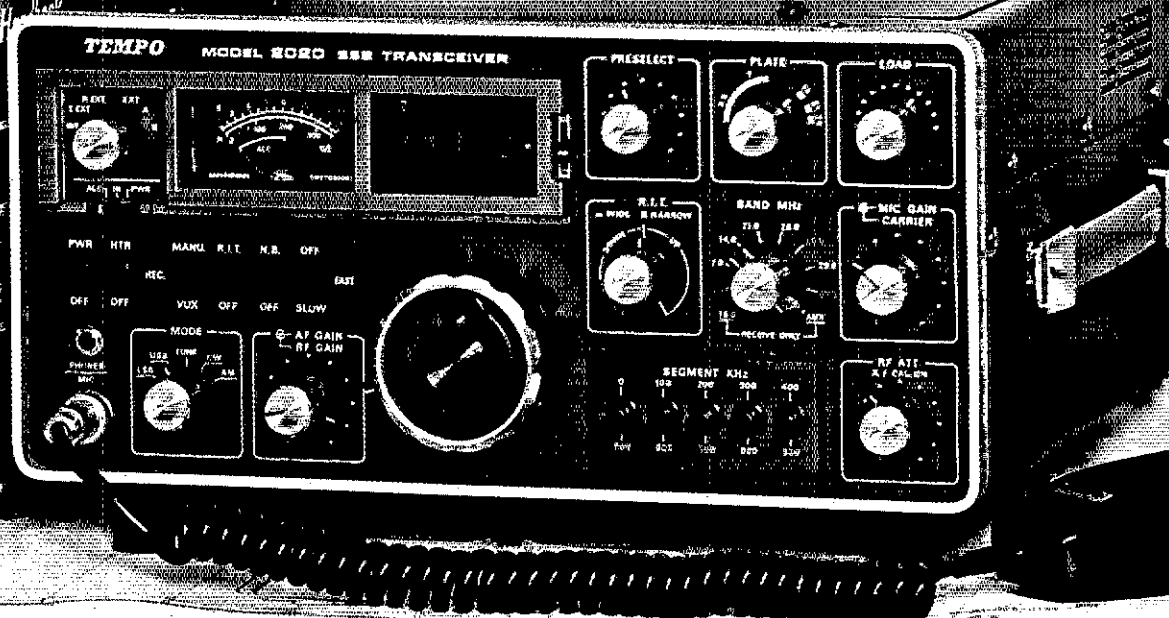


WORLD ATLAS
THE CALLBOOK—UNITED STATES LISTINGS—

United States License

radio amateur

The Radio Amateurs



WE DON'T KNOW OF ANOTHER TRANSCEIVER OFFERING ALL THESE FEATURES AS STANDARD EQUIPMENT

- Hybrid digital frequency presentation . . . built-in
- AC and DC VDC power supplies . . . built-in
- CW filter . . . built-in
- High performance noise-blanker . . . built-in
- VOX and semi-break in CW keying . . . built-in
- Speaker . . . built-in
- Cooling fan . . . built-in
- Microphone . . . included

When you buy the Tempo 2020 you don't have to spend a bundle on accessories . . . just hook up to a power source and an antenna and you're on the air. A truly fine transceiver at a modest price.

The Tempo 2020 features a phase lock-loop (PLL) oscillator circuit that minimizes unwanted spurious responses. It is an advanced solid-state unit with only 3 tubes, including 2 rugged 6146-B final amplifier tubes. It covers all bands 80 through 10 meters, USB, LSB, CW and AM. Additional features worth noting is the 2020's crystal calibrator and WWV receiving capability, dual RIT control, fixed channel crystal control on two available positions, RF attenuator, adjustable ALC action, phone patch in and out jacks, separate PTT jack for foot switch, extraordinary receiver sensitivity (.3u S/N 10 db) and oscillator stability (100 Hz 30 min. after warm-up).

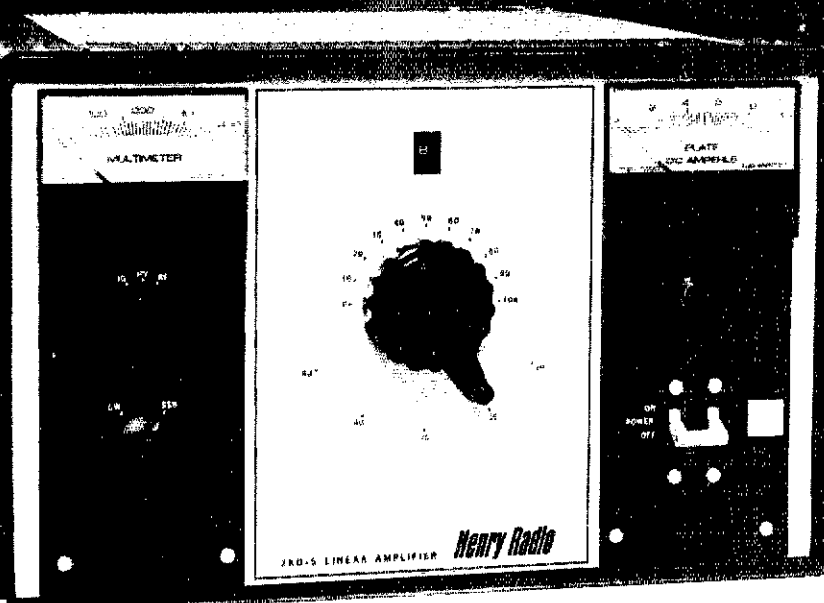
The TEMPO 2020	\$759.00
Model 8120 external speaker.....	\$29.95
Model 8010 remote VFO.....	\$139.00

Send for descriptive information on the fine transceiver, or on the time proven Tempo ONE transceiver which continues to offer reliable, low cost performance. Both are available at select dealers throughout the U.S.

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

This is the amplifier you have been waiting for



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

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

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

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

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

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

- The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, 15 and 10 meter amateur bands.
- 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 10 meters. If you want to put that strong clear signal on the air that you've probably heard from other 2K users, now is the time. Move up to the 2K-4. Floor console...\$995.00

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
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LOW BAND VHF AMPLIFIERS (35 to 75 MHz)

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

HIGH BAND VHF AMPLIFIERS (135 to 175 MHz)

Tempo 130A30	30W	130W	\$189.
Tempo 130A10	10W	130W	\$179.
Tempo 130A02	2W	130W	\$199.
Tempo 80A30	30W	80W	\$149.
Tempo 80A10	10W	80W	\$139.
Tempo 80A02	2W	80W	\$159.
Tempo 50A10	10W	50W	\$ 99.
Tempo 50A02	2W	50W	\$119.
Tempo 30A10	10W	30W	\$ 69.
Tempo 30A02	2W	30W	\$ 89.

UHF AMPLIFIERS (400 to 512 MHz)

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

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

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

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

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

please call or write for complete information.

Henry Radio

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931 N. Euclid, Anaheim, Calif. 92801 714/772-9200
Butler, Missouri 64730 816/679-3127

Prices subject to change without notice.



IC-245/SSB, the Mobile Maximizer

MULTI-MODE MOBILE TRANSCEIVER

ICOM's new, fully synthesized **IC-245/SSB** maximizes mobile FM, SSB and CW operations with a very compact dash mounted transceiver like nothing else in the mobile world. This Maximizer's single knob dial makes the most of the mobile modes while totally minimizing manipulations. One fast moving detent knob gives the **IC-245/SSB** accurate tuning in all modes with positively no time lag or backlash in display stability, even when flying through steps of 100 Hz at 5 KHz per second. **And just as easily, you can work the new 144.5-145.5 repeaters regardless of splits or spacing.**

- **Single knob frequency selection:** The **IC-245/SSB** is synthesized with convenient single knob frequency selection over the entire band. No more fussing with two or more knobs just to check what is going on around the band. One easy spin of the 50-position detent knob does it all.
- **Two VFO's built-in:** The second VFO, which is a more money tack-on with most other transceivers, is a standard item with 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 **IC-245/SSB** LSI chip provides for the input of programming digits from a remote key pad, which can be combined with Touch Tone circuitry to provide simultaneous remote program and tone. Computer control from a PIA interface is also possible.
- **FM stability on SSB and CW:** The **IC-245/SSB** synthesis of 100 Hz steps makes mobile SSB as stable as FM. This extended range of operation is attracting many FM'ers who have been operating on the direct channels and have discovered SSB.

The **IC-245/SSB** is the very best and most versatile mobile transceiver made: that's all. For more information and your own hands-on demonstration, see your ICOM dealer. When you mount your **IC-245/SSB**, you'll have the very maximum in multi-mode mobile.

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

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 (PEP); 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

VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

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THE COVER

Playing the radio game at sunset in Curacao in the first run of this "everyone-works-everyone" contest. See page 72 for results.



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Now there are two MLA amplifiers. Dentron announces the NEW MLA 1200

The MLA 1200 is the first...
 The MLA 1200 is the first...
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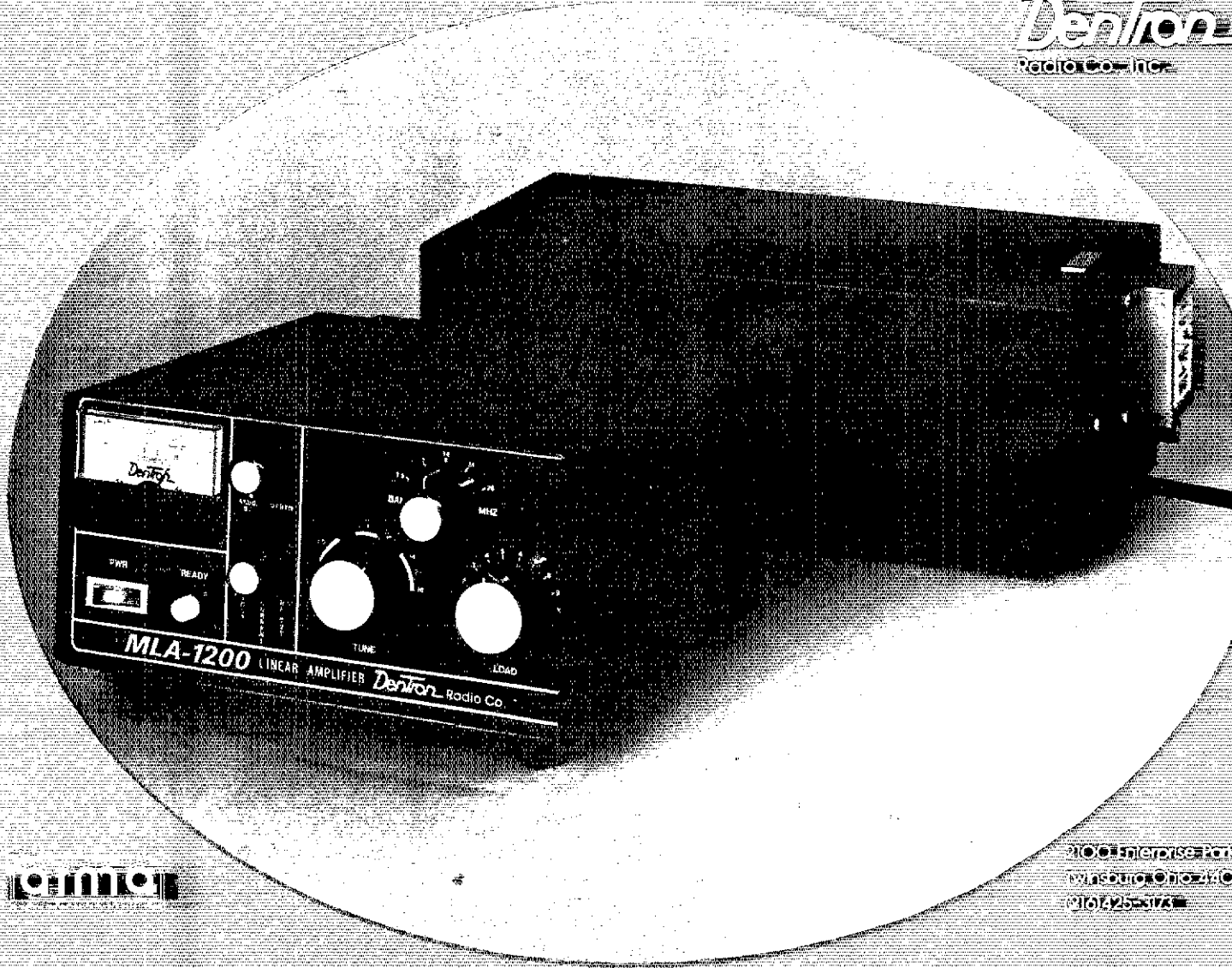
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MLA 1200 \$199.50
 MLA 1200 \$159.50
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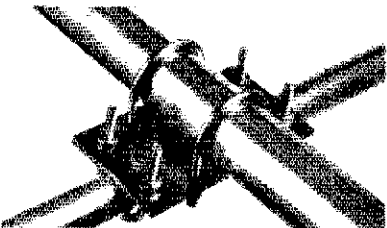
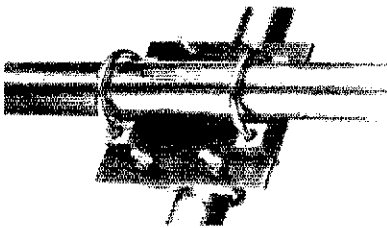
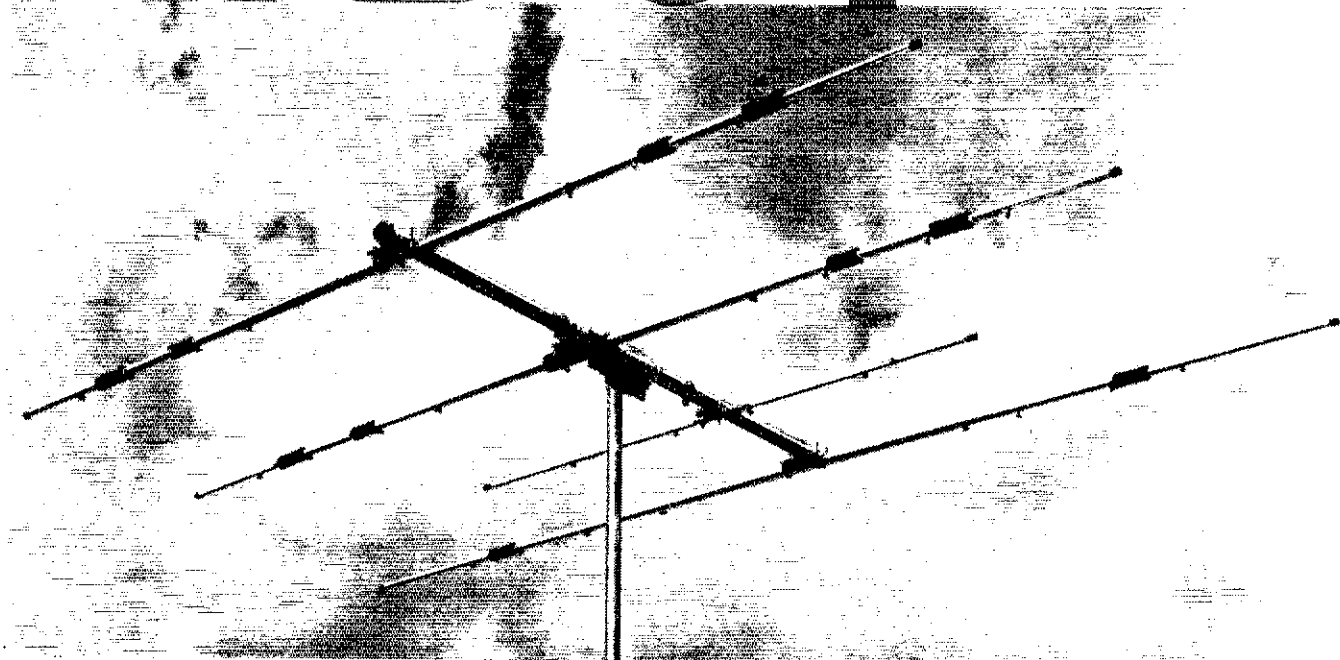
Dentron
 Radio Co., Inc.



LOEHLER

2100 Enterprise Park
 W. Mansfield, Ohio 44130
 (616) 255-3171

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!

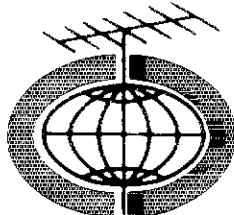
SPECIFICATIONS

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

February 1978

5

The Kenwood family is growing!

The TL-922, a brand new linear amplifier, is now a reality.

Give yourself the "big signal" that commands attention on today's crowded bands. The TL-922 runs the full legal limit on all the ham bands from 160-10 meters and is compatible with most amateur exciters. The TL-922 is a must in any Kenwood station.

Make yourself heard like you've never been heard before, with the Kenwood TL-922 linear amplifier.

TL-922

What makes one linear amplifier different than all the rest? Check out these features:

Full amateur band coverage — Includes 160 meters.
Instant heating filaments — The 3-500Z tubes require no warm up period. Just turn it on and go!

Time delay fan circuit — Even after you turn the TL-922 off, the super quiet fan continues to work for approximately 2 minutes to greatly extend tube life.

Adjustable ALC output voltage — Lets you tailor the ALC voltage to your exciter.

Standby position — Provides amplifier bypassing without having to turn the AC power off.

Two independent safety interlocks — One disconnects AC line voltage and the second shorts B+ to ground when tripped.

Vernier plate control — For smooth, easy tune-up.

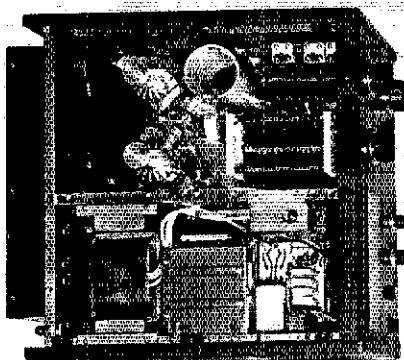
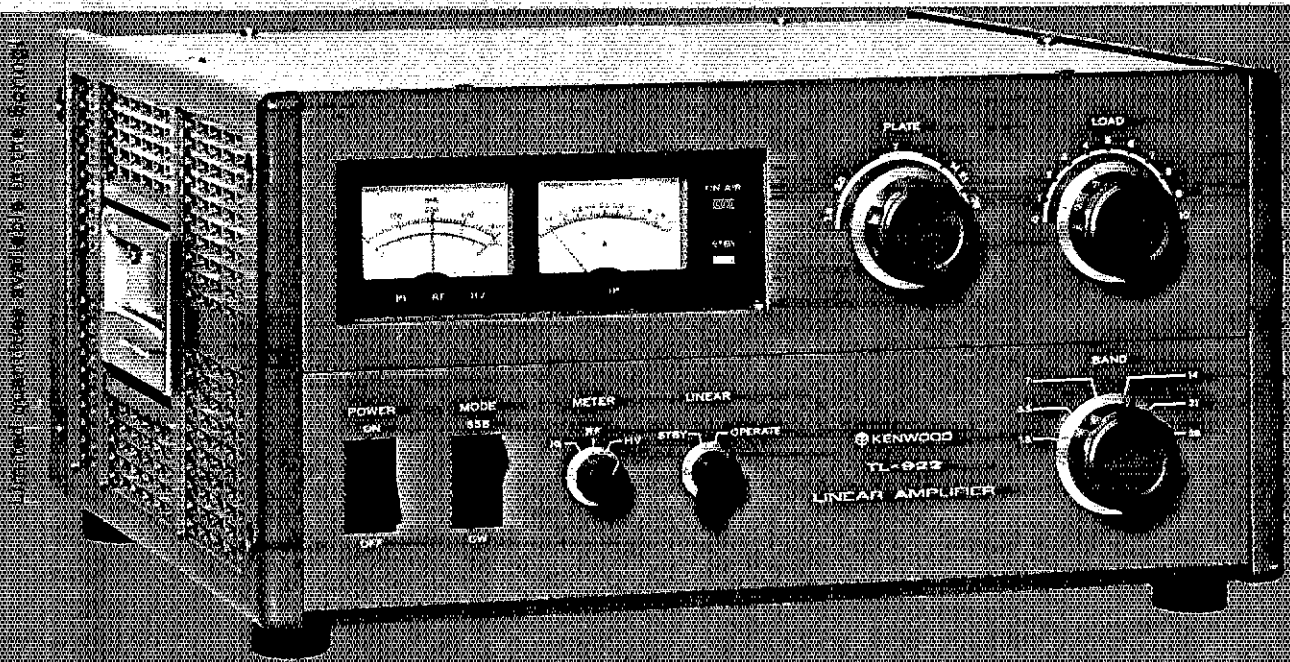
Diecast side panels — Includes functional carrying handles for easy transportation.

Thermal protection of power transformer — Amplifier automatically switches to standby if power transformer temperature exceeds 145° F.

Tuned Input Circuit — Means improved spurious characteristics.

Line voltage selector — Easily switched between 120 and 240 VAC.

Plate Current Meter — Separate meter allows continuous monitoring of plate current.



Shown with top panels removed

Frequency Range: Amateur bands, 160-10 meters
Drive Power Required: 80 W nom, 120 W max
Mode and Duty Cycle: SSB, cont for 30 min CW and RTTY, key-down cont for 10 min
RF Input Power: SSB: 2,000 watts PEP, CW, RTTY, 3,000 watts DC
Plate Voltage: (at idle) 3.1 kV SSB, 2.2 kV CW, RTTY
Circuit Type: Class AB₂ grounded grid linear amplifier
Input Impedance: 50 Ω, unbalanced at better than 1.5 SWR
Output Impedance: 50 to 75 Ω, unbalanced
Harmonic Suppression: min 40 db, depending on exciter used.
Fan Motor Delay Time: 140±30 seconds (at room temperature)

ALC: Neg going, adjustable threshold, -8V DC max output (typ).
Tubes: 2 x Eimac 3-500Z.
Semiconductors: 18 Diodes, 1 Zener diode
Power Requirements: 120V, 28A, 220/240V, 14A, 50/60Hz; for maximum SSB input.
Dimensions: 390 mm (15 3/8" x 190 mm (7 1/2") x 407 mm (16")
Weight: Net 31 kg (68 lbs) Shipping 38 kg (83 lbs)

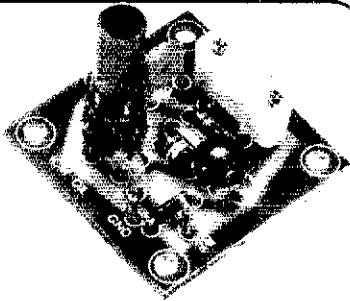
The above specifications are subject to change without notice due to developments in technology.

TRIO-KENWOOD COMMUNICATIONS INC.
 1111 WEST WALNUT/COMPTON, CA 90220

for the experimenter!

INTERNATIONAL CRYSTALS & KITS

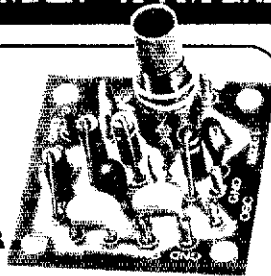
OSCILLATORS • RF MIXER • RF AMPLIFIER • POWER AMPLIFIER



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.

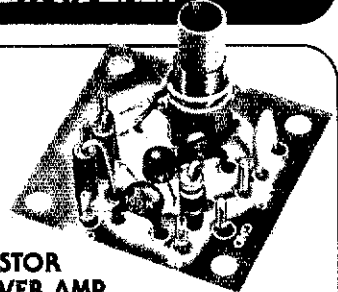
\$4.95 ea.



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.

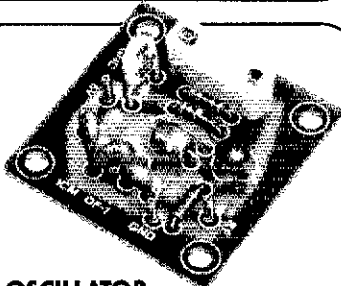
\$5.50 ea.



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.

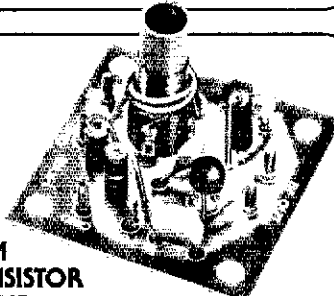
\$5.75 ea.



OF-1 OSCILLATOR

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

\$4.25 ea.



SAX-1 TRANSISTOR RF AMP

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

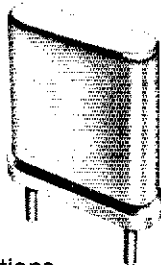
\$5.50 ea.



BAX-1 BROADBAND AMP

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

\$5.75 ea.



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

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

Shipping and postage (inside U.S., Canada and Mexico only) will be prepaid by International. Prices quoted for U.S., Canada and Mexico orders only. Orders for shipment to other countries will be quoted on request. Address orders to:
M/S Dept., P.O. Box 32497,
Oklahoma City, Oklahoma 73132.



International Crystal Mfg. Co., Inc.

10 North Lee
Oklahoma City, Oklahoma 73102

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

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

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

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

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Ham Activity and Solar Activity: Going Up!

The editorial hopper sometimes becomes so clogged with the weighty issues facing amateur radio that we overlook an important fact: It is operating and technical investigation, not regulatory hassling, which are the essence of amateur radio. Were it not for the sheer enjoyment we amateurs derive from the former, we wouldn't concern ourselves with the latter. And today, happily, there are more hams doing more operating and investigating than ever before — and from all indications they're enjoying it more, too.

Amateur radio faces many problems and uncertainties, but this doesn't keep most hams from participating in an ever-broadening range of activities. This is not just a subjective impression gained from casual observation through rose-colored glasses; the objective indicators we monitor at Headquarters are strongly positive. As of November 30, 1977, there were nearly 327,000 licensed amateurs in the U.S. and nearly 18,000 in Canada. When completed, the tally of annual reports from the 99 IARU member-societies will show a worldwide amateur population of more than one million. League membership stands at more than 160,000. These four figures are all-time highs, and, if present enrollment in Novice and General training courses is any indication, the growth trend should remain strong throughout 1978.

The Communications Department reports that awards applications and contest entries are up substantially. For example, more than 100 vhfers joined the new "6 Meter '600' Club" during the first year of the award's availability, and the number of entries in the DX Competition this month and next is almost certain to exceed the previous mark of 2822. The number of listings in the *Repeater Directory* increased by 56 percent in one year, with much greater percentage growth in the bands other than 2 meters. Interest in the W1AW Code Proficiency program is at the highest level ever. Last year's Simulated Emergency Test and Field Day activities set records, and the number of messages handled by the National Traffic System shows a strong upward trend. On the technical front, so many good contributions to *QST* have been received that there is a larger backlog of unpublished articles than we would like, a situation we expect to resolve in the coming months.

The sun has come out of its doldrums,

with Cycle 21 sunspot numbers already exceeding the peak predicted by pessimistic observers. About one-third of today's hams have joined us since the last peak of solar activity in 1968. They have some pleasant surprises awaiting them, especially as 10 meters opens for worldwide DX! A comparison of the propagation charts in this month's "How's DX?" with those appearing just one year ago will show what we mean, and there's more to come!

It's fortunate that propagation conditions are improving at this time, giving us greater use of 10 and 15 meters, for otherwise we might be faced with an overwhelming interference problem as more and more amateurs take to the air. The ham bands do not automatically expand to accommodate newcomers, and growth in numbers and activity is bound to create some problems in the more popular bands. The situation is especially acute in the Novice subbands, to which 55,000 Novices and 65,000 Technicians must restrict their hf operating. In July, the League's Board of Directors moved to petition the FCC for an expansion of the 80-meter Novice band by 25 kHz to alleviate the severe crowding which now exists during the evening hours. This petition has now been filed, along with a great deal of persuasive documentation. A renewal of the League's long-standing request for a modest expansion of the 20-meter phone band also has been made. Both of these changes have ample justification, but will involve some inconvenience for at least a few amateurs.

If we observe common sense in our operating, there should be room enough for everyone. But if things are frustrating you, try something different for a while. A new band or mode, OSCAR, traffic nets, ARES or other public service work, moonbounce, microwaves and RC models have all been known to revive flagging interest. If operating loses its attraction, try teaching a class, building a piece of gear from scratch or kit, or editing a club bulletin. Sometimes a joint project with a ham friend will get things perking again.

If nothing works and you drop out of amateur radio permanently, you'll become a member of a very exclusive group. The number of people who have tried each of the wide variety of activities in amateur radio and found nothing to hold their interest is vanishingly small! — K1ZZ

League Lines...

A brand-new list of contact points for assistance with RFI problems appears on page 43. This RFI Assistance List, by Harold Richman, W4CIZ, incorporates several changes and additions which have not appeared in previous versions.

The League has filed three petitions with the FCC requesting additional operator privileges for licensees. The first renews comments previously submitted in Docket 20282 and urges the FCC to open up all frequencies above 50 MHz to General and Technician class licensees. The second is also a renewal of previously submitted comments and requests the FCC to open up 14,175-14,200 kHz for voice operation by Extra Class amateurs, and 21,250-21,270 kHz for shared voice operation by Extra and Advanced class amateurs. The third breaks new ground by asking the FCC to extend the 80-meter Novice subband from its present 3700-3750 kHz to 3675-3750 kHz. Details will appear in "Happenings" for March.

U. S. maritime mobilers must continue to observe the U. S. phone band limitations even when they are outside Region 2. Max Grossman's petition, RM-2243, resulted in modification of Section 97.95 but not Section 97.61, which spells out the phone subbands.

DOC has announced that any amateur or club in the province of Quebec may substitute the prefix VZ through October 12, 1978, to celebrate the 25th anniversary of Radio Canada TV.

Clubs and other groups sponsoring hamfests and flea markets are encouraged to support the ARRL Code of Ethics. They can do this through displaying signs indicating their preference that receivers, transmitters and amplifiers be sold only to licensed individuals. For more details see November QST, page 11.

ARRL Overseas QSL Service Users! Effective March 1, in addition to the \$1 and current QST address label that are necessary when sending QSL cards, an s.a.s.e. (13¢) will be required.

The upcoming 1978-79 ARRL Repeater Directory will contain new information concerning all repeaters. New registration cards (CD-240) have been mailed to all repeater licensees listed in the 1978 U. S. callbook. If you are not among those listed in the callbook and need a registration card, please send an s.a.s.e. to Hq. and request CD-240. The deadline for receipt of all cards is March 1.

FCC reminds applicants for amateur and CB licenses that application fees are no longer required or desired. A surge in the number of fees accompanying applications has slowed things down in Gettysburg. The fee information carried on old FCC forms should be disregarded.

Doing it the hard way? W8TN (ex-WA8UUY) recently worked WB8SCD one block away. The contact was made through OSCAR 7 somewhere northeast of Nova Scotia, about 2000 miles away from their QTHs in West Virginia. It was not a prearranged schedule.

ARRL Communications Manager WINJM and the Chief of Emergency Communications for the American National Red Cross have entered into an agreement concerning the handling of disaster welfare inquiries during major emergencies. See next month's "Happenings" for full details.

Brand new on the calendar for 1978: an ARRL EME (earth-moon-earth) Contest April 15-16 and May 20-21 (now that's a DX Competition!); plus an all-new UHF Contest for 220 MHz and above on August 5-6. (For the latter you had better study up on your latitude/longitude!).

Are you the club secretary? Program chairman? Please remember QST copy deadlines when submitting Hamfest announcements. They should be here at least three months prior to the hamfest date.

Made your vacation plans yet? San Diego, CA, is the site of the 1978 ARRL National Convention, September 22-24. Watch QST for further details.

The W9TO vacuum-tube keyer (never published in amateur literature but manufactured by Hallicrafters) was one of the most popular keyers ever designed. Its successor, Chet Opal's Micro-TO keyer, was an all-solid-state version with ICs which appeared in QST for August, 1967, and gained equal popularity. Now Chet goes one step further, to an all-CMOS keyer with message memory. With its fine ancestral line, this latest entrant in the "most-memory-for-the-least-parts" competition should prove to be a winner.

The Micro-TO Message Keyer

By Chet B. Opal,* K3CU (ex-K3CUW)

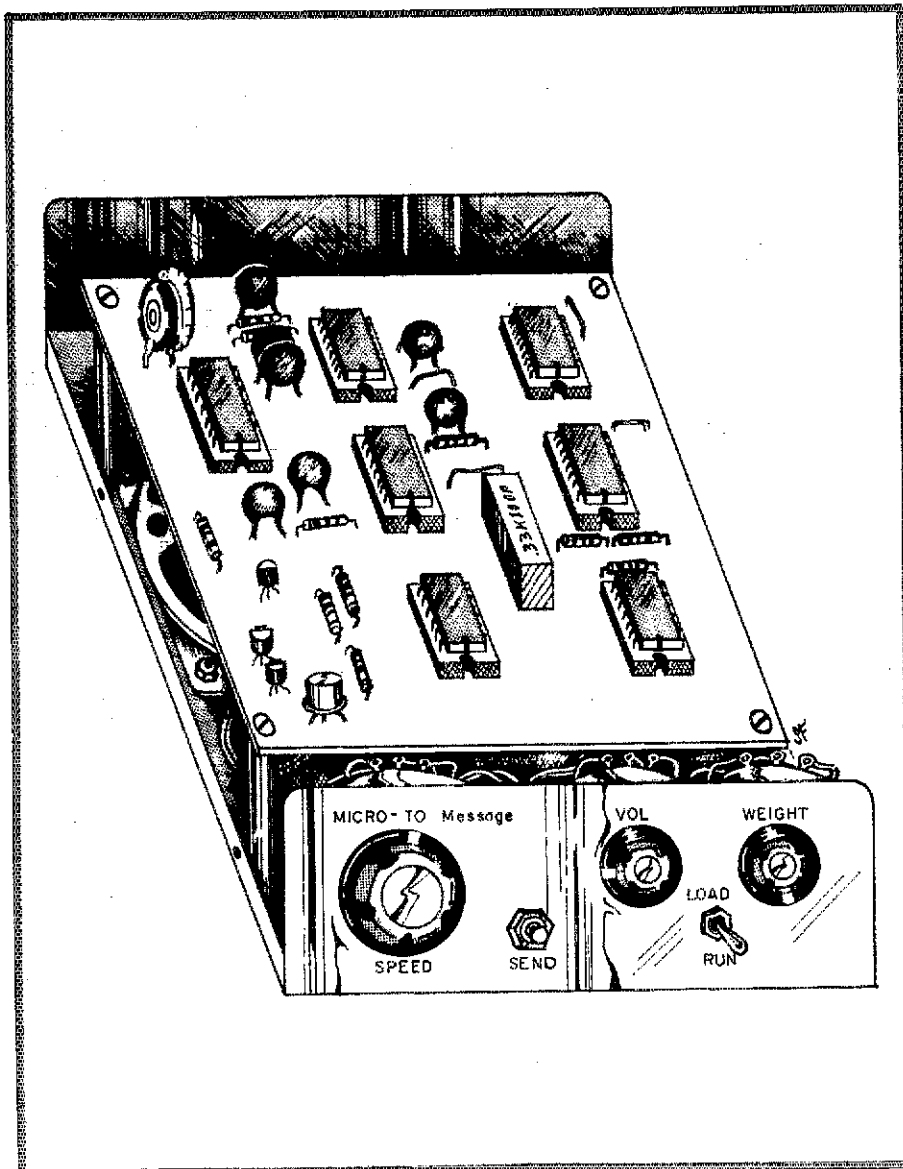
Since the advent of semiconductor read/write or random-access memories (RAMs), it has been possible to design cw keyers with convenient message-sending capabilities (for example, the Accu-Memory keyer¹). To operate such a keyer all you do is throw some switches and send the message you want to record. Afterward, the message or messages can be called at the push of a button.

The circuit described here has two advantages over previous designs: It is very simple (only seven ICs, fewer than many nonmessage keyers), and it uses all-CMOS circuitry. Because the CMOS circuits draw so little power, battery operation is practical, which means that the recorded message can be stored indefinitely, independent of the power line (great for Field Day!).

The keyer can be hooked up in parallel with your favorite keyer to provide message capability, or some of the ideas can be applied to existing designs. However, the unit described here has been designed so that it can function as a stand-alone unit. It includes a monitor, a simple weight control, and both positive- and negative-keying outputs. Message loading is very convenient. On playback it can be interrupted by closing either paddle contact. The memory can hold two runs of the alphabet, two sets of numbers, and a punctuation mark or two. The keyer is readily expandable to include multiple-message capability.

The Circuit

The basic idea is quite simple and similar to some previous designs: The message is recorded as a series of 1s and 0s in consecutive locations in a memory. (A dot is a 1 followed by a 0; a dash is three 1s followed by a 0.) On readout, the message is fed back in parallel with the normal keyer output. The design can be adapted to almost any keyer; one requirement is that a free-running clock must be used so that spaces will be recorded and so that the message can be clocked out on



Both front-panel and interior simplicity of the Micro-TO Message Keyer are evident in this illustration. A complete keyer with monitor, weight control, and 1024 bits of memory!

playback. In some keyers a free-running clock will generate endless dots which must be inhibited.

Fig. 1 is the schematic of the keyer described here. Circuits U1, U2 and U3 form the basic keyer. U4, U5 and U6 provide memory functions, while U7 and the

transistors are associated with the monitor and keying circuits. The keyer portion is essentially a Micro-TO MK II circuit² with a few changes. The clock has been modified to include an external "run" input, and a J-K flip-flop has been substituted for the original D flip-flop so

*5414 Old Branch Ave., Camp Springs, MD 20031
¹Footnotes appear on page 14.

that dots can be inhibited. The message (actually, its complement) goes to the memory from U2C and is fed back and merged in U1C. Basically, by grounding pin 1 of U2A and connecting pin 8 of U1C to the positive supply, one would have an ordinary TO keyer.

The heart of the memory circuit is U6, a 1024-bit CMOS RAM chip. The memory location is addressed by lines A0-A9. The address is latched onto the chip during the falling portion of STR ("not strobe"). On the rising edge of STR, the data at D₁ will be stored at that location if WE ("not write enable") is low or, if WE is high, read out from that location and placed on the D₀ output line. Since D₀ is often in an undefined open state, a pull-up resistor (R9) is used to define it to "1," i.e., a blank. (Remember we store the complement of the message.) Also, the MSG latch flip-flop is used as a buffer between D₀ and the output gate, U1C, in order to eliminate glitches while the memory output is changing.

Addresses to the memory chip are generated by U5, a 12-bit binary counter. This chip counts upward by one on each negative transition at the C input whenever it is not held in the reset mode. The clock pulse is derived out of phase with that applied to U6 and delayed by R6 and C4 so that the addresses are set up at the correct times to be accepted by U6. The counter is normally held in the reset mode, with all outputs 0 by the Q output of the MSG flip-flop U4B, which is set in the standby mode (this flip-flop is sort of upside down).

The counting circuitry and memory are activated when the MSG flip-flop is reset. That can happen in two ways. In the recording mode (S1 thrown to LOAD), a "0" is applied to the D input of U4B. When either paddle is depressed, the output of U1D changes to a 1; this signal is applied to the clock input of U4B, causing the 0 at the D input to be transferred to its Q output. This starts the clock and also takes the binary counter out of the reset mode, so that it starts counting upward. It also enables U6, which records the signal at D₁ at successive memory locations following each clock pulse. When the counter gets to the 1024th clock pulse, output 2¹⁰ changes state; this feeds the S input of U4B, setting it again and terminating the process.

In the playback mode, U4B can be reset by tapping the SEND button. In this case, since WE is high, the input is not recorded, but instead played back via D₀. The message normally ends as above, when 2¹⁰ changes state. In addition, the D input of U4B now has a 1 on it, so that if either paddle is tapped this 1 is transferred to the Q input of U4B, resetting everything. In this way it is possible to terminate a CQ when, as often happens, you hear someone come back to a previous CQ just as you have started the current one.

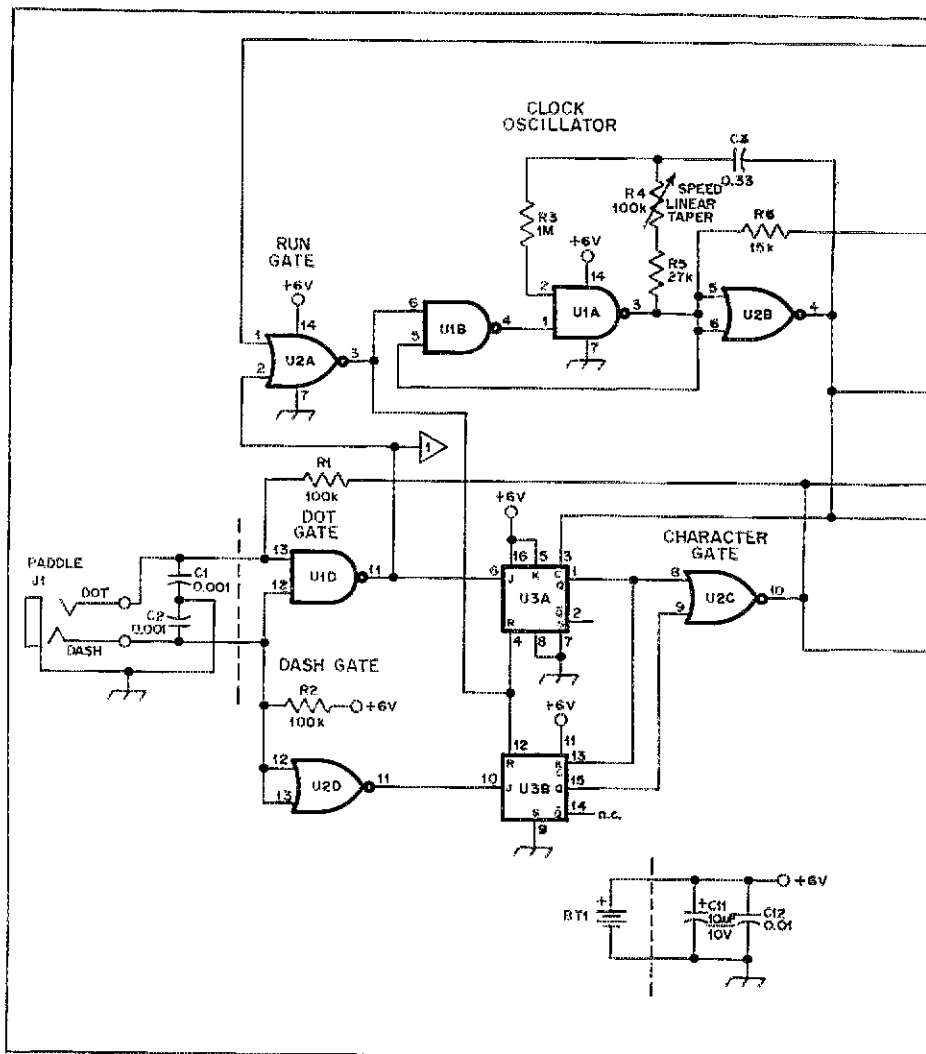


Fig. 1 — Schematic diagram of the Micro-TO Message Keyer. Unless noted, resistors are 1/4 W, 10 percent; capacitors are ceramic, 50 V. C1, C2 and C5 are mounted where their associated signal leads enter the cabinet.

BT1 — 4 to 7-volt battery, four AA cells of any type in series.

C3 — Polyester (Mylar) dielectric capacitor.

C11 — Low-leakage electrolytic, 10 V or higher (tantalum recommended).

D1, D3 — Silicon, signal diode (1N914,

1N4148, etc.).

D2 — 200-PIV, silicon diode (1N4003,

1N4004, etc.).

J1 — Two-circuit, 1/4-in., phone jack.

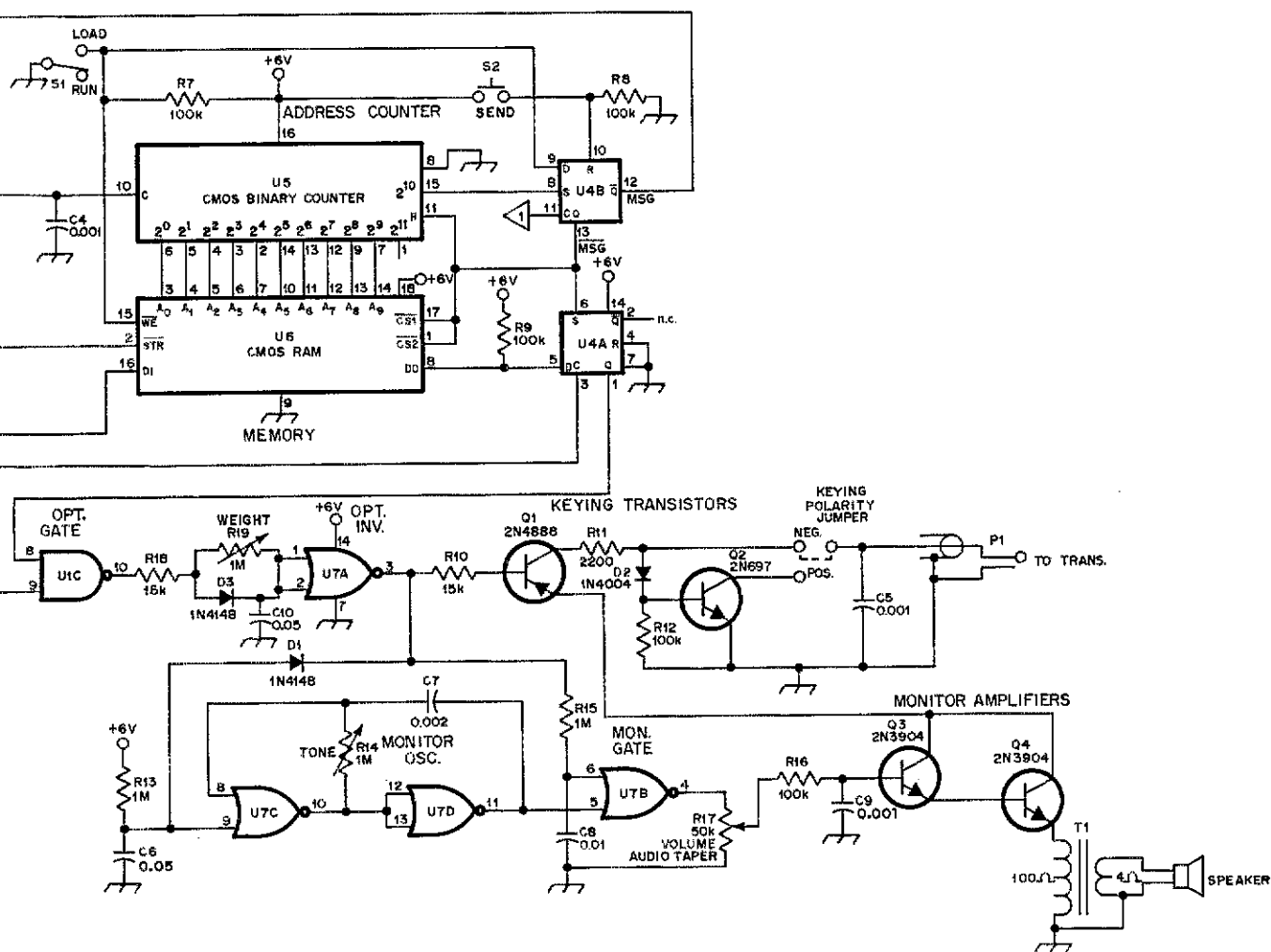
The output of U1C contains the message coming from the paddle or the memory. At this point the dot "mark" duration is exactly equal to the "space." In order to compensate for transmitter delays (or to add a little "meat" to the dots, which some operators like) a simple network consisting of R18, R19, D3 and C10, has been installed at the output of U1C. At the beginning of each character C10 charges rapidly through R18 and D3 but at the end it discharges slowly, depending on the setting of weight control R19, extending the "mark" period. The time added is independent of keying speed, so if the weight control is used mainly to make the dots heavier, it will have to be changed whenever the speed is changed.

The monitor is the same circuit as used in the Micro-TO MK II. An additional

monitor amplifier is included to provide sufficient drive to the speaker at the lower voltage used here. Also, an npn transistor has been added to provide positive-to-ground keying, which is needed by some of the newer solid-state rigs. The transistor shown will sink about 50 mA of keying current.

Construction

I built my unit using a pc board, the layout for which is shown in Fig. 2.² If you use this pattern, be sure to install all the jumpers (18 of them). IC sockets were used everywhere for checkout purposes; this isn't really necessary although it might be worthwhile for U6. I used a Radio Shack no. 270-253 cabinet (5-1/4 × 3 × 6 in. or 133 × 76 × 152 mm), which is attractive and quite inexpensive.



LS1 — 2-1/2-in. (62.5 mm), permanent-magnet speaker, 4 to 10 ohms.
 P1 — 1/4-in. phone (or other suitable) plug.
 Q1 — 200-volt, silicon, pnp transistor (2N5414, 2N4888, MM4002).
 Q2 — Medium-current, medium-voltage, silicon switching transistor (2N697, etc.).
 Q3, Q4 — Npn, general-purpose, silicon

transistor (2N2222, 2N3904, etc.).
 R4 — 100-kΩ, linear-taper, 2-W, carbon pot.
 R14 — 1-MΩ Trimpot.
 R17 — 50-kΩ, audio-taper, 2-W, carbon pot.
 R19 — 1-MΩ, linear-taper, 2-W, carbon pot.
 U1 — Quad, CMOS, two-input, NAND gate (CD4011AE, SCL4011AD, etc.).
 U2, U7 — Quad, CMOS, two-input, NOR gate

(CD4001AE, etc.).
 U3 — Dual-CMOS, J-K flip-flop (CD4027AE, etc.).
 U4 — Dual-CMOS, D flip-flop (CD4013AE, etc.).
 U5 — CMOS, 12-bit binary counter (CD4040AE, etc.).
 U6 — 1024 X 1-bit CMOS RAM (Intersil IM6518CJN).

Everything will fit into the next smaller size, but I wanted room for future expansion. The speaker is mounted on the floor of the cabinet over an array of holes and the circuit board is mounted on standoffs above it. The battery holder could also be mounted under the board, but I glued it to the cover for easy access.

Most of the parts can be obtained from stores like Radio Shack or Lafayette, which are proliferating everywhere as a consequence of the CB boom. I plan to make available the memory chip, the high-voltage pnp transistor and perhaps other parts, depending on demand. The choice of the push button is important: It must have a soft touch so that the cabinet doesn't walk across the table every time it is pushed. I used an inexpensive, miniature, unenclosed unit and bent the

contacts for a feather touch.

Checkout and Operation

A warning: Never install an IC with power connected. Applying voltage to a signal pin before the chip is powered can cause an internal breakdown which persists after power is applied. The CMOS RAM in particular, with thousands of transistors in it, can get "toasty." This doesn't lead to permanent damage if caught in time, but it can be rough on batteries.

Set the WEIGHT control to minimum resistance (fully counterclockwise), the other controls to midrange, and the LOAD/RUN switch to RUN. Hook up the batteries and keying paddle, and close the thumb contact on the paddle. This should lead to a series of dots; the index

finger should produce dashes. Adjust the PITCH, VOLUME and SPEED controls to suit. Practice sending for awhile. Now throw the switch to LOAD and send a CQ. You may notice that it is a little harder to send in this mode, since the clock is running continuously, and your timing must be more accurate. After waiting to load blanks into the remainder of the memory, throw the switch to RUN and hit the SEND push button. Out should come an exact replica of what you sent. Determine whether you have a positive or negative voltage at the transmitter key terminals, and patch the keyer output accordingly. Put the top on, plug the key in, and have at it.

Power Considerations

The keyer draws virtually no current in

the standby mode. The actual drain is highly variable, determined primarily by the temperature, the characteristics of the particular memory chip, and potentially leaky components such as the transistors and C11. Actually, C11 is used only to hold power to the keyer while changing batteries. A good test of leakage is to disconnect the batteries, wait a few minutes, then reconnect them. If the message remains intact, there are no serious leakage problems.

The main power drain during operation is from the keying and monitor circuits. Turning the volume control all the way down shuts the monitor off. Another power-saving possibility is to increase the value of R11 until the transmitter barely keys, then substitute about half this value.

I would be pleased to correspond with anyone having difficulties and would also like to hear ideas on what features would be desirable in future versions of the keyer (a stamped reply envelope would be much appreciated). On the latter point, the emphasis here has been on simplicity. Obviously desirable additions would be multiple messages, auto-repeat, iambic operation with dot and dash memories, Morse-to-Baudot conversion, automatic logging . . .

QST

Footnotes

- ¹Garrett and Contini. "The Accu-Memory," *QST*, August, 1975.
- ²Opal. "The Micro-TO MK II Keyer," *QST*, September, 1975.
- ³As a convenience to those wishing to avail themselves, ready-made circuit boards may be obtained from the author, as may some of the harder-to-find components. The boards are the same size as the one pictured but have been altered to provide an optional dual message capability. Since prices will depend on demand, the author requests you send a self-addressed stamped envelope for the latest list of prices. (The memory ICs are \$7.50 each at this printing date.)

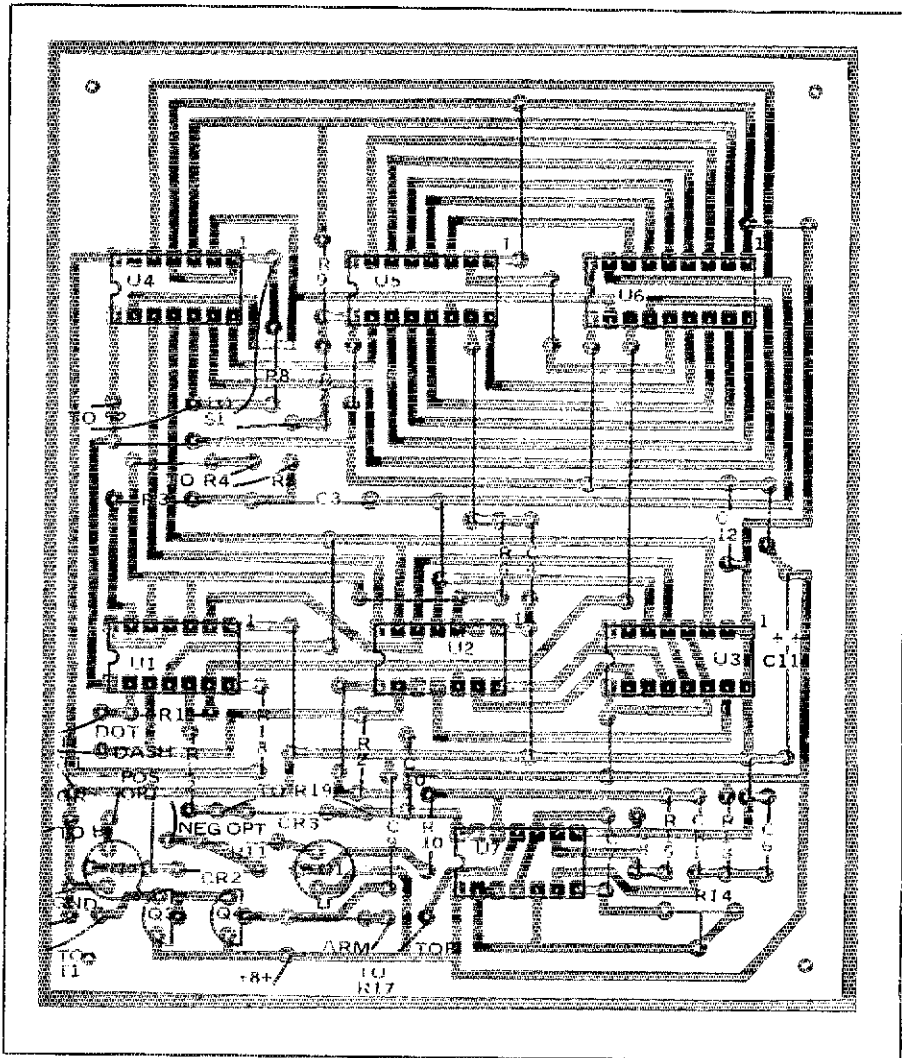


Fig. 2 — Circuit-board etching pattern for the Micro-TO Message Keyer. The pattern is shown at actual size from the foil side of the board with gray representing copper. Refer to schematic and accompanying parts list for identification of components; all components are mounted on the nonfoil side of the board.

Strays

PRACTICE FIRST ON P76-5

□ OSCAR 8 fans can practice tracking and tuning up their 435-MHz converters with the P76-5 satellite. This Stanford Research Institute spacecraft transmits continuously on 435.974 MHz, with a power of about 200 mW. Its 1000-km (600-mile) altitude corresponds well with the projected orbit of OSCAR 8. So you can debug and Murphy-proof your ground station, and even check for possible transmitter-receiver interaction problems, with this bird. (Warning: The third harmonic of the uplink frequency is close to the downlink frequency and may desense your receiver or converter.)

The accompanying table contains

reference orbit information for February. To determine equator crossings of future orbits, add the period (105.729 minutes) and the orbital progression (26.432 degrees per orbit) to the given figures. The orbit crossing marks on the OSCAR 8 OSCARLOCATOR will introduce an error of about 10 degrees per day. For more precise tracking of the P76-5 satellite, see Thompson, *QST* for November, 1975, and the data below.

By the way, the P76-5 satellite transmits on many different frequencies, all in phase, as part of an ionospheric propagation study. The satellite is often off on Sunday evenings, local time. — *WB2CHO*

The P76-5 Satellite

- Period: 105.729 minutes
- Inclination: 99.655°
- Apogee: 1025.968 km
- Eccentricity: 0.045°
- Progression: 26.432° per orbit
- Reference orbits for February, 1978:

Day	UTC	°W	Day	UTC	°W
Feb. 1	0020	188	Feb. 15	0036	196
Feb. 2	0042	198	Feb. 16	0116	206
Feb. 3	0122	208	Feb. 17	0011	180
Feb. 4	0017	192	Feb. 18	0051	200
Feb. 5	0057	202	Feb. 19	0131	210
Feb. 6	0137	212	Feb. 20	0026	194
Feb. 7	0032	195	Feb. 21	0106	204
Feb. 8	0112	205	Feb. 22	0001	188
Feb. 9	0006	189	Feb. 23	0041	198
Feb. 10	0047	199	Feb. 24	0121	208
Feb. 11	0127	209	Feb. 25	0015	191
Feb. 12	0021	193	Feb. 26	0056	201
Feb. 13	0102	203	Feb. 27	0136	211
Feb. 14	0142	213	Feb. 28	0030	195

A Universal Crystal Oscillator

Do you like weekend projects? This gadget will test any crystal from 50 kHz through vhf without tuning — and it will drive a counter for checking crystal frequency.

By Fred Brown,* W6HPH

One doesn't have to be in amateur radio for very long before he discovers that crystal-controlled oscillators are the most stable kind of circuits one can use. When you start experimenting with circuits, and all hams do sooner or later, you'll probably acquire a junk box. With that comes a collection of surplus crystals. Take our word for it — it will happen.

My own crystal collection is so extensive I can nearly always find a rock close enough to any desired frequency. This makes it possible to test out a circuit and continue working on a project without stopping to await delivery of an ordered crystal for the exact frequency.

But, unfortunately, the frequency of surplus crystals is not always what is marked on the holder. Some are marked with a transmitter-output or a receiver-input frequency, and some are marked only with a meaningless channel number. Some are not marked at all. There is a need for a crystal tester that would oscillate with *any* crystal without the need for fussing with tuning adjustments or impedance matching. The output of the test oscillator should be capable of driving a frequency counter directly for display of the actual crystal frequency. In the past I have often improvised by link coupling to a grid-dip oscillator, but this expedient is awkward, tricky and does not readily drive a counter.

All About the Circuit

In developing the UCO, several oscillator circuits were tried, some quite complicated. But the old, dependable Pierce proved more surefire and worked over a wider frequency range than any of the others. In fact, I have yet to find a usable crystal that will not oscillate in this circuit. The circuit oscillates readily at 50 kHz (the lowest frequency rock in my collection), and continues right on up

through the 25-MHz upper frequency limit of fundamental-mode crystals.

A 2N4220 n-channel JFET is used in a straightforward Pierce oscillator with the crystal between drain and gate. See Fig. 1. Output to the counter is taken from a capacitive voltage divider, C1 and C2, in the drain circuit. Rf voltage on the FET drain is detected by the 1N914 diode and is indicated on a 0-100 microampere meter. The meter reading is a rough indicator of what, in the old days, was called crystal "activity." If your rock is so inactive that it does not produce any

reading, the odds are it will not oscillate in any circuit. The 1N645 diode (any silicon diode will work) across the meter begins to conduct at about 1/2 volt and prevents the meter from going off scale, no matter how vigorously the FET oscillates. A 0-1 mA meter could also be used in the UCO if R1 and R2 are reduced in value to about 1/10th of those given.

By using a one-inch meter and miniature components, the UCO can be built in a 1-1/2 × 3 × 4-inch (38 × 76 × 102-mm) box. Parts layout is not critical but rf leads should be kept reasonably

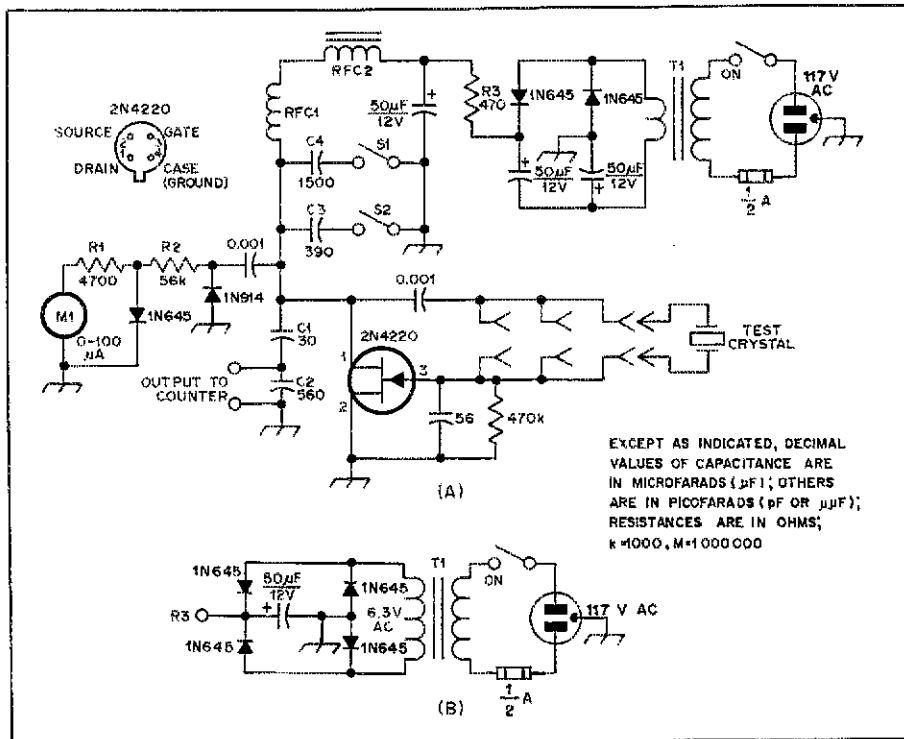


Fig. 1 — Circuit diagram of the crystal tester is shown at A. An alternative power-supply circuit using a conventional 6.3-V ac filament transformer is shown at B.

RFC 1 — 2.5-mH, rf choke, four pi.

RFC 2 — 150-mH, miniature toroid, 30-ohms dc resistance.

T1 — Plate-to-voice-coil type, 33:1 turns ratio, see text. (Stancor A4748).

*Box 2053, Rancho Santa Fe, CA 92067

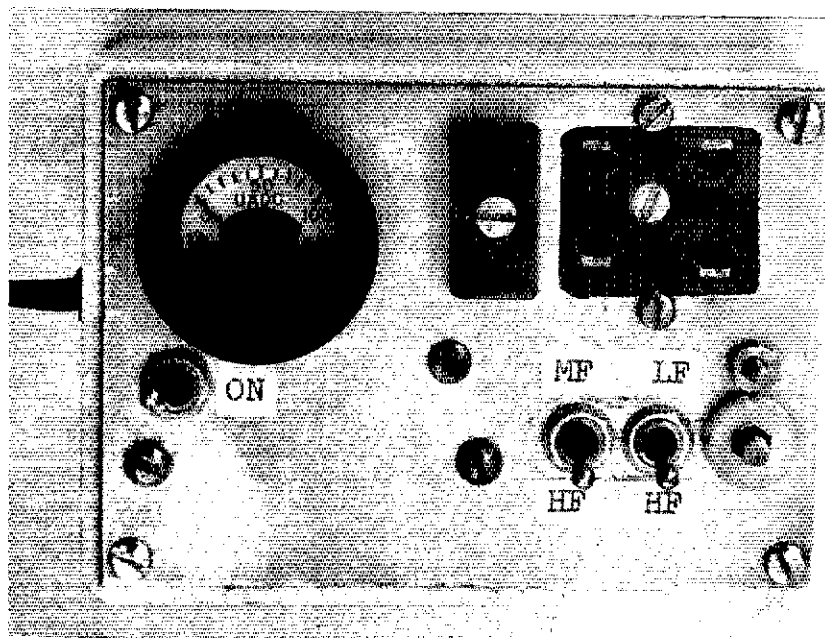
short and direct. The three crystal sockets shown accommodate HC-6/U, FT-243 and FT-241 as well as the older CR-1A type crystals. Other crystals, such as those with wire leads, are taken care of by a pair of alligator clips mounted on the prongs of a cut-down, CR-1A holder. In this unit I used a terminal pair rather than a coax fitting for connection to the frequency counter since my counter terminates in a pair of alligator clips.

Putting It All Together

A 9-volt battery will power the UCO, but a power supply was included since my shack already has too many battery-powered gadgets. (I'm getting to be battery poor.) The transformer, T1, can be a small plate-to-voice-coil output transformer of approximately 33:1 turns ratio. Such transformers can be salvaged from defunct, tube-type TV sets and radios. The full-wave voltage doubler provides about 9 volts output. The FET drain current is about 4 mA, not oscillating, and drops to about 2 mA when a crystal is plugged in.

To get the UCO to oscillate with some mf and lf crystals, it was necessary to switch in extra capacitance between the drain and ground. This is handled by the two toggle switches, S1 and S2, and C3 and C4. If you are only interested in hf crystals, you will not need these capacitors or switches; most mf crystals will oscillate without them also. Neither will you need RFC2, a miniature toroidal 150-mH inductor. A single, three-position rotary

¹The audio transformer may not be on hand, but a 6.3-V, filament transformer can be substituted. See Fig. 1B for the substitution.



¹All the UCO components are mounted on the 3 x 4-inch (76 x 102-mm) cover plate of a small utility box.

switch could have been used in place of S1 and S2, but a rotary was not used in this particular unit for lack of space.

With S1 and S2 open, the oscillation frequency of the UCO will be at the parallel-resonant frequency of the crystal, as shunted by about 20 pF. Closing S1 or S2 will effectively shunt the crystal with an additional 30 pF, or about 50 pF total.

VHF Crystals

Fundamental-mode crystals are used for frequencies up to a maximum of about

20 or 25 MHz. At higher frequencies third-, fifth- or seventh-overtone modes are employed. The UCO will test vhf crystals, but they will oscillate on the fundamental, not the overtone frequency. The oscillation frequency will be very close to, but not precisely one-third, one-fifth or one-seventh the vhf frequency, since the overtone is seldom an exact integral multiple of the fundamental. The discrepancy is not large, however, typically about 0.1 percent, or 150 kHz at 2 meters. QST-1

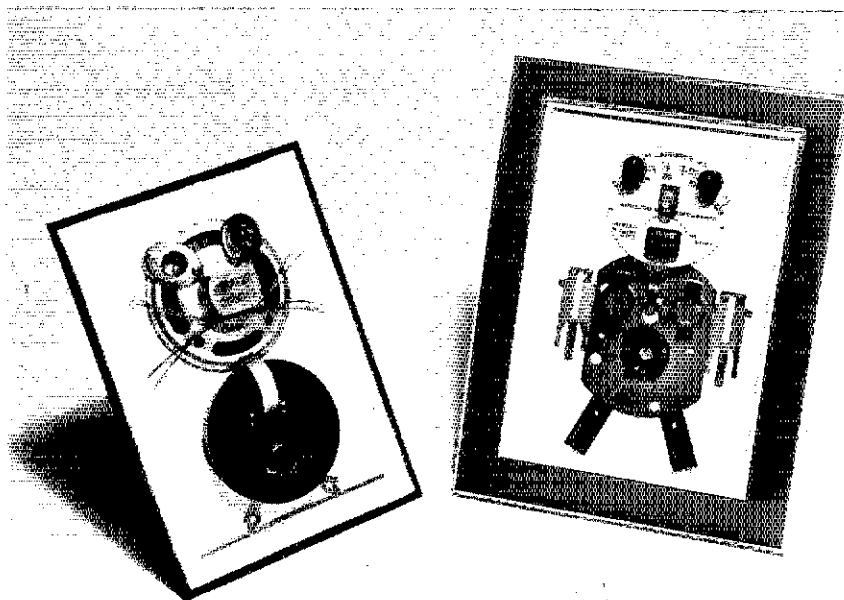
Strays

JUST AN INCONVENIENCE

□ What may be an insurmountable obstacle for one person can be merely a hurdle for another. Frank Wagner, WB6FCM, of Napa, CA, made the climb from Technician to Extra Class in just four months despite partial blindness. And his enthusiasm for amateur radio continues: He now teaches Novice courses at Silverado Junior High School in Napa. It is difficult for him to see like you or I, but as he says, "It really isn't a serious handicap . . . it's a little inconvenient!" — Ronald G. Martin, W6ZF

QST congratulates . . .

□ Douglas Zwiebel, WB2VYA, a Geraldine Rockefeller scholar at the University of Pennsylvania, School of Veterinary Medicine.



A creative member of the Society of Wireless Pioneers, Hyman Wallin, of Silver Spring, MD, produces electronic art from parts salvaged from various and sundry junk boxes. Hearing of Hq. staffer W1YL's penchant for cats, he constructed the design shown here especially for her.

A Long-Delayed Echo Revisited

Long-delayed echoes — what causes them? They have been one of amateur radio's longest standing and most intriguing mysteries.

By Nathaniel Cohen,* N1IR, Jonathan Davis,** WA1TCL and Franklin Davis,*** WA1TCK

Long-delayed echoes have been an exciting topic of conversation among radio amateurs for years and reports of several score observations have appeared in *QST*.^{1,2,3} But major problems in explaining LDEs have prevented any viable scientific analysis. For example, almost all LDEs have occurred on the low bands, where large antenna beamwidths and the possibility of hoaxes have frustrated efforts in defining the region where the echo happens. Fortunately, there is one unique case of an LDE which yields valuable insight into the nature of the phenomenon which is discussed here.

OZ9CR Revisited

On July 7, 1974, Hans Rasmussen, OZ9CR, noted a "ghost echo" during his EME tests.⁴ The echo occurred two seconds after the return of his EME signal. Hans' setup and discovery are pertinent to the study of LDEs for several reasons:

- 1) The use of 1296 MHz made it unlikely that a hoax was perpetrated because of the paucity and ardency of EME buffs.
- 2) At 1296 MHz the ionosphere cannot reflect signals.
- 3) A lower limit of electron density in the extraterrestrial reflector can be found.
- 4) Beam size was quite narrow (1.67 degrees subtended), which pinpoints the vicinity of the reflector.
- 5) The bandwidth of 500 Hz sets stringent limits on the Doppler frequency shift.

In point three, we mention an "extraterrestrial reflector." Why is this true? Why can't the signal be a bounce from the

moon to ionosphere to the moon to the earth? Quite simply, the physics is not correct. Every vhf'er knows that skip is not the best at 1296, with good reason. For good and especially *direct* reflection, the transmitted frequency must be on the order of the electron plasma frequency, f_p , where $f_p \approx 5.6 \times 10^4 n_e^{1/2}$ Hz. Here, n_e is the electron density in number per cubic centimeter.

Transmit *above* the plasma frequency and no skip, *below* and you are doing fine. Typically, the ionosphere reflects up to 30 MHz, which corresponds to an n_e of 3×10^7 electrons/cm³. With reflection at 1296 MHz, the electron density must be 5.4×10^8 electrons/cm³ or greater. This means that the ionosphere would be at least 1000 times its normal density for moon-ionosphere-moon reflection! Combining this with the geometry and signal loss makes it apparent that the echo arose from an extraterrestrial reflector about 700,000 kilometers distant.

Solar Cloud Hypothesis: Untenable

Solar physicists have shown that storms on the sun can produce ejection of dense, ionized plasma clouds if these clouds have

high velocities in addition to internal magnetic fields for self-confinement.⁵ OZ9CR has taken the usual value of 1000 km/s in attributing his LDE to a nearby, but extraterrestrial, reflecting plasma cloud ejected from the sun. This is incorrect for three reasons. First, a *close* cloud moving at this velocity would produce very prominent radiation in the form of QRN on the hf bands. Second, the bandwidth of 500 Hz sets a Doppler upper limit of 0.11 km/s for any v_e , the velocity of the cloud toward the observer on the earth. With $v_e = 1000$ km/s, a large Doppler frequency shift of 4.3 MHz would result.⁷ Yet the cloud would have been ejected *radially* from the sun. Thus, it would have only a negligible Doppler velocity if it were passing the earth at a position approximately perpendicular to the line of sight with the sun, along with a correction for the earth's orbital velocity of 30 km/s. And third, the clouds are short-lived and soon dissipate without forming stable orbits.

The question of Doppler velocity is *not* trivial and indeed strongly refutes the ejection hypothesis. In Fig. 1 we show the relative arrangement of the sun-earth-

The Echo Mystery

Everyone loves a mystery story, especially one based on personal experience. What could be more mysterious than hitting your key and then listening to your own signal in your receiver a second or two later? This has happened on and off for as long as amateurs have been transmitting and has remained a mystery ever since the first *QST* mention of the subject in 1934.

The pages of *QST* reported some 90 long-delayed echo (LDE) occurrences as of 1971 in an article by three California scientists. Their call for additional reports produced several dozen in succeeding years, but the subject boiled up most heatedly in 1976, when Hans Rasmussen, OZ9CR, was quoted in the May

issue of *QST* as having heard his own echoes at 1296 MHz. The significance of that event was that previous explanations of LDEs, such as ionospheric scattering and multipath propagation via the F layer, just fall apart at 1296 MHz.

Footnotes in the two accompanying articles refer mainly to letters from amateurs reprinted in "Technical Correspondence" in the past 18 months as the LDE controversy swirls and swarms. Cohen and Simpson present two of the best possible explanations seen to date. ARRL headquarters welcomes your reports of LDEs as well as *your* proposed explanations of the phenomena; whoever turns out to be right will certainly achieve everlasting fame and glory, if not riches! — *K1TN*

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**37th and Spruce Sts., Philadelphia, PA 19174

***Physics Department, Oberlin College, Oberlin, OH 44074

¹Footnotes appear on page 18.

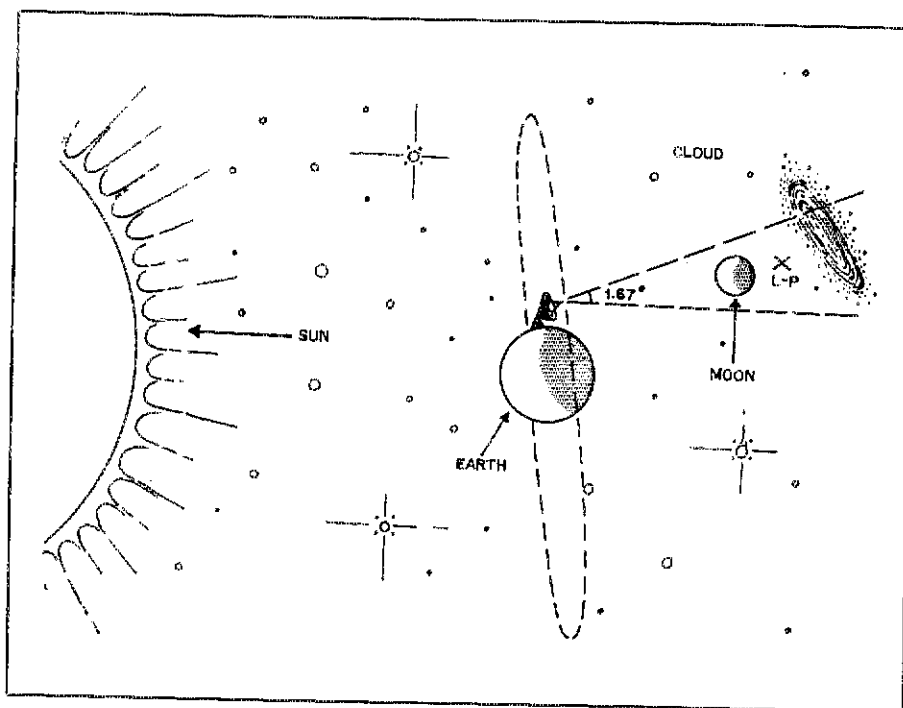


Fig. 1 — The sun-earth-moon-cloud system during the time OZ9CR received long delayed echoes. This view is taken with respect to the observer's horizon. Distances, sizes, etc. are not to scale. The great circle represents the points at which this cloud would have had small Doppler velocities if it were ejected from the sun. The X, identified L-P, indicates a semi-stable, earth-moon, Lagrange point about 600,000 km from the earth.

moon-cloud system. By noting the position of the sun and moon on July 7 we also obtain the position of the reflecting cloud within the antenna beamwidth. At this position a traveling cloud ejected from the sun would have a Doppler velocity vector of 0.87 times its true velocity, resulting in a substantial frequency shift. Small Doppler shifts occur on the great circle defined by the points perpendicular to the line of sight with the sun as is also shown in the diagram.

Dust Swarms and the Solar Wind

The possible significance of the zodiacal light and Gengenschein with LDEs has been discussed in *QST*.⁸ Although LDEs are not associated with these optical phenomena, they have much in common. Simply stated, there are large areas containing many small sized (1/2-micron) particles often ascribed to a meteoric or cometary origin. In other words, these are dust swarms which can form semi-stable orbits and last about 1000 years before disintegrating. Can OZ9CR's LDE have resulted from a swarm of these particles? We say yes, but with some reservations.

There are two problems with LDEs and dust swarms. First, why is there such a high electron density in a dust swarm? Second, why isn't the swarm at an earth-moon-system Lagrange point⁹ (located near the earth at distances of about 600,000 km)? Here, the forces acting on a mass cancel, and the orbit is stable and synchronous with that of the earth's orbit.

Since the reflection cloud was not at a Lagrange point, how do we explain the cloud in terms of a high-density dust swarm? Fortunately, this problem has already been studied and it has been noted that high particle densities in interplanetary dust streams can occur in perturbations seen near the Lagrange points.⁹ In addition, it seems likely that the reflection cloud would be a dust swarm not in synchronous orbit to the earth, but whose v_e cancels with the earth's orbital velocity. The perpendicular velocity of the cloud is not readily obtainable from OZ9CR's observations but seems likely to be small since internal turbulence would cause substantial Doppler broadening with large velocities resulting in garbled echoes with bandwidths greater than 500 Hz.

Now problem one: How can there be such a large electron density? The answer is found in the solar wind. When the solar wind hits these dust swarms it erodes away layers of the particles in a mechanism called *sputtering*. The layers are ionized, producing a local electron density. But a density of 10^8 electrons/cm³ is unusual; why is this sputtering so intense? The cause lies in the salience of solar activity during the week of July 1-7, 1974. Particularly on July 5, many energetic solar flares were recorded which created a strong solar wind with an average velocity of 1000km/s.¹⁰ This was capable of producing intense sputtering for a short time, easily producing an effect on a large dust

swarm. For the echoes of OZ9CR the cloud-swarm must have had an angular size at least on the order of the beam size and greater than 20,000 km across, consistent with this view. Thus, OZ9CR's LDE seems to be the result of a large, dense, dust swarm and a strong solar wind.

Searching for LDEs

Clearly much work remains to be done to yield greater understanding of the LDE phenomenon. Unfortunately, the problems mentioned for hf LDEs complicate attempts at learning more about the dust swarms. We suggest that more LDE work be done at uhf and vhf and during known times of pronounced solar activity. Searches at 2 meters may prove the most ideal because of the lower electron density necessary while still maintaining narrow beamwidth. Although the Lagrange points need not be the only place to look, they are good places to begin. The organized involvement of moonbouncers may enhance our understanding of LDEs in addition to demonstrating a new and possibly viable means of radio propagation.

Acknowledgements

The authors are grateful to D. Stinebring, J. A. Pierce and R. Hohlfeld for their comments. Cohen acknowledges the support of an NLC Trust Fellowship and the National Astronomy and Ionospheric Center, Cornell University. QST

Footnotes

- ¹Villard, Graf and Lomasney, "Long-Delayed Echoes ... Radio's Flying Saucer Effect," *QST*, May, 1969, p. 38.
- ²Villard, Fraser-Smith and Cassam, "LDEs, Hoaxes, and the Cosmic Repeater Hypothesis," *QST*, May, 1971, p. 54.
- ³Villard, Graf and Lomasney, "A Long-Delayed Echo AR," *QST*, February, 1970, p. 30.
- ⁴Rasmussen, "Ghost Echoes on the Earth-Moon Path," *Nature*, 257, p. 36 (1975).
- ⁵Rasmussen, "Ghost Echoes on 1296 MHz," *QST*, June, 1976, p. 36.
- ⁶Kundu, *Solar Radio Astronomy*, Interscience, New York, 1965, p. 577.
- ⁷Fletcher, "Ghost Echoes Again," *QST*, March, 1977, p. 43.
- ⁸Clark, "Two Possible Explanations for LDEs," *QST*, November, 1971, p. 40.
- ⁹Roach and Gordon, *Light of the Night Sky*, Reidel, Boston, 1973, p. 40.
- ¹⁰NOAA, *Solar Geophysical Data*, CRPL FB-135, 361, July, 1974.

Strays

TOGETHERNESS

□ Not a few family members have received consecutive calls when going for their licenses at the same time. But how many get calls with the same suffix? Bob and Judi Goldschmidt, of Stanton, CA, took their tests together and wound up with the call signs WA6SKE (his) and WB6SKE (hers).

More Reflections on LDEs

Solar wind? Plasma clouds? Here are other thoughts about long-delayed echoes.

By Richard Simpson,* W6JTH

The observations of long-delayed echoes by Rasmussen¹ have received rather piecemeal discussion in *QST*.^{2,3} The original statement and cover letter⁴ remain the most useful sources of information for evaluating this phenomenon. The published explanations, however, including Rasmussen's own, do not stand up well under close examination.

Rasmussen originally reported peculiar 1296-MHz echoes during moonbounce tests in the summer of 1974. The character of these signals was somewhat similar to the lunar echoes except that they were "hoarse" and delayed by an additional two seconds. Their presence did not appear to be highly dependent on antenna pointing and they had no noticeable Doppler shift. After considering the evidence, Rasmussen proposed that the ghost signals may have been reflections from a solar streamer located some 400,000 km beyond the moon and moving toward the earth at 1000 km/s.

Garibaldi² has correctly noted that time delay and Doppler shift should be very noticeable if the proposed reflector were moving at 1000 kilometers per second. With this velocity, time delay should decrease 0.4 second during each minute of observation. This compares with the fixed, 2.6-second, round-trip time for a lunar echo. Rasmussen observed his ghost for at least 20 minutes and detected no change whatsoever in its position with respect to the lunar echo. One infers from this that the reflector was stationary with respect to the observer.

A rather high Doppler shift is expected from a rapidly moving reflector.² At 1296 MHz a 1000 km/s target should impart 8.64 MHz of shift (Fletcher³ is low by a factor of two). Since Rasmussen's receiver passband was only 500 Hz and the Doppler offset due to earth-moon motion and

earth rotation amounts to only a few kHz, it is unlikely that he would have detected an echo from a plasma cloud such as the one he hypothesizes. Thus, from Doppler considerations (which are not independent of time-delay shifts) one also concludes that the source of the echo was stationary with respect to the observer.

Fletcher postulates a plasma cloud that was moving so that its velocity with respect to the earth was zero. This is certainly a possibility, but other problems remain. Any connection between the stationary cloud and the radio blackout which occurred on the day following must (under such circumstances) be considered entirely fortuitous.

A recent review article, "Waves in the Solar Wind"⁵ describes the usual flow of plasma from the sun. Most movement is radially outward, meaning that the strongest radio reflections from a solar-wind "wavefront" would occur when the antenna is pointed directly toward the sun. Rasmussen's geometry is such that his antenna was aimed away from the sun and opposite to the direction of the earth's motion in its orbit. Only a turbulent or otherwise irregular front to the cloud could then scatter energy back toward the earth. Both are possible, especially considering that a major solar disturbance was taking place. A disturbance, however, would not be likely to produce the very stable signal which was reported.

In addition to being Doppler shifted away from 1296 MHz, the echo from a turbulent moving cloud likely would be Doppler spread owing to the wide distribution of velocities within the cloud. Similarly, the echo time delay would depend on which of many parts of the cloud responded to the transmitted signal.

The reflection mechanism within the cloud poses additional problems. If we imagine that the cloud behaves as the ionosphere does, then its critical frequency can be found from $F_C = 9000\sqrt{n}$,

where n is the density (in electrons per cubic centimeter) of the plasma. For typical D and F2 layers above the earth, n has values of 10^3 and 2×10^6 , respectively. These give critical frequencies on the order of 300 kHz and 13 MHz. To reach a critical frequency of 1296 MHz one must have an electron density of 2×10^{10} . When one compares this with the ambient solar-wind density at the earth⁶ of $n = 10$, it becomes obvious that the ionospheric-reflection analogy is not satisfactory.

Incoherent scatter, such as that associated with aurora, is a second possibility. Incoherent echoes, however, are much weaker than those returned via ionospheric reflection at hf. At the distance of the moon or beyond, they would very likely be undetectable.

The foregoing does not in any way explain Rasmussen's observations. The time-delay and Doppler-shift arguments strongly suggest, however, that the echo mechanism is fixed with respect to the earth and is not connected with a moving plasma cloud. Recent theoretical work and systematic attempts at LDE detection by Crawford, Sears and Bruce⁷ do not seem to apply here because of Rasmussen's much higher operating frequency. Clearly, more observations and good reporting will be needed before phenomena of this sort can be explained.

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The Long-Boom Quagi

What, you're not on 432 yet? If it's the need for an antenna that's stopping you, you've got the green light now — this 15-element quagi.

By Wayne Overbeck,* K6YNB/N6NB

No, a quagi is not the sound made by a certain species of duck found only in northern California and southern Alaska. A quagi is merely one of the most interesting amateur antenna designs to come down the pike in recent years. The author first described this combination of cubical quad and Yagi-Uda design techniques about a year ago¹ and the response from amateurs seemed to demand further work on the design. The result is a quagi for 432 MHz, a band of ever-increasing interest among vhf operators working direct, moonbounce and through the OSCAR 7 satellite.

What does the quagi have going for it that makes it an attractive alternative to both the quad and Yagi-Uda arrays? Easy, noncritical construction, for one thing, as well as simple matching of the feed line to the driven element. Also, quagi fires have been fed by recent discussions of the advantages of quad loops over rod-type driven elements (such as used in straight Yagi-Uda designs).² Not that there has been any doubt about that, as attested in past work by acknowledged experts Orr and Lindsay.^{3,4}

Finally, Danish scientist Appel-Hansen has produced results⁵ indicating that while quad loops make excellent driven elements and reflectors, rods seem to be superior directors. Thus, the quagi, for your 432-MHz pleasure.

The vhf quagis were designed by amateurs, using amateur methods. Although developed independently of Appel-Hansen's work, they are a practical

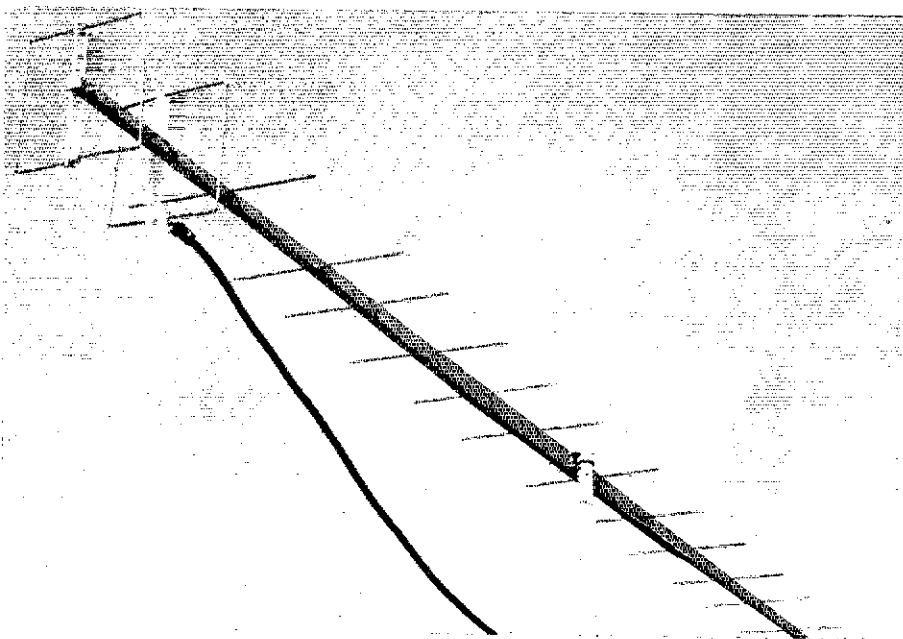
application of the principles he demonstrated. The effectiveness of the original quagi design is well known, and numerous amateurs have asked if the quagi principle could be applied to a super-long antenna for 432-MHz work.

The answer is the 15-element array to be described. It is just as easy to reproduce as the smaller eight-element quagi, but it offers nearly 15 dB gain over a dipole (dBd). Boom length of the antenna is 5λ (11.5 feet or 3.51 meters for 432 MHz). Obviously, this boom length makes such an

antenna impractical for use on the lower amateur frequencies, but at 432 MHz it fits nicely on a 12-foot (3.66 meter) length of 1 × 2-inch (25 × 50-mm) lumber.

Long-Boom Performance

The 15-element quagi has been tested repeatedly against other long-boom antennas, including the 16-element, log-periodic Yagi described by Holladay⁶ (made commercially by KLM Electronics), and the 21-element, F9FT Yagi. When the 15-element quagi was designed,



The long-boom quagi is elegant in its simplicity. Tapering the boom lends greater rigidity to the structure. The most difficult part of this project may be obtaining lumber straight enough for accurate alignment of the elements.

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¹References appear on page 21.

the KLM long Yagi was used as a reference standard against which to test the new array. In several test-range experiments the quagi's gain was found to be comparable to that of the 16-element, log-periodic Yagi.

To confirm the new design's performance and reproducibility, a second 15-element quagi was built directly from the dimensions that appear in Table 1, with the original antenna out of sight. This "cookbook" quagi was taken to the three major vhf antenna gain competitions in the United States in the spring and summer of 1977. In all three measurements, the quagi's performance was very similar to that of the larger, more expensive, commercial antennas. At the Central States VHF Conference, the 15-element quagi and 16-element KLM antenna were rated at identical gains, with the 21-element F9FT array about 1 dB greater than both. On the other hand, the quagi outperformed both the F9FT antenna and the KLM in the sun noise measurements at the East Coast VHF Society's session. When the same antennas were measured with a nearby signal source, however, the best F9FT and KLM antennas topped the quagi by 0.8 to 1.0 dB. That result was closely duplicated at the West Coast VHF Conference.

The consensus of all these measurements seems to be that all of these long-boom antennas are very good performers, with none holding a decisive advantage over any other in gain. Whether an amateur buys a long 432-MHz Yagi or "rolls his own" will depend on his budget, schedule and personal preferences. With this quad-driven array, gone are the days when first-rate, 432-MHz Yagis could be built only by those having special skills and elaborate test equipment. No longer must a builder match impedances and struggle with critical baluns to get a 432-MHz Yagi to take power efficiently. To duplicate this antenna, all the builder need do is cut the rods and wire loops to within about 1/32 inch (0.8 mm) of the dimensions given in Table 1.

As with any uhf project, the quagi builder should use the materials specified or expect to do some extra "tweaking." Any sort of 1/8-inch (3-mm) rod stock will do for the directors, but the quad loop must be no. 12 AWG (2-mm) TW covered copper wire (available from electrical suppliers). If you use bare wire (or any other diameter wire) for the loop elements, be prepared to adjust the lengths. A wood (or other nonconductive) boom is used. The quad loops are supported by Plexiglas strips while the director rods pass through the boom.

As with the smaller eight-element quagis, the long-boom 15 should be fed directly with 52-ohm coaxial cable. A type N connector is soldered into the midpoint of the bottom side of the driven loop. The

About Building Quagis

Since the original "VHF Quagi" article appeared in *QST* for April, 1977, hundreds of hams have successfully reproduced these antennas. However, several builders have written the author that they were having difficulty getting their quagis to work. These difficulties stem from three causes:

1) *Failure to observe correct polarization* — The photos in *QST* show horizontally polarized arrays, but vertical polarization is standard in fm and repeater work. Several builders have written complaining that they built quagis and put them up "just like you showed it in *QST*" only to find that their groundplanes would get into the local repeater better! For fm service, the quagi must be vertically polarized. That means the directors must be vertical and the feed point must be on the side of the driven element. Despite its square shape, a quad-type loop is not universally polarized — it is vertical

or horizontal, depending on where it is fed.

2) *Failure to allow for overlaps at joints* — The dimensions given for the driven element and reflector are *net* dimensions. The builder must allow excess length for any overlap when the loop ends are soldered.

3) *Failure to use the specified wire type* — While any conductor of the proper diameter (1/8 inch or 3.2 mm) is fine for the directors, the driven element and reflector loops must be made of no. 12 TW wire with its insulation in place. Use of bare wire — or any other size wire — will require a correction in loop length. One builder used brazing rod for his driven element and had to increase the length 1.7 percent to get the VSWR down to a normal 1.2 at resonance. But once he made that correction, his eight-element quagi was measured at 13.8 dBd gain at the West Coast VHF Conference last May!

Table 1
432-MHz, 15-Element, Long-Boom
Quagi Construction Data

Element Lengths — Inches (mm)

R — 28" loop (711)	D7 — 11-3/8 (289)
DE — 26-5/8" loop (676)	D8 — 11-5/16 (287)
D1 — 11-3/4 (298)	D9 — 11-5/16 (287)
D2 — 11-11/16 (297)	D10 — 11-1/4 (286)
D3 — 11-5/8 (295)	D11 — 11-3/16 (284)
D4 — 11-9/16 (294)	D12 — 11-1/8 (283)
D5 — 11-1/2 (292)	D13 — 11-1/16 (281)
D6 — 11-7/16 (291)	

Boom — 1 × 2-inch × 12-ft (25 × 51-mm × 3.66-m) Douglas fir, tapered to 5/8 inch (16 mm) at both ends.
Driven element — No. 12 TW copper-wire loop in square configuration, fed at center bottom

Inter-element Spacing — Inches (mm)

R-DE — 7 (178)	D6-D7 — 12 (305)
DE-D1 — 5-1/4 (133)	D7-D8 — 12 (305)
D1-D2 — 11 (279)	D8-D9 — 11-1/4 (286)
D2-D3 — 5-7/8 (149)	D9-D10 — 11-1/2 (291)
D3-D4 — 8-3/4 (222)	D10-D11 — 9-3/16 (233)
D4-D5 — 8-3/4 (222)	D11-D12 — 12-3/8 (314)
D5-D6 — 8-3/4 (222)	D12-D13 — 13-3/4 (349)

with type N connector and 52-ohm coax.
Reflector — No. 12 TW copper-wire loop, closed at bottom.
Directors — 1/8-inch (3.2 mm) rod passing through boom.

feed-line coax is brought perpendicularly to the antenna feed point, running along the boom or (preferably) directly to the supporting mast.

Like the smaller quagis and other antennas, long-boom 15s can be stacked in pairs, fours, eights or 16s for additional gain. With this much gain over a dipole for each bay, a stacking distance of six to seven feet is recommended at 432 MHz. Since these antennas can be built of much lighter materials than the 16-element, log-periodic Yagi, they represent a practical as well as economical approach for moon-bounce work. Allowing for normal feed-line losses, 16 long-boom quagis should deliver nearly 26 dB gain over a dipole, while about 23 dB would be attainable with only eight bays. Even the larger 16-bay array would be only about 20 × 20 feet (6 × 6 meters) in size, not that big by EME standards!

However, any EME system consisting of long-boom antennas poses special mechanical problems because all bays must track accurately enough so that they all point at the moon at once. As the

author learned during an Alaskan moon-bounce DXpedition, this can be difficult under adverse environmental conditions.†

Conclusion

There you have it, a long-boom version of the quagi antenna that offers very high gain without high cost or undue construction complexity. Anyone who takes reasonable precautions to follow the listed dimensions should be able to achieve the same results! The author again wishes to thank WB6RIV for his antenna-range assistance! □

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BC-Band Energy — A Rejection Filter

Strong bc-band signals can spoil amateur reception. Build this high-pass filter and protect your receiver front end.

By Edward E. Wetherhold,* W3NQN

How does your receiver front end stack up against strong, broadcast-band signals in the 550- to 1600-kHz range? Inadequate front-end selectivity, or bipolar-transistor rf amplifier and mixer stages which perform poorly, can result in unwanted cross-talk and overloading from adjacent commercial or amateur stations. A simple cure for this problem is to install between the antenna and receiver a filter that will sufficiently attenuate the out-of-band signals but pass those signals of interest with little or no attenuation. If the

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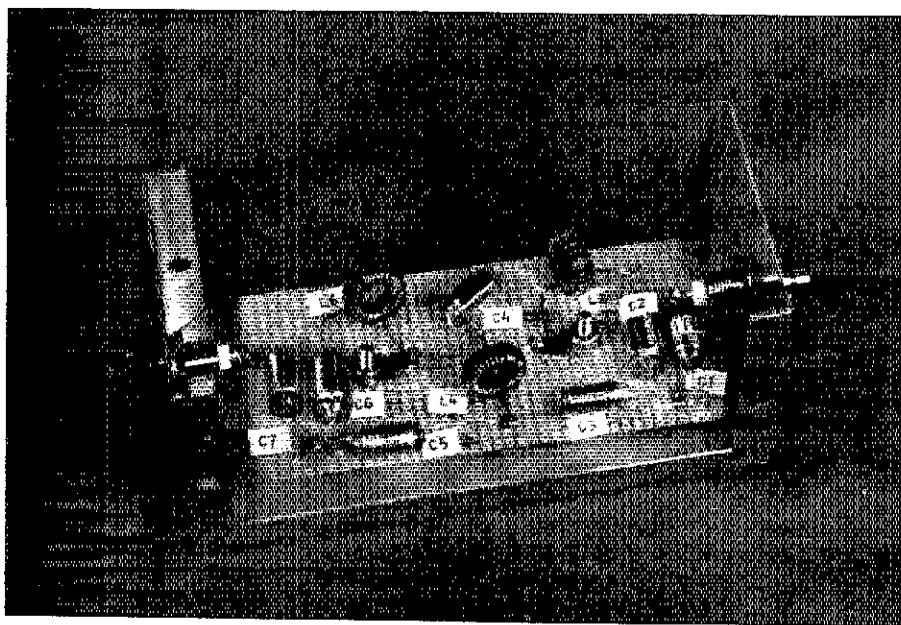
receiver is designed for reception of frequencies below *and* above the broadcast band, a 550- to 1600-kHz band-stop filter will be required. However, if reception is desired only below *or* above the broadcast band, then a less complex low *or* high-pass filter will suffice. Because a majority of ham receivers are used for reception above 1600 kHz, a high-pass filter will generally be preferable to the band-reject filter. For the same number of components, the high-pass filter performance is superior to that of the band-reject type.

Since the power level of broadcast stations can be quite high, the stop-band at-

tenuation of the high-pass filter should also be high, preferably in excess of 60 dB. The cutoff frequency should be selected so less than 1 dB of attenuation occurs above 1800 kHz, the start of the 160-meter band. Receivers are generally designed to present a 50-ohm load to the antenna, and the filter should also be designed for the same impedance level. The rate of attenuation rise, VSWR, pass-band ripple, and number of filter components are all interrelated and many design choices are possible. In the high-pass design to be discussed, the maximum VSWR of the filter was selected to be 1.353. To obtain adequate stop-band attenuation and a reasonable rate of attenuation rise, a filter of 10 elements was considered necessary. Finally, to simplify construction, only those designs permitting the use of standard-value capacitors were considered.

Of the two filter-design procedures now used, the image-parameter and modern-filter design (or network synthesis), the modern-design procedure was used because of its greater preciseness and versatility. The modern-filter design procedure was first explained for the amateur in the pages of *QST*¹ and *Radio Communication*² in 1969 and 1971, respectively. These articles should be used for background information and an explanation of any unfamiliar filter-design terms. From the many different types of modern-filter responses (Bessel, Butterworth, Chebyshev, elliptic, etc.), the elliptic type (referred to as "Cauer parameter" type in ref. 3) was chosen because it provides the fastest rate of attenuation rise. A disadvantage of the elliptic filter is that it

¹References appear on page 24.



The filter is built on perboard in a 2 x 2 x 5-inch Minibox. The filter can be made smaller if desired, and phono connectors can be used in place of the BNC fittings shown here.

requires tuning, but if this can be accomplished with the use of close-tolerance, standard capacitor values, the tuning should present no problem. One of the design parameters of the elliptic filter is A_s , the value of the minimum stop-band attenuation in dB. In the references used,^{3,4} the A_s ranges from 2.65 to 133 dB in increments of several dB. For this particular application, the C0715 filter-catalog listings between $A_s = 52$ to 90 dB were of interest. The "C0715" of the filter catalog heading signifies a filter with Causer (or elliptic) parameters of degree "n" = 7, and a reflection coefficient of 15 percent (equivalent to a VSWR of 1.353). The degree n = 7 is equal to the number of elements in the Chebyshev filter to which the Causer filter is related. All Chebyshev filters are Causer filters with $A_s = \text{infinity}$. Consequently, the Chebyshev filter has no stop-band ripples as does the Causer. To obtain stop-band ripples and a finite value of A_s , three capacitors are added to series tune inductors L2, L4 and L6 of the filter shown in Fig. 1. The total number of elements in the Causer filter is thus 10.

In the C0715 catalog, there are 25 normalized filter value listings between $A_s =$

52.8 and 91.7 dB. The extremes of this range were considered as the minimum and maximum acceptable values of A_s . A computer data file (no. 1) was assembled in which the normalized values of C1-C7, inclusive, and L2, L4 and L6 were listed for each of the 25 values of A_s . Another data file (no. 2) was assembled containing the capacitor values of the Mallory SXM polystyrene series (2.5 percent at 160 V). A computer program was then used to evaluate each normalized catalog listing in data file no. 1 for a cutoff frequency of 1.6 to 1.75 MHz in increments of 0.1 MHz. The computer was programmed to print out only those designs in which all capacitor values were within ± 3 percent of the standard values in data file no. 2. Of those designs printed out by the computer, the one design believed to be most suitable was selected for construction. The parameters of the selected design are listed in Fig. 1 along with the calculated component values. Although the A_s value was less than the desired 60 dB, it was high enough (58.3 dB) to be adequate for the application.

Building the Filter

The filter layout, schematic diagram

and response curve, the component values used, and the toroidal-inductor winding specifications are all shown in Fig. 1. The design parameters and the calculated filter component values and other calculated parameters are shown in the upper right-hand corner of Fig. 1. The standard-value capacitors used are listed under the filter schematic diagram. Note that all standard values are within 2.8 percent of the design values. Since the maximum deviation between the actual capacitance used and the design value will be only 5.3 percent, there should be little or no difficulty in obtaining the desired response. If the attenuation peaks (f2, f4 and f6) at 0.677, 1.293 and 1.111 MHz are not obtained, a slight squeezing or separating of the toroidal-inductor windings should be all that is required to tune the series-resonant circuits. Note that series circuit C6-L6 should resonate at f6 = 1.111 MHz, but from the response curve it actually resonated at about 1.130 MHz. This frequency error of about 2 percent is small enough to ignore. The A_s value was selected to be 58.3 dB, and examination of the response curve shows the measured filter response to be in good agreement. The measured values of cutoff frequency (at the attenuation

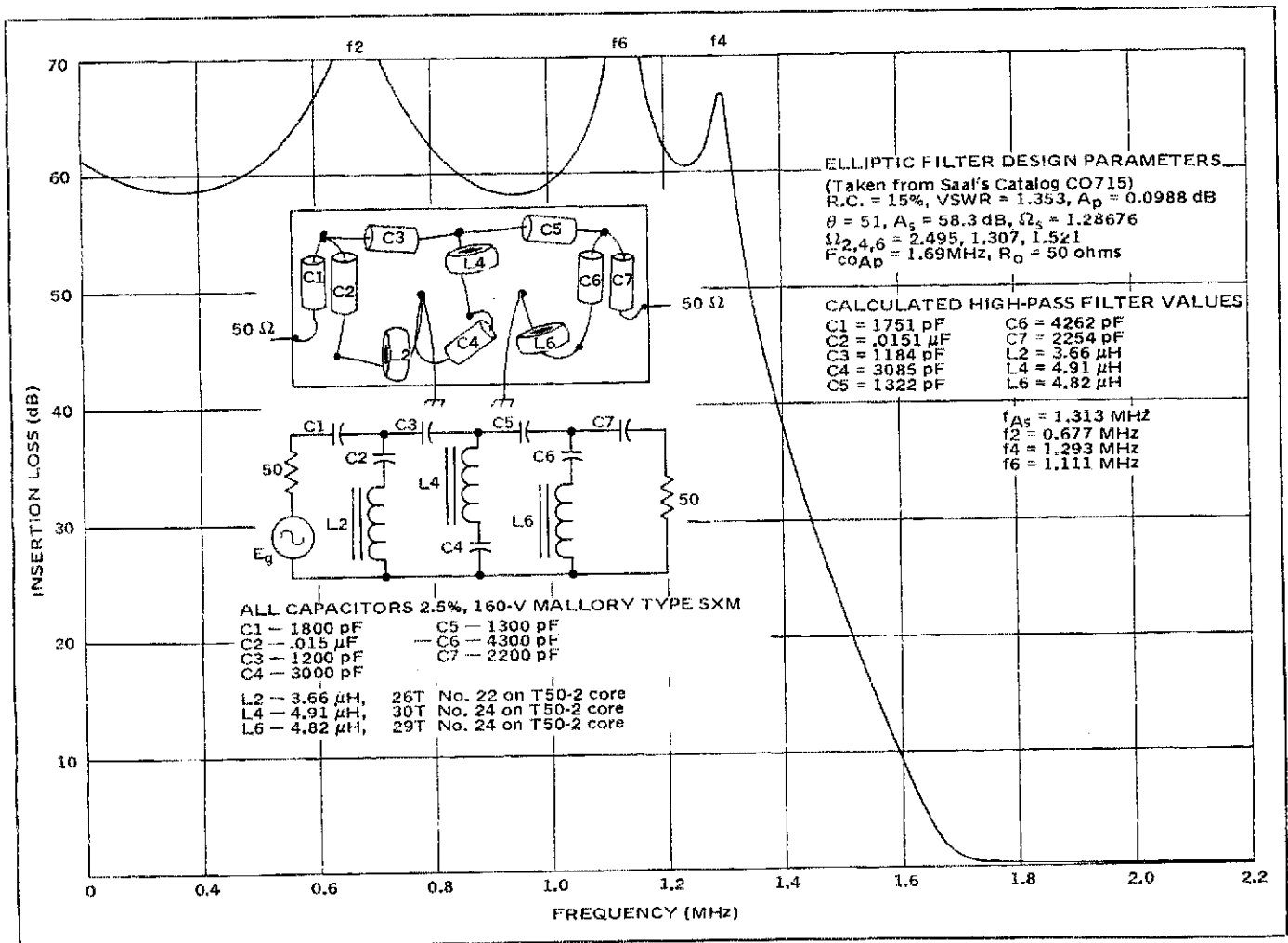


Fig. 1 — Filter-response curve, insertion loss, layout and schematic diagram. Terminal impedance is 50 ohms for this 1.7-MHz, high-pass filter.


level of 0.0988 dB) and the measured value of fA_s (the frequency where A_s is first reached) are also in good agreement with the calculated values. The measured pass-band loss was less than 0.8 dB from 1.8 to 10 MHz. Between 10 and 100 MHz, the insertion loss of the filter gradually increased to 2 dB. The measured input impedance versus frequency was in good agreement with the calculated input impedance between 1.7 and 4.2 MHz. (The frequency range above 4.2 MHz was not tested.) Over the range tested, the input impedance of the filter remained within the 37 to 67.7 ohms input-impedance window (equivalent to a maximum VSWR of 1.353).

Final Comments

Construction of the filter is relatively simple, as shown in the photograph, and

no difficulty should be experienced if the Mallory SXM polystyrene capacitors are used. These capacitors have a standard tolerance of 2.5 percent and are available through all Mallory distributors. The Micro-metals iron powder T50-2 toroidal cores are available through either Amidon,⁵ Palomar Engineers,⁶ or G. R. Whitehouse.⁷ Write to these distributors for prices or see *QST* ads for January, 1977, pages 108 and 160, and *QST* for February, 1977, page 126.

The performance of this filter is a good example of what can be expected when the modern-filter design procedure is used. The designer has a wide choice of filter catalogs from which to choose (reflection coefficients from 1 to 50 percent for 5- to 13-element elliptic filters) and has the assurance that the finished design will perform as intended. As the advantages of

the modern-design procedures are more frequently demonstrated and this design procedure becomes more familiar to the amateur, it will eventually replace the less versatile image-parameter design procedure. For your next filter requirement, why not try a modern-filter design? 

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Strays

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QST isn't the only publication for beginners that comes out of League HQ. Written for newly licensed amateurs, *New Ham News* is chock full of timely articles of special interest to new hams. You'll find such pertinent topics covered as Novice antennas, humorous experiences that we can all learn from, operating and upgrading tips, and more. The quarterly newsletter is mailed free of charge to all Novice members of the ARRL, as well as to all new licensees. The latest issue, Winter, 1978, is hot off the presses. If you

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AMATEURS ASSIST AT WHEELCHAIR EVENT

The National Wheelchair Games, held last summer at San Jose, CA, presented unique possibilities for Santa Clara Valley



The unique portable operation of WA6VRK at the 21st annual National Wheelchair Games at San Jose, CA.

amateurs, and they rose to the occasion in unique ways. Roy, WA6VRK, for example, used an unusual rig consisting of two lead-acid motorcycle batteries built into a backpack. The rig was an ICOM 211 into a modified discone antenna that strongly resembled a broken umbrella. In all, more than 40 amateurs provided communications for the five-day event.

JET PROPULSION LAB TOURS

Most amateur radio groups are busy enough with their own projects, but the Jet Propulsion Laboratory Amateur Radio Club of Pasadena, CA, goes further by inviting other clubs for tours of the JPL complex. The visitors see a multimedia presentation, full-sized spacecraft models, assembly and test areas, and the W6VIO club station. Interested groups should contact Norm Chalfin, K6PGX, JPL ARC, 4800 Oak Grove Dr. (180/302), Pasadena, CA 91103. Tel. 213-354-6833.

NEW HAM NEWS

FALL, 1977

A QUARTERLY PUBLICATION OF THE ARRL CLUB & TRAINING DEPARTMENT

VOL. 2, NO. 4

Up Your License Grade

What is the single most popular activity of new amateur radio operators? Upgrading their license class! Novices are taking organized courses for the theory and Technicians are listening to W1AW code practice daily for the code. Coast to coast, many new hams have put the next license class as their top priority. Fall is the season for classes, and again this Fall, the ARRL is providing the amateur community and new hams in particular with every possible assistance.

A new General level theory course, similar to the very successful Novice course, is starting in September. For the location of the class nearest you, drop a note to ARRL HQ. And meanwhile get a head start on the rest of the class with a copy of the ARRL Radio Amateur's License Manual, 70th edition. It is the required text in most courses, and also contains a complete chapter on how to take the tests.

and the most up-to-date collection of the rapidly changing rules and regulations.

For Technicians working on their code, the ARRL offers the *Code Kit*, two hours of random character code practice specially designed for today's amateur. The 13 wpm comprehension code test is a snap after mastering these tapes. And for on-the-air code practice, W1AW has expanded its slower speed practice schedule and put up a mammoth new antenna system just to help you. See the W1AW schedule in *QST* or write HQ for your free copy.

For additional background beyond that required for the FCC exam, and for a wealth of simple construction projects, we recommend the latest edition of *Understanding Amateur Radio*. Substantially rewritten, the new edition closely follows the ARRL course outline, and it provides clear and concise explanations of all aspects of radio theory.

It's informative, it's lively and it's free! Write ARRL HQ for your first copy of *New Ham News*.

A Spectacle-Mounted Code Blinker

Want a neat idea for the handicapped amateur? This one is invented by a handicapped amateur, so you know the idea is tested and true!

By D. W. Conover,* WA6MJZ.

This flashing cw-assist device will offer considerable utility for many deaf amateurs, as well as enhancing their code-speed learning potential. Such a unique means of simplifying the visual flash technique for cw operation could lend further support to amateur radio by adding to its ranks many deaf people. Otherwise, they might be denied ready entry into a fascinating hobby.

A spectacle-mounted LED can be especially attractive to the hard-of-hearing person who needs a visual method for receiving code rather than a vibratory means. Even for the experienced amateur who has recently become deaf, this device will allow the operator to watch the code while writing it down. A general view of the device is shown in the drawings and the photo.

As a person who became deaf very recently, I also found this device to be a definite help in essentially eliminating the usually temporary, but always annoying, double-vision phenomenon that often accompanies a stroke to the central nervous system. For the deaf person with double vision, imagine — if you haven't already experienced it — keying a dash ("T") and knowing it, only to see a space flash in two slightly offset places! The sender — at least when he is first learning cw — is very apt to interpret this signal as two dashes ("M").

The Concept

By using the modified spectacles in the sketch, the operator can eliminate the double-vision handicap and can improve his efficiency with very little interruption in his hobby. Fig. 1 shows how a pair of ordinary prescription spectacles can be fitted with a L-shaped boom to hold an LED in the proper position. In this specific application, the boom (a hammered piece of

copper wire about 10 inches long), was attached by small bolts to the left temple piece of the spectacle frame. Of course, the boom can be attached to either side in order to meet the user's preference or special physiological needs.

For the person with no double vision or other visual acuity problems, the spectacles can be used without lenses in them. The empty frames merely serve as a convenient mount for the L boom and LED while still permitting the light source to

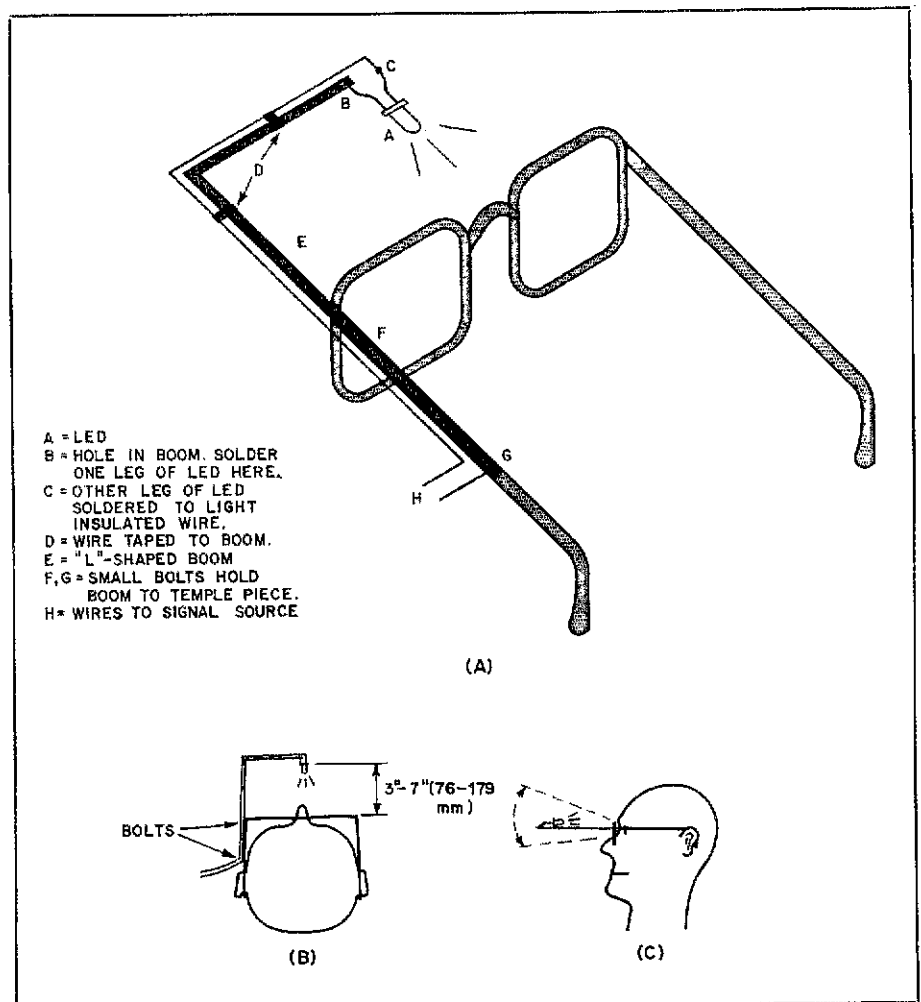


Fig. 1 — A sketch of spectacles with boom and LED flasher attached. At B, a top view and at C, a side view.

*4270 Alta Mira Dr., La Mesa, CA 92041

move in synchrony with head movements, thus keeping the LED in a constant position in front of the eyes.

Whatever type frames are used, it is strongly suggested that fairly substantial plastic temple pieces be employed to minimize possible breakage and provide an insulation base for the boom. There may be a more technical optometric term for the so-called "temple pieces." However, most users of eye glasses will consider the temple pieces as those parts of the frames which fit along the sides of the head and hook over the ears.

Frame Construction

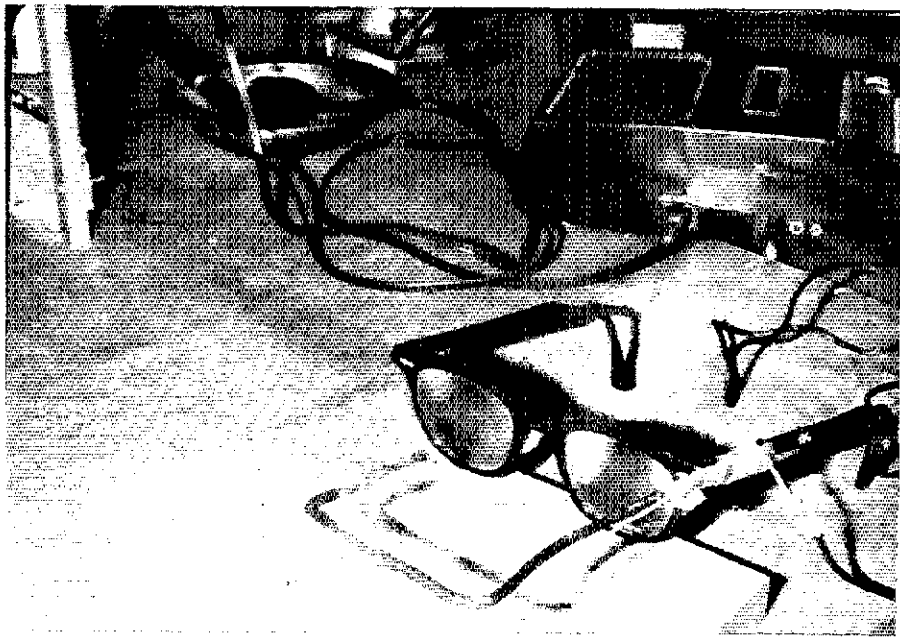
A simple boom can be made out of readily available piece of No. 8 or No. 10 copper wire, or any functionally similar material. If round wire is used, simply hammer the LED end flat for about 1/2 inch, (13 mm), and drill a small hole about 1/32 inch, (1 mm), dia. through the flattened part to accept one of the LED "legs." An LED will be soldered in place later in the construction process.

The length of the temple end of the L boom should be about three or four inches. It should be hammered flat in two places in order to accept two small bolts which secure the boom to the plastic temple pieces. See Fig. 1A. The long leg of the boom must project straight out past the temple pieces from about three to six inches, depending on many factors, the most important of which is a need for monocular or binocular viewing. If you are monocular (because of double vision), the bent portion of the boom should begin at about three inches in front of the lens plane and extend to the right (or left, depending on which side the boom is anchored) about 1-1/2 inches (38 mm). This arrangement will place the LED light source in front of the left (or right) eye and just outside the visual field of the other eye, thus avoiding double vision (diplopia).

By placing the LED about three inches in front of the lens plane it is generally within the near-point range of the eye. This is the distance within which most people can no longer cause the eye muscles to converge. For binocular viewing with normal eyes or for individuals with just one eye, the bent portion of the boom can be as far out as seven inches in front of the lens plane. With most viewers, the LED at seven inches will appear as a reasonably bright source about 1/4-inch (6 mm) in diameter and at an indeterminate distance. The lighted LED can be seen under ordinary ambient lighting conditions.

Additional Thoughts

So much for mechanical construction of the basic spectacle mount to hold the LED. Now for some general comments on LEDs as they apply to the cw flasher. For



This photo gives the prospective constructor an idea of how the flasher is mounted to the glasses.

this application, it was found that a red jumbo unit was the most satisfactory of a number of LEDs tested. Other colors, however, may be more satisfactory for certain people. But this again requires a bit of trial and error by the individual builder.

Available in a variety of shapes and sizes, LEDs are generally driven by a dc source, with 20 to 50 mA current required. Depending upon the cw signal-source voltage, it will again be up to the user to determine what value of series resistor to use with the LED to keep the driving signal close to 3 volts or less. As a precaution, the author used a small Zener

diode (1/4 watt, 3.5 volts) across the LED terminals to minimize possible damage by minor voltage spikes in the cw-producing signal.

Signal Sources

For cw practice, Fig. 2 shows the circuit designed by the author for use with a HAL DKB-2010 dual-mode keyer/keyboard. This keyer generates near-perfect signals, making it ideal for code practice. Actually, almost any cw oscillator, tape cassette or receiver could be utilized. Also, the author has used his Drake R-4C receiver for the signal source. The LED flasher was connected directly

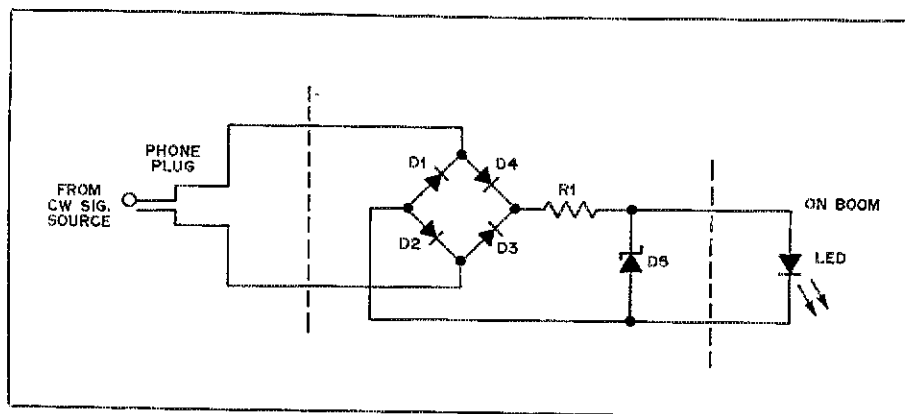


Fig. 2 — Circuit diagram of the LED power supply.

D1-D4 — Any small-signal diode.

D5 — 3.5-V, 1/4-watt Zener diode.

R1 — 10 to 300 ohms, 1/4 watt (see formula below).

A simple formula for determining the value of the series resistor R1 is

$$R1 = \frac{V_{source} - V_{LED}}{I_{LED}}$$

where: V_{source} = ac voltage measured at signal source.

V_{LED} = rated LED forward peak voltage.

I_{LED} = rated LED forward current in amperes.

to the headphone jack.

Another reason for using the headphone jack on the author's R-4C may be a bit humorous to some readers. To the XYL or other passive listeners exposed to hours of annoying (to them) chirps and clicks, the resulting silence of using the headphone jack which mutes the speaker is most welcome. Probably most hard-of-hearing enthusiasts are rarely aware of the severe annoyance to others that they create with close to full audio gain for either LED flashes or vibratory cw-reception methods. The deaf operator may be forgiven — as was the author — by his non-cw-oriented friends. But often, unless muted by some means, this crashing code could ultimately become the objective of, at least, unwished-for mayhem!

The red jumbo LED finally used in this system has a maximum forward drop of about 3 volts. A typical value of forward current for a light-emitting diode is 50 mA, or 0.05 A. Assuming the source voltage is 10 volts, then the theoretical value for R_s is

$$R_s = \frac{10 - 3}{0.05} = \frac{7}{0.05} = 140 \text{ ohms}$$

If the calculated value of the series


resistor is not available, one can readily substitute the next closest value, plus or minus 20 percent or so. Actually the value of R_s used by the builder will depend entirely on the cw signal-source voltage and so may vary from about 10 ohms to 300 ohms.

With the author's DBK-2010, a 20-ohm resistor was used. The jumbo LED used with this signal source has lasted for over eight months. If one drops much below 20 ohms for the HAL keyer, the LED will show a much brighter dot symbol. This is quite desirable, but the LED life is shortened considerably.

If the circuit shown in Fig. 2 is used between the cw signal source and LED, the likelihood of a damaged LED is further reduced because of the additional small voltage drop in the bridge rectifier. Four HEP-154s or equivalent rectifier diodes would be quite satisfactory, although the author used four small diodes of unknown value salvaged from the components of a surplus board. The reader will note that a series resistor and a low-voltage Zener are shown. This joint provision (series resistor and Zener) in the final circuitry was probably a bit of unnecessary sophistication. The Zener alone is all that is actually necessary. An occasional signal voltage spike might destroy

an LED protected only by the series resistor. As was mentioned previously, the signal source from most units that the operator may use will be a small ac voltage, generally on the order of 10 volts or less.

The potential user of this device might as well face it at the beginning: Each cw signal source will be somewhat unique in output voltage value and impedance. There are about as many signal sources (receivers, transceivers, oscillators, keyers and cassettes) as there are operators. Fortunately, LEDs are quite inexpensive so one can have a bit of fun while experimenting.

The author would be remiss in not giving much of the credit for the novelty of this device to his mentor, technical helper and patient adviser, W6MNO. It was he who initially suggested the LED application trials for faster cw learning as well as routine use by the deaf operator. Success in amateur radio by deaf and blind operators is due largely to amateurs with the same spirit shown by Chuck in helping and encouraging those of us who are handicapped and by pushing us into a challenging source of much satisfaction — ham radio. Others do care! Good luck and happy experimenting to those of you who might try to build this gimmick. 

Feedback

□ With reference to the WA2FIJ modification of the "PEP Wattmeter — a la Heath" (Hints and Kinks, *QST* for July, 1977), R1 will effectively control the positive output if pin 7 of the positive IC regulator (type 723) is connected to ground. — *K5HHE*

□ In "Full Break-In and RIT for the HW-8 QRP Transceiver" (*QST* for July, 1977), author K6TG advises that he left the decimal out of R104 in Figs. 4 and 5. The correct value of R104, 4.7k ohms, will increase the RIT frequency spread to about 5 kHz on each side of the zero mark.

□ The article, "Public Service Begins with You" (*QST* for January), stated that names of amateurs who assist during emergencies or in public service capacities must be listed in *QST* before a Public Service Certificate can be issued. In fact, the only prerequisite is an article or mention of the event in *QST*.

□ The call sign of Wade Mitchell, father of 5-year-old Novice Guy Mitchell, should be WD0CFW (*QST* for November, page 79).

□ There was a mix-up with the photo caption on page 54, *QST* for November. W6BWM appears at left, not K6SKA. Let's face it — W1RU blew it! — *W1RU*

□ In "Crystals Inside Out" (January, 1978, *QST*), an error appears on page 28. With reference to Fig. 2 on page 29, the text states that "in both of these circuits the energy that is fed back through C . . ." keeps the grid circuit oscillating. The "C" value should be indicated in Fig. 2 as being the interelectrode capacitance between the grid and plate of the tube, not the capacitor shown. In both circuits, the capacitor shown as C functions as a bypass capacitor, preventing any rf energy generated by the oscillator from entering the power supply through the B + line.

In Fig. 4, page 29, the vibration modes shown as "longitudinal and shear" should be more accurately stated as "longitudinal *flexure* and shear."

The final transmit frequency in Table 1, page 32, should have read 146.34 MHz, not 46.34 MHz.

Strays

SILVER JUBILEE AWARD OFFERED

□ To celebrate the Silver Jubilee of Queen Elizabeth II, the Greater Manchester County Council is sponsoring a special award for contacting amateurs in the newly formed county. To qualify, licensed amateurs outside the British Isles

must contact 25 county residents. The 250 to 300 amateurs who reside there will add "in the county of Greater Manchester" to their call signs. Any band and any mode may be used, except land-based repeaters. A special award will be issued for five contacts through OSCAR. No QSLs are required, but a duplicate copy of the log, certified by a radio club or two amateurs, must be submitted. The fee for the award is three IRCs. Deadline for submitting applications is June 30, 1978. Write Don Aitchison, G3BSA, 28 Avondale Dr., Astley, Tyldesley, Manchester, M29 7ES, England.

SHORTEST CALL

□ From among the proliferation of new two-letter calls has come the shortest in the U.S. — N5EE. It's held by Fredrick Walworth, ex-K5CK, of Dallas, TX. In fact, a check of the *callbook* shows that it ties with E1S1 for the world's shortest call, with both being a mere 25 bauds in length.

W1AW GETS OUT

□ The regular listening audience of Hq. station W1AW has grown noticeably during the first year that the new antenna system from the estate of Ralph Thetreau, W8FX, has been in operation. In fact, not only are "locals" tuning in, but people in some rather distant locations. Among the participants in the Code Proficiency program is Bill Norris, VK2WN, who qualified for his 25 wpm endorsement over a distance of 11,000 miles.

Calculating Capacitor Values

There's nothing mysterious about the proper values for blocking and bypass capacitors in rf circuits. These simple guidelines can help the homemade-equipment designer.

By Doug DeMaw,* W1FB

In response to a number of inquiries concerning correct values for blocking and bypass capacitors, we offer this information for your use. We have attempted to simplify the procedure in this presentation by providing a rule-of-thumb approach to capacitor type and value determination.

Our first example is the plate blocking capacitor of a typical rf power amplifier (Fig. 1). We will presume that the amplifier is for the bands from 3.5 to 29.7 MHz. Blocking capacitor C1 should be selected for the lowest operating frequency, which is 3.5 MHz. In an ideal circuit the reactance of C1 would be negligible or nonexistent in order to prevent a mismatch and subsequent power loss in the circuit. However, a slight reactance presented by C1 could be tuned out by adjustment of C3 and L1. This would lead to a small change in tank-circuit Q_L (loaded Q) which could be ignored for the most part. However, since a properly designed pi network is intended to transform the plate impedance to the load impedance (4000 to 50 ohms in this example) at a specified Q (12 to 15, typically) it is desirable to select a C1 value that does not require the pi network to compensate for unwanted reactance.

A practical guideline is to allow the reactance of C1 to be 1/100 of the plate impedance of the amplifier tube. In Fig. 1 we have specified 1 kW of dc input power. An efficiency of 60 percent is common for a Class B or Class AB2 linear amplifier, so we can assume that approximately 600 W will be present at C1 and the pi network. With a plate voltage of 2000 and a plate current of 500 mA, our plate impedance is 4000 ohms. Therefore, X_{C1} = 0.01 × 4000, or 40. To obtain from this number the value of C1 in μF:

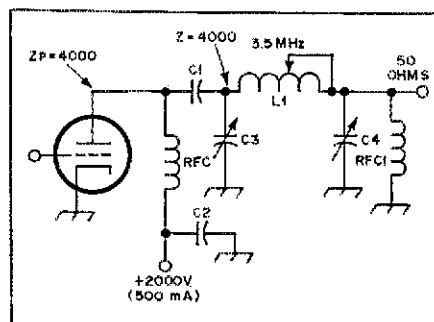


Fig. 1 — Tube amplifier used as an example for calculating C1 and C2 values (see text).

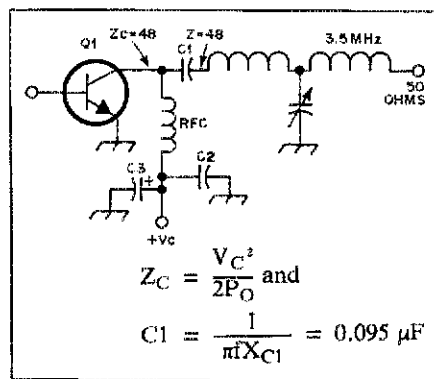


Fig. 2 — Circuit example related to determination of C1, C2 and C3 values. X_{C1} = 0.01Z_O.

$$C1 = \frac{1}{2\pi f X_{C1}} = \frac{1}{6.28 \times 3.5 \times 40} = 0.0011 \mu F \quad (\text{Eq. 1})$$

where f = MHz and X = ohms.

In this case a 0.001-μF capacitor will be entirely suitable, permitting the use of a standard value. The voltage rating of C1 should be 2V_p or 8000 V. This will allow adequate safety margin for the dc path through the pi network, then to ground

via RFC1. We need not be too concerned about the rf-voltage rating because the impedance at each end of the capacitor is the same — 4000 ohms, assuming that the pi network is designed correctly. Therefore, the matter of rf-voltage drop across the capacitor is a minor one provided the pi network is not grossly misadjusted while full power is applied. The Q of the capacitor should be high at the operating frequency, and it should be noninductive in nature. A ceramic capacitor satisfies the requirement.

A final consideration remains: ability of the capacitor to pass the rf current without overheating (which can cause a change in capacitance value or destruction of the component). Because we are using C1 at a fairly high impedance point in the circuit, the current passing through it will be relatively low. This can be determined by

$$I_{rf} = \frac{W}{Z_p} = \frac{600}{4000} = 0.39 \text{ A} \quad (\text{Eq. 2})$$

where I = current in amperes, Z_p = plate impedance, and W = watts.

If the same capacitor were used at a 50-ohm point in the circuit, we would have considerably more rf current to deal with (3.46 A) and heating would occur if we used a physically small ceramic capacitor. It would become necessary to place several capacitors in parallel in order to distribute the current among them, reducing the heating in any one capacitor of the combination. The 600-W power figure used in Eq. 2 was derived from the 60-percent efficiency we assumed for the amplifier.

Fig. 2 illustrates the principle we are discussing, but as applied to a solid-state amplifier.

Bypass Capacitors

Plate bypass capacitors should have a

*ARRL Senior Technical Editor

very low reactance at the lowest operating frequency if they are to be effective in creating an ac ground. We are not as concerned about C2 being ideal for rf applications as we are in the case of C1. Therefore, it is less difficult to locate a capacitor with high C and adequate voltage rating for our bypassing job. Conversely, a high-C plate blocking capacitor with a suitable dc-voltage rating and a high Q might be expensive, or even impossible to purchase from ordinary amateur supply stores.

In view of the foregoing it is practical to use a factor of one for X_{C2} of Fig. 1. We can assume a theoretical B+ bus impedance of zero, although in practice this is seldom true. If such a condition did exist, we would have no need for a bypass capacitor. To calculate the value of C2

$$C2 = \frac{1}{1(2\pi f)} = \frac{1}{1 \times 6.28 \times 3.5} = 0.045 \mu F \quad (\text{Eq. 3})$$

where f = frequency in MHz. The voltage rating of C2 should again be 2V_p, or 8000 volts. A ceramic or mica capacitor will be suitable for use at C2.

Another Consideration

At Fig. 2 we have a solid-state rf amplifier. It is common practice to bypass the collector circuit at low frequencies as well as at rf. This is because transistors tend to self-oscillate at low frequencies because of the extreme gain they exhibit in that part of the spectrum. C2 is chosen in accordance with Eq. 3, but C3

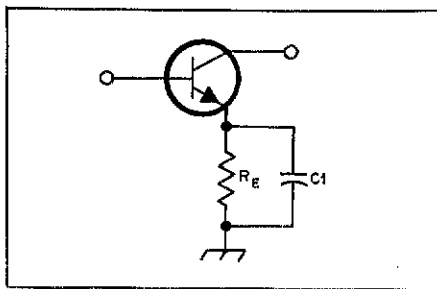


Fig. 3 — Circuit showing emitter bypassing (see text).

requires a much larger value. We should make it effective at, say, 1000 Hz and higher. Once more we will assume a reactance factor of 1, and the value for C3 will be determined by

$$C3 = \frac{10^6}{1(2\pi f)} = \frac{10^6}{1 \times 6.28 \times 1000} = 159 \mu F \quad (\text{Eq. 4})$$

where f = hertz. A third bypass capacitor is used frequently at the point where C2 and C3 of Fig. 2 are joined. It is smaller in value than C2, and is intended as a vhf/uhf bypass element. It helps prevent unwanted self-oscillation above the hf range, and is calculated in accordance with Eq. 3. C2 and C3 not only provide an ac ground for Q1, but discourage rf currents from flowing along the collector-supply bus to other stages in the circuit. This helps prevent feedback which could cause unstable operation. C3 can be the nearest standard capacitor value — 150 μF , at twice the supply voltage potential.

If a 12-volt collector supply is used, C3 should have a 25-volt rating (dc).

Emitter or Cathode Bypassing

Fig. 3 shows a typical transistor emitter circuit. The value for C1 can be determined by

$$C1 = \frac{10^6}{2\pi f R_E} = \frac{10^6}{6.28 \times 300 \times 470} = 1.1 \mu F \quad (\text{Eq. 5})$$

where R_E = emitter bias-resistor ohmage and f = lowest frequency in Hz.

A 1- μF capacitor will suffice as the nearest standard value. Here we have effectively bypassed the emitter resistor at 300 Hz, providing maximum stage gain above that frequency. Gain below 300 Hz will fall off markedly. It can be seen from this that the lower the operating frequency, the larger the value of C1. The same principle applies for cathode-resistor bypassing.

For determining the value of an emitter or cathode bypass capacitor at rf, say, 3.5 MHz:

$$C1 = \frac{1}{2\pi f R_E} = \frac{1}{6.28 \times 3.5 \times 10} = 0.0045 \mu F \quad (\text{Eq. 6})$$

where f is in MHz and R_E is in ohms. In this equation we have specified a 10-ohm emitter resistor. The voltage rating of the emitter or cathode bypass capacitor should be twice the developed dc voltage across R_E . For audio amplifiers an electrolytic or tantalum capacitor can be used for C1. A ceramic capacitor is recommended for rf bypassing work.

Strays



A NOVICE AT 79

Earning a Novice license was an extraordinary achievement for Red Dozier,



Once a Western Union telegrapher, 79-year-old Red Dozier operates his first amateur station from his home on the Rappahannock River near Urbanna, VA.

WD4JDL, of Wake, VA. At age 79, he is nearly blind and had to convert from American Morse code to international Morse for his first amateur license. During the 1920s, Red worked as a telegraph operator for Western Union in Norfolk. The experience has paid off, as he can now receive code at speeds up to 30 wpm. In fact, he wants to arrange high-speed contacts, particularly with other old-time telegraph operators. Contact him at Box 14, Wake, VA 23176. — Len Dozier, Jr., WB8ZFI

FLAMINGO NET COMMEMORATIVE

In celebration of its 25th anniversary, the Flamingo Net of Miami, FL, offers a special seal for attachment to the net certificate. Present certificate holders qualify

by working 10 other certificate holders, while all others must work 20 holders. All contacts must be on 10 meters during calendar year 1978. Log the certificate number, call sign, name and location. Send the application, with \$1 for handling, to Walt Dixon, W4DWN, 820 N. E. 123rd St., Miami, FL 33161.

SPRECHEN SIE DEUTSCH?

Dale Lally, W0OWF, director of the Arts & Sciences Learning Lab at the University of Louisville, is involved in an unusual on-the-air experiment. He meets with Ed Richmond, W4MGN, of Georgia Tech, at noon Wednesdays (Eastern Time) on 7235 kHz so that students of both universities can practice German. Amateurs conversant in German, French or Spanish are invited to check in to the gathering. If the enthusiasm of the students (and the amateurs!) continues to run high, more languages will be added. Inquiries should be sent to Dale at the Arts & Sciences Learning Lab, University of Louisville, Louisville, KY 40208. — WA6IDN

Product Review

Cushcraft 2-Meter Collinear Array

Is this antenna really new? Is it different? Well, the truth of the matter is that the DX-144 and its DXK-140 stacking kit have been Cushcraft products for a few years. That doesn't qualify them as new, but because of the rekindled interest in 2-meter DX types of antennas, it seemed worth testing the system and reporting the results in *QST*. Now that more and more "import" boxes are being sold in the USA as "low end" of 144 MHz has increased notably. The cw and ssb modes are so popular in specific regions that some long-term operators are heard complaining about the QRM!

The DX-144 basic package consists of two 20-element, collinear bays. Each is a conventional 16-element collinear, as many of us knew it in bygone times. But a parasitic director has been added in front of each driven element to provide 20 elements. The DXK-140 stacking kit contains the cable harness, vertical tubing supports (two each), rugged horizontal bars (two each), matching transformer and all necessary assembly hardware. All the buyer needs is a tower, rotator, feed line and some elbow grease.

Assembly was a backyard project which took two evenings (approximately six hours). The putting together could have been cut by an hour had the writer not coated each of the nuts and bolts with GE Silastic compound. Cushcraft supplied cadmium-plated iron nuts and bolts, and rather than have the antenna become a "rustcraft" type later on, it seemed prudent to encapsulate the hardware at the offset. Previous experience with Silastic has proved that it remains intact for several years.

The written instructions which are supplied with the antenna system are somewhat vague in spots. This caused a small slowdown in assembly at the beginning, as there were some parts that weren't shown in the data sheets. However, a bit of common sense can be applied to solve minor problems of that variety!

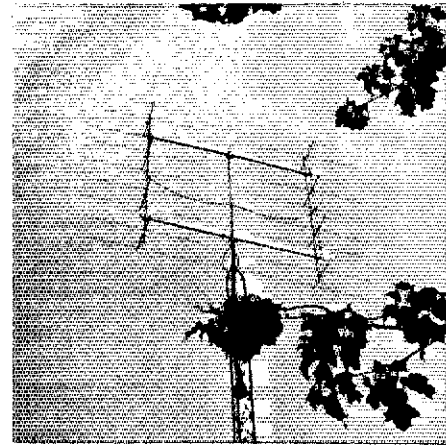
The quality of the materials is excellent. The aluminum tubing is very sturdy, and the antenna elements are made from solid aluminum rod. Each insulator is made from solid polystyrene rod, except for the phasing-line spacers (four each), which appear to be made of Bakelite or similar material. Without some additional protection, however, the plated iron bolts, nuts and U clamps would be subject to rust from salt air and pollutants found in most metropolitan areas.

Each bay of the array was adjusted for an SWR of 1:1 by pointing the antenna skyward while it was four feet above ground. Bringing the SWR down to a 1:1 level was a simple matter of setting the transmitter on 144.1 MHz and spreading or compressing the adjustable fitting across the phasing lines at the point where the harness is connected (see photograph). The SWR was checked at 146 MHz after being optimized at 144.1 MHz. The reading on a Bird wattmeter was 1.3:1, indicating the excellent bandwidth of collinear antennas.

Installation was a two-man job. The array took one hour to affix at the top of the 50-foot, ungued tower. Owing to the weight of the composite array (fairly heavy) a Ham-II rotator is being used.

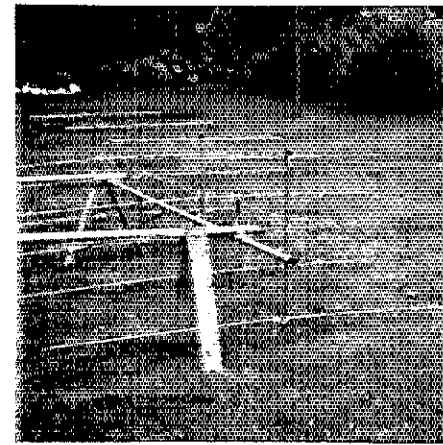
From a less-than-ideal vhf location in Newington, performance has been good. The effective daily communications range (cw and ssb) with 10 watts of power output is approximately 125 miles (200 km). A power amplifier would serve nicely as an "equalizer," because many signals are heard which can't be worked in solid fashion. Such stations are without exception using 100 watts or more of power output.

A 40-element array of this type should have a theoretical gain of approximately 17 dB, although in practice it may depart from that number slightly. The ARRL has no test range with which to verify the gain or radiation pattern of any antenna. In practice, the DX-144

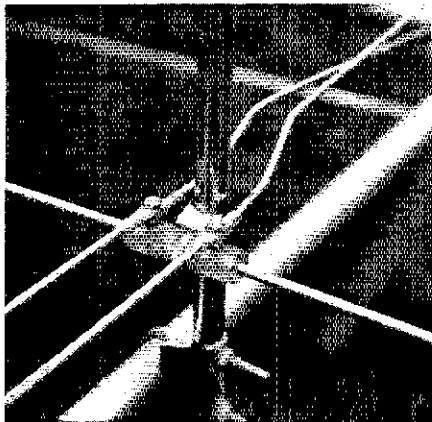


The DX-144 collinear array is shown in place atop the 50-foot tower at W1FB.

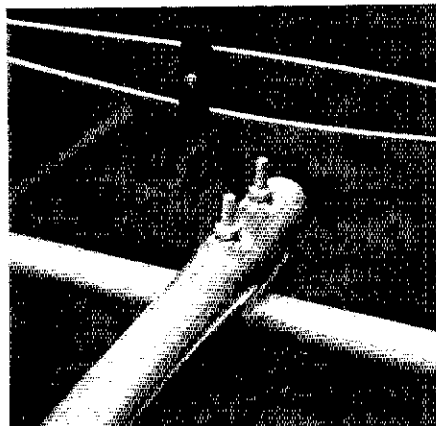
One 20-element bay of the antenna shown on the assembly stands prior to erection.



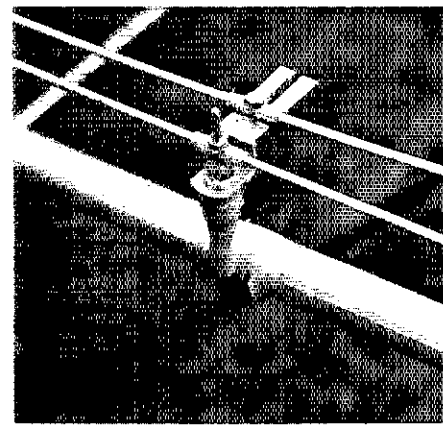
View of one of the insulators and the phasing bars.



View of one end of the rugged H frame from the DXK-140 stacking kit. These bolts and all others in the system have been coated with GE Silastic compound to prevent rusting.



The adjustable U slot for obtaining an SWR of 1:1 is shown here. At this point in the system the phasing lines are moved together or apart until a 50-ohm match is secured.



has a very sharp discrete frontal lobe, with a rather broad overall major lobe. The front-to-back ratio over a fairly stable 25-mile (40-km) path (measured with a Tektronix step attenuator) checked out at 28 dB. This side nulls weren't measured, but were quite deep.

During the ARRL VHF QSO Party of September, 1977, and under casual operating conditions, WIFB worked 18 ARRL sections, 12 states and 85 QSOs. Transmitter power output was 10 watts. W8IDU (Michigan) and VE1ASJ were worked by means of aurora during the contest. It is worth adding that the operating site is boxed in by small mountains to the south, west and north!

The total system is in the \$150 price class. The manufacturer is Cushcraft Corporation, Box 4680, Manchester, NH 03108. — *WIFB*

VHF ENGINEERING SYNTHESIZER II

"WINJM and WA1JHZ, move to WR1AZZ to pass the 25 through messages."

"Sorry, I don't have that pair in my rig."

"How about 'AZY'?"

"Sorry, no crystals for that repeater either."

Stocking up on crystals does have its limitations with today's rate of repeater growth unless you have a large interest in crystal companies' stocks. On the other hand, acquiring a fully synthesized rig might require hocking the cat as well as the kids. Besides, you just don't want to part with your faithful rig, do you?

VHF Engineering has produced a kit that gives a feasible alternative — their Synthesizer II. It is a unit that is compatible with virtually any 2-meter fm equipment normally using crystals. Direct-reading thumbwheel switches select any multiple of 5 kHz across the entire band. Not only are the standard plus-and-minus 600-kHz transmitter offsets available, but the user may program up to three more offsets of his choice.

Circuitry

Only one crystal and TTL ICs are used to derive a 6-, 8- or 12-MHz output for the

transmitter. On receive, 15 MHz is produced. Among the unique features of the circuit is a provision, by diode programming, to adapt it to any receiver i-f between 100 kHz and 30 MHz. For example, Standard uses 11.7 MHz in their radios instead of the usual 10.7 MHz. Similarly, diode programming of the divide-by-N counter allows transmitter offsets in any increment of 100 kHz. In the New York City area, for instance, 1-MHz splits are supplementing the 600-kHz-split repeaters.

Any power supply voltage from 10 to 18 volts may be applied to the synthesizer. It is prerogated to +9 volts by a 2N6576 while an LM309K provides a regulated 5 volts for all logic circuitry. At 12.5 volts, the unit draws about 750 mA.

Construction and Interface

Most components are mounted on a double-sided drilled and plated-through pc board. Since that single board has more than 700 solder connections, the kit builder would be well advised to review the instructions thoroughly. Sockets might also be considered for the 20 ICs that go on the board. Indeed, a soldering error did creep in during one late-night session. Bad readings on the VCO led to finding transposed 1-k Ω and 10-k Ω resistors. The mistake was corrected with the aid of the troubleshooting guide and, fortunately, the synthesizer was most forgiving. All the instructions are straightforward. Priority and careful attention should be given to the VCO coil. Because of its location in a corner, it should be assembled and mounted first. Both voltage regulators are mounted on the back of the anodized aluminum chassis. They should be securely seated because of their heat dissipation requirements.

Tune-up was very easy. Only a VTVM and frequency counter are required during initial tuning. Further adjustments are made on the receiver output filter when it is mated to the receiver input. For complete interface between the Synthesizer II and a transceiver, four leads are required — two 50-ohm leads, a PTT lead, a 12-volt lead, and ground return. Matching

networks are constructed at the crystal sockets to compensate for the high-impedance inputs. This consists of a 47- or 51-ohm resistor to ground and a 0.001- μ F capacitor in series. On transmit a resistor is also placed in series to limit the drive. With an HR-2B, for example, a 100-ohm resistor was required. Such phase-modulated rigs do not need any more modification. If a direct-fm type is used, however, the transmitter modulation must be applied directly to the synthesizer. Details of that are given in the manual.

The Synthesizer II approximates an average transceiver in size, so consideration might be given to placing the transceiver in a remote location for a mobile installation if space is at a premium. Using RG-174/U, the 50-ohm cables can run up to 30 feet without serious loss.

The unit measures 2-1/4 \times 5-1/2 \times 8 inches (57 \times 140 \times 203 mm), and weighs about 1-1/2 pounds (0.68 kg). The Synthesizer II may be obtained from dealers or directly from VHF Engineering, 320 Water St., P. O. Box 1921, Binghamton, NY 13902. Price class for the kit is \$170, or \$240 for a wired and tested unit. — *KH6HQG*

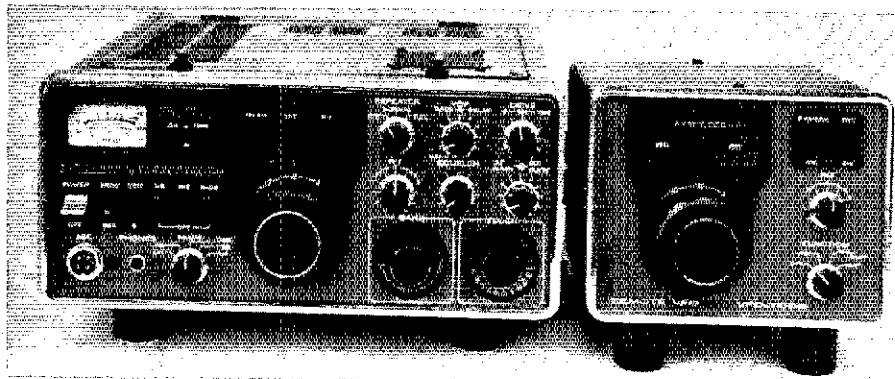
TRIO-KENWOOD TS-700S 2-METER TRANSCEIVER

Notable among the more prominent changes in character, the latest version of Kenwood's a-m, ssb, cw and fm box, the TS-700S, is the digital frequency counter and display. Bright, easy-to-read blue LEDs post the approximate operating frequency plainly at the upper center of the front panel. The word "approximate" is used in the preceding sentence because the local-oscillator frequency is sampled by the counter instead of collective sampling of the BFO, local oscillator and heterodyne oscillator. (The latter scheme is used in the TS-520S and TS-820S hf-band transceivers.) Despite this change in format, frequency readout is entirely suitable in terms of accuracy. Observations show that a minor display offset exists in the fm part of the band when the TS-700S is set for the fm mode; the display indication is lower than the actual frequency. This reviewer has not checked the readout accuracy for ssb and cw operation, but for all practical purposes it is close enough to being *on the nose* for serious weak-signal work on 144 MHz. It is probably as accurate, or more so, than many receiver-converter combinations in use by 2-meter DXers. The fine-frequency analog readout has been disposed of in the TS-700S. This could present a problem if ever the digital display ceased to operate. The 100-kHz, coarse-frequency analog marks have been retained, however. No spurious signals from the counter circuitry have been observed during transmit or receive. Frequency stability of the TS-700S is excellent.

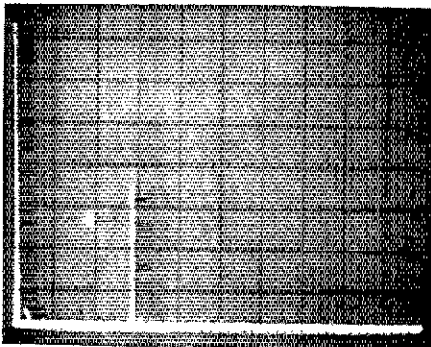
A major complaint among TS-700A users was inadequate receiver sensitivity (overall gain). Most owners of the early model bought or built preamplifiers and installed them at the receiver front end. The new model TS-700S contains an additional preamplifier which can be switched in from the front panel. Measured gain of this selectable preamp was between 6 and 7 dB for both units tested at ARRL. Kenwood informs us that the transistors used in the extra preamp are graded out before installation to ensure a noise figure of 2 dB. Although the actual receiver noise figure has not been checked in the ARRL laboratory, on-the-air in-

The Synthesizer II makes a neat package. The switch at the left selects the various outputs required for standard and nonstandard transmitter offsets.

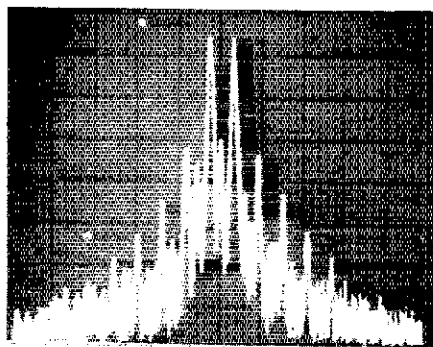




What's new in this classy-looking gray box? How do the "works" differ from those of the earlier version, Kenwood's TS-700A? Both are fair questions for the prospective buyer and are answered in this review, which begins where the TS-700A review ended when it appeared in *QST* for March, 1976.



Spectrum-analyzer display of the TS-700S transmitter output. The vertical line near the left is the carrier. It actually reaches to full scale, but has been suppressed by means of cavity filters to prevent overloading of the analyzer front end. The vertical scale is 10 dB per division and the horizontal scale is 50 MHz per division. Measurements made at 10 watts output.



Spectral display of the transmitter. The horizontal scale is 2 kHz per division, and 10 dB per division for the vertical scale. Third- and fifth-order IMD products down approximately 32 dB.

indications are that the receiver does indeed have a very low noise figure.

The dynamic range of the receiver seems to be very good, even when strong local signals are close to the operating frequency. As is the case with most receivers which have a noise blanker, some degradation of the receiver dynamic range occurs when the blanker is actuated. This effect is not observed unless the interfering nearby signals are very strong, indicated as 25 dB or more over S9. A strong signal entering the receiver when the blanker is turned on tends to sound distorted when the receiver is tuned to the frequency of the loud signal, a fairly common trait of a blanker. However, the TS-700S blanker is perhaps the most effective one for its purpose that this reviewer has operated. At W1FB there are times when local power leaks deflect the S meter to 10 dB over S9. The noise can't be heard when the blanker is actuated, and the meter reading drops to less than S1!

Cw and ssb operators should be especially interested to know that semi-break-in delay and VOX have been added to the new model. A side-tone oscillator has been added, also. The VOX controls are located on the front panel of the rig for convenience of adjustment.

The TS-700S has a low- and high-power switch on the front panel. The instruction booklet specifies that the low-power mode (approximately 1 watt) should be used only on fm,

as distortion may result when low power is employed during ssb transmissions. Several checks were made to verify this, but in all cases the ssb signal was reported to be very "clean."

A spectral analysis of the transmitter output brought startling results. The accompanying spectral photographs show that the two-tone transmitter IMD products are approximately 33 dB below peak carrier value. But of even greater interest is the reduction of harmonics and spurs. All unwanted energy is -75 dB or greater from the fundamental value! This is by far the cleanest spectral characteristic seen for commercial vhf equipment by ARRL laboratory personnel. It more than conforms to the recent FCC requirement that spurious output must be -60 dB or greater at this operating frequency. A two-resonator, high-Q band-pass filter is used at the transmitter output. No doubt this greatly aids the reduction of spurious output energy. This filter is switched into the receiver front end during the receive mode — a very clever engineering trick!

One feature that is worthy of mention is that the cw mode is operated on lower sideband, while ssb on 2 meters is normally carried out on the upper sideband. This presents a slight inconvenience to the operator who, under weak-signal ssb conditions, decides to switch to cw for better readability. The change in modes requires that the receiver be retuned, which could under very adverse conditions result in losing

Kenwood TS-700-S 2-M Transceiver

Dimensions (HWD) and weight: 5-3/8 x 11-1/2 x 15 inches (137 x 292 x 391 mm), 23 pounds (10.5 kg).

Power requirements: 117/220 V ac, 95 W; or 12 to 16 V dc at 4 A (transmit).

Frequency range: 144 to 148 MHz, a-m, fm, cw and ssb.

Power output: 1 watt or 10 watts, minimum (3 W a-m).

Receiver i-f bandwidth: 12 kHz for fm and 2.4 kHz for other modes.

FM transmitter deviation: ± 5 kHz.

Price clas: \$700.

Manufacturer: Trio-Kenwood Communications, Inc., 1111 West Walnut, Compton, CA 90220.

the station being worked. Perhaps future models of the TS-700 will have the cw mode changed to the upper sideband position, or mayhap a modification kit could be offered to those desiring it at a nominal cost.

On-the-air use of the transceiver has been enjoyable and satisfactory. Numerous contacts have been made, including cw DX near 144.1 MHz. Audio-quality reports on fm and ssb have been excellent. The cw note is hum- and chirp-free, but nearly 2-meter amateurs report a slight click on the cw note. The keying is a bit on the "hard" side with both the TS-700A and TS-700S models. It should be an easy matter to add some shaping to the keying circuit.

It is this writer's opinion that the TS-700S is an excellent buy for the price being asked. Anyone who is interested in DX work on 2 meters should enjoy owning this equipment. If fm is part of the vhf operating routine, the flexibility of frequency selection with continuous band coverage for fm repeaters and simplex should be an appealing feature.

An external VFO, the VFO-700S, is available as an accessory. This unit was tested with the TS-700S and proved to be stable and reliable. It is a handy device when the operator wishes to keep the transceiver on a specific frequency, but wants to monitor or operate in some other part of the band. In areas where there is considerable activity near 144 and 145 MHz, the VFO is a useful item, especially during vhf contests. — W1FB

TOLTEC WIRE-WRAPPING SUPPLIES

Let's say you're wanting to build a project which uses a couple of dozen integrated circuits and a handful of other parts. There is no circuit-board etching pattern available, and anyway you may want to experiment with the circuit a bit to improve its operation. How do you go about wiring it up? Soldering point-to-point lengths of wire is one way, sure. Would you consider wire wrapping? As the saying goes, try it, you'll like it! Wire-wrap techniques permit placing several conductors at one pin of an IC with no pain, no strain, no solder. And if you decide to move or remove a conductor later, unwrapping the wires is not difficult. A tool for wrapping by hand and a separate unwrapping tool are not expensive. Or for "the person who has everything," electric wrapping tools are available.

The problem for the amateur, though, is where to buy the wire. Of course you can pur-

chase a spool of no. 28 or smaller solid-copper, tinned, plastic-covered hookup wire, and you can cut and strip each length as you need it. That gets a bit tedious, though. Besides, hookup wire is rather brittle and usually doesn't take kindly to more than one or two wrap and unwrap jobs. A different alloy of wire is commonly used for production wire-wrap runs, and precut, prestripped lengths are available — *in quantity*. Still not much help for the amateur wanting to purchase small amounts!

Here's where Toltec Corp. comes in. Now, to aid those amateurs wanting to do modest amounts of wire wrapping, Toltec offers a wire kit. At a price class of \$44 you get 2300 lengths of wire ranging from 1.5 inches (38 mm) to 11.25 inches (286.7 mm). Each length is packaged separately with 100 wires per package (200 for commonly used lengths), 14 packages in all. Both ends of each wire are stripped of 1 inch of its green Kynar insulation, the correct amount for a proper wire wrap. The wire itself is no. 30, solid, silver plated. If you prefer, this wire may be purchased from Toltec in 100- or 1000-ft spools. Toltec also offers hand- and electric-operated wrap tools and an unwrap tool. That's Toltec Corp., 21342 Washington, N.E., Albuquerque, NM 87110. Try it; you will like it! — *KITD*

THE 5534 OP AMP

The 5534 is a recently introduced high-performance general-purpose operational

amplifier. It is a plug-in replacement for 741 types in many applications and offers greatly improved specifications. The slew rate is 13 V/ μ s and the power bandwidth is 200 kHz. Capable of directly driving 600 ohms with 10 V rms, this device promises a reduced parts count in new designs. An additional feature of the 5534 is low noise, with an audio noise figure of about 1 dB. The op amp is internally frequency compensated for closed-loop gain greater than three. An external compensating capacitor may be used for unity gain and other special conditions such as capacitive loading. The high slew rate of the 5534 means reduced IMD. This feature, combined with the low noise figure, makes this op amp particularly attractive for use as the principal gain block in a direct-conversion receiver. Speech processing is another application that could benefit from an improved op amp such as the 5534. The device is available in a mini-DIP (suffix N) or TO5 package. The single-quantity price class is \$3. Manufacturer: Signetics Corp. — *WIRN*

THE SSM 2020 COMPANDER AND 2040 VOLTAGE-CONTROLLED FILTER

The SSM-2020, from Solid State Music, Inc., is a low-noise, wide-dynamic-range amplifier designed for electronic musical instruments. The device functions as a two-quadrant, transconductance multiplier. Gain control is achieved by employing the 2020 as a variable feedback element in an op-amp circuit. The

2020, when used this way, is capable of lower distortion over a wider dynamic range than simple JFET voltage-controlled resistors. This device appears to have numerous potential applications to ham radio, particularly in direct-conversion receivers. For example, in conjunction with good op amps and rectifier and time-constant circuitry, the two sections can be used together to achieve 120 dB of age range, a feature not usually found in direct-conversion receivers. As a compander, the 2020 should provide very predictable performance in speech processors, possibly at a reduction in parts count over some existing designs. The SSM-2020 comes in a 16-pin, dual-in-line package.

Also from Solid State Music, the SSM-2040 is a four-section, filter control element whose cutoff frequency can be exponentially voltage controlled over a wide range. This device can be used as a building block in virtually any type of active filter. The flexibility of the chip is somewhat limited, however, in that pin-out constraints dictate a single control input, thereby precluding independent control of the four poles. This one objection notwithstanding, amateurs should find the SSM-2040 worthy of consideration for use in new equipment designs. The data sheet features several applications with simple design equations and values of essential parameters in "cook-book" form.

Price class of the SSM-2020 is \$8 in single-lot quantities. Data sheets are available from the manufacturer, Solid State Music, Inc., 2102A Walsh Ave., Santa Clara, CA 95050. — *WIRN*

Strays



PR PAYS

With a little advance planning, your club can do what the Pennroyal Amateur Radio Society, Hopkinsville, KY, did recently. Provided with advice and materials by the ARRL Club and Training Department, club members spoke at civic clubs, showed "Moving Up to Amateur Radio," convinced local radio stations to air the Dick Van Dyke public service announcements, and held a very successful display at a local shopping mall. In addition, a detailed and favorable article on amateur radio featuring

K4DMW was published in the local newspaper. In all, a worthwhile effort that caused a good number of people to look twice at amateur radio and its benefits to the community.

I would like to get in touch with . . .

other amateurs who live in remotely located, unusual structures (such as geodesic domes and yurts)

and who would like to establish contests or awards for QRPP contacts. Hunt Turner, K0HT, Box 101, Berthoud, CO 80513.

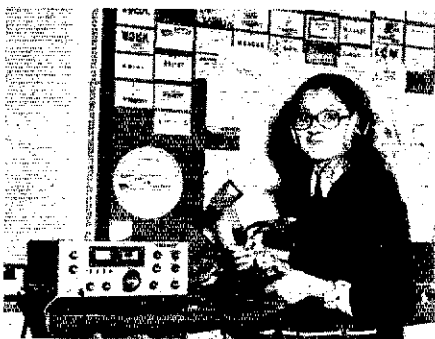
Navy Chief Frank Beldon, John Gibson and others from the Treasure Island Radio Club, K6NCG, who donated their Christmas, 1964, leave to the cold and flooded northern California areas, helping disaster-stricken victims. Vern Hajek, K6UGS, 1924 Packard St., Concord, CA 94521.

anyone with a QSL from W1BL prior to 1968. Al Blank, W1BL, 727 Pine St., Bristol, CT 06010.

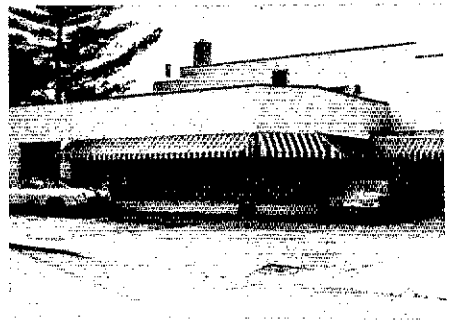
hams who are in or retired from the lithographic or photoengraving industries, to form a net. John A. Peterson, WB9RPY, 466 Dover Dr., Des Plaines, IL 60018.



Tom Westerfield, WA4ZVL, operates the portable club station at a shopping mall during the Pennroyal ARS' week-long effort to attract attention to amateur radio.



Brazilian foreign exchange student Lillian Block talks with friends and family back home via the North High and Farnsworth Junior High club station, Sheboygan, WI. Teacher Jim Burns, K9ERO, uses amateur radio to help students learn about Latin American countries. The club operates solely on contributions.



This former Edsel dealership may not look like a busy federal building, but on this site of a Civil War battle a staff of 80 persons handled about 5,000,000 license applications last year. In fact, every U.S. amateur has had contact with it at least once during the past five years. It is, of course, the FCC building in Gettysburg, PA. Known officially as the Facilities Branch of the Safety and Special Services Bureau, they also process licenses for such other radio services as aviation and marine. (WB2CHO photo)

Technical Correspondence

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

WINDMILL INTERFERENCE?

□ Windmill generation of electric power may be a mixed blessing — this is the message that the September, 1977, *Electro-Optic Systems Design* note on Professor Thomas Senior's work (at the University of Michigan) seems to carry. Professor Senior calculates that the giant (more than 100 feet in diameter) windmills planned by the Energy Research and Development Administration (ERDA, now part of the new U.S. Department of Energy) will cause significant television interference at two miles from the windmill location. This interference would be caused by variable reflections from the metal blades, and would depend on the locations of the TV station, TV receiver, windmill and probably on wind velocity.

The ERDA is to be congratulated for funding this study, for the effect has long been known. Military and civilian pilots know that "talking through the props" puts a burble (modulation) on the voice. This rumble depends on engine (and therefore propeller) speed.

The B-29 of WW II used propeller modulation of the tail-gun radar signal as the "friend or foe" identification. The propeller blade rate (number of blades passing near the radio wave per second) of the B-29 was different from the enemy propeller blade rates. If the radar echo modulation was in the B-29 blade rate range, the radar would turn on a red light and the tail gunner wasn't supposed to fire.

The effect is caused by the radio-wave reflections setting up standing waves. When the standing waves change, the received signal will change phase and strength. TV receivers may not be able to handle the changes without momentary effects on the reception.

Changing standing waves may not be undesirable in other cases. In the early days of microwave ovens (ca. 1950), Raytheon found that the standing waves in ovens tended to cook foods in peculiar patterns, part raw and part overdone. The cure was to have a fan blade rotating through part of the oven, shifting the standing waves and sweeping the cooking energy across the food.

Ham rigs have also been affected. Doug DeMaw, W1FB, speaks of his early 2-meter final having a fan within the cabinet causing reports of "unusual modulation" because of the changing standing waves (causing rapid tuning changes) in his resonant-line tank circuit.

The *Electro-Optic System Design* article suggests the ERDA cure may lie in making windmill blades of either nonconducting or absorptive material. Nonconducting materials have dielectric constants different than air, and radio waves will reflect off any differing dielectric constant material. Perhaps a fiberglass-air honeycomb material would cause little reflection, but some interference would probably be noticeable for a thousand feet or so.

Absorptive materials pose two problems — such materials (unless shaped either conical or pyramidal) tend to have a narrow-band

response. So what frequencies are to be absorbed? Frequencies which *are* absorbed will cause repetitive shadowing of receivers behind the windmill. Total absorption may cause near-total loss of signal when the blades are momentarily in the "worst position." Of course, signals *not* absorbed will experience the changing reflections.

Another subject to ponder is that local TV disruption is far from the worst possible consequence of windmill reflections or absorption. Conceivably, the communications in a microwave link could be disrupted at a critical time, with dire results. Professor Senior's suggestion that "windmills in their present form will have to be sited with great care" sounds prudent. — *David T. Geiser, WAZANU, Technical Advisor, ARRL*

OUT-OF-THIS-WORLD EXPLANATION OF LDES

□ It has been over a year since Hans Rasmussen's report in *QST* of ghost echoes on the earth-moon path. I have noted the subsequent comments by W6NWO in September, 1976, *QST*, those of K4KCK in March, 1977 and I have read the original article by Rasmussen published in *Nature* for September, 1975. [Also see two *more* articles in this issue of *QST*. — Ed.]

Rasmussen's explanation of the echoes as a result of a sun-generated cloud of ionized particles seems unlikely. Similar instances of this phenomena certainly should have been noticed by others considering the vast amount of rf that has been emanating from our planet for many years. It does not seem reasonable that such ionization would be frequency specific. While there have been other long-delayed echo reports, these have been sparse, quasi-apocryphal, and not as clear cut as Rasmussen's.

As an alternative explanation, I want to suggest the possibility, admittedly miniscule, that Rasmussen was in contact with an orbiting interplanetary probe. Professor Ronald Bracewell, in his book, *The Galactic Club*, mentions that a probe is probably the way interplanetary communications will occur. Bracewell speculates that an orbiting device would echo back TV signals. I disagree. Rather, I propose that the contact would more likely be made in just the manner Rasmussen describes — by cw signals in that frequency range.

An extraterrestrial group probably will have no direct evidence from anywhere of technological activity of the radio level (as we have none) and hence, they would have to probe many points. Economics would dictate simple, energy-conserving units. Cw fills this requirement. First, they would reason that any society reaching radio skills would quickly fill the spectrum and would be using narrow-band systems themselves. Second, cw is more of a two-way communications mode than TV. Anyone using it would probably be listening for a reply, thereby enhancing the chances for

discovery of the probe. Third, a cw signal could be reported back to base at low speed, using a very narrow bandwidth to reduce noise and to minimize spectrum coverage for the receiving scanners.

The 1296-MHz frequency is well within the bandwidth requirements for a small probe using 1420 MHz, the hydrogen natural frequency, as the center. This frequency is in the low-noise band and also would have the bonus of using a 1420-MHz sensor to search out likely star systems for life. The frequency range would also allow employment of small, yet broadband, high-gain steerable antennas that could track any likely signal, much in the manner that Rasmussen's signal seemed to be followed.

I recognize that the odds against there being such a probe are astronomical (no pun intended) but this seems to be just the sort of project that radio amateurs could attempt. Such an endeavor would be too chimeric for professional scientists and their funding managers. Therefore, if someone would compute a family of possible orbits from Rasmussen's data, EME amateurs could conduct an organized search for similar "echoes."

A probe would probably be programmed to do nothing but repeat signals until it was sure it was recognized. This could require identical interrogations from widely separated points or at regular intervals to denote orbital acquisition by the interrogators.

Some coordination of this effort would be required. If anyone is interested, I will volunteer to assist. — *Forrest O. Burke, K4SK, 353 Coral Dr., Cape Canaveral, FL 32920*

MOSFET GRID DIPPER

□ A friend of mine sent me a copy of my article, "A Dual-Gate MOSFET Dip Meter" (*QST* for January, 1977); There are still problems in getting printed matter here in Lebanon. I would like to make one elaboration on the presentation as it appeared in *QST*.

My dipper operates according to a heretofore unused principle; the dipping depends on the S shape of the transconductance curve which gives rise to a nonlinear relationship between voltage and current of the tank circuit. This effect is known since B. van der Pol derived, in 1920, his famous equation, but no device existed to fit the theory. I have been waiting for the MOSFET to be invented and then several more years before I could get one here. When tried, the dual-gate MOSFET performed exactly as the theory predicted.

With this FET the Q of the tank circuit is not affected and the sensitivity to dipping may be very large. I believe that the present circuit is fundamentally superior to any dip meter produced thus far. That this is not mentioned in the article does not really matter very much because, if the dipper is really good, this will become apparent anyway. I am surely happy and proud to have my circuit in the journal. — *Dr. Frans Bruin, Observatory, American University of Beirut, Beirut, Lebanon*

WIND POWER, MINNESOTA-STYLE

□ W0MCN's fine article on wind power (*QST* for July, 1977) inspired me to jot a few notes about my own experiences with harnessing the wind. My goal was a functional unit, simply constructed, with easily obtainable parts. The unit pictured is the result of much trial and error, and could be duplicated for less than a hundred dollars.

The bearing and blade-mount assembly is the front spindle, hub and wheel from an automobile. The ratio between wheel and alternator is about 4.7:1. I devised a simple, but effective horizontal and vertical pivoting point; the main assembly "jackknives" vertically when gusts occur, by simple mechanical balance. The unit rides on the wind when the output reaches around 30 amperes.

The alternator is a "surplus" unit (available from various surplus outlets) and is rated at 60 A, 28 V. It is watertight, and produces 12 V and up in moderate winds (low RPM). I charge two 12-V auto batteries in parallel.

The blades measure 1 × 4 feet (0.3 × 1.2 m) and are made of 1/4-inch plywood with an airfoil stapled to the wood. The airfoil is made of aluminum flashing and the shape was just a guess but is much more efficient than a flat blade.

Early experiments with simple propellers revealed awesome tip speeds and a tendency to self-destruct. The multiblade unit is much more stable and less prone to vibration, which is important if one intends to mount the unit "in the open" for most constant winds.

In closing, I would like to say that I consider commercial power to be the cheapest commodity I pay for. I doubt very much that I will ever be capable of producing all my own electric power. It is fun to fire up my Drake TR-4

and tell contacts that I'm running it from wind power, though! — *Bud Graham, WA0WXL, 194 Poplar Rd., Duluth, MN 55804*

SIMPLIFIED ANALYSIS OF RF CIRCUITS

□ In the article, "Designing Solid-State RF Power Circuits" (*QST* for August, 1977) the author uses a very complex method of analyzing an rf circuit. Smith Charts, conversion to admittance, susceptance and normalized impedance can be very confusing to the newcomer [not to mention many old-timers! — Ed.].

A simpler approach is to replace the impedance of the inductor by $j\omega L$, and that of the capacitor by $1/j\omega C$. Then the circuit can be solved by means of simple algebra, where all impedances are treated as though they were resistors. For the problem presented in Fig. 10 we write the equation $(10 + j\omega L) \times (1/j\omega C) = 50$, which states that the series combination of the load and inductor in parallel with the capacitor is to be the input impedance.

Using $j^2 = -1$ and ordinary algebra gives:

$$C = (25\omega)^{-1}; L = 20\omega^{-1} \text{ or}$$

$$X_C = 25 \text{ and } X_L = 20.$$

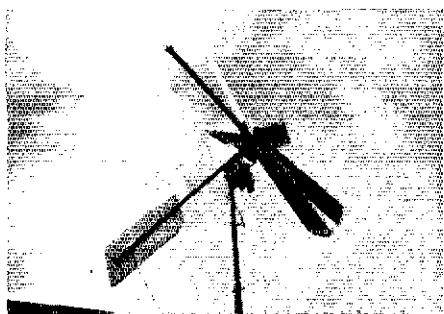
This seems to be considerably easier and cheaper than using the Smith Chart method. — *Louis C. Graue, K8TT, 624 Campbell Hill Rd., Bowling Green, OH 43402*

□ The recent *QST* article, "Designing Solid-State RF Power Circuits," brought to mind two simple algorithms for converting impedances to admittances and vice-versa. These can be used on any calculator that has polar/rectangular conversion capabilities. Scientific or engineering notation is necessary in the calculator since typical admittances are much smaller than unity.

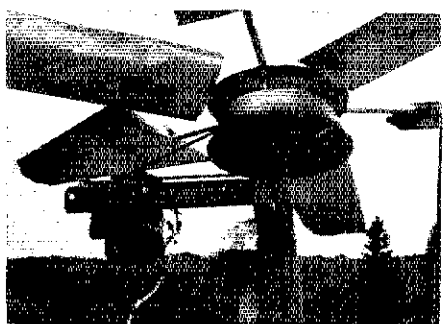
The theory behind the two conversions is very simple. A complex impedance ($Z = R + jX$) can be represented as a vector ($Z = |Z| \angle \theta$). To convert an impedance vector to an admittance vector, or vice versa, the sign of the angle is changed and the reciprocal of the magnitude is taken. Once the desired vector is obtained, it is converted back to rectangular form. This is basically what is done in the standard formula. But the polar/rectangular conversion done by the calculator reduces the amount of button pushing when using the vector approach, particularly when the circuit has several series or parallel elements.

Two examples are shown in Tables 1 and 2, with calculation key sequences listed. The calculators used were Hewlett-Packard models HP-21 and HP-25, so other types may require slight modification if reverse Polish notation (RPN) and memory stacks are not used by the machine. From the examples it can be seen that converting between parallel and series equivalents can give some additional insight into design problems. Looking at the series circuit ($Z = 25 - j25 \Omega$) as an antenna impedance, we might be tempted to add a series inductor to cancel out the capacitive reactance, and then add a transformation network to convert the resistance from 25 ohms to 50 ohms to match a feed line. If the parallel equivalent is looked at, you see at once that the parallel resistive component is 50 ohms; $1/0.02 \text{ mho} = 50 \text{ ohms}$. To match this load to the 50-ohm coaxial line, only a parallel inductor is required to cancel the capacitive susceptance.

These algorithms have been used for designing antenna-matching networks and rf-amplifier impedance-matching problems, and have proved to be very helpful. — *Mal Crawford, K1MC, 19 Ellison Rd., Lexington, MA 02173*



The WA0WXL fan tips up in a strong wind to prevent damage to the structure.



Close-up view of the WA0WXL wind power machine, showing the vertical "jackknife" pivot point.

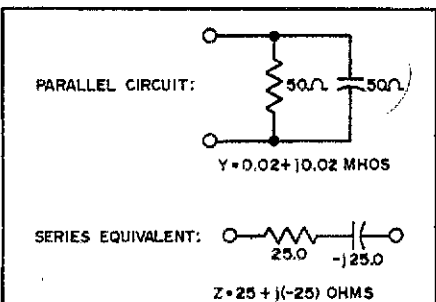


Table 1
Converting Susceptance to Reactance

Operation	Keystrokes
00 Enter Susceptance	20 [EEX] [CHS] [3]
01	[Enter]
02 Enter Conductance	20 [EEX] [CHS] [3]
03 Convert to Polar Form	[P]
04 Reciprocal of Magnitude	[1/X]
06	[CHS]
07	[X\neqY]
08 Convert to Rectangular Form	[R]
09 Read Resistance	(display) 25.0
10	[X\neqY]
11 Read Reactance	(display) -25.0

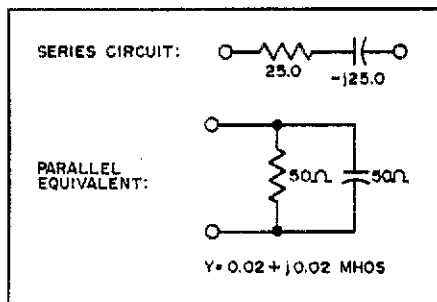


Table 2
Converting Reactance to Susceptance

Operation	Keystrokes
00 Enter Reactance	25 [CHS]
01	[Enter]
02 Enter Resistance	25.0
03 Convert to Polar Form	[P]
04 Reciprocal of Magnitude	[1/X]
05 Change Sign of Angle	[X\neqY]
06	[CHS]
07	[X\neqY]
08 Convert to Rectangular Form	[R]
09 Read Conductance	(display) 20 -3
10	[X\neqY]
11 Read Susceptance	(display) 20 -3

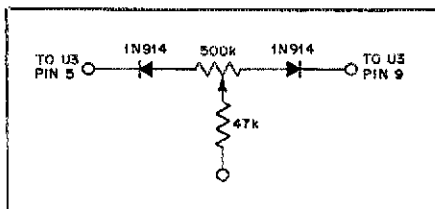
Hints and Kinks

A WEIGHT CONTROL FOR THE ACCU-KEYER

The WB4VVF Accu-Keyer (*QST* for August, 1973) and The Accu-Memory (*QST* for August, 1975) are without doubt the most-built construction projects ever to appear in *QST*. The Accu-Keyer is a first-class device, yet economical to build. It provides sending that contains a precise dash-to-dot length ratio of 3:1 suggested by Samuel Morse many years ago.

Nevertheless, many seasoned operators have found the apparently unalterable 3:1 ratio, as set up by the keyer logic, a disadvantage. For instance, a T may be mistaken for an E or part of a letter preceding it. Miscopying a 4 as a 5 has driven many a Southerner up a wall during cw contests. A weighting larger than 3:1 accentuates the difference between dots and dashes, alleviating such problems at high speeds and under poor conditions.

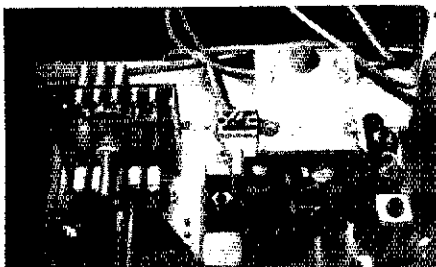
Changing the weighting at the keyer may also compensate for unwanted weighting changes caused by transmitter operation or a keyed antenna relay. The change is accomplished by altering the clock speed slightly by different amounts during the dot and dash intervals. This is done by feeding the Accu-Keyer dot-present and dash-present lines back to the clock-speed-determining components through appropriate diode steering. The keyer logic continues to count out what it perceives to be a perfect 3:1 ratio, but is fooled by having the counting rate altered by adjustment of the clock frequency. Although the circuit shown is for the Accu-Keyer, the principle is applicable to most electronic keyers which use a single clock. A weight control may also be added to the Accu-Memory. — *Hal Kennedy, N4GG*



A weight control addition for the Accu-Keyer. References are to the original Accu-Keyer schematic diagram.

A TRIMMER CAPACITOR FOR THE DRAKE 4 SERIES

Some owners of the Drake R-4A and R-4B receivers have experienced difficulty keeping the transmitter and receiver on the same frequency while in the transceive mode. Drift of the receiver carrier oscillator is responsible. Separate-frequency operation easily leads to



Alignment of either the Drake R-4A or R-4B receiver is simplified by means of this small variable capacitor.

signal leapfrogging with each operator trying to zero beat the other station.

Aligning the Drake receiver is rather awkward. I simplified the procedure by installing a small variable capacitor (1-10 pF) in parallel with C61. The trimmer, visible in the photograph, is soldered to the VFO cabinet by means of one leg. The other leg is connected to a lead that passes through a nearby grommet and terminates at the ground side of C61. The trimmer may be reached by a small screwdriver inserted through a hole in the cabinet.

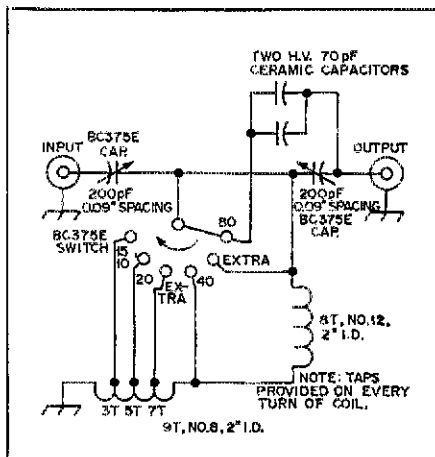
Place the receiver and transmitter in the transceive mode with the function switch on. Depress the microphone button. Adjust the trimmer so that the birdies become a single tone, indicating that the two oscillators (transmitter and receiver) are zero beat. — *Stan Dicks, WB8HAT*

AN INEXPENSIVE ANTENNA TUNER

Roller inductors and differential capacitors can be quite costly. A suggestion in one of Walter Maxwell's *QST* articles encouraged the construction of the tuner illustrated in the circuit diagram shown on these pages. It eliminates the shunt part of the differential capacitor used in *The Radio Amateur's Handbook* Universal Transmatch, and uses junkbox parts from an old BC-375E tuner and two homemade coils. The unit has been used with 2 kW PEP ssb and 1 kW cw with no voltage breakdown.

Although only six switch positions are available, extra coil taps permit changes to enable matching a particular antenna system to a transmitter. At this station, the six taps used have permitted the matching of several different types of antenna systems with SWR values varying from 1.0 to not over 1.5. The most regularly used antenna is a 107-foot dipole, fed with 30 feet of 300-ohm, TV line. A 4:1 balun at the bottom of this line permits a

short length of coaxial cable to be brought into the shack. Lengths of RG-8/U up to 50 feet have been tried with satisfactory results. — *William L. North, W4BX*



Variable capacitors and a band switch from a military surplus BC-375E tuner are used in this inexpensive antenna-matching system.

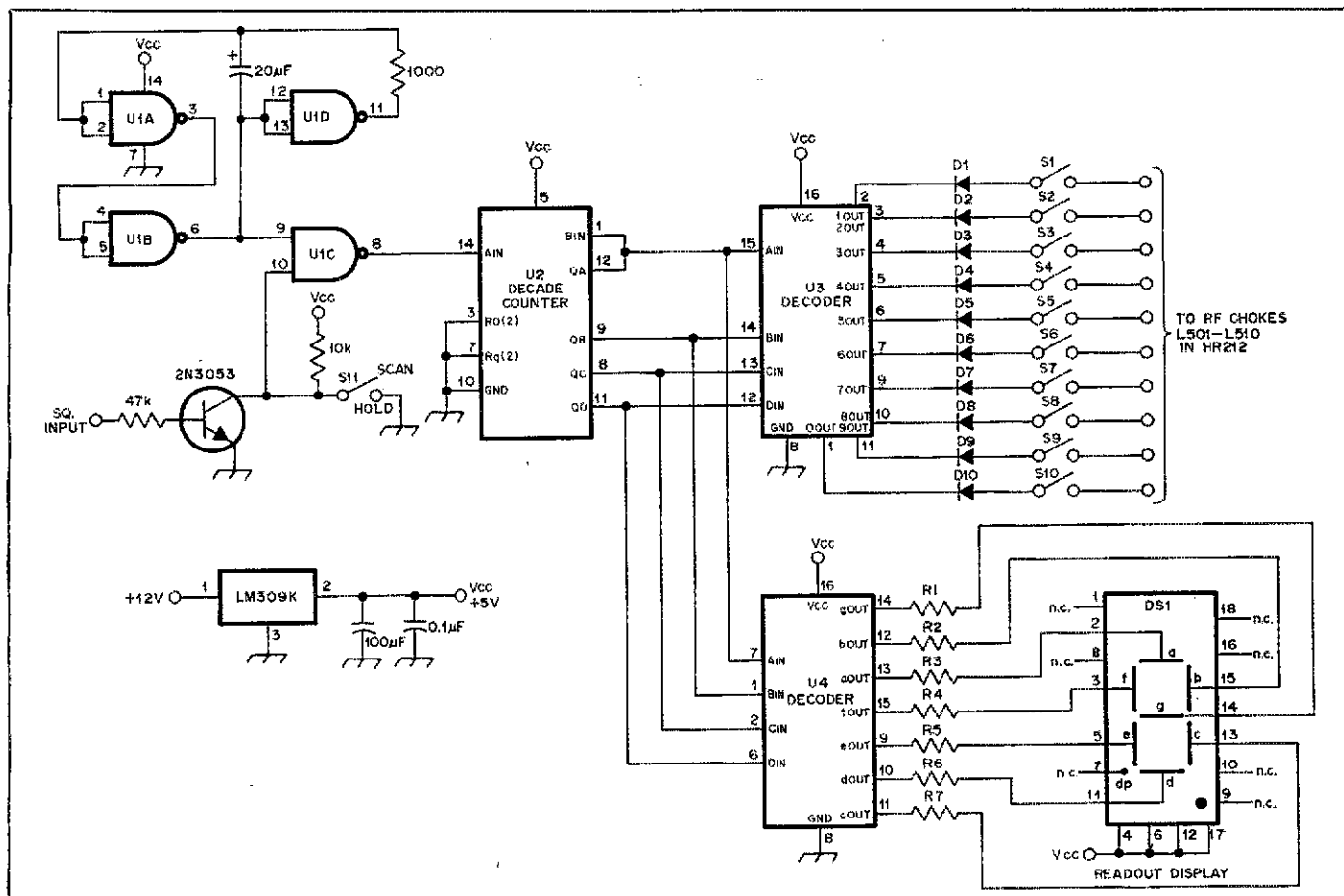
MICROPHONES AND THE TS-520

This information is primarily for amateurs who are not fully satisfied with microphone performance in conjunction with their TS-520 transceiver. My Turner +3 preamplified microphone gives sufficient gain but, like some other microphones, it tends to provide more low-frequency response than high.

A simple modification to increase the high-frequency response is to insert a 0.001- μ F capacitor in series with the hot lead from the microphone. If an even higher frequency response is desired, the series capacitance should be decreased in 100-pF steps until a desirable response is reached. — *Edward G. Harris, WA2INE*

FM BCI ON THE MFJ CW FILTER

My MFJ CWF-2 cw filter picked up fm-broadcast interference from a station less than a half-mile away, even though shielded cable was connected between the filter and the receiver. The problem ended after I connected a lead from the ground terminal on the back of the filter to the terminal strip mounting screw, providing a direct chassis ground. With the original wiring, the filter ground terminal was connected to chassis ground by way of filter wiring. Now everything is fine. — *John E. McKeen, W1TN/W1BDK*



Circuit for a 10-channel scanner designed for use with the Regency HR-212, 2-meter transceiver. Resistors are 1/4 watt.
 D1-D10 incl. — Silicon switching diodes, type 1N4154.
 DS1 — Seven-segment readout display, Litronix type DL-747 or Radio Shack no. 276-056.
 R1-R7 incl. — 220 ohm.
 S1-S10 incl. — Spst switch.
 U1 — Quad 2-input positive NAND gate, TTL type 7400.
 U2 — Decade counter, TTL type 7490.
 U3 — BCD-to-decimal decoder, TTL type 7445.
 U4 — BCD-to-seven segment decoder, TTL type 7446.

10-CHANNEL SCANNER FOR THE REGENCY HR-212

Looking for a scanner for the Regency HR-212 2-meter transceiver? Would you like one that not only scans 10 channels but also has an IC-regulated power supply, large LED seven-segment readout, and features automatic stop, start, and stop of the scanner? Then consider this unit which may be built in a Radio Shack utility cabinet (no. 270-254). All parts should be readily available from local radio supply stores. The circuit diagram shows the relatively simple design.

These few construction points should be mentioned. To use the automatic-stop-and-start feature, unsolder the wires on the channel-12 selector switch of the HR-212. Tape these wires because they will not be used. Tie all the grounds, except the ones for the LM309K, the 100-µF capacitor and the 0.1-µF capacitor, to a terminal that is insulated from the chassis. Connect a wire from the channel-12 selector switch to the terminal to which the grounds are tied. The other three ground leads are connected to the chassis of the HR-212.

With this arrangement, the 5-volt power supply runs continuously. When one switches to channel 12, the ICs are grounded and the scanner starts operation. When switched to another channel, the scanner stops.

Diodes should be connected in series in the

Pin Connection, Top View

Pin	Function
1	No Pin
2	Cathode — a
3	Cathode — f
4	Anode*
5	Cathode — e
6	Anode*
7	Cathode — dp
8	No Pin
9	No Pin
10	No Pin
11	Cathode — d
12	Anode*
13	Cathode — c
14	Cathode — g
15	Cathode — b
16	No Pin
17	Anode*
18	No Pin

*Common redundant anodes

leads to the HR-212. These prevent the voltages of the HR-212 from reaching the scanner circuit. The squelch voltage is taken from the white jumper located near Q105 and C137 in the HR-212. These two components are on the i-f board. A connection may be made to the

on/off switch for the +12 volts.

Finally, when connecting the 10 wires leading to the chokes in the HR-212, one should make sure that they are connected to the sides of the chokes wired to the channel switch. The 10 spst switches in series with the oscillators are for switching out the channel that one does not wish to monitor. — *Richard A. Little, K9EEH*

2-METER MOBILE ANTENNAS

Fm enthusiasts interested in inexpensive 2-meter mobile antennas should note that Sears sells both the magnetic-mount type and one for trunk lid attachment. Both are in the \$15 price class and are available through the catalog service. — *Neil F. Dunn, W1WV*

NEW FEET FOR THE HAM-KEY HK-1

I was somewhat disgruntled when my new Ham-Key Model HK-1 would slide around the operating desk when I became tired and a bit careless. My remedy was to replace the three round feet with four self-adhesive square feet such as those used on the Heath HW-8. The increase in surface area of the feet ended the wandering. — *John S. Jolly, WA7NWL*

Tracking the Next OSCAR

Part 2: Be the first kid on your block to tune in the next amateur satellite. It's easy with these simple tracking aids.

By Charles J. Harris, * WB2CHO

If you're involved in space communications via OSCAR, you're in luck! If not, there's no better time to begin than now. With one amateur spacecraft going strong and two others in the works, there will soon be several birds to choose from.

AMSAT-OSCAR 8 is slated to roar into orbit March 5. And the first of the Russian RS series of amateur satellites will join it soon thereafter. This article will show how to find A-O 8 and RS.

You can be among the very first to hear these new satellites. The orbital information and tracking aids which follow will help open the door to the First 100 Orbits Club. All you need is equipment to receive 435.1 MHz and a good pair of ears.

The same simple tracking aids that thousands of satellite enthusiasts now use to find OSCAR 7 will tune you into OSCAR 8 and the RS satellites. A few easy modifications will transform your ARRL OSCARLOCATOR into an orbit predictor for the new spacecraft.^{1,2}

Different Orbit

The present OSCARLOCATOR accurately predicts the location of both AMSAT-OSCAR 6 and 7, as well as that of certain weather satellites. But OSCAR 8 (called A-O D prior to launch) and the RS are targeted for substantially different orbits. These new satellites revolve around the earth at an altitude of about 560 miles (900 km), quite a bit lower than the 910-mile (1500-km) orbit of the two previous OSCARs. This lower orbit will affect the orbital speed, period (time of one revolution around the earth), maximum communications range and access time, and the frequency shift caused by the Doppler effect.

Why is OSCAR 8 in a lower orbit? NASA launches the OSCAR satellites as "hitchhikers" on regular NASA flights. The orbit of the primary payload determines OSCAR's orbit. In turn, the altitude affects the orbital speed and period.

The First 100 Orbits Club

How often do you get a chance to be first in anything? Here's an opportunity for any amateur to be among the first to receive OSCAR 8. The ARRL is offering membership in the First 100 Orbits Club to anyone reporting OSCAR 8 telemetry from any of its first 100 orbits. Send your reports to ARRL hq. on the special reporting sheets available from Hq. for a business-sized s.a.s.e.

You'll need to know launch and equator-crossing times to track OSCAR 8 properly. You can get this information from the live W1AW broadcast and from W1AW bulletins during the first days of operation.

If you haven't listened to the amateur

satellites before, try copying the telemetry from OSCAR 7, Mode A. QST carries the tracking data every month. Once you get some practice on OSCAR 7, you only need the OSCARLOCATOR and the EQX data to find OSCAR 8. EQX is *equator crossing information*, the time (UTC) and place (degrees west longitude) the satellite passes over the equator moving from south to north.

We cannot publish EQX data for OSCAR 8 until the satellite completes the first few months of what we hope will be a long and successful communications career. Meanwhile, W1AW will continue to provide EQX information.

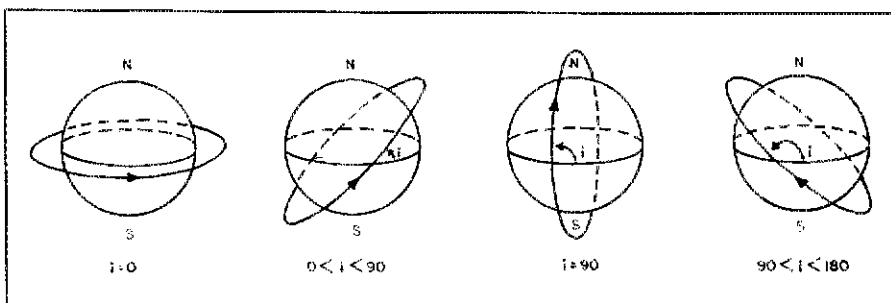


Fig. 1 — Angles of inclination.

OSCAR 8 races around the earth at about 17,000 miles per hour (7550 meters per second). By comparison, the higher orbit of OSCAR 7 dictates an orbital speed of 16,000 miles per hour (7100 meters per second). The increased orbital speed and lower altitude of OSCAR 8 lead to a shorter satellite period. The new OSCAR circles the earth once every 103 minutes, about 12 minutes faster than A-O 7. The shorter period in turn means there are more orbits per day; 14 for OSCAR 8, compared to 12-1/2 for its predecessor.

Gain Orbits, Lose Range

The lower altitude of the new satellite directly affects every user, as the maximum range of communications is re-

duced. You can make contacts as far away as 4000 miles (6400 km) with A-O 8. Fortunately, A-O 7, with its 4900-mile (7900-km) maximum range, continues to provide plenty of DX opportunities to dedicated satellite enthusiasts. And the first of the AMSAT-Phase III satellites promises 12,000-mile DX next year.¹

OSCAR 8's orbit also reduces the maximum access time during each orbit. The satellite will be within range of a given ground station for no more than 17 minutes per orbit (compared with 22 minutes for OSCAR 7).

The greater number of orbits each day helps compensate for this reduced time, but all told there will be less operating time available through OSCAR 8 than through its predecessor. Rapid, efficient

*Club and Training Manager, ARRL

¹Footnotes and references appear on page 40.

contacts, and a minimum of time-consuming strings of dits will be the order of the day on OSCAR 8.

More Shift, Less Tilt

The faster orbital speed of the lower or-

bit will also increase Doppler shift, the apparent shift in frequency caused by the relative motion between the spacecraft and the ground station. The higher the relative speed, the greater the frequency displacement. You will hear a shift of up to 6 kHz on 10 meters as OSCAR 8 passes overhead.

A final difference between the orbit of OSCAR 8 and that of OSCAR 7 is the inclination. This is the angle between the track of the satellite and the equator, as shown in Fig. 1. The smaller inclination (99° compared to 102°) forces OSCAR 8 closer to the poles than OSCAR 7. This makes a minimal difference in the satellite track, but is of interest in the RS series, as we shall shortly see.

Tracking the New Bird

We can translate these theoretical orbital parameters into concrete tracking data with the aid of a few equations.^{4,5} We have done all the math and drawn the track of the satellite (Fig. 2). If you own an ARRL OSCARLOCATOR, you can trace the track of the new satellite directly onto its acetate overlay. When you compare the new track with the previous one for OSCAR 7, you will see that the track of OSCAR 8 passes closer to the North Pole (less inclination) and has times spaced farther apart, due to the greater orbital speed.

You can compensate for the shorter range of OSCAR 8 by using the smaller range circle provided in Fig. 3. This represents about 80 percent of the OSCAR 7-sized range circle.

You must make one final change in your OSCARLOCATOR before it is ready to find OSCAR 8. The point at which the new satellite passes over the equator on the next orbit is 25.7° to the west. The earth is turning under the

satellite, and the shorter period means the earth turns less under an OSCAR 8 orbit than under the longer OSCAR 7 orbit. With a compass and protractor, make equator crossing marks 25.7° apart, working to the west, all around the equator. Your last mark should be very close to the first one, as OSCAR 8 makes (almost!) 14 complete orbits each day.

With these simple modifications completed, you'll have a reliable tracking aid for both active AMSAT satellites. But if you prefer to keep the two satellites separate, you may purchase a new OSCARLOCATOR, complete with map, OSCAR 8 overlay and range circle, for \$1 postpaid from ARRL hq.

Tracking the RS Satellites

The proposed Russian series of amateur satellites will be in an orbit similar to that of OSCAR 8. The orbital height is nearly the same (590 miles, 950 km). This gives an orbital speed, period, Doppler shift, communications range and progression essentially identical to those of OSCAR 8. One big difference between the orbits is the inclination. The RS satellites will have an inclination of 82° , much less than the 99° of OSCAR 8. Look at Fig. 1 again. The smaller inclination of RS means that the satellite passes to the right of the North Pole, as viewed on the OSCARLOCATOR. The track of RS is shown as a dotted line on Fig. 2 and on the new OSCAR 8/RS OSCARLOCATOR. It is practically a straight line!

The Big IF

One big assumption underlies all the foregoing: Everything will go as planned. Murphy seems to be unusually active these days, especially in U.S. space shots. Information on the RS series is usually second-

Fig. 2 — The tracks of OSCAR 8 (solid line) and RS (dashed line) on the OSCARLOCATOR map.

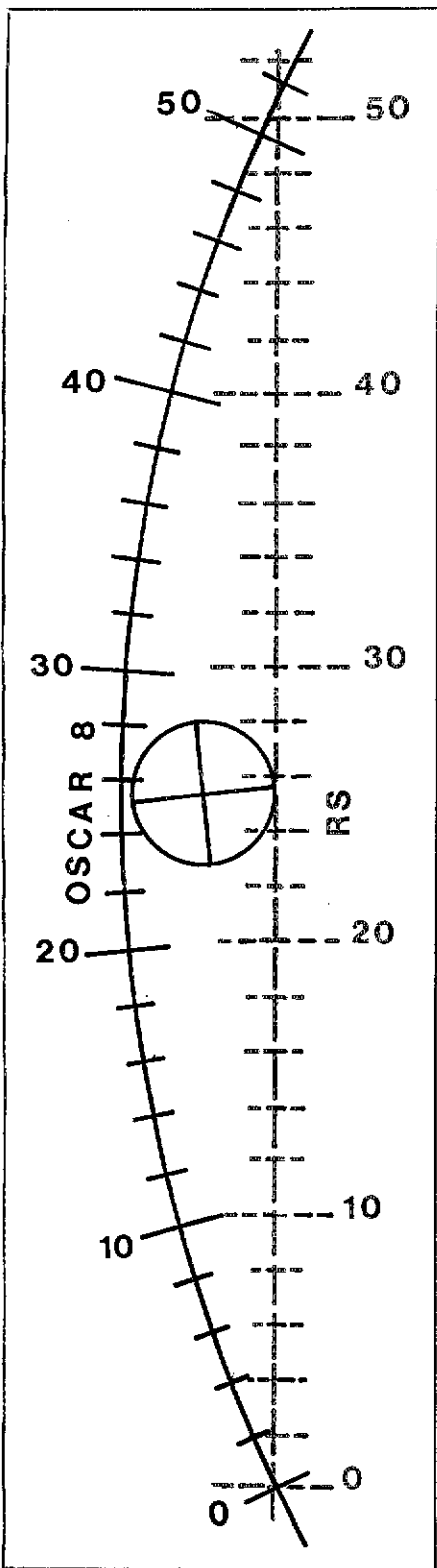
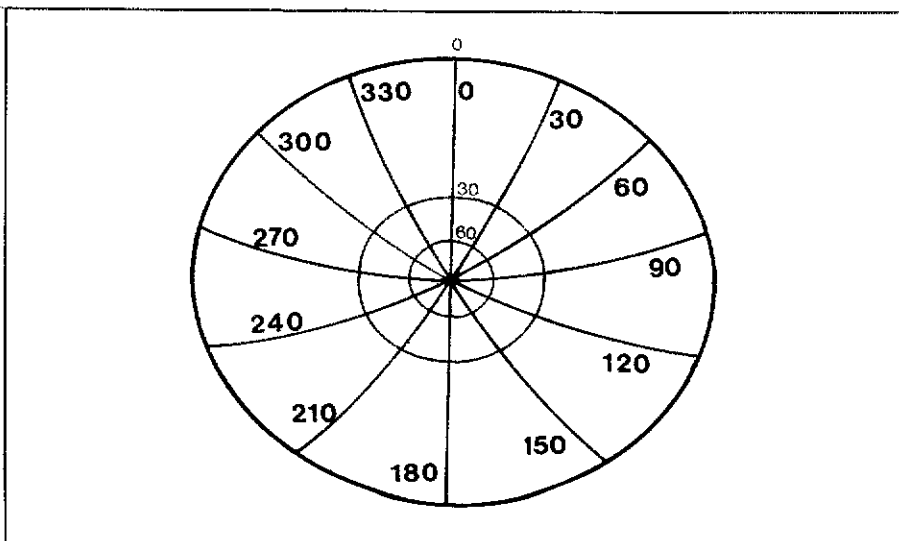


Fig. 3 — The range circle for these lower satellites is about 80 percent of the size of the OSCAR 7 circle.



and third-hand, and very incomplete. Fortunately, in most space shots things either go pretty much as planned or they don't go at all. Only occasionally does a satellite end up in an orbit drastically different from the one predicted, as did OSCAR 4. If something goes wrong, seriously wrong, you may have to go back to the Thompson article and do your own tracking plots, or wait until the next issue of *QST*. Hopefully, both OSCAR 8 and the first RS will fly as planned, and you will be among the first to copy signals from the new bird.

5, 4, 3, 2, 1 Ignition

OSCAR 8 should lift off its launch pad about 9:50 A.M. PST on March 5. The launch "window" (the time when the satellite can rocket into the correct orbit) lasts for four days. If technical or other problems postpone the liftoff, it will probably go off at about the same time on one of the next few days (March 6 through 8).

You can share the excitement of the countdown, right from your own radio shack. WIAW will be on the air throughout the day, and will relay countdown, launch and initial tracking infor-


mation as it happens. The ARRL headquarters station will come on the air at 1700 UTC on 14290 kHz on the 5th. If the rocket cannot go as scheduled, the regular WIAW bulletins (see "Operating News," page 85) will carry complete details on when to listen. The ARRL invites anyone listening to send a report of the reception to ARRL hq. for a special "First Day of OSCAR 8" QSL card.

About 20 minutes after liftoff, OSCAR 8 will pass the equator and enter earth orbit. The satellite will start transmitting on Mode J immediately. It will remain in Mode J for about the first week of operation, since its 10-meter Mode A antenna cannot be extended from the spacecraft until it stops spinning.

Be Prepared

Last month's article on OSCAR mentioned some simple ways of receiving 435 MHz. You can test your 435-MHz receiving system by listening for the 435.1-MHz beacon on OSCAR 7. Listen to telemetry channel 6B when the satellite is in Mode A. If 6B reads anything but zero, the

beacon is on. Now listen for the beacon itself. It will be about the same signal strength as the new satellite. If you can copy the 435.1-MHz beacon without difficulty, you should be all set for OSCAR 8! You might also try listening to the P76-5 satellite (see related story on page 14, this issue).

OSCAR 8 will be in the sky very soon. Will you be ready? 

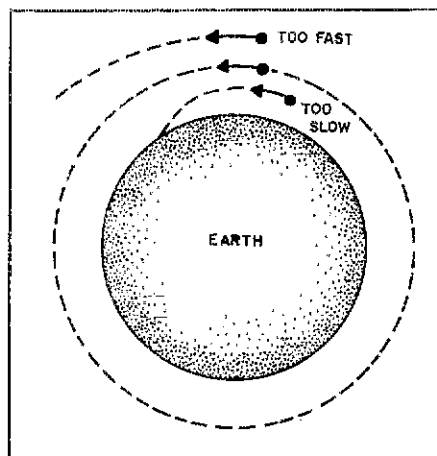
Footnotes

- ¹Kleinman, *Getting to Know OSCAR — from the Ground Up*, p. 26.
- ²Ahluquist, "Update Your OSCARLOCATOR," *QST* for October, 1977, p. 47.
- ³Kleinman, *op cit*, pp. 30-37.
- ⁴Thompson, "A General Technique for Satellite Tracking," *QST* for November, 1975, p. 29.
- ⁵Danielson, "Australis-OSCAR 5," *QST* for October, 1969, pp. 54-56.

References

- The Radio Amateur's Handbook*, 54th edition, ARRL, 1977.
- ARRL Ham Radio Operating Guide*, 1976.
- Getting to Know OSCAR — from the Ground Up*, ARRL, 1977.
- Thompson, "A General Technique for Satellite Tracking," *QST* for November, 1975.

Fig. 4 — At each satellite altitude there is one speed which gives a stable orbit.



Why Does It Stay Up?

OSCAR 8 has no internal propulsion system. Why doesn't it crash to earth after its release from the launch rocket? Actually, it does fall, just as the path of a thrown baseball curves downward due to the gravitational attraction of the earth. The satellite is moving forward so fast that as it does fall toward the earth, it passes right by. It misses the earth completely!

Now it is still up in the air, and it continues to fall toward the earth. Because there is no air resistance to slow the spacecraft, it still moves forward at about the initial speed. It will continue to miss the earth as it falls. As long as the spacecraft moves forward, it will miss the earth and stay in orbit.

This same balance between the satellite falling and its forward speed determines the relationship between the altitude and period of the satellite. Any object in space must travel at precisely the correct speed to remain in a stable orbit. If the satellite is moving too rapidly, it will move forward faster than it falls toward the earth, and leave the orbit for outer space. If it moves too slowly, it will fall faster than its forward progress, and land in

someone's backyard. (Actually, it would burn up in the atmosphere long before it hits the ground.)

There is a given orbital speed for every height which results in a stable orbit. The higher the orbit, the slower the spacecraft has to move to keep "missing" the earth as it falls. The orbital height fixes the speed, and thus also the period. The lower the orbit, the faster the speed, and the shorter the period.

When John Glenn became the first American in orbit, he circled the globe every 90 minutes, at an altitude of about 100 miles. The moon, at an altitude of about 250,000 miles, circles the earth every 28 days. OSCAR 6 and 7 are between these extremes, with 910-mile altitudes and periods of about 115 minutes.

This same phenomenon explains why there is only one possible height for "geosynchronous" satellites, ones that stay over the same spot on the earth's surface at all times. These satellites have a period of exactly 24 hours. Only at an altitude of about 23,000 miles, and at the corresponding orbital speed will the spacecraft remain stationary to an observer on earth.

Strays

QST congratulates . . .

□ Morris C. Johnson, WA4AKU, named Georgia's 1977 Amateur of the Year at the Georgia Single Sideband Association's annual meeting.

□ Warren Weldon, W5DFU, who has received a letter of commendation from a staff assistant to President Carter for designing and building a home ATV station that provides early storm warning in-

formation to the National Weather Service at Tulsa, OK.

□ Ruth Phillips, K3AGR, new president of Metrovision, the Washington, DC, area ATV group.

□ Charles E. Eagleton, WA2MWT, honored by the borough of Ramsey, NJ, for 25 years of c.d. and RACES work.

□ Donald H. Swift, WB2RJX, elected governor of Rotary district 709, Rotary International.

□ Thomas V. Corrigan, WA2GPB, elected supervisor of the Town of Bethlehem, NY.



OSCAR 6 may have gone silent in the skies, but it's alive and well in western Pennsylvania, says W3EXQ. He came across this sign near Spaces Corner, on Rtes. 28/66.

Blackout Spawns Amateur/Police Emergency Network

When the police come to you for help, you know you're doing something right. That's what happened in New York City following last summer's blackout, and a new chapter of amateur radio public service will be the result.

By Joel P. Kleinman, * WA1ZUY

They didn't realize it at the time, but the hundreds of amateurs who provided assistance to the hard-pressed New York City Police during last summer's blackout began a chain reaction that could spread nationwide.

As reported in *QST* for October and November,¹ area hams supplied emergency communications and in some cases transportation to the police, whose own communications had become hopelessly overburdened. Emergency nets were set up on several area repeaters, while hundreds of handhelds and battery-powered rigs relayed urgent messages between the streets and neighborhood police precincts.

It wasn't long after power had been restored that Police Commissioner Michael Codd personally commended the amateurs who took it upon themselves to help out. The next step was obvious — set up a permanent network of volunteer amateurs who could provide communications to the police during future emergencies. If an unorganized group of amateurs could accomplish so much, the reasoning went, then just think how effective they could be when brought together in a formal network.

The result is the impending birth of the Civilian Amateur Radio Patrol (CARP), a group of volunteers who will serve as the giant city's eyes and ears when another crisis strikes. At a recent preliminary meeting, three New York amateurs who served their city during the blackout, and the NYPD's coordinator of civilian volunteer programs, set the wheels in motion.



A first lesson in vhf communications for NYPD Sgt. Ray Staehs, who is in charge of the program bringing volunteer radio amateurs into the Department's emergency network. Bottom row, from left: Wally Shapiro, N2WS, Sgt. Raymond Staehs and Mel Teisch, WB2IDJ. Top row: Officer John Powers, Citibank's Sal Vella and Dave Minott, WA2EXP.

"We Need You"

Police Sgt. Raymond Staehs could have been speaking for the city's 8,000,000 residents when he told the three hams, "We need you, especially during disasters. Without communications, the city is dead."

In turn, Dave Minott, WA2EXP, Mel Teisch, WB2IDJ and Wally Shapiro, N2WS, agreed to help get the new program off the ground.

Also at the meeting were Sgt. Staehs'

assistant, Officer John Powers, and the community affairs officer of Citibank Corporation, which is interested in funding the project.

To take some of the mystery out of amateur communications, Dave, Wally and Mel explained how an emergency is handled over a repeater. "If I saw someone who was shot," Dave said, "I'd say the single word 'break' and everyone would know there was an emergency. All other traffic ceases until 911 (the direct

*Features Editor, *QST*

¹"Amateurs Respond to NYC Blackout," *QST*, October, 1977, p. 95; "Lights Out," *QST*, November, 1977, p. 76.

NAME _____ ADDRESS _____ HT. _____ WT. _____ AGE _____ _____ SIGNATURE OF BEARER _____ THIS CARD IS FOR IDENTIFICATION PURPOSES ONLY AND DOES NOT ENTITLE THE BEARER TO ANY SPECIAL PRIVILEGES. EXPIRES DEC. 31, 1980	<p>The person described on the reverse side of this card is a Civilian Volunteer performing patrol in cooperation with the New York City Police Department.</p> _____ COMMANDING OFFICER PCT. _____ DEPUTY COMMISSIONER COMMUNITY AFFAIRS Misc. 735 Rev. 6-76
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Members of the Civilian amateur Radio Patrol will carry distinctive identification cards that will allow them special access during emergencies. To show its appreciation, the city plans to honor outstanding members of the organization at an annual ceremony. Ongoing publicity for group and individual participation will be another benefit to the amateurs involved and the Amateur Radio Service.

phone line to the police) is reached.”

To show what he meant, Dave switched on the handheld, tuned to WR2ACD atop the Chrysler Building, and pointed out that it could provide reliable, city-wide communications while using emergency power. All New York-area repeaters will be part of the program, forming a sophisticated network among handhelds, mobile rigs and base stations throughout the area.

As CARP is envisioned, a few hundred amateurs from all parts of the city will serve during emergencies under the supervision of police officers. Amateurs accepted into the program will be responsible for helping to keep communications humming during emergencies and watching the streets for criminal activity. “I believe in the people keeping the city straight,” Sgt. Staehs told the group.

CARP members will become familiar

with their local precinct houses and the men and women who run them. In turn, the commanding officers and community affairs officers will get to know the amateurs by name. Should a crisis occur, the amateurs will offer their services to the precinct CO. They may be assigned to squad cars, or the scene of an accident or fire — wherever they can best serve.

Training Session and Meeting to Come

As the next step, a training manual will be developed to guide the volunteers. In addition, an organizational meeting and training session to be held in February (time, date and place to be announced locally) will bring the potential CARP members together. There, police communications experts will show the amateurs how to convey the most information about an emergency situation in the shortest amount of time.

Once CARP has been formed from

among those who express an interest, decals and special identification cards will be issued. In addition, visor cards will allow members access to areas that are off-limits to civilians during an emergency.

Coming as it did on the heels of the blackout, the formation of this new group is a fitting tribute to both the individual amateurs who assisted during the blackout and the Amateur Radio Service. It was apparent to those at the preliminary meeting that the NYPD is as enthusiastic about CARP as are the amateurs helping to get it off the ground. “There’s no doubt about it,” Sgt. Staehs commented at one point, “once word gets around about this, it will spread nationwide.”

If the organized group works together as well as individual amateurs did during last summer’s blackout, the prophecy is bound to come true.

Strays



NANUK CONTACTS SOUGHT

Robert Gleason, W3KW, author of *Icebound on the Siberian Arctic*, is anxious to locate hams, or their descendants, whom he worked while on the *Nanuk* during the winter of 1929-30. In particular, he wants to find the person who operated from the *Wisconsin*. Write to him at 3734 Ramsgate Dr., Annapolis, MD 21403.

WORKED ALL BRITISH COUNTIES

The Worked All British Counties award is offered to amateurs in two

classes: Class 1 is awarded to stations who work all U.K. counties and Scottish regions, plus one GC/GJ, one GC/GU and one GD. Class 2 is for any 55 U.K. counties. Contacts made on any band and in any mode from May 1, 1974, count. To qualify, send a certified list of stations showing date, time (UTC), call sign and county of U.K. station worked, and his RST and your RST. Cost of the award is \$2 (one pound sterling or 20 IRCs). Upgrading from Class 2 to Class 1 costs half that amount. Send claims to Alec Brennend, G4AVA, 76 Deneley Ave., TODMORDEN VIA. LANCS, England.

WAFAPA WALLPAPER

For those who contact AA4AA on the air, Ken Maness, ex-WA4EJX, offers an appropriate certificate: Worked America’s First AA Prefix Award. Write to him at 3946 Skyland Dr., Kingsport, TN 37660.

I would like to get in touch with . . .

Novices to start a worked-all-states net at about 0200 UTC around 7140 kHz, or other suggested time and frequency. Scott Dawley, WB9YMF, 8365 Chestnut St., Wauwatosa, WI 53213.

RFI Assistance List

Suppress your RFI difficulties and your frustration as well. Consumer service help is available from these manufacturers.

By Harold R. Richman,* W4CIZ

One of the significant accomplishments of the ARRL RFI Task Group has been this RFI Assistance List. Particular thanks must go to Hal Richman, W4CIZ, whose individual efforts and devotion to accuracy have been instrumental in making this list one of the most respected documents in the RFI literature. This is evidenced by the fact that the FCC includes this very list in its latest RFI publication: How to Identify and Resolve Radio-TV Interference Problems.

And a note of thanks should go to the manufacturers who have allowed their names to be included in this list. They are voluntarily offering their assistance to the public in an effort to help alleviate the growing RFI problem, and their cooperation is deeply appreciated.

Admiral

RFI complaints are usually handled by the local Admiral dealer service technician. "National service personnel are available to assist the technician when needed. Admiral maintains its own staff of technical representatives who travel in the field and may be called upon to assist the dealer technician with difficult problems, including RFI. Admiral provides technicians with various instruction bulletins dealing with rf interference suppression." RFI complaints should be referred to the local Admiral dealer. If front-end overload or cross modulation occurs in areas of extremely high-level transmitter radiation, the National Service Division has suitable traps available at no charge to the customer. Write for such information to the National Service Division, P. O. Box 2845, Bloomington, IL

60701. Attention: Mr. R. E. Gremer.

Akai America

Akai products include audio tape recorders, video tape recorders, a-m/fm receivers, speaker systems and related accessory products. Inquiries related to RFI should be addressed to Customer Service Department, 2139 E. Del Amo Blvd., Compton, CA 90220. Tel. 213-537-3880. "Upon receipt of these inquiries, we will investigate the situation and, to our utmost, try to resolve the customer's problems."

Allen Organ Co.

When a complaint is received via the dealer, Allen Organ Company sends the dealer an informational service bulletin on RFI and sufficient components to cover all amplifiers in the affected instrument. This service is offered at no cost to the customer. Refer RFI problems to the local Allen dealer. Inquiries may be directed to Mr. David L. George, National Service Manager, Macungie, PA 16162. Tel. 215-965-9801.

Altec Lansing

Customer RFI problems are referred to the authorized Altec warranty stations located nationwide and denoted by an information card furnished with each piece of equipment. Unusual situations are, at the option of the warranty station, referred to Altec Customer Service, 1515 W. Katella Ave., Anaheim, CA 92803. Tel. 714-774-2900 or to the Engineering Department, 1515 S. Manchester Ave., Anaheim, CA 92803. Attention: Chief Engineer, Electronics.

Arvin Industries, Inc.

Customer problems involving RFI should be referred to Mr. John Currey,

Manager of Field Service, 15th St., Columbus, IN 47201. Tel. 812-372-7271.

Audio Research Corp.

In the event of an RFI problem, customer may write to Mr. Scott Crist, Chief Engineer, P. O. Box 6003, Minneapolis, MN 55406. Tel. 612-721-2961.

Baldwin Piano & Organ Co.

RFI complaints are usually handled by the local Baldwin service technician. Factory personnel are available to assist the technician when needed. Baldwin maintains its own staff of technical representatives who travel in the field and may be called upon to assist the dealer technician with difficult problems, including RFI. Baldwin provides technicians with a detailed instruction bulletin entitled "Hints on Suppressing RF Interference." RFI complaints should be referred to the local Baldwin dealer. Inquiries may be directed to Mr. Robert C. Scherer, Manager, Organ Technical Service, 1801 Gilbert Ave., Cincinnati, OH 45202. Tel. 513-621-4300.

Benjamin Electronic Sound Co.

Refer RFI problems to Mr. Robert Rosenberg, Service Manager, 790 Park Ave., Huntington, NY 11743. Tel. 516-673-8600.

Capehart Corp.

Capehart Corporation, manufacturer of stereo console phonographs and radios, asks that the customer refer an RFI problem in their product to Mr. Elliott S. Scheff, General Manager, Capehart Corporation, 5th St., Norwich, CT 06360. Tel. 203-886-0111.

Conn Organ Corp.

RFI complaints should be referred to

*ARRL RFI Task Group, 3908 Lake Blvd., Annandale, VA 22003

the local Conn dealer, whether instrument is in or out of warranty. Factory assistance is available to the dealer if he is unable to correct the RFI. RFI problems encountered within term of instrument warranty are usually corrected by the selling dealer without cost to the organ owner. Mr. Thomas A. Umbaugh, Assistant Service Manager, 1101 East Beard-sley Ave., Elkhart, IN 46514. Tel. 219-264-7511.

Curtis Mathes

Curtis Mathes products include color TVs and stereos (100-percent solid-state) in portable, console and combination configurations. Customer complaints involving RFI should first be resolved at the retail-dealer level. If not satisfied, then the complaint should be made in writing to the Consumer Relations Department giving all details of the problem, along with the model info, serial number, date of sale, dealer and service history. Each complaint will be handled individually. Write to P. O. Box 151, Athens, TX 75751. Attention: Consumer Relations Department.

Dumont (See Emerson Quiet-Kool Co.)

Dynaco-Dynakit Division of Tyco Laboratories

Inquiries related to RFI involving Dynaco products should be addressed to Customer Service Department, Dynaco Division Tyco Laboratories, Coles Road, P. O. Box 88, Blackwood, NJ 08012. Tel. 609-228-3200. Dynaco has available for owners of Dynakits an excellent information sheet on solving RFI problems.

Elpa Marketing Industries, Incorporated

Complaints are handled with respect to parts and labor on an individual basis. Necessary modifications for RFI are made on a no-charge basis, parts and labor, during the term of instrument warranty. Beyond warranty, modification parts are available free of charge. Customer then pays for labor involved in the installation of the parts. Refer RFI problems to Mr. John F. King, Thorens Building, New Hyde Park, NY 11040. Tel. 516-746-3002.

Emerson Quiet-Kool Company

Customers should refer RFI problems, or inquiries related to Emerson or Dumont TV problems, to Mr. Jerome Roth, P. O. Box 300, Woodbridge, NJ 07095. Tel. 201-381-7000.

Fisher Corporation

Fisher Corporation asks that RFI problems involving a Fisher product be handled as follows: (1) Request assistance from the local selling dealer; (2) Request assistance from the local Fisher authorized service station (a list is packed with every Fisher unit). Contact with local Fisher agencies is the preferred method of

handling. Fisher's service coordination group maintains close communication with Fisher authorized service stations, Fisher's Engineering Department, and works under the supervision of the office of the National Service Manager. If the problem cannot be solved at the first two service levels, contact Service Coordination, 21314 Lassen St., Chatsworth, CA 91311. Tel 213-998-7322.

Garrard Plessey Consumer Products

Garrard advises the consumer on methods which may eliminate RFI. In unique cases where the suggestions are ineffectual, customer should refer the RFI problem to Mr. Havens or Mr. Coll. "Any RFI problems which are referred to us are always handled on a no-charge basis." Mr. Ed Havens or Mr. Ron Coll, Assistant Service Managers, 100 Commercial St., Plainview, NY 11803. Tel. 516-694-7377.

General Electric Co.

RFI problems involving G.E. *television receivers* should be referred to the nearest General Electric Customer Care Service Operation. If G.E. Customer Care Service is unable to correct the RFI, the customer should refer the problem to: Manager, Product Service, Television Business Department, College Blvd., Portsmouth, VA 23705. All RFI problems involving G.E. *radios, record players, and other audio products* should be referred to Manager, Customer Services, Electronics Park, Syracuse, NY 13201.

Gulbransen

Gulbransen cooperates with dealers and customers in offering suggested solutions to RFI. Gulbransen does not reimburse the consumer for servicing. However, when extreme cases are encountered due to proximity of the transmitter and relative power, the dealer may sometimes absorb the cost of servicing RFI problems. Customers should refer RFI problems to the local dealer. Inquiries may be directed to Mr. J. A. Iacono, Consumer Service Supervisor, 100 Wilmot Rd., Deerfield, IL 60015.

Hammond Organ Co.

Hammond maintains a staff of technical service representatives who become directly involved in RFI cases that the dealer's service personnel are unable to solve. Hammond states that the services of engineering and technical field service departments under its control are provided to consumer and dealer alike without charge, whether or not a product is within warranty. RFI problems should be referred to the local Hammond dealer. The Hammond Technical Service Department asks that it be informed of any unique interference problem involving the Hammond instrument. Mr. J. J. Welch, Technical Field Service Manager, 11700

Copenhagen Ct., Franklin Park, IL 60131. Attention: Technical Service Department.

Harman-Kardon, Inc.

Customers should refer RFI problems to Mr. Len Gaynor, Manager of Customer Service. Customer RFI problems are handled on an individual basis. If local, the customer is invited to bring the affected set into the plant. Nonlocal customers are referred to the nearest warranty station. Corrective action is provided at no cost to the customer. Subsidiary of Jervis Corporation, 55 Ames Ct., Plainview, NY 11803. Tel. 516-681-4000.

Heath Schlumberger

Heath Company suggests that, for fastest service on matters related to RFI, regardless of the product line involved, customers may now reach the Technical Consultation Department by either writing directly to that department, Heath Company, Benton Harbor, MI 49022, or by using a new direct-line telephone system to the department — 616-982-3302. Do not write to an individual.

Hitachi Sales Corp. of America

Customers with RFI problems should contact the service manager of the nearest regional office: Western Regional Office, 401 W. Artesia Blvd., Compton, CA 90220; Mideastern, 1400 Morse Ave., Elk Grove Village, IL 60007; Eastern, 48-50 34th St., Long Island City, NY 11101; Midwestern, World Trade Center 183, 2050 Stemmons Freeway, Dallas, TX 75207.

J. C. Penney

J. C. Penney Company asks that customers with RFI problems contact their nearest J. C. Penney store for personal assistance. 1301 Avenue of the Americas, New York, NY 10019.

JVC America, Inc.

Inquiries related to RFI involving JVC products may be referred to the office of Mr. Akira Deguchi, Chief Engineer, 50-35 56th Rd., Maspeth, NY 11378. Tel. 212-392-7100.

Kenwood Electronics, Inc.

Kenwood asks that customers with RFI problems take the affected unit to an authorized service center where an adjustment will be made at no cost to the customer if the product is properly registered with Kenwood and within warranty. It is suggested that prior authorization for the return be obtained from Mr. Toshi Furutsuki, 15777 South Broadway, Gardena, CA 90248. Tel. 213-323-1400.

KLH Research & Development Corp.

KLH initially provides the customer with a listing of suggested steps for

isolating and correcting RFI. If self-help does not resolve the problem, the customer may write to Jeff Ayres, Manager, Customer Service, 30 Cross St., Cambridge, MA 02139, for authorization to return the affected unit to the factory. Return can then be made through contact with the nearest KLH factory authorized service station. Customer bears the responsibility for shipping the unit to and from the repairing service station. KLH absorbs the cost of service for their units as long as the unit is covered by a KLH warranty and is returned to the factory.

Lafayette Radio Electronics Corp.

Customers should refer RFI problems involving Lafayette products to the local dealer. If the dealer cannot alleviate the problem, the customer may contact Mr. P. Morgillo, Vice President, Engineering, 111 Jericho Turnpike, Syosset, NY 11791. Tel. 516-921-7700.

Marantz (See Superscope)

Magnavox Consumer Electronics Co.

Customers should direct RFI problems involving Magnavox products to Magnavox at the nearest of the nine divisional service offices: Pacific Division, 1360 San Mateo Ave., South San Francisco, CA 94080; Los Angeles Division, 2645 Maricopa St., Torrance, CA 90503; Southwestern Division, 8813 John Carpenter Highway, Dallas, TX 75247; Great Plains Division, 7510 Frontage Rd., Skokie, IL 60076; Great Lakes Division, 24092 Detroit Rd., Westlake, OH 44145; Southeastern Division, 1898 Leland Dr., Marietta, GA 30062; Northeastern Division, 607 North Ave., Door 17, Wakefield, MA 01880; New York Division, 161 East Union Ave., East Rutherford, NJ 07073; Mid-Atlantic Division, 2201 Rte. 38, Suite 750, Cherry Hill, NJ 08034.

McIntosh Laboratory, Inc.

McIntosh has a number of authorized service agencies located throughout the country. Customers will be assisted to receive prompt help. RFI and other service related problems can be directed to Mr. Albert Hyle, Customer Service Manager, 2 Chambers St., Binghamton, NY 13903. Tel. 607-723-3512.

MGA Mitsubishi Electric Corp.

Melco Sales, Inc., is the sales and service representative for the Mitsubishi Electric Corporation. RFI reports from the field, beyond the dealer's capability to resolve, in which Melco Sales becomes involved, are handled on an individual basis. "All attempts will be made to give customer satisfaction." Melco Sales suggests that requests for assistance be addressed to 3030 East Victoria St., Compton, CA 90221, or the Service Department may be contacted by telephone on a toll-

free number — 800-421-1132. Mr. Chuck Trout is the National Service Manager.

Midland International Corp.

Midland asks that, should any RFI problems be encountered with their portable black-and-white and color TVs, individuals contact Mr. Gene Pipes, General Service Manager, P. O. Box 1903, Kansas City, MO 64141. Tel. 816-842-5922.

Montgomery Ward

Service for RFI should be obtained from the nearest Montgomery Ward location. If service is not obtainable locally, customer may write to the customer service product manager at the corporate headquarters in Chicago. Corporate Offices, 535 West Chicago Ave., P. O. Box 8339, Chicago, IL 60680. The Montgomery Ward field service organization can call upon factory and corporate engineering talent for assistance in handling difficult RFI problems.

Morse Electro Products Corp.

"RFI complaints related to Morse/Electro-Phonic entertainment products may be referred to Customer Service Manager, 101-10 Foster Ave., Brooklyn, NY 11236. Tel. 212-257-7000."

Nikko Electric Corp. of America

Nikko's line of products includes stereo receivers, tuners, amplifiers, combination pre-amp and main-amp pairs. For information and assistance with any Nikko Electric products, inquiries should be made to Mr. Les Aubin, National Service Manager, Service Department, 16270 Raymer St., Van Nuys, CA 91406. Tel. 213-988-0105.

Norlin Music, Inc.

Norlin offers local service organizations technical help in treating RFI through the Norlin Service Manager and his staff assistants. Customers should refer RFI problems to the local Lowrey dealer. Inquiries may be directed to Norman B. Erickson, Director of Engineering, 7373 North Cicero Ave., Lincolnwood, IL 60646.

North American Phillips Corp.

Each RFI situation is handled individually by the service manager of the particular division whose product is involved. Inquiries related to RFI should be addressed to the proper division at 100 E. 42nd St., New York, NY 10017. Tel. 212-697-3600.

Nutone Division

Refer RFI problems to Mr. Norman W. Aims, W8JYD, Consumer Relations Department, Scovil Housing Products Group, Madison and Red Bank Roads,

Cincinnati, OH 45227. Tel. 513-527-5415.

Panasonic Co.

When instances of RFI occur, the customer should contact Panasonic at the following address: Panasonic Company, Div. of Matsushita Electric Corp. of America, 50 Meadowlands Parkway, Secaucus, NJ 07094. Attention: Mr. Warren Oppenheimer. Tel. 201-348-7000. Customer should provide model number, serial number, and information concerning the problem. Upon review of the problem, the customer will be contacted and advised where to return the unit for corrective repair. "Panasonic will absorb both parts and labor costs in these instances."

Philco-Ford (See GTE Sylvania)

Quasar Electronics Corp.

For a high-pass filter, consumer should contact Quasar Electronics Corporation, Consumer Relations Manager, 9401 West Grand Ave., Franklin Park, IL 60131. Model and serial number of the receiver, frequency of the interfering signal if known, should be included with the written request, as well as whether sound or picture, or both, are affected. The Quasar distributor serving the local area should be contacted relative to any other interference problem that is unique to Quasar products.

Radio Shack

Customers who encounter unique interference problems involving Radio Shack audio products may write to Mr. Frank Roberts, Product Development Manager, or Mr. Peter Falcone, National Quality Control Manager, National Headquarters, 2617 West Seventh St., Fort Worth, TX 76107. Tel. 817-335-3711.

RCA Consumer Electronics

RFI problems involving both television and audio products may be referred to Mr. H. L. Carter, 1-455, 600 N. Sherman Dr., Indianapolis, IN 46201. Tel. 317-635-9000, extension 4255. Requests for filters should include model number and serial number of the RCA television receiver. Filter installation charges will be the customer's responsibility.

Rodgers Organ Co.

RFI problems involving the Rodgers Organ may be referred to Mr. Dale T. Justice, Custom Organ Test Department, 1300 N. East 25th Ave., Hillsboro, OR 97223. Tel. 503-648-4181.

Rotel of America, Inc.

Stereo receivers, amplifiers, tuners and tape decks. RFI problems should be referred to Michael Gregory, National Service Manager, 1055 Saw Mill River Rd., Ardsley, NY 10502. "RFI problems will

be handled according to the terms of our limited warranty."

Sansui Electronics Corp.

RFI problems should be directed to Mr. Gerald M. LeBow, Vice President, 201 Communications Inc., 201 East 42nd St., New York, NY 10017. Tel. 212-867-3325. 201 Communications, Inc., is the advertising and public relations agency representing Sansui. Mr. LeBow will direct the customer to an appropriate Sansui Service Center. Mr. LeBow states that all Sansui products are carefully checked prior to final engineering commitments for susceptibility to RFI. "Units are often taken to high-rf-level areas such as New York City to determine any design flaws."

Sanyo Electric, Inc.

In the event an RFI problems should occur, the customer is requested to take the set to the nearest Sanyo authorized repair station. Transportation to and from the shop is the responsibility of the customer. Should the shop not alleviate the problem, either the customer or the shop should contact Mr. Thomas R. Smith, Field Service Manager, Sanyo Electric, Inc., Electronics Division, 1200 W. Artesia Blvd., Compton, CA 90220. Tel. 213-537-5830.

Schober Organ Corp.

Customers with RFI problems are supplied with the necessary parts, free of charge, to correct the trouble. Schober Organ Corp. also assists customer in location of offending stages in the organ. Refer RFI problems to Mr. Warren A. Boehling, Development Engineer, 43 West 61st St., New York, NY 10023. Tel. 212-586-7552.

Scientific Audio Electronics, Inc.

Refer RFI inquiries to Mr. Michael L. Joseph, National Marketing Manager, P. O. Box 60271, Terminal Annex, Los Angeles, CA 90060. Tel. 213-489-7600.

H. H. Scott, Inc.

Manufacturer offers simple instruction sheet to aid customers in resolving problems involving rf pickup. The information includes suggestions about suitable equipment grounding, power line bypassing, hints and suggestions on how to determine where rf is entering the equipment. Customers should refer any RFI problems to Mr. D. F. Merryman, Engineering Dept. 111 Powder Mill Rd., Maynard, MA 01754. Tel. 617-897-8801.

Sears, Roebuck & Co.

Sears asks that customers with an RFI problem involving a Sears product contact the nearest Sears service department for assistance. Inquiries may be directed to Mr. R. C. Good, Manager, Marketing

Communications, Home Appliances, Dept. 703, Sears Tower, Chicago, IL 60684.

Sharp Electronics Corp.

Sharp Electronics will, with proof of purchase, supply customers with a Drake TV-300 high-pass filter at no cost. Audio rectification problems are handled on an individual basis by the Service Department. Refer RFI to Service Manager, 10 Keystone Pl., P. O. Box 588, Paramus, NJ 07652. Tel. 201-265-5600.

Sherwood Electronic Laboratories, Inc.

Customers with interference problems should contact Mr. John Davis, Service Laboratory Manager, Sherwood Electronics Laboratories, Inc., 4300 N. California Ave., Chicago, IL 60618. Tel. 312-478-7300.

Shure Brothers, Inc.

Manufacturer recommends the use of balanced-line, low-impedance microphones, cables . . . If an RFI problem persists after the above measures have been taken, the consumer should contact Shure Brothers, Inc. with specifics, so that they may be able to help solve the problem. Refer RFI problems to Mr. F. F. Hoffman, Customer Service Manager, 232 Hartrey Ave., Evanston, IL 60204. Tel. 312-679-5830.

Sony (Consumer audio tape products only — see Superscope)

Sony Corp. of America

RFI problems involving Sony products should be directed to Sony at 47-47 Van Dam St., Long Island City, NY 11101. Attention: Customer Care Department. Tel. 212-361-8600.

Soundesign/Tanglewood Audio Corp.

Soundesign/Tanglewood Audio Corp. requests that all service problems relating to *non-stereo merchandise* be referred to Mr. Noel H. Goldman, National Service Manager, 34 Exchange Pl., Jersey City, NJ 07302. Tel. 201-434-1050. "All service problems on stereo merchandise is to be referred to our authorized service centers. The nearest one can be found by calling toll-free in the continental U.S. 800-243-6000, and in Connecticut, 882-6500."

Superscope Corp.

Superscope/Marantz a-m/fm receivers, tuners, amplifiers, tape recorders, record players, and audio systems. Sony consumer audio tape products. In the event of special RFI cases resulting from extremely high fields, contact Technical Services Department at Superscope corporate offices. "Modifications necessary to resolve such RFI problems are provided to

customers on an individual basis." 20525 Nordhoff St., Chatsworth, CA 91311. Tel. 213-998-9333. Attention: Mr. A. M. Williams, Manager, Research and Engineering.

GTE Sylvania, Inc.

Sylvania policy: "Factory field service and field engineering personnel work together to solve many of the TVI and audio rectification problems. If the consumer has an interference condition, he should contact his local dealer. He is in touch with the manufacturer's services that will help resolve it." Consumer should contact the dealer and work through his services first. RFI problems are handled on an individual basis. Sylvania has available for its technicians an excellent pictorial TVI training manual titled, *Diagnosis, Identification and Elimination of TVI*. Entertainment Products Group, Group Headquarters, 700 Ellicott St., Batavia, NY 14020. Tel. 716-343-3470. Mr. Jack Berquist, Field Training Supervisor.

Tandberg of America, Inc.

When RFI occurs in Tandberg products the manufacturer suggests that the unit be returned to them. "We will do any modification possible to eliminate the RFI." Authorization should be obtained from Mr. Tor Sivertsen prior to return of the unit. Mr. Tor Sivertsen, Technical Manager, Labriola Ct., Armonk, NY 10504. Tel. 212-892-7010.

Tenna Corp.

Tenna Corporation has not produced home-entertainment equipment within the past two years, but will be glad to help out all past customers if a problem arises with RFI. They will install circuit change at no cost, except postage and handling. All unique RFI problems may be referred to Mr. Tom Beuck, National Service Manager, 19201 Cranwood Parkway, Cleveland, OH 44128. Tel. 216-475-1400.

Thomas Organ Co.

RFI is usually resolved at the dealer level. If the manufacturer's field service is made aware of a consumer complaint regarding RFI, they contact the seller and advise him on how to eliminate the problem. Should that fail, "we continue to pursue the problem utilizing our own people." Thomas Organ Company has six field service engineers. In the event of a call for assistance, an engineer personally contacts the consumer by telephone, makes an appointment to visit the home of the consumer to correct the RFI condition, with or without the dealer's technician. "We do not charge the consumer for this service." Refer RFI complaints to the dealer. Inquiries may be directed to Mr. Daniel E. Hofer, Manager, Field Service, 7310 North Lehigh Ave., Chicago, IL 60648. Tel. 312-647-0700.

Toshiba

Customers should contact the nearest regional office for obtaining assistance in resolving RFI problems involving Toshiba televisions, radios, tape products, amplifiers, tuners and receivers. Eastern Regional Office, Mr. Terry Hogan, Field Service Manager, 41-06 Delong Street, Flushing, NY 11355. Tel. 212-939-7400. Western Regional Office, Mr. S. Ito, Regional Service Manager, 19515 S. Vermont Ave., Torrance, CA 90502. Southwest Regional Office, Mr. Tom Underwood, Regional Service Manager, 3225 E. Carpenter Freeway, Irving, TX 75062.

U.S. Pioneer Electronics Corp.

Consumers in the Eastern region may contact Mr. Fred Ellis, 75 Oxford Dr., Moonachie, NJ 07074; in the Midwest, Mr. John Kempinski, 1500 Greenleaf Ave., Elk Grove Village, IL 60007; in the Western region, Mr. Steve Hase, 13300 South Estrella Ave., Gardena, CA 90248.

Wells-Gardner Electronics Corp.

"Wells-Gardner is a private-label manufacturer of consumer electronic

products. Inquiries related to RFI should be referred to our private label customers whose address appears on the model-number label attached to the product. Special problems which may be encountered by private label customers are usually referred to Wells-Gardner." 2701 N. Kildare Ave., Chicago, IL 60639.

The Wurlitzer Co.

"The Wurlitzer Company makes available a toll-free telephone line, 800-435-2930, to assist any technician or customer in any and all needs pertaining to the Wurlitzer product. The Wurlitzer Company maintains a staff of field service managers who can assist should an RFI problem arise." 1700 Pleasant St., DeKalb, IL 60015.

Yamaha International Corp.

Yamaha organization attempts to cure each RFI problem on an individual basis. Yamaha supplies all necessary technical information at no charge. If interference is due to design error, Yamaha takes steps at its own expense to remedy the problem. Refer RFI problems to the local dealer. The dealers are kept well informed and

current on RFI countermeasures. Inquiries may be directed to Mr. Dan Bryden, WA6PXO, Electronic Service Department, 6600 Orangethorpe Ave., Buena Park, CA 90622. Tel. 714-522-9011.

Zenith Radio Corp.

Zenith gives consideration to handling and providing relief for RFI problems on a case-by-case basis. RFI problems should be referred to Service Division, 11000 Seymour Ave., Franklin Park, IL 60131. Tel. 312-671-7550. RFI referrals should include model and serial number of the affected product. Customers with a unique, difficult RFI problem may direct a letter to Mr. Brian J. Marohnic, W9DCN, National Service Manager, same address.

Other Manufacturers

Ms. Sally Browne, Director of Consumer Affairs, Consumer Electronics Group, Electronic Industries Association (EIA), 2001 Eye Street, N.W., Washington, DC 20006. Tel. 202-659-2200, may be contacted for assistance in handling RFI problems involving manufacturers who are not listed here.

Strays

PLAYERS' CHOICE DXPEDITION

What prefixes head your list of "most-wanted"? Next summer K2HFX will lead a group to whatever area (within reason!) is most desired. Prepare a list of five suggestions and send it to Jay Kobelin, WA2FIJ, 60-2B Richmond Blvd., Ronkonkoma, NY 11719. Tel. 516-981-7575 or 516-364-0400, ext. 264 or 755.

FIRST YLs JOIN 600 CLUB

The first YLs to earn "600 Club" status for their 6-meter operation are Patricia D. Williams, WB4PRM and Frances Gideon, WB8WXZ. From Rockmart, GA, Pat holds award no. 28; no. 32 was issued to Frances, of Albion, MI. (By year's end, 100 awards had been earned.)

Patricia says she works all bands, but prefers 6 meters. Her OM is WA4DYK. Frances reports that she is a new, but very enthusiastic, ham. Her OM is not a ham, but she is attempting a conversion!

Congratulations to WB4PRM and WB8WXZ for their fine work! — WICKK

ARRL 6 Meter "600 CLUB" Awards

1	WD4FAB	WB8WXZ	W1GUD	WB5UWX	WA4NXM
WA5CBT	WB9RJQ	K0TLM	WB9RZY	WB2ELB	80
WB4PXW	WB8BGY	WA4OWC	50	W3IIT	WB5UYT
WA8OGS	20	WB5CHW	WB3CXE	WA1LXN	W9MA
W5TIH	K8WKZ	WB5WLK	WA1KYH	WB2RLK	WB9VXD
WA4HEF	WB0WAO	WA4NJP	N9RS	WB8RNY	WB3BFB
WB4WXE	WB2FZE	WB0QCD	WB8WYG	K6RNO	WA4NEL
WA0MRH	W6BA	VE3CKU	K5EFW	70	WA1EXU
WA1OUB	WA5VJB	40	W3HMU	W4MNZ	WA7UJH
WA0TRO	K7NN	WB4FLH	K3MWV	WB4JYL	JA7SDU
10	W2DZ	WB4YKI	WB0ULX	W5TRB	WB4WEN
VE1ASJ	K8IXU	K7ZCB	W0RWC	JA1VOK	W0SI
K4CKS	WB4PRM	K1ZKR	VE5LY	WB9OPD	90
WA5HNK	W2BN	K1VSC	80	W6BXO	WB8AWV
WA8KLN	30	W1JR	WA1UQC	W1HWL	WA4MPC
K3RLI	WB2RLK/6Y5	WB0JTH	K1ZFE	WA2KOK	WB4NXY/2
WB6LBR	WB0PNK	WA3DMF	W1BOM	WB8BDW	
WB2WIH					



Pat (left), WB4PRM and Frances (right), WB8WXZ, are the first YLs to earn the 6-meter 600 Award.

La Scala of Milan Cures Some Virginia Hams

After befriending two Italian amateurs on the air, a Virginia ham discovers there's more to a DX contact than what meets the ear on 20 meters.

By Enrico Davoli, M.D.,* WB4GKN

Bravo! Belissimo! The audience roared with an untamed enthusiasm. It was an electrifying experience. I was sitting backstage at the Kennedy Center in Washington, DC, and the world-famous La Scala Opera Company had just finished the third act of *La Boheme*.

Now, I'm not an entertainer. Professionally, I'm a pediatrician. It was my avocation — ham radio — however, that found me the backstage seat and what ultimately became the most wonderful 19-day period of camaraderie in my entire life.

It Started on 20 Meters

I had first met I2CUK and I2DMH on 14.305 MHz. Hams are ubiquitous, you know. Nonetheless, it *did* surprise me to learn that Carlo and Domenico are two of the several radio amateurs who are great vocal and musical performers and stars in La Scala, the most famous opera company in the world.

Then I received a telephone call from Carlo. He had just flown into the United States — along with the entire La Scala group — and was calling to announce his arrival. Without hesitation my Italian-born father (who always had been in awe of La Scala) and I went to the hotel to greet Carlo and to meet other members of the company. Carlo, I2CUK (Maestro Carlo Camerini), by the way, is the musical director and Domenico is a baritone in the chorus.

Carlo made a simple, polite request to visit my shack and family during La Scala's stay in the Washington area. So, on the second evening we invited Carlo and several associates (known as *Scaligeri*)

to visit our home for dinner and also to examine my shack. It was then that I met the third ham, Giuliano, I2UCE, a cellist. WB4QJO and W4RX joined us.

After dinner, our family and guests experienced an impromptu "jam session" in which the maestro, Carlo, used a vintage but untuned upright piano in our messy basement. Giuliano used an ordinary mouth organ, and Franco (chief electronic technician) used an old, discarded guitar that we were able to find at the last moment. We were treated to two hours of beautifully sung Italian folk songs, operatic arias and a rendition of "Old Man River," sung in Italian by Rino Cerri (basso profundo of the chorus). I2DMH sang some of the folk songs, and, in addition, a very touching Italian love song for

my wife, Jane, in honor of our 20th wedding anniversary. We were later informed by the maestro that Domenico is the most highly regarded baritone of the La Scala chorus! Fortunately, I was able to record it all on tape for posterity!

On and On

In the many days that followed, we hosted the *Scaligeri* at our home several other times for large dinner sessions, more visits to the ham shack — it seemed as though we never had a single dull moment. In turn we were invited to view the long-sold-out Kennedy Center performance from backstage.

There were two episodes which took place that had many similarities: a testing session for a new transceiver Giuliano



Backstage at the Kennedy Center, with (from left) Domenico Giglietti, I2DMH, baritone; Vince Gambino, WB4QJO; Vince's daughter, Elisa; and Rino Cerri, basso.

*2501 E. Meredith Dr., Vienna, VA 22180

purchased at a local shop, and a spaghetti-fest. One afternoon Vince, WB4QJO and I arranged to take the *Scaligeri* to a local McDonald's, just to give them a taste of what our country has to offer in the form of "fast food." Rino politely suggested, however, that he might like to make some spaghetti for everyone since the group had not touched a morsel of pasta since their departure from Italy. After some quick shopping at the local supermarket, what followed was a classic scene where *nine* Italians were seen in the kitchen together. There was much chattering, shouting, cooking, boiling and mixing. But ultimately, a meal consisting of four courses (including spaghetti) was served.

It is interesting that approximately the same type of hectic scene took place during the rig-testing session. Giuliano brought his newly purchased transceiver to WB4QJO's shack where Vince assumed the same role as Rino did while cooking the spaghetti!

Everything turned out beautifully in both instances. Oh well, McDonald's will have to wait for a return visit!

Reciprocity

The association with the *Scaligeri* produced a feeling of closeness which I'm certain will endure for many years. We were able to share so much of our own lives with them that they felt very much at home with us and our families. But the story does not end there. Subsequently, my wife and I visited Italy where we met, in all, 55 hams and their families, including the *Scaligeri*! In each and every one of the cities we visited we were treated like visiting royalty.

And it all started on 20 meters.

Say, if you're having any trouble making an "I" contact, just "break" (or "knock" as they say in Italian) on 14.305 any day between 1130 and 1330Z.

Ciao!



Domenico and Rino seen from backstage during a scene from *La Cenerentola*.

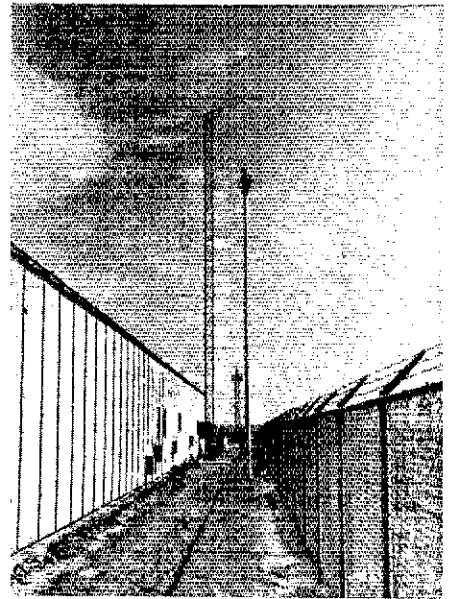
Strays

AMATEURS TO SPEAK AT IEEE CONFERENCE

□ The 28th IEEE Vehicular Technology Conference will feature a free amateur radio session March 23 at the Grand Ballroom of the Regency Hotel, Denver, CO. Speakers at the session, to be held from 7 to 10:15 P.M., include ARRL Vice President Carl Smith, W0BWJ; *QST* Assistant Technical Editor, Lew McCoy, W1ICP; Mark Wharton, K0LO; Robert Shriner, WA0UZO and Jim Andrews, WA0NHD (the session organizer).

Another highlight will be an ARRL-FCC round table featuring several of the above plus Carlos Roberts, chief, Office of Plans and Policy, FCC; Brian Gilbert, of the FCC Denver office; and Chic Cotterell, W0SIN, ARRL Rocky Mountain Division director.

If you are in the area, plan to take in the meeting and the show. — *W1ICP*



An alien sight in the desert, the Sinai Field Mission's 55-foot Rohn tower is the Mission's only direct link to family and friends thousands of miles away. Aside from running phone patches, the station devotes time to contacting European and North American amateurs looking for SU-land (Egypt).

ISOLATED FIELD MISSION STATION SPANS THE CONTINENTS

□ One of the more exotic of last year's crop of Novice classes was held in a desert outpost separating two nations that have been at war for 30 years. The classes were just one outgrowth of the Sinai Field Mission's amateur radio station, located in the buffer zone between Israel and Egypt.

The station was the brainchild of W7FPX/SU and several other amateurs among the U.S. military and civilian electronic technicians and communications experts assigned to watch the strategic area for border violations. Permission to operate and run phone patches back to the States from the lonely outpost was granted by the FCC, the UN, and the governments of Israel and Egypt. A club station license application is pending.

With the generous assistance of the Field Mission's communications operations manager, W. W. Warner, a former amateur, the station took form. Having no direct access to permanent equipment, they solicited a temporary station from the U.S. Department of State. It consisted of a Collins KWM-2A and 30L-1 linear in to a Mosley TA-33 Classic Triband antenna at 55 feet. Electricians and carpenters at the Mission helped set up the station in the building housing hobbies and crafts.

Since that time, a permanent station has been secured. The station has been operating as much as its operators' work load will permit. It is active on 20 and 15 meters to Europe and North America. With the help of U.S. amateurs, phone patching has been very successful. Since

this is the primary reason for the station's existence, they usually stop more casual operating when a signal conducive to phone patching is reached. They will QSL 100 percent on cards received.

The Novice classes have also been highly successful, with several prospective amateurs preparing to get on the air from the Sinai. After the Novice class is completed, they are planning to continue teaching theory and code to the General level, allowing the Novices to upgrade when they return to the U.S.

When a permanent peace finally reaches this long-embattled area, the men serving at the Sinai Field Mission will be assigned elsewhere. Their tour of duty in the desert has been made a great deal more pleasurable by the Field Mission amateur radio station and the hams who man it. — *Jim Reynolds, W7FPX/SU*

TOOK A WHILE, BUT WORTH IT

□ Exactly 50 years after his first amateur license, W6FWQ, was notarized, Roy Gould, now N6GM of El Monte, CA, passed his Extra Class test. The notary who witnessed Gould's oath on February 2, 1927, G. S. Corpe, 6LM, had already been licensed for 11 years and is still active today at age 83!

The Lure of 2 Meters

Part 1: Do hams who operate on 2 meters have more fun? Follow this series of articles and decide for yourself.

By Joel P. Kleinman,* WA1ZUY

“It was deadly quiet aboard *Seagull VII*. The hang-glider rose swiftly, carried aloft by a hot-air balloon. At 2360 feet, Ren, in the balloon, yelled, ‘Are you ready?’ I told him I was, and instantly felt the nose drop as the glider left its mooring.

“I flared out, then got on the 84/24 repeater and chatted with several people until I had drifted down to about 300 feet. I had no trouble getting into both the Wyandotte and Saginaw repeaters. I signed off when I started preparing to land.”

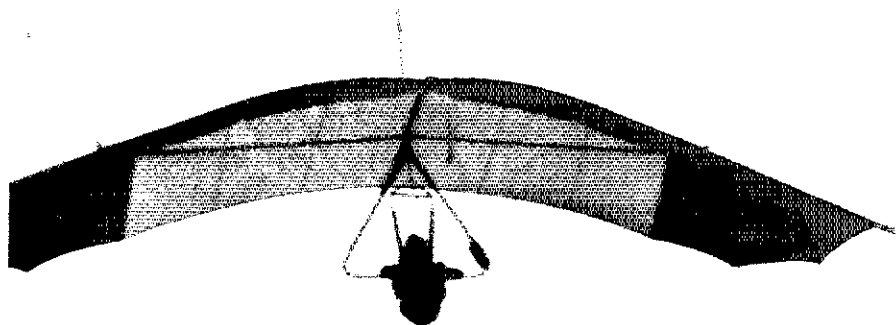
Dennis Schmalzel, WB8UAX, learned two things from his airborne experience this past summer: You can take a 2-meter handheld just about anywhere, and it’s not usually a good idea to operate through a repeater while you’re airborne, as you’ll likely hit a couple of machines at once!

Dennis’ jaunt aboard *Seagull VII* was merely one of the many ways spirited 2-meter enthusiasts find happiness while operating mobile, portable, aeronautical or while spelunking (exploring the depths of a cave). You name it; hams have done it!

This series of articles will take you from just about scratch to some degree of expertise about amateur radio’s most popular band. We’ll take a look at repeaters, study the latest equipment, and hear about some of the people who enjoy doing the things they like to do best — with the help of the 2-meter band.

It’s No Wonder

There must be a reason why the 2-meter band is the most heavily used of all. There are 64,000 Technician class licensees in the U.S., and it’s safe to say that they are the largest group on the band. Yet it’s not at all unusual to hear two-letter call signs on the local repeater. And it’s no wonder, really. Though an Extra Class license provides no additional operating privileges on the 2-meter repeater subband, no other band is more convenient and versatile. High-speed cw is fine in its place, but for



When Dennis Schmalzel, WB8UAX, made a record-breaking glide from 2360 feet, he naturally brought his handheld along for the ride. (It’s visible at the right.) While floating back to earth, he calmly made 10 contacts through two area repeaters.

the times it’s impractical, such as when you’re doing 55 on the Hollywood Freeway, nothing compares to the 2-meter band.

Whether touring Europe in a rented VW, taking the auto-train from the frigid North to Florida, or exploring a nearby cave, you’ll have a better time with a portable 2-meter rig. Compact antennas and synthesized transceivers that do away with crystals make vhf operating that much more enjoyable. Odds are, you’ll get your wife and grandmother to listen to some good conversation on the local repeater a lot quicker than you can get them to strain to hear a noisy, fading, cw or ssb signal from far-off New Zealand!

For public service and emergency communications, nothing can compare to the 2-meter band. Anywhere and anytime there’s an emergency that hams can assist with, you can be sure that a flock of vhfers with handhelds or mobile rigs will sprout like dandelions on a May lawn. Many others will be monitoring local repeaters to see if their help is needed. It’s all part of the long tradition of public service that has pretty much gotten amateur radio where it is today; the 2-meter band has made it all possible.

Yet there is far more to 2 meters than fm and repeaters. Ever give a thought to moonbounce? Exotic, yes. Out of reach of the average amateur, no! Along with meteor scatter, tropo bending, auroral propagation, and tropospheric ducting, moonbounce is a great way to negotiate DX contacts on 2 meters.

If anyone thought that 2 meters wasn’t meant for DXing, his doubts were exploded once and for all this past October when YV5ZZ and LUIDAU completed a

record-breaking, 3150-mile point-to-point QSO.

What’s It All About?

The 2-meter band stretches from 144 MHz to 148 MHz in the U.S. and Canada. Technician class licensees can presently use all but the lowest 1 MHz. Although code, sideband and slow-scan television are allowed on the entire band (save the first 100 kHz, which is reserved for code only), a great majority of the activity on 2 meters is fm.

There’s a logical reason for this. In the years following World War II, there was a great deal of a-m activity on 2 meters. Ironically, it took an FCC rules change affecting the Commercial Mobile Service to spur amateur radio into widespread use of fm. The change, which came in the late 1950s, rendered obsolete much commercial mobile fm equipment, and hams quickly grabbed it. But that gear was wide-band fm, and in the interests of spectrum conservation it eventually gave way to today’s narrow-band fm.

What Do Repeaters Do?

In the days before repeaters, hams needed fairly large antennas and substantial power to extend their reliable vhf range much beyond the “line of sight.” The apartment-dweller and the mobile operator could still have a lot of fun, but contacts over distances of more than 30 miles or so were relatively rare. Now, repeater stations are set up on mountaintops and tall buildings to amplify and relay incoming signals. A well-placed repeater can expand the range of com-

*Features Editor, *QST*

Footnotes appear on page 52.

munications to 100 or 150 miles, even with a 1-watt handheld. If you're using a handheld, of course, you won't be able to reach distant repeaters as well as 10-watt mobile stations can. But even handhelds can get out 100 miles or so, if conditions are favorable. The order of the day, at least compared to the hf bands, is low power.

You've probably heard repeaters referred to as "one-nine-seven-nine" or just "seven-nine." The numbers refer to their frequencies. A one-nine-seven-nine repeater has an input frequency (the one you transmit on to reach it) of 146.19 MHz. Its output is 600 kHz higher, 146.79 MHz. If you're using crystal-controlled equipment, you'll need a 146.79 MHz crystal to hear this repeater and a 146.19 MHz crystal to access it. The input is 600 kHz higher than the output for repeater channels above 147 MHz. A seven-five-one-five repeater, for example, refers to 147.75 MHz input, and 147.15 MHz output.

Just about all 2-meter repeaters in the U.S. and Canada use this 600-kHz separation. In all, about 60 repeater channels, or separate frequencies, are available.

Like anything else man-made, repeaters don't just grow on mountaintops. They're usually built and maintained by clubs. Most repeater clubs allow all comers to use their repeaters, but some don't.

A good example of an "open" repeater is WR4AAF in Jacksonville, FL. If a visitor to the area strikes up a conversation with a club member, he might be treated to a recording that welcomes him to the area. Another tape lists other area repeaters.

Not all repeater clubs go to such lengths to encourage newcomers and visitors to use their machines, but most will be glad to hear from you if you're new in town or just getting on the 2-meter band. The transmitter of most repeaters is accessed, or "keyed," by the presence of a carrier on its input frequency. "Closed" repeaters are financed and operated by a group of amateurs mainly for their own use. You probably won't be able to key a closed repeater unless you know its access code. Such a code might be a tone burst, a whistle, or a subaudible tone frequency sent continuously.

Another quirk of just about all repeaters is the time-out feature, required by the FCC for all remotely controlled repeater stations. As a result, most machines will cut off after three minutes of continuous use. The timer resets when a signal disappears from the input frequency. Most repeaters have three-minute limitations, but some are as short as 30 seconds.

Many repeaters have a special circuit that allows users to interconnect with telephone lines. Autopatch, as it is called, is a great convenience, and is indispensable in emergencies. It requires an add-

Table 1
Repeater Terminology

Autopatch — Electronic device for interfacing the repeater with the phone lines.
Carrier Tail — Repeater carrier that remains after transmitting station stands by (must drop out in less than five seconds).
Channel — Operating frequency of the repeater, or frequency used by two stations communicating on simplex.
Circulator — Device placed between the repeater transmitter and the duplexer or antenna to permit transmitted signal to reach the antenna, but to prevent signals coming down the feed line from entering the last stage of the transmitter. Also known as an isolator.
Closed Repeater — Repeater financed and operated by a group of amateurs for their private use. Non-members usually are not welcome.
Control Station — Committee member of the repeater group or club who is authorized by FCC to control the repeater remotely by wire-line or radio.
COR — Carrier-operated relay. Used to activate and turn off repeater transmitter at the beginning and end of transmissions. Also called "squelch relay."
Duplex — Simultaneous transmissions between two stations using two frequencies.
Duplexer — Passive device used to permit the repeater receiver and transmitter to operate at the same time, and while employing a single antenna and feed line.
Frequency Synthesizer — Electronic device for generating control frequency by digital techniques.
Full Quieting — A receiver condition during which the received signal is strong enough to fully silence the internal noise of the receiver.
High Band — 148 to 174 MHz. Also, the 2-meter band.
Intermod — Intermodulation distortion (IMD) in receiver front end or transmitter PA stage caused by nonlinear operating conditions. Causes spurious signals to be heard or transmitted.
Low-Band — 30 to 50 MHz. Also, the 6-meter band.

Machine — Repeater station or remote base.
Narrow Band — Fm receiver or transmitter characteristic when adjusted for narrow deviation amounts (generally 5 kHz).

Open Repeater — Repeater available for use by any licensed amateur, club member or not.

Oven — Voltage-operated heating element used to house transmitting and receiving crystals to maintain a relatively constant operating temperature.

Picket Fencing — Flutter on a mobile signal as the transmission path is blocked or reflected momentarily by trees, utility poles or other obstructions.

PL — Private Line, A Motorola trade name. Specific, continuous tone that must be transmitted to activate repeater.

Remote Base — A remotely controlled station, usually operating simplex.

Simplex — Alternating transmissions between two stations using the same frequency.

Split Channel — Repeater frequency pairing that is not 600 kHz in separation, or pairing that does not conform to accepted national pairings.

Squelch Tail — Noise burst transmitted by repeater between transmissions (normally less than one second in duration).

Timer — Electronic or mechanical device at repeater which limits each transmission to three minutes or less. Resets only when signal disappears from input frequency.

Tone Access — Method of preventing a repeater from being activated unless a specific tone frequency is transmitted at the beginning of a transmission. Also called whistle-on.

Tone Burst — Short-duration tone used to turn on tone-access repeaters.

Touch-Tone Pad — Trade name of a device that allows access to a repeater's autopatch facility.

Vault — Building used to house repeater.

Wide Band — Transmitter or receiver characteristic established for receiving or transmitting wide amounts of deviation (usually 15 kHz).

on accessory to your transceiver, called a Touch-Tone pad.

How to Operate on Repeaters

The first time is always the toughest. You hit the push-to-talk button and sing out your call sign. "WA1ZUY Interim BS Mobile 1, listening eight-eight. Anyone on frequency?"

Absolute silence. Where is everyone? It's Saturday afternoon! I try it again and get an answer right away. Or so I thought. "This is W1JOX. The station who just called, you're not getting through. Try hitting the transmit switch a little harder."

"W1JEX this is WA1ZUY interim BS mobile one. OK, thanks, guess that was my problem. How's this?"

"My call is W1JOX, W1 Juliet Oscar X-Ray. Name here is Jack. You're fine now. I'm located in East Hartford. What's your name and location?"

"W1JOX this is WA1ZUY Interim BS Mobile 1. Real fine, Jack. Name here is Joel, and I'm heading east on Rte. 84 in West Hartford. Uhh . . . Back to you,

Jack. WA1ZUY this is . . . Ahh . . . W1JOX this is WA1ZUY Interim BS Mobile 1."

"Yeah, Joel, well I'll let you go now. Nice chatting with you and 73. WA1ZUY Interim BS, W1JOX signing clear on eight-eight."

At that point I wasn't sure if I was supposed to say anything or not. I didn't.

That first, halting QSO taught me some basic rules of operating: Hit that PTT (push-to-talk) button with authority, always give the call sign of the station you're calling first, and avoid cluttering up the repeater with long, dragged out i-ds each time you transmit. (You need only identify yourself at the start and finish of each QSO and every 10 minutes in between.) I look back with pride on the one thing I did really well that first time into the local machine, however. With the airwaves as crowded as they are, one should keep QSOs short and to the point. I'd say I passed that test with room to spare!

What are some other good operating practices on repeaters? Pausing a few

seconds before transmitting is a vital one. If someone is trying to break in, it's the only way he or she can do it. Emergencies don't wait for long QSOs to end! Giving others a chance to join in is a common courtesy, emergency or not.

When you want to get on, and things are quiet, in most areas of the country you won't call out "CQ" on 2-meter fm. A simple "This is WD6PDQ listening seven-nine" gets the point across that you're looking for someone to talk with.

Signal reports are better described than coded on a repeater, so you won't hear, "Your RS is 58, OM." You may very well hear something like "You're not quite making it into the machine," which describes a noisy, intermittent signal. So does "You're 50-percent full quieting (referring to the point at which the receiver's internal noise is silenced). "Picket fencing" means the signal is fluttering because of obstacles in the line of sight between the transmitter and the repeater.

When you're dealing with signal reports and such, keep in mind that you are transmitting through a repeater. If you know its general location, you'll have a better idea of potential problems.

Not all 2-meter fm activity takes place through repeaters. Although there are more than 3000 repeaters in the U.S. and Canada, 2300 of which are 2-meter machines, some are severely overcrowded. For this reason, 2-meter activity in metropolitan areas is often *simplex* or point-to-point on a single frequency. Simplex operation is encouraged, in fact, whenever it isn't necessary to use a repeater. A common standard simplex frequency is 146.52 MHz; if you want to use simplex, try 52 first, and you're likely to find someone else monitoring. In congested areas, contacts are first made on 52, then moved to another simplex frequency, where there's less competition for air time.

There's More to 2 than FM

Spurred on by the OSCAR satellites and the radio amateur's traditional need to explore the unknown, 2-meter DXing has become an ever-more-popular pastime. Snaring DX is a bit more painstaking than on 80 meters on a winter's evening, but well worth the effort. Most 2-meter DXing is with either cw or ssb. Narrow bandwidth, high power, and sensitive receiving equipment makes this "weak-signal" work possible. A brief look at each type of 2-meter, weak-signal operating follows.²

OSCAR, which stands for Orbiting Satellite Carrying Amateur Radio, is the name given to a series of spacecraft that have been orbiting the earth since 1961. The newest OSCARs use 2 meters as both input and output frequencies (signals sent up to OSCAR 7 on 2 meters are converted to the 10-meter band, and signals sent up



When organizers of the National Wheelchair Games asked a group of San Jose, CA, amateurs for assistance recently, they were happy to provide it. An extensive network of 2-meter mobile and portable operators ensured that communications and transportation went smoothly during the event. Here, Jack, K6XS, keeps in contact with another volunteer with a 2-meter backpack.

on 432 MHz come down on 2). Contacts have been made through OSCAR 7 between Washington, DC and Hawaii, but its normal range is from 200 to 4000 miles. You can use ssb and cw through OSCAR, but a-m and fm are too wide to be efficient uses of the satellite's transponder (repeater). OSCAR is available for two-way contacts to anyone with at least a Technician class amateur license.³

Ionospheric conditions affect 2-meter DXing in a variety of ways. Tropospheric openings (actually a misnomer since the activity takes place elsewhere in the atmosphere) are caused by temperature inversions. When a mass of cold air sits above a body of warm air, the boundary between them may refract (bend) radio signals, causing beyond-the-horizon contacts.

Tropospheric ducting is another type of 2-meter propagation. It may cause a distant repeater to suddenly come in as clearly as if it were local, then just as suddenly drop out.

Auroral propagation can result in 2-meter contacts of 200 to 700 miles. It is accomplished by bouncing signals off the aurora, curtains of intense ionization in northern or southern latitudes. Cw is the most common mode of operating, since voice signals are highly distorted.

Another way inventive vhfers send their signals over great distances is by working meteor scatter. In this mode, ionized gases left in the wake of a meteor reflect the waves. Meteor scatter enthusiasts can be found checking astronomical charts for periods of intense meteor activity.⁴

Moonbounce, mentioned earlier, has come within the reach of most amateurs in recent years. While it still takes quite a bit of power and a good antenna and receiv-

ing system to reach the moon and hear your signal come back, it is much easier to do than it used to be. The longest recorded moonbounce contact took place between Sweden and New Zealand. Much moonbounce activity, also called EME for earth-moon-earth, is done on cw, although ssb is used as well.⁵

Next month's article will survey the wide range of equipment available to the 2-meter fm enthusiast. A subsequent series of QST articles will explore each of the vhf and uhf bands in detail, and will include a survey of equipment used for weak-signal work on 2 meters.

Footnotes

¹For a good discussion of propagation, see *The Radio Amateur's Handbook*, 1978, 35th ed., ARRL, pp. 559-572. A more basic treatment can be found in *Tune in the World with Ham Radio*, 2nd ed., ARRL, 1977, pp. 72-73.

²A detailed discussion of beyond-the-horizon vhf propagation can be found in *The Radio Amateur's VHF Manual*, 3rd ed., ARRL, 1972, pp. 17-23. Reports of band conditions and 2-meter DX openings appear in each month's QST column, "The World Above 50 MHz."

³Further information about operating through and equipping a ground station for OSCAR can be found in *Getting to Know OSCAR — from the Ground Up*, ARRL, 1977.

⁴See Stewart, "VHF DX via Meteor Scatter," QST, December, 1977, pp. 31-32.

⁵Recent articles in QST dealing with moonbounce include: Kearman, "An Introduction to the World Above 50 MHz," November, 1977, pp. 13-18; and Morris, "K2UYH — Moonbounce WAC," September, 1976, pp. 57-60. A bibliography of QST articles dealing with moonbounce is available from ARRL hq. for a business-sized, self-addressed, stamped envelope.

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The Radio Amateur's VHF Manual, ARRL, 3rd ed., 1972.
 Stewart, "VHF DX via Meteor Scatter," QST, December, 1977.

FCC Drops 220 Restrictions

The FCC has announced that the restrictions on the use of the 220-MHz band for portions of Texas and New Mexico have been dropped. Heretofore amateur stations were restricted from using 220-225 MHz while engaged in normal amateur operations between the hours of 0500 and 1800 local time Monday through Friday inclusive, of each week in those portions of the states of Texas and New Mexico in the area bounded on the south by parallel 31°53' N., on the east by longitude 105°40' W., on the north by parallel 33°24' N., and on the west by longitude 106°40' W. Thus, the Amateur Service is now allowed to operate on the 220- to 225-MHz band in all portions of the United States, subject to the continuing restriction which prohibits harmful interference to the Radiolocation Service. Since this action was essentially noncontroversial in nature, the Commission ordered that it become effective December 12, 1977, without the customary waiting period.

FCC DENIES "HFer PETITION"

R. H. Watkins of Santa Ana, CA, requested that the FCC establish a new "Special Radio Service" between 27.505 MHz and 27.900 MHz (RM-2776). The proposed Special Radio Service would utilize single sideband suppressed carrier emission (A3J) and would employ "amateur type transceivers" for communications. A prospective licensee in the Special

*Public Information Officer, ARRL

Radio Service would be required to pass written and oral examinations before being issued a license. The commission noted that it had received a number of comments supporting Mr. Watkins' proposal.

In turning down Mr. Watkins' proposal, the Commission made the following observations:

"The Commission is aware of the interest of some individuals in the creation of a radio service similar to the one proposed by the petitioner. We are also aware that there are already a number of people illegally engaging in precisely the sort of radio operation petitioner advocates. Such illegal operation, the possible penalty for which is a year in prison and a \$10,000 fine, is openly encouraged by a number of organizations. The complete disregard for the law of those operating radio equipment illegally on the frequencies immediately above and below the frequencies allocated to the Citizens Band (CB) Radio Service (26.96 MHz-27.41 MHz) is a source of continuing and deep concern to the Commission. . . .

" . . . It is clear that petitioner's proposed Special Radio Service would be principally a hobby service. A hobby service similar in most respects to petitioner's proposed service, the Amateur Radio Service, has existed for many years, however. The Amateur Service is allocated frequencies throughout the radio spectrum, including 28.0 MHz to 29.7 MHz and is intended to fulfill the communications requirements of individuals such as Mr. Watkins. The type of radio service petitioner

requests plainly conforms to the definition of "Amateur Service" found in Article I, Section II of the Radio Regulations of the International Telecommunication Union, and anyone operating in such a service, whatever its name, would by definition be an amateur radio operator. Because the Commission is generally obligated by Section 3(1) of Article 41 of the Radio Regulations to license as amateurs only those persons qualified both technically and in the sending and receiving of the International Morse code, it appears we are precluded from creating a new radio service of the type requested. Mr. Watkins' request is therefore not feasible."

The Commission did not stop at merely dismissing the petition on the grounds that it would violate international treaties, but went on to make the following comments.

"Even if we were lawfully permitted to create a new Special Radio Service (which would more accurately be described as a high-frequency Amateur Service without a telegraphy requirement), we would not be inclined to do so. The frequencies petitioner suggests for allocation to the Special Radio Service are allocated currently in the United States to the Industrial Radio Services and the United States government. We are not persuaded that allocation of these frequencies to a quasi-Amateur Service would serve the public interest. To re-allocate frequencies now allocated to the government would require extensive coordination with the Executive Branch and the Interdepartmental Radio Advisory Committee. The type of service requested does not warrant such action. We only recently re-allocated many of the frequencies in the 27-MHz band, previously available to the Industrial Services, to the CB Service. These factors, as well as the large number of frequencies already available for hobby communications, lead us to conclude that favorable action on petitioner's request is not warranted."

"In summary, although we recognize the wishes of some people to engage in amateur-type communications without having to suffer the limited inconvenience of learning the international Morse code, we believe such communications are appropriate only in the Amateur Service. We strongly emphasize the complete illegality of so-called "HF" operation, and we will continue to do whatever we can to eliminate such operation. We encourage all persons engaged in illegal operation above and below the 27-MHz Citizens Band to terminate operations at once. Those failing to do so run the risk of possible fine and imprisonment."

AMATEUR APPLICATIONS OF HF OPERATORS DESIGNATED FOR HEARING

The FCC has designated amateur radio applications of three former CB licensees for hearing. The three applicants are Philip Karlin,



WBØFND, who did great work with the ham station at the Missouri State Fair, and WBØMUU, who helped more than 100 Novices with their code in the past year, were presented special Midwest Division awards by the Director, Paul Grauer, WØFIR. From left: WØFIR, SCM KØRWL, WAØKDE accepting for WBØFND and WBØMUU. (WØHSK photo)

Sayville, NY; Horace A. Landry, Fern Park, FL and Walter J. Taubenkrau, Eugene, OR. The three applicants' CB licenses were revoked for operating outside the terms of their licenses. In addition, they had been members of HF International, an organization that the FCC found promoted unlicensed and otherwise illegal operation. The applications were designated for hearing because the conduct resulting in revocation of their CB licenses also raised serious questions regarding their qualifications to be Amateur Radio Service licensees.

In a somewhat related matter, the FCC has revoked the CB license of Ellsworth L. (Red) Wells, originator and former principal officer of the State of Florida Sidebanders Association, which is also known as the "27W" or "27 Whiskey" club. As "Base Control" of the organization, Wells was responsible for assignment of 27W numbers to members as well as writing and distributing a newsletter that included organization rules promoting operation by CB licensees in violation of the FCC rules.

Although we at Headquarters have no concrete proof that any licensed amateur is involved in "HF" operation, we have received a number of complaints from other amateurs around the country that there are a few misfits in our ranks. Even though ARRL has no "police powers" of its own, it is dedicated to maintaining the long tradition of the Amateur Radio Service being one of the "cleanest" services; therefore, we are forwarding to the FCC any evidence that we receive of an amateur operating out of band. It is obviously a very small number that engage in this activity, but there is no room in the amateur service for even one operator who consistently and willfully operates out of band, regardless of his rationale.

DOC INSTITUTES POINT-OF-SALE CONTROLS

The DOC has instituted point-of-sale controls over external rf amplifiers in an effort to keep



Central Missouri Radio Association (CMRA) President Mike Hagen, WBØEYV, receives Charter of Affiliation from Midwest Division Director Paul Grauer, WØFIR, at recent CMRA "Charter Party."



Bluegrass Amateur Radio Club officers with the "Amateur Radio Week" proclamation: (l-r) Dan Dolan, K4RN; Russ Watjen, WB4PSB; Sam Humphries, WA4KKV; Sandy Tyser, K9EWW/4; Ron Pujla, WA4OEB and Ed Bono, WA4ONE.

these amplifiers out of the hands of the General Radio Service operators (Canada's CBers). This procedure (see *QST* for April, 1977, page 74) is somewhat similar to those recommended to the FCC during the recent oral arguments over type acceptance of amateur equipment and banning of 10-meter amplifiers.

FCC OFFICIAL DIES

Harry Fine, W3KYI, FCC deputy chief engineer, died December 5, 1977, at age 65 after a brief illness. Earlier this year he had deferred his personal preference to retire from government service in order to remain on at the FCC as head of the steering committee preparing WARC. Having represented U.S. interests at more than two-dozen major telecommunications conferences as well as having played a major role in the development of domestic and international communications systems, he was a respected and recognized authority in world circles. His amateur friends will miss him.

STAFF NOTES

Stan Horzepa, W1LOU, has joined the Communications Department staff as public service communications assistant. Licensed since 1969, Stan operates OSCAR, 2-meter fm, and 10 and 20 when the bands are open. He holds a BA from the University of Connecticut and a law degree from Western New England College.

FCC ANNOUNCES NEW OFFICE HOURS

In an effort to provide better service to citizens located in the western portions of the country, and to improve liaison with members of Congress, who tend to work late, the FCC changed its official working hours from 8 A.M. until 4:30 P.M., to 8 A.M. to 5:30 P.M., effective January 3, 1978.

BEHIND THE DIAMOND

Norwich, CT, is the birthplace of many notable figures in American history. One is the famous Revolutionary War general, Benedict Arnold. The other, a former specialist five in the U.S. Army, is ARRL staffer Hal Steinman. Diligent research by ARRL early this year uncovered 144 books on Arnold but none on Steinman. We at ARRL believe the time has come to correct this gross injustice.

I asked Hal about his feelings on sharing a common hometown with Benedict Arnold. "Past events don't concern me much. Besides, Arnold and I were never in the same league." Describing Steinman personally, evident immediately when meeting him for the first time is his aplomb. "Who else would pick a call like KIET?" people (normal people, anyway) at ARRL hq. asked. What with phonetics such as "Kiss One Enormous Toad," it is no wonder Extra Class amateurs in Newington croaked at the very thought of it. Hal, much to his credit, leaped at the opportunity.

Steinman grew up in Norwich, attended local schools and went on to higher education at the University of Connecticut where he earned a BA in mathematics. Hal, who never liked windy weather much anyway, was caught in a draft, as it were, upon graduation. Since the U.S. Army was overstocked in mathematicians, it was decided at the Pentagon to employ his services elsewhere. Forthwith, they dispatched our hero to Fort Sam Houston in San Antonio, TX, for medical training. Following successful completion of the course, Steinman was reassigned to another career field at his first duty station — computers. More about computers later.

After discharge in 1972, Hal attended Dartmouth University Graduate School, studying higher mathematics, a favorite subject of his. It was at Dartmouth that Steinman postulated that "Base-eight is the same as base-ten — if you are missing two fingers." He left Dartmouth in 1974 to work for ARRL as an assistant secretary in the old Secretarial Department (now Membership Services Department). In 1975, a crisis developed which could only be overcome by utilizing Steinman's unique skills. The computer programmer writing the



Hal Steinman, K1FHN/K1ET

membership survey to assess members' reactions to Docket 20282 departed the area, abruptly leaving a void temporarily unfilled. Hal stepped into the breach, finished the program in two months and nursed the work along until it came to fruition. "Luckily," he said, "I knew something about computers. I showed the individual operating the computer what needed to be done and stayed up all night doing it!"

In 1975 Hal became the editor for the "Washington Mailbox" column. "ARRL, in effect, interprets the rules," Steinman said, "with FCC approval. Every column must be cleared with them before publication." Despite monthly wranglings with our friends at Personal Radio Division about content, Hal is generally pleased. "The FCC assayed the mood of the amateur community quite accurately. It is a well-read section of *QST*."

His amateur career must be mentioned as it is for everyone featured in Behind-the-Diamond. In 1962, Hal and Dave Sumner, K1ZZ, formed the Kelly Junior High School Radio Club. Then, they took an important step — they got their licenses, Steinman as KN1FHN and Sumner as KN1ZND.

Since those days, our subject has branched out somewhat into other activities. He is presently working on an MBA at UConn, has plans for getting married in the spring of 1978 (watch *QST* for details) and enjoys running.

Hal believes running has great therapeutic value which cannot be achieved in any other sport. He was also impressed with the improvement his mental recall experienced following a three-mile run. "I used to tie strings to my fingers but now, since I began running, I no longer find it difficult to jog my memory."

Most recently Hal gained a certain notoriety when we ran a picture of him and asked our members if they really believed his new office was plush. The overwhelming response was aptly summed up by the following radiogram received at this office from Jay, ME: "ANSWER TO *QST* QUESTION X ITS AS PLUSH AS HE DESERVES 73 BILL."

Some of you may recall that Hal authored this column until recently. When word got around Headquarters that Hal was to be our subject this month, there was a universal request that he should be *punished* just as he had punished others. — *WAITZK*

ARRL IN WASHINGTON

The FCC periodically holds open meetings with representatives of the amateur radio media to exchange information. The first of these meetings was held last spring in Gettysburg,

PA, to acquaint the media (and through them, the amateur community) with the license processing and budgetary problems then facing the Commission. The second, held last summer in Washington, DC, dealt with rulemaking issues and procedures and FCC structure. The third, held November 30 in Washington, saw the FCC requesting guidance on the priorities which should be placed on the various services to be performed for the Amateur Radio Service by the Commission's Personal Radio Division. The League's representatives were General Counsel Booth, Assistant General Manager Sumner, *QST* Contributing Editor Tynan, and Washington Coordinator Steinman.

In response to the Commission's request for guidance, the League's representatives pointed out the importance of continued attention to the amateur examination process: improved Novice exams which would be more a test of knowledge and less of test-taking ability, and Advanced and Extra exams based upon the new syllabus (exams now in use are nearly 10 years old, although a revised study syllabus was put into circulation 18 months ago). Protection and encouragement of specialized experimental activities such as moonbounce, beacon stations, and ASCII teleprinter code was also supported by the League and others. A gentleman who identified himself as Richard Cooper of the Communications Attorney Service was also present and provided the group with a different perspective on a number of issues.

Oral argument in Dockets 21116 and 21117, the banning of external amplifiers and type acceptance of amateur equipment, followed the next day, December 1. Denny Had of Dentron opened the session with a lucid presentation on the difficulties that the proposal would present to the small companies. ARRL General Counsel Booth then argued that the proposals simply would not work in alleviating the interference problem. He suggested as an alternative the RFI bills currently before Congress. Pete Sodolski of EIA described linear amplifiers as a curse and suggested that any measure to eliminate them would be helpful (Mr. Sodolski was the only participant to argue for the proposals).

Allen Robertson of Heath stated that type acceptance would not help the problem (interference) and that if it did come to the Amateur Service, then Heath will have to drop 12 products, spend \$2,000,000 on redesign and



A set of ARRL publications has been donated to the Neill Library, Pultman, WA, by the Washington State University Amateur Radio Club. From left: Ed Schweitzer, W7KOW, director of instruction for the club; Alice Blackburn, head librarian; and Dan Ransom, K7MM, club president.



Stan Horzepa, WA1LOU, is the new public service communications assistant in CD.

lay off 200 employees during the process. Dave Hilliard of R. L. Drake characterized the problem as one of marketing, needing a marketing solution. He pointed out that Canada already has point-of-sale controls for external amplifiers and suggested that such a procedure would be much more effective. Richard Wilder, K3DI, a research engineer in electromagnetic interference, said the proposals would merely lead to a black market. He suggested that the FCC could have a WATS line to receive tips on violators and could then split the fines between informers and the government, as IRS already does.

SECONDARY LICENSES SUPPORTED

In testimony presented to the House Subcommittee on Communications in late October, ARRL President Harry Dannals, W2HD, provided a strong argument for the retention of secondary station licenses.

"In addition to the ever-increasing number of stations who are radio amateurs, some older, more affluent, or retired amateurs maintain seasonal homes in different sections of the country, each containing a complete amateur station. The reasons for separate licenses are as valid today as in the early days of radio. In fact, the reasons today may be even more valid. Sources of interference must be promptly pinpointed, particularly if there is the slight chance of interference to reception of aviation navigation signals or to public safety operations. Invariably, one residence is unoccupied when the other is occupied. If the primary station is licensed to the unoccupied location, mail or other communications might not be forwarded, at least promptly, to the other residence. Separate licenses prevent such a failure to receive important communications. In this regard, a number of amateur licenses are revoked each month for failure to reply to official communications from the Commission as required by Section 1.89 of the Commission's Rules. At present, the only way other than by obtaining a secondary station license that an amateur licensee can meet his obligation to notify the Commission of his correct mailing address is to submit a letter, in accordance with Section 97.42, every time he goes from one seasonal residence to another. How much easier, for Commission personnel and licensee alike, it would be if separate permanent addresses could be maintained for the separate stations! Far from reducing the Commission's work load, the proposal to eliminate secondary station licenses would, in fact, exacerbate the Commission's administrative and enforcement problems."

Joint DOC/CRRL Meeting

In a conference session at the Parliament building during the latter part of 1977, CRRL officials Hesler, Loucks and Benson met with Minister of Communications the Hon. Jeanne Sauve and DOC department heads. The discussion touched on topics of vital concern to all amateurs — among them, the newly proposed Novice and Experimenter license classes, radio frequency interference, and tower-zoning restrictions placed by local ordinances. League officials, pleased with the continued and enthusiastic support of the Amateur Service by the minister and her department, described the joint meeting as both productive and cordial.

Advancing the State of the Art

While emphatic in her praise of the Canadian Amateur Experimental Service, the minister did point out that the Amateur Service needed to be tolerant and supportive of changes dictated by the times. The inference was that perhaps the amateur had, in general, become somewhat complacent. This, of course, underscores one of the very reasons for the proposed Experimenter class of license. The Department hopes to infuse certain extremely well-qualified, technically oriented amateurs into the ranks to enhance its continued justification as an experimental service.

At the meeting's conclusion, Director General John deMercado of the Telecommunication Regulatory Service indicated that DOC was now prepared to implement the proposed Experimenter license to vhf-and-above privileges only. This supports the continued position and recommendation of the CRRL from the outset.

Proposed Novice License Tabled

On a more distressing note, Dr. deMercado stated the Department's intention to "table" the proposed Novice license. Director Hesler advised conference members that the League could not possibly endorse this move. He forewarned participants to anticipate further argument in favor of the Novice license at the Ottawa Amateur Radio Symposium.

RADIO INTERFERENCE REGULATIONS

It is now official. Sections 3 and 4 of the Radio Interference Regulations have been revoked and new sections substituted. Under these latest regulations, no one can sell any equipment unless it has been suppressed or, in cases where regulations prescribe radio noise limits, the equipment exceeds those limits. Additionally, it's illegal to sell or use an external power amplifier to boost the output of a station performing a General Radio Service. Dealers and others can not sell such power amplifiers without both seller and purchaser filling out certain forms. Completed forms must be for-

*Director, Canadian Division



Viewing the equipment recently purchased by the Lions Club of Armdale, Fairview and Rockingham are (l-r) VE1RO, VE1OM and Earle Whoare, chairman of the amateur radio project.

warded to DOC within 10 days from the date of sale.

On the subject of interference, it is certainly no secret that because of the inclusion of the 11-meter band on some Yaesu equipment in Canada, GRS operators have purchased such equipment for operation on 11 meters, and probably elsewhere. Protesting this matter to the general manager of Yaesu Electronics Corporation, Director Hesler just received the following notification: "Good news — Canadian Yaesu's will not have 11M on them any more. Credit yourself with proving what good industry/ARRL relations can do!"

CANADIAN RADIO TECHNICAL PLANNING BOARD

Of special note to the ever-increasing problem of interference is the reactivation of the EMI Committee of the CRTPB. Long-time board member, the CRRL has been acknowledged for League expertise in amateur RFI problems with Vice Director Loucks' appointment to this key committee. As a professional engineer and executive with Ontario Hydro, Bill Loucks takes with him his own impressive credentials to serve on this committee.

CANADIAN INTRUDER WATCH

How are the amateur frequencies protected from violators operating in exclusively amateur allocations or from commercial stations whose

spurs and/or harmonics may wander into the amateur bands? Through the folks of the CRRL Canadian Intruder Watch. Performing basically an IARU function, they identify stations breaching ITU regulations pertaining to the amateur frequencies. Once they've identified an offending signal and have determined its frequency, they fill out a card, reporting the trespasser to DOC, with a copy mailed also to CRRL. Currently, more than 600 dedicated stations participate in the IW worldwide, 33 of these in Canada under program National Coordinator Donna Hesler. Can you spare a few hours weekly to join the effort to keep the amateur bands clear of intruders? If you're interested, please write VE1YX at CRRL hq. for complete information and an application form.

WARC DONATION TO CRRL

The Scarborough Amateur Radio Club 1977-ARRL National Convention committee voted unanimously at its last meeting to earmark any surplus convention funds toward defending amateur frequencies at the 1979 World Administrative Radio Conference. Accordingly, the CRRL recently received a cheque for \$1150, with the request to remit these funds to the special ARRL account for WARC support. Your Director was most pleased to present this gift to the ARRL at the Executive Committee's fall meeting. We are most grateful for this thoughtful contribution from the Scarborough 100 Percent Club.

POTPOURRI

□ Our congratulations to Walter Dolphin, VE2TD, for his extremely well-written and edited *independent* ham radio publication "The VE2TD News Letter." This publication usually runs to around 22 pages. If interested, write for a sample copy and full information. VE2TD, by the way, received a Division Certificate of Merit last year for his contribution to the welfare and progress of amateur radio.

□ Recently, the Lions Club of Armdale, Fairview and Rockingham (NS) purchased a complete ham station to extend their public-service activities. The station, VE1LCR, is located in the home of whitecaner Camille Maillette, VE1RO. License custodian Doug Johnson, VE1OM, is responsible for the station's technical operation. For three years running, the Lions Club — with VE1RO as operator — has undertaken one-day blitzes to QSO as many other Lions clubs worldwide as possible.

□ In the past, Canadian clubs and individuals have been sending news information and pictures direct to the ARRL in Newington. We now request that such information be directed to VE1SH, P. O. Box 419, Sackville NB E0A 3C0, as editor of this news page. Sending it to ARRL hq. will only result in a delay.

Correspondence

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

DAVID AND GOLIATH

□ My congratulations and sincere appreciation for your efforts in the recent FCC proceedings on its Class E CB proposal. — *Clifton Parker, ex-ICBT, WIKJG, Morrisville, VT* . . . All amateurs should appreciate your help on the 220 deal, but to say 220 CB is dead is a bit premature. — *Bruce Frahm, K0BJ, Colby, KS* . . . What a pleasant relief. My hearty thanks to ARRL for its successful fight to keep "Smokey reports" off our bands. — *Ted Kankas, W8HV, Ishpeming, MI* . . . A fine victory, but I believe that the battle is still only half-won. The League deserves kudos for its part. In addition, W6VMY deserves a share of the credit. He played an enormous role in the development of 220 operation here in the Bay area. — *William Osler, N6FF, San Jose, CA* . . . I discontinued my membership in anger of the incentive licensing plans (1966); however, with the 1979 WARC approaching and the efforts being made by industry to open portions of the amateur frequencies to CB operations, I must push my feelings about incentive licensing aside. The League is in the best position to serve the amateur in our struggle to keep our frequencies and I wish to be amongst those who support the League in this effort. — *David Hough, K0VMO, Minneapolis, MN* . . . I wish to see all amateur operator licensees have the privilege of using all amateur frequencies regardless of class of operator license. — *Jack Seymour, W9PM, Rockford, IL* . . . Incentive licensing, oft lamented, spawned new generations of Extra Class operators. It gives amateur radio the aspect of "double pyramid," with one point sticking up and the other point resting in the ground, not a very good architectural practice! A no-code license, properly administered and "self-policed" would definitely broaden the base of the amateur radio structure. With its position enhanced by this 220 decision, ARRL should flex some muscle to get a good set of no-code test rules. — *William Osler, N6FF, San Jose, CA* . . . The simplest way to remove the unlicensed use of the hf bands is to remove the code requirement from some of the bands. Code being a requirement in this age is about the same as moving Class D CB to 220. — *R. Scappatura, WB2AGF, Port Chester, NY* . . . I care very little about the success or failure of CB. The "old" ARRL missed a great opportunity to control it by not developing the 10- and 11-meter bands on a CB-type oriented class years ago. — *Ernest Oman, Santa Paula, CA* . . . The unbiased reports and the FCC's own statements seem to reveal that the unsuitability of the band and uneducated, illegal activity were what killed the plan. That ARRL put in a 3/4-pound "brief" probably contributed less than the individual hams and other parties accomplished. — *J. R. Lorenz, WA9RDV, Bourbonnais, IL*

GOING CODELESS THIS WINTER?

□ Let's re-examine the absurd idea of restricting sales of amateur gear to licensed amateurs. You're endorsing an easy way out for the FCC. It's the same as wanting to restrict handgun sales. — *Steve Frohase, WB4UKL, Ocala, FL* . . . It's about time that a firm stand was taken. I will support the dealers and manufacturers who subscribe to the Code of Ethics and refuse to repair any amateur transmitting equipment that is not owned by the proper people. — *David Schmarder, N2DS, Corning, NY* . . . Some dealers on the West Coast are selling rigs to people with ocean or cruising boats. They tell these people they can use these rigs as long as they use a fancy call. — *Keith Olson, Belfair, WA* . . . ARRL in its own inimitable way has attempted to slow down the flow of equipment into the wrong hands. It's too bad there are detractors who claim this is restraint of trade. Sure it is.

It's restraining radio gear from getting into the wrong hands, slowing down gear to be used illegally. Why would anyone but a licensed amateur need an amateur transmitter? I support ARRL's intent to prevent the destruction of amateur radio by the greedy. I prefer to buy from those companies that care for the future of this great hobby. — *Jerald Malin, WB2LEI/WR2ABS, Endwell, NY*

FOR SERVICES RENDERED

□ We at the Salvation Army would like to express our appreciation to the "ham radio" operators throughout the world for their support of the Salvation Army in times of disaster. May God bless you! — *Major Jack Waters, Disaster Relief Coordinator, Atlanta, GA*

□ On behalf of the members of the Springfield Amateur Radio Club I would like to thank you for a very enjoyable and informative presentation. . . . We appreciate having a director as good as Mr. Egbert. — *John Bauer, WB8ZUW, Springfield, OH*

□ Many thanks for resuming the publication of our AMSAT PHASE III "ad" in QST. The response has been excellent and has brought in over \$25,000 in donations in the past six months. — *Perry Klein, W3PK, Washington, DC*

□ I was surprised to receive the copies of our club papers that the ARRL had on file. I had not realized such were available. They will be very helpful in getting the history of our club put together. This proves that our club paper is read by your folks and that you go over and beyond the "call of duty" to provide excellent services to your affiliated club members. — *Sheldon Davis, W3FVU, Indiana, PA*

□ As a new secretary of QCWA I have suddenly become very careful in reading every line of print emanating from our Headquarters. QCWA News says you can furnish me with Radio Club News. As a member of the League, but still a ham who reads QZ with interest, this particular matter serves to again illustrate that much goes on in the ARRL beyond creating QST and a huge building. — *Fred Adsit, W2Z0J, Syracuse, NY*

□ I'd like to thank the entire Headquarters staff for the excellent job being done in providing frequent code practice via W1AW, up-to-date license study material, promotion of growth in amateur radio and representation of amateur interests before the FCC. — *Stephen Sorton, N0ST, Colorado Springs, CO*

FLOODED

□ I was disappointed with the Johnstown article (QST for December, 1977). Unfortunately, you elected to exploit the negative and ignored the good done by the majority. — *Ned Mountain, N8NM, Medina, OH*

□ Your honest coverage of this sad story makes me hope that I can someday do the job we hams should be confident of doing when called upon by victims of such emergency. — *William Dunleavy, WB3EKJ, Frankville, PA*

□ I had a rather frustrating experience with the Johnstown emergency, and this report shows me why. — *Roscoe Davis, WA9TJS, Clarksville, IN*

□ My own experience in the Johnstown emergency is very much in line with the details mentioned in your article. — *George Wintriss, W3UKZ, Carversville, PA*

□ What is so important about using the full call sign when lives are being saved? I believe this increased brevity resulted in enough increased efficiency to save additional lives. Why are you emphasizing Band-Aid solutions to real problems? SET participation has little or nothing to do with proper operating in a major disaster. . . . Ham radio was caught up in the political ballgame as surely as all the other relief efforts were. . . . If you think it's bad that the hams went on wild-goose chases, you should have seen an entire surgical team be airlifted as a result of bad advice coming over nonham communications. This man is using his own yardstick to measure our performance. — *Bill Rogers, N3WR, Johnstown, PA*

[Editor's Note: More on Johnstown in an upcoming issue of QST.]

SOME FEELINGS FOR BASICS, OR YOU LIGHT UP MY LIFE

□ When December QST arrived, I looked at the first seven articles in dismay. I've been licensed since 1945 and who needs this basic stuff about tube receivers and shopping at hamfests much less how to adjust a straight key. However, I must congratulate the authors of all those "basic" articles as well as the QST editors. This kind of interesting, useful reading not only steers newcomers in the right direction but serves to remind some other hams that life isn't all frequency synthesizers and 3-500Z finals. — *Julian Jablin, W9IWI, Skokie, IL*

□ Kudos to Jim Bartlett, WB9VAV, on his fine article "Tuning Up a Transmitter." As a kid experimenting with shortwave transmitters, there were two things I could hardly believe: (1) max radiated power would actually correspond to a dip in plate current, and (2) that it would ever be possible to light a 100-watt light bulb with a standard, air-dielectric variable capacitor in series. — *William Coady, San Francisco, CA*

MARCONI NEVER RAN A kW!

□ It seems to me that all of the latest innovations and breakthroughs are of very little value if they are not applied in a no-nonsense way. The article concerning the one-half spectrum requirements (QST for December, 1977) denotes a significant breakthrough and advancement for amateur radio. BUT, are there things ALL amateurs could do to enhance the usefulness of amateur radio? I think so. I am in no way against the privilege of being able to use linear amplifiers. What I am against is the manner in which they are being used. I do not propose that amateurs curtail their usage, nor do I say that they are the backbone of the problems encountered on the bands. What I do believe is that with the terrific influx of new amateurs like myself, the usage of linear amplifiers, with added discretion, might enhance the abilities of the available spectrum space. The attitude of "I can't make full use of my station without one" is ridiculous. — *Larry Meyer, WD8KWK, Kalamazoo, MI*

COMING TO TERMS WITH TERMS

□ Maybe, just maybe, WA2DTC ("Correspondence," QST for December, 1977) can convince his XYL that it stands for "ex-young-lady" in the sense of "one-time girlfriend, now beloved helpmate." — *Byron Davies, WB6ELA, San Francisco, CA*

Silent Keys

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

WIARN, George F. Leal, Sr., Hopkinton, MA
 WIBAB, Warren E. Holmgren, Malden, MA
 WIDVO, Ernest A. Read, Rockville, CT
 WA1EXF, William J. Tracy, Hyde Park, MA
 W1IMU, Oliver J. Lemieux, Johnston, RI
 W11ZJ, Raymond H. Reniff, Ashfield, MA
 W1KHZ, William E. Cain, Warrick, RI
 W1LRD, Walter F. Sheridan, Bedford, MA
 W1LTY, Gordon E. Peterson, Lunenburg, MA
 W1OFG, Albert C. Quinn, Swampscott, MA
 W1VC/W4GS, Richard Baer, Pittsfield, MA
 W1WJN, Raymond P. Hall, Plymouth, MA
 WA1YPB, Walter I. Emery, E. Bridgewater, MA
 W2ANE, Charles F. Nichols, Webster, NY
 W2EC, Ferdinand C. W. "Ferd" Thiede, Setauket, NY
 WB2ELG, James K. Swyler, Pitman, NJ
 W2FNN, Tibor C. Kovach, West Orange, NJ
 WB2JRU, Raymond C. Kane, Garden City, NY
 W2OHL, John H. Wehner, Totowa, NJ
 W2PTM, Robert R. Welsh, Haddonfield, NJ
 K2QGA, Andrew J. Aldrich, Syosset, NY
 W2TNU, George E. Brunette, Rome, NY
 W31DJ, Lester C. Palmer, Franklin, PA
 WA3KZB, Benjamin B. Rice, Pittsburgh, PA
 W3OZV, Elias B. Clayton, Chester, PA
 W3QW, William I. Taylor, Huntingtown, PA
 W3YD, Thomas Page Brennan, Ingram, PA
 W4CSZ, Russell L. Lewis, Lexington, TN
 WB4DFG, Roy G. Spangenberg, DeLand, FL
 WB4ERS, Max O'Neal, Pine Mountain, GA
 WB4GAU, Robert H. Elliott, Ft. Lauderdale, FL
 W4IRY, Thomas F. "Red" Styers, Farmville, NC
 K4KCP, Elliott A. Ackerman, Tucker, GA
 WB4LPL, Sister Suzanne Williams, Asheville, NC

K4OBO, James P. Oliver, Jacksonville, FL
 WA4TQU, William M. Bragg, Knoxville, TN
 W4TWF, Ernest D. Adam, Sr., Mobile, AL
 K4VP, James D. Fry, Virginia Beach, VA
 WB4SKO, Milton B. Tucker, Martinez, GA
 W4WBV, Franklin A. Sherrill, Crab Orchard, TN
 W4WRQ, J. Andrew Galloup, St. Petersburg Beach, FL
 WA4YGF, Joseph R. Neeley, Atlanta, GA
 W5AAK, William D. Penn, Dallas, TX
 K5FQG, William R. Cunningham, Houston, TX
 W5HBY, R. K. Andrews, Alexandria, LA
 W5MB, Rev. Henry O. Gottschalk, Austin, TX
 W5ZB, Gordon A. O'Reilly, Tulsa, OK
 W6BUJ, Nelson K. Hopper, Redwood City, CA
 WA6FWS, Floyd C. Manchester, Fresno, CA
 WB6GCH, Cecil O. Sawyer, Westminster, CA
 K6HQZ, Lloyd G. Linville, Imperial Beach, CA
 W6INX, Paul H. Steelman, Lakewood, CA
 W6KY, Harold L. Hendricks, Chula Vista, CA
 W6LJ, William K. McIntosh, Red Bluff, CA
 WA6QXI, Robert B. Mundt, Hermosa Beach, CA
 K6TAA, Frederick O. Penniwell, Pacifica, CA
 W6UPK, James M. Raidy, Lakewood, CA
 W6VAA, Henry Y. Satterlee, LaCrescenta, CA
 W6VMC, Donald J. Guy, Inglewood, CA
 W6VNC, Logan T. "Bud" Waterman, Broderick, CA
 W7ATX, Jaret K. Morrow, Mesa, AZ
 K7DM, Lawrence W. Mallach, Newport, OR
 W7DXK, Thomas E. Ward, Great Falls, MT
 W7IGI, Charles J. Barnhart, Redmond, OR
 Ex-7NI, David T. Wersen, Los Angeles, CA
 WB7NKI, Robert L. Burns, Newman Lake, WA
 K7NUO, Rev. Cornelius O'Connor, Buffalo, WY
 WA7QBV, Robert E. Howell, Tucson, AZ

W7TCH, Floyd W. Seward, Dallas, OR
 W8IBP, Robert J. Howey, Detroit, MI
 WB8JFP, John R. Jones, Toledo, OH
 W8NFP, Charles E. Sollers, Sr., Mogadore, OH
 WB8RYM, Donald R. Armontrout, Cincinnati, OH
 W8ZMA, Vincent B. Diebold, Cincinnati, OH
 WB9AZZ, Atif Fred Elkholly, DeKalb, IL
 K9CFZ, Frederick M. Crandall, Indianapolis, IN
 W9GLF, Leland M. Lund, Roselle, IL
 WB9KRH, Richard E. Myers, Ft. Wayne, IN
 W9OAR, Frank J. Bostjancic, Joliet, IL
 WB9PTF, Father Edward M. McLaughlin, Shelbyville, IN
 WA9YAN, Clifford D. Eiche, Watertown, WI
 WA9ZQD, Harold L. Nielson, Hancock, WI
 WA9ZWI, Ralph E. Melford, Atkinson, WI
 W0AVN, George H. Charlwood, Creve Coeur, MO
 W0BYC, Clarence C. Courtney, Winfield, KS
 W0CCHO, Roy C. Backstrom, Duluth, MN
 K0DHO, Otto L. Wold, Minneapolis, MN
 K0DVN, Kenneth A. Breaker, Wichita, KS
 K0IRM, John Palumbo, Pueblo, CO
 W0JHQ, Harry J. Thielvoldt, Edina, MN
 K0MTI, Dwight A. Sparks, Lynnville, IA
 WA0ONQ, John H. Emmitt, Denver, CO
 WA0PUP, Bemsley W. Conn, Manchester, MO
 VE1EK, A. E. W. Street, Halifax, NS
 VE3BZL, Norbert LaPointe, Naughton, ON
 VE3EUY, Bruce Rowbotham, Cornwall, ON
 VE7PV, Ian F. MacArthur, Saanich, BC
 VE7TM, W. J. Halliday, Vancouver, BC
 HC2LF, Leopoldo Feist, Guayaquil, Ecuador
 Ex-ON4DN, Ghislain Detemmerman, Oudenaarde, Belgium
 ZL3KN, Gordon J. Wilson, Christchurch, NZ

50 Years Ago

February, 1928

- Bev Dudley says a carefully built Colpitts oscillator can be almost as stable as crystal control, especially if you adjust its coupling to the amplifier properly.
- An inexpensive neon lamp is not as dramatic as pulling an arc with pencil lead, but is much more useful in measuring such things as voltage distribution on antennas, efficiency of chokes, etc., according to I.H.
- A solid corps of serious experimenters is working hard to disprove the common belief that "5 meters is no good."
- An article on 6AM was initiated by his novel use of three-phase power to get maximum efficiency with minimum filter (and a "distinctive" note besides), but the story grew to 10 pages of description of an outstanding amateur station.
- WNP of the MacMillan expedition is frozen in up north of Labrador, but is in regular contact with civilization through ham QSOs — 20 meters working better than 40. Expedition members were particularly interested in results of the Dempsey-Tunney fight.
- With multiple stages for receivers becoming more and more common, shielding takes on greater importance, and Ralph Mason of Alcoa reports on the effectiveness of different metals and thicknesses — copper appearing to have only a slight edge over aluminum.
- Many of the troops are unhappy about abolition of 85-meter phone privileges, and the Editor argues that new high-frequency voice bands will be where the future action is.
- Amateur licensees grew 13 percent in number last year.

25 Years Ago

February, 1953

- FCC has abandoned its idea of special calling frequencies, much to everyone's relief, and opened a portion of 40 meters for voice operation for the first time. The Commission also abolished the Class A license requirement for phone activity, an action bemoaned by the Editor since it removes incentive from the licensing structure. A flood of protests in the "Correspondence" section supports the League's view.
- The first recorded amateur communication with transistors took place from K2AH, using a 24-milliwatt rig on 2 meters, covering a distance of 25 miles.
- W0EIU describes the selectivity characteristics of the new Collins mechanical band-pass filters.
- Electronic keys are the rage, and W6SRY makes a great step forward with his "Ultimate," containing a memory circuit.
- Another harbinger of the future is W1GXJ's exposition on the use of ferrite cores for inductance circuits.
- The FCC's plan to establish local TVI committees to alleviate interference to television reception is working well, W3AP reports.
- ZL2IQ touts the stability of the Clapp oscillator, often known as a series-tuned Colpitts, with the additional advantage of simple remote-control tuning.
- Construction details are included this month on the 10-meter, handheld, civil-defense units built in quantity by civic-minded Detroit amateur clubs and individuals.
- W0ELA had a ball as VS5ELA in Borneo. — W1RW

Strays



I would like to get in touch with . . .

- hams who need Allegany County, NY, for a county award on 10 or 15 meters. Jeff Pitzrick, WA2IGK, Rte. 1, Portageville, NY 14536.
- anyone who can tell me my grandfather's call. Henry A. Wulff lived in Brooklyn, NY, until 1938; then he went to Sacramento and Elk Grove, CA. RuthAnn Biel, WB6PHK, 5700 Franklin Blvd., Sacramento, CA 95824.
- hams working the 160- to 190-kHz experimenter's band. Richard Wagner, K4MZE, 1015 Haber Dr., Brentwood, TN 37027.
- stamp collectors for a net, duplicate exchange, and so on. Jim Navary, WA4TZM, 2324 Dominion Ave., Norfolk, VA 23518.
- veterinarians involved in ham activities. Henry I. Alacon, DVM, P. O. 1173, Live Oak, FL 32060.
- an owner of a Phillips B3X75U receiver. Allen Kelly, Jr., Rte. 3, Box 1000-A, Bayouside Dr., Houma, LA 70360.
- those who contacted either W8SCAL (1962-1977) or VE3JU (October, 1974 to March 19, 1977) for replacement QSL cards lost in a fire. Please send via bureau or to Jay Allen, VE3JU/N8JA, P. O. Box 73, Success, SK S0N 2R0.
- fellow hams in commercial broadcasting (DJs, program directors, newsmen, engineers and others) to learn of existing nets, and form a new one or two. R. L. Kocher, WD4ICJ, P. O. Box 678, Daytona Beach, FL 32017.
- Pan American Airways hams, active or retired, for a roster. Please give name; call; mailing address; station based; job title; whether present, retired or former employee; favorite operation, and other calls now held. Bob Williams, K6EMN, 32 Madrona St., San Carlos, CA 94070.

Washington Mailbox

Conducted By Harold M. Steinman,* K1FHN

LOGGING REVISITED

Q. What information is required to be kept in an amateur station log?

A. For most amateur operations, very little information is required. We'll talk about the bare minimum essentials first; then we'll get into the exceptions.

First of all, the log must contain the call sign of the amateur station and the signature of the station licensee. This requirement may be satisfied in one of two ways. The items may actually be entered in the log, or a photocopy of the station license may be substituted for these items. Just paste it or tape it in. (97.103a)

Second, you must enter in the log the location and dates that you initiate and terminate fixed-station operation of your station (97.103b). This scares many people into thinking that every time they turn on the rig they must reenter this information. This is not the case. You do *not* have to make a new entry each time you turn your rig on or off.

Here's an example: Say you receive your amateur license January 1, 1978, and begin operating your station on that date. You should enter the date January 1, 1978 (along with your location), into your log. You may then operate your station at that location for several years without ever entering the date or location in your log again. If you move, that would be considered terminating operation at that location, and you should enter that date in your log.

If you operate your station in portable status at any time, the locations and dates upon which portable operation was initiated and terminated at each location must be entered in your log. (97.103b)

In most instances, that's all the information the FCC requires in a log.

Q. Most instances? What are the exceptions?

A. If the station licensee ever designates some other amateur as the control operator, the date and time periods must be logged, and the signature and primary station call of the control operator must be recorded in the station licensee's log. (97.103b1)

Additionally, each time a station is used to send or receive third-party traffic, a log entry must be made. This entry must include the names of all third parties, and a brief description of the traffic content. (97.103b2)

Q. What if I allow a nonham to speak over my station under my supervision. I am still the control operator. How would I log this?

A. Actually, this is a special case of third-party traffic. Anyone (licensed or unlicensed) other than the control operator, is considered a third

party, and as such anything that he transmits over your station automatically becomes third-party traffic (97.3w). This means that his name must be entered in the log, and a brief description of the content of his transmission. His signature is not required, although it's little bother to include it.

Q. What are the logging requirements for mobile operation?

A. For mobile operation there are *only* two instances in which information must be entered in the log: (1) if the control operator is other than yourself, and (2) if you send or receive third-party traffic. The information required in these instances is the same as that required in a fixed-station log. (97.103b)

Q. What's the difference between portable operation and mobile operation?

A. Portable operation is radiocommunication "conducted from a specific geographical location other than that shown on the station license." (97.3m)

Mobile operation is radiocommunication "conducted while in motion or during halts at unspecified locations." (97.3m)

In other words, portable operation would take place from a specific location other than the address shown on the station license. By "specific" we mean the address does not change from one moment to the next. In mobile operation, the station location is constantly changing, as in driving a car.

The distinction between portable and mobile operation is important because logging mobile operation is simpler than logging portable operation. As stated earlier, you have to log the locations and dates upon which you initiate and terminate portable operation. There is no such requirement for mobile operation.

Q. Aren't the logging requirements for repeater stations, remotely controlled stations, control stations, and auxiliary-link stations a bit more complicated than those requirements you've discussed so far?

A. Yes, they are. They're not all that complicated, though. In fact, they are "one-time" entries that need only be entered in the log at the start of station operation, and amended only if the frequency, power or some other characteristic of the station changes. (97.111f)

New repeater regulations *may* be in effect by the time you read this column. Under these rules it may be a great deal easier to get on the air with a repeater, remotely controlled, control or auxiliary-link station. However, there will still be specific logging requirements for these types of stations. If you are contemplating establishing such a station, the ARRL has a "repeater licensing kit" which explains the logging requirements and contains instructions on how to determine the informa-

tion that goes into the log.

You may obtain the "repeater licensing kit" by sending a large (9 × 12-inch) self-addressed envelope, with 24 cents postage, to Repeater Licensing Kit, ARRL, Newington, CT 06111. 11.

Q. Is there any special form on which the log must be kept?

A. No. Although logbooks are available from a number of places, the FCC does not require that any particular form be used. A loose-leaf notebook may be used, for that matter.

Q. I gather that there is no objection to keeping a more detailed log if I desire?

A. None at all; in fact, it's encouraged. Although the Commission only requires the logging of the minimal information necessary to conduct its enforcement program, many amateurs prefer to keep a more detailed log. It provides a history of the operation of the station, and is useful for checking whether you've sent or received QSLs, and so on. On the more serious side, it can provide crucial evidence in RFI/TVI cases, or if you receive a citation for illegal operation. Logs are sometimes used by licensees to prove or disprove that they were or weren't on the air at a particular time, so a well-kept log is in their best interest.

Q. Does the station log have to be in written form?

A. The FCC Rules (97.103) say that the log must be "legible," and this implies that the log must be written or typed. However, this applies only to the minimal information; i.e., station call sign, signature of station licensee, location and dates upon which operation is initiated or terminated, date and time periods the control operator is other than the station licensee, and that control operator's signature and primary call sign.

Notations of third-party traffic, however, may be in a form other than written (recorded, for example), so long as they can be transcribed into written form if necessary. (97.103b2)

Q. How long must a log be kept?

A. The FCC requirement is that the log be kept for one year following the date of the last entry. (97.105)

[Note: Questions appearing in this column are typical of those frequently asked of the FCC and other agencies. Answers, prepared at ARRL, have been approved by FCC staff. Interpretations contained herein concur with those of the Personal Radio Division of the FCC. Numbers in parentheses refer to specific sections of the FCC rules.]

*Deputy Manager, Membership Services, ARRL

Autopatch and Phone-Patch Use — ARRL Guidelines

Over the years, phone patching has been a way of life with the American amateur. With the increase in repeater use, and in conjunction with that the use of autopatch, interconnects of amateur equipment to telephone systems has become commonplace. Along with this increase there have been more and more abuses taking place. By the same token, amateur radio has needed a set of guidelines. The following material was looked over by the Personal Radio Division of FCC and they agreed these were good guidelines for amateurs to use.

Time and again, in this column and in other ways, ARRL has cautioned amateurs. Let's quote from Docket 21033:

"In our 1972 Report and Order in Docket 18803, however, amateur licensees were warned about the use of autopatch equipment in violation of Section 97.114 of the rules, to facilitate the regular business affairs of any party. Since 1972, the abuse has become, if anything, more widespread. — We again warn the Amateur Service of unlawful use of telephone interconnections facilities and stress that unless voluntary compliance with our third-party traffic regulations increases significantly, we may have to take action to curb the transmission of *all* third-party traffic in the amateur service."

Guidelines

Radio amateurs in the United States enjoy a great privilege: the ability to interconnect their individual stations and repeaters with the public telephone system. The wisdom of the federal government in permitting, and even in defending, this freedom has been demonstrated time and again. There is no way to calculate the value of the lives and property which have been saved by the intelligent use of phone-patch and autopatch facilities in emergency situations. The public interest has been well served by amateurs with interconnect capabilities.

As with any privilege, this one can be abused, and the penalty for abuse could be the loss of the privilege for all amateurs.

What constitutes abuse of phone patch and autopatch privileges? In the absence of specific regulations governing their use, the answer to this question depends on one's perspective. Consider these facts: To other amateurs, phone-patching activities which result in unnecessary frequency congestion, or which appear as a commercialization of amateur radio operation are an abuse of their privilege to engage in other forms of amateur activities.

To the telephone company, which needs to protect its massive investment in capital equipment, anything which endangers its equipment, its personnel, or its revenues is an abuse.

To the Federal Communications Commission, which is responsible for the efficient use of the radio spectrum by the services it regulates, any radio communication which could be handled more appropriately by wire is an unnecessary use of a valuable resource.

To the commercial suppliers of radiocommunication for business purposes (radio common carriers), competition from a noncommercial service constitutes a possible threat to their livelihood.

At one time or another, threats to radio amateurs' interconnect privileges have come from each of these sources.

In 1979, a threat may come from another quarter: the governments of certain nations which prohibit amateurs from handling third-party messages internationally in competition with government-owned telecommunications services. If illegal phone patching to and from their countries cannot be controlled, they reason, the solution may be to ban *all* international third-party traffic by amateurs and to permit no such special arrangements.

The question facing amateurs is this: Should phone patches and autopatches be subject to reasonable, voluntary restraints, thereby preserving most of our traditional flexibility, or should we risk forcing our government to define for us specifically what we can and cannot do? Experience has shown very clearly that when specific regulations are established, both innovation and flexibility are likely to suffer.

The Amateur Radio Service is not a common carrier, and its primary purpose is not the handling of routine messages on behalf of nonamateurs. However, third-party communications as an incidental part of amateur radio adds an important dimension to the public-service capability of amateurs.

It is the policy of the American Radio Relay League to safeguard the prerogative of amateurs to interconnect their stations, including repeaters, to the public telephone system. An important element of this defense is the encouraging of amateurs to maintain a high standard of legal and ethical conduct in their patching activities. It is to this end that the following guidelines are addressed. These guidelines are based upon several sets of standards which have been in use for several years on a local or regional basis throughout the country. The ideas they represent have widespread support within the amateur community. All amateurs are urged to observe these standards carefully so that, insofar as possible, our traditional freedom from government regulation may be preserved.

1) International phone patches must be conducted *only* when there is a special third-party agreement between the countries concerned. The only exception is when the *immediate safety of life or property* is endangered.

2) Phone patches or autopatches involving the business affairs of any party must not be conducted *at any time*. The content of any patch should be such that it is clear to any listener that business communications is *not* involved. Particular caution must be observed in calling any business telephone. Calls to place an order for a commercial product must not be made, nor may calls be made to one's office to receive or to leave business messages. However, calls made in the interests of highway safety, such as for the removal of injured per-

sons from the scene of an accident or for the removal of a disabled vehicle from a hazardous location, are permitted.

3) All interconnections must be made in accordance with telephone company tariffs. If you have trouble obtaining information about them from your telephone company representatives, the tariffs are available for public inspection at your telephone company office.

4) Phone patches and autopatches should *never* be made solely to avoid telephone toll charges. Phone patches and autopatches should *never* be made when normal telephone service could just as easily be used.

5) Third parties should not be transmitted until the responsible control operator has explained to them the nature of amateur radio. Control of the station must *never* be relinquished to an unlicensed person. Permitting a person you don't know very well to conduct a patch in a language you don't understand amounts to relinquishing control.

6) Phone patches and autopatches must be terminated *immediately* in the event of any illegality or impropriety.

7) Autopatch facilities must not be used for the broadcasting of information of interest to the general public. If a repeater has the capability of transmitting information, such as weather reports, which is of interest to the general public, such transmissions must occur only when requested by a licensed amateur and must not conform to a specific time schedule. The retransmission of radio signals from other services is not permitted in the Amateur Radio Service. However, the retransmission of taped material from other sources is permitted.

8) Station identification and logging regulations must be strictly observed. In particular, U.S. stations conducting international phone patches must identify in English at least once every 10 minutes. Reciprocal licensees operating in the U.S. must obey all FCC regulations.

9) In selecting frequencies for phone patch work, the rights of other amateurs must be considered. In particular, patching on 20 meters should be confined to the upper portion of the 14200- to 14350-kHz segment in accordance with the IARU Region 2 recommendation, Miami, April, 1976.

10) Phone patches and autopatches should be kept as *brief as possible*, as a courtesy to other amateurs; the amateur bands are intended to be used primarily for communication among radio amateurs.

11) If you have any doubt as to the legality or advisability of a patch, *don't make it*.

12) Outstanding examples of public service work (lives or property saved) should be reported to the ARRL Newsline, 203-667-0138, for possible dissemination to the national news media. Stories of local interest should be reported to the local media.

Compliance with these guidelines will help to ensure that our interconnection privilege will continue to be available to us all into the future, facilitating the continued contribution of the Amateur Radio Service to the public interest.

*VRAC Liaison, ARRL hq.

Public Relations, German-Style

The Berlin International Radio and Television Fair is one of the biggest events of its kind in Europe. The event is held every two years, and exhibitors from 80 countries participate.

The Deutscher Amateur Radio Club, which is the national society representing radio amateurs in West Germany, has once again used the event to give the 600,000 visitors an impressive demonstration of amateur radio. Over 100 square yards of floor space were made available to the DARC volunteers, and DKØIA was put on the air 'round the clock.

On 27 August, DARC hosted an outdoor barbecue for all Berlin amateurs. Of course, it was held between exhibit buildings, where at-

tendants could see firsthand just how many hams there were in the area.

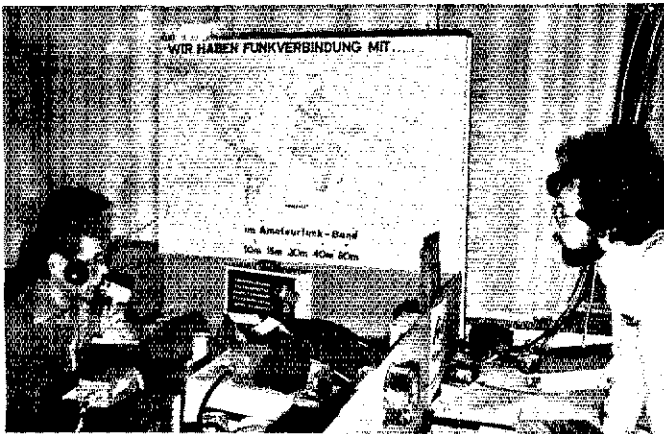
DARC wanted to show the full range of amateur radio, so they included displays on OSCAR satellites, state-of-the-art design of amateur equipment, and vhf repeaters. West Berlin's repeater, DLØSP, was linked to repeater DLØXX on the West German border, and daily reported the ham activities and convention events to DARC hq. in Baunatal.

But this isn't all that DARC has done to promote the amateur radio service to the public! The Office of the Federal German Chancellor has had its reception area literally taken over by amateur radio, as the Bonn chapter of DARC got to work displaying 200 QSL cards

and 20 amateur radio awards and diplomas. Selected by DL9YQ, and displayed on over 40 wall panels, these QSLs and diplomas are intended to represent typical amateur radio activities — and to help pass the time of prominent guests and visitors to the Chancellor's office while waiting to be received. So far, at least 54 newspapers throughout the Federal Republic of Germany have published stories on the unique display.

Such concerted efforts in public relations pay invaluable dividends in terms of the respect and cooperation afforded the amateur radio service. To the Germans, public relations means *action!*

*International Services Officer, ARRL



"WE ARE IN COMMUNICATION WITH . . ." reads the sign at the Berlin International Radio and Television Fair. Miniature bulbs were installed on the map, and the lights were illuminated as contact was established with different countries. (DJ7GS photo)



Of course, it's more fun if there is some way for the 600,000 visitors to actually hear what is going on. So DARC members provided many pairs of headphones along a visitor's bar! Several of the visitors are shown here monitoring an ssb contact. (DJ7GS photo)

"It's a very friendly country!" smiled IARU Vice President Vic Clark, W4KFC, as he returned from a recent trip to Iceland. With 125 members (half of whom are licensed radio amateurs), the Islenzkir Radioamatörar is a very active national society. Shown here are some of the members and officers who warmly welcomed and met with W4KFC. (L-r) TF3KB, TF3EL (present treasurer), TF3AW, TF3HP, TF3SE (present secretary) and TF3JB. (W4KFC photo)



On a recent Antigua holiday, W1FB and W1CKK met with members of the Antigua RC. (Also present was Marian Anderson, WB1FSB, ARRL technical secretary.) At a special meeting in a nearby college, W1FB gave a technical lecture and discussed WARC-79 and the IARU with club members and local CBers studying to become amateurs. At departure time, club members extended a gracious farewell, and a handsome plaque was presented to the ARRL Technical Department in friendship. Shown are (l-r) Vere Bird, Jr., VP2AG, club president and son of the Premier of Antigua; Jerry Price, VP2AC; Doug DeMaw, W1FB; and Hyacinth Matthew, VP2AYL, well known on the hf bands. (VP2AC photo)



YL News and Views

Conducted By Louise Moreau,* W3WRE



Those YL Contests

Often "YL News and Views" receives mail requesting reasons for YL activities, particularly our contests. We are asked to explain the "why" of our major operating contests held each year, and give the background on each.

The YLRL "Howdy Days" is a casual, informal type of contest, for women operators only. It is held each September. "YL Howdy Days" originated as a YL QSO Party planned with a "get-acquainted" theme for newly licensed YLs to meet each other on the air.

The "YLAP" is the YLRL Anniversary Party that celebrates the formal organization of YLRL in 1939. Beginning as a QSO Party for YLs in the early days of YLRL, this contest for YLs only is in two parts; the cw portion in October, then phone in November.

Another of the oldest of YL contests is the annual YL-OM event held each February and

March. This contest started on the air as a "Valentine QSO Party" then changed into the now familiar YL-OM phone contest in February, followed by cw in March. It is open to all licensed amateurs with the original plan for YLs to work OMs and the men operators to work YLs.

The most recent of our major contests is the DX YL to North American YL Contest, now scheduled in April, that was introduced in 1973. With the increasing number of DX countries that have licensed women amateur radio operators, this activity was planned to enable women worldwide to meet and grow to know each other through this contest.

For the past five years *YL Harmonics* has sponsored a special certificate for the Novice participant who submits the highest score of contacts in the Novice band.



Peggy Belnap, WB7NDZ, active on the Novice frequencies, is anxious to give that difficult Utah contact to those who are hunting for the WAS-YL Award.

TAPES FOR BLIND YLs

YLRL sponsors a "Tape Topics" activity for blind YLs of this country. One of the permanent projects of the club, "Tape Topics" records each issue of *YL Harmonics* and other published information regarding women in amateur radio, including "YL News and Views" from *QST*. These tapes are available upon request to all sightless YL operators, whether members of YLRL or not. In the eastern United States the Tape Topics librarian is WB4AUR; and in the western half of the country, K7NZO.

amateur radio licenses: Anne Marie Bridier, F1EQD; Nicole Manetta, F1ERT; Colette Chaix, F6EWY; Danielle Lequet, F6EYI and Silvie Pacheteau, F6EYL.

This year the French YLs will be celebrating the 50th anniversary of women in amateur radio in their country.

1978 YLRL APPOINTEES

Eila Russell, WA8EBS, 1978 YLRL president, has announced the following appointments to YLRL offices for the year 1978: Supply Chairman, Jean Thompson, K1TVT; YL Clubs Correspondent for *Harmonics*, Lillian Abbott, K8CKI; International Membership Correspondent, Ernestine Boerner, WA2VIE; Chairman, Nominating Committee, Irene Mulick, WB0MPC and Eastern Tape Topics Librarian Thelma Bolvin, WB4AUR.

NEWLY LICENSED FRENCH YLs

The French YL map is increasing with the addition of the following women who have recently received

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

NEW YL NET

The Georgia Peaches have added a second net to their schedule. In addition to the previously listed Thursday net on 7.277 MHz at 1400 UTC, they have a second net, also on Thursdays, on 3.934 MHz at 1300 UTC. These two nets are proving most successful and all YLs are invited to participate.

The Georgia Peaches, as the name implies, is a statewide YL club. The membership is open to all women amateur radio operators of Georgia. The club sponsors a certificate for contact with club members.

CANADIAN YLs IN GERMANY NET

Canadian YLs stationed in Germany have organized a special net that meets each Sunday at 1800 UTC on 14.169 MHz. All participating stations are members of CLARA with temporary German calls.

Eila Russell, WA8EBS, 1978 YLRL president. Also president of Buckeye Belles, Eila served as YLRL president in 1974 and originated the club's DX-YLCC award during her term of office. (*W8BU photo*)



The Huntsville Area YLRC members who have been active presenting amateur radio in the Huntsville, AL, schools. Top row (l-r) WA4MLK, WA4GQD, WB4VUA, WA4WQH, WB4WOY, WA4UWJ. Middle row: WD4BBR, WD4DDJ, WD4CYP, WB4RIV. Front row: WA4AXA, WA4RND, WB4TJE, WA4YCR.



How's DX?



Conducted By Rod Newkirk, *W9BRD

Well Done, Mr. Biffle

Sound like some character out of an old novel by Hemingway or Fitz? The era is correct and he was quite a character. We ran across Ira O. Biffle last year while rereading Lindy's epic *We* on the golden anniversary of the first solo transatlantic airplane QSO. Some DX! Reminded us that we're due for more documented exploits of Elmer, patron saint of eager newcomers to amateur radio. . . .

My Elmer was W9LNC, now W0LNC, and he persisted valiantly for a quarter century. In the early '50s I was in communications, Kansas City PD, and Bob rode our crime lab cruiser. On slow midwatches he'd drop by for ham QSOs from our hf cw layout and I became very interested. I obtained my first shortwave receiver, an S-53A, but pursuit of my ham ticket was interrupted by marriage and other priorities. Bob refused to give up, though, and continued to keep me informed of ham doings as the years flew by. A year or so ago we both retired from KCPD and, thanks to Bob Bristow, I finally joined the game. (W0ALE) . . . Wonder how many veteran amateurs still enjoy visits with their Elmers. Saw mine a few days ago in Maroa, IL. He's W9GJL and he got me going back in '29 through our high school ham club. We're both still enthusiastically active on the air. (W9GDI) . . . It wasn't easy for me to become the youngest ham in the Caribbean two years ago. No radio clubs or neighbor amateurs to help. So I learned about the hobby from the FB books of everybody's back-up Elmer, ARRL. Thanks, League! (FG7XA) . . . K8NN, formerly WD8CPU, is a fine neighbor to this DX newcomer. John's Elmer-like hints and 2-meter alerts are building up my countries total. (WB8ZRL) . . . My first receiver was a 1971 gift from W0HNI, a gracious Elmer indeed. When I became WN0DRG shortly afterward I concentrated on WAS, ragchewing and boosting my code speed. My first DX, a KH6, was a startling surprise. Now I'm in England with USAF and hope to become the object rather than the victim of those wild, 14-MHz, WANK pileups. (WB5QWT) . . . I'm a multiElmer ham, my first being W1DMZ. As an SWL in '64 I heard Skid on 75 a-m, phoned him and was invited over for a thrilling QSO with New Jersey. Connecticut National Guard operators K1BIY, WA1s JCL and TMA later encouraged me to become a Novice but I had little luck with 3 watts and a poor antenna. I turned to WA1FFO, who aided me toward Technician status but TVI closed me down after working 14 states on 6 meters. When Techs were happily granted Novice hf privileges I moved to 10, 15 and 40 with the

help of K1THP and WA1SZU. My grateful thanks to all! (WA1TZK)

Elmer, thy magic wireless spell is everywhere. What about yours? If you'd care to salute him or her via "How's" just wiggle your ballpoint our way. Oh, who was OM Biffle? One of the greatest Elmers of them all. Biff taught Charles A. Lindbergh how to fly.

FROM QST'S DX MAILBAG

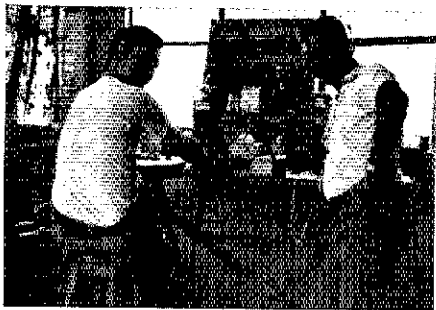
EUROPE — YL DX? G4EZI suggests CT4YG, DA1GF, EA5 4CR 5VI 7AA 8PX, EP2PY, F9YL, FG7XL, HB9ARC, H18XDJ, IT9VJP, JH1ACA, KL7JDI, KZ5UH, LA1ZI, LX1TL, ODS1L, OE6s YHG YKG, OH3TJ, OK1OZ, ON8IC, OX3ZM, OY5J, OZ1s AVV BNZ, PY8JO, SM5HYL, SP5EWA, UKs 2AAG 2BBB 5MBV, VE3HYU/SU, VK3BIR, VP9IJ, XE1CI, YS1BW, YV5CKR, ZD8AM, ZL1s AJL BKL BOR, 3A2HZ, 4X4NW, 6W8CY and 9H1YL; all ladies active in voice subbands. (DXNS) . . . I'm stationed in Oxfordshire tuning around while awaiting my G5 call. European pileups on such locals as MID are just as fierce as any WANK dogfights. Dad is W5SST and my mother, now a Silent Key, was WB5MOH. (WB5QWT) . . . Pre-WWII United Kingdom amateurs grow ever less in number. Since my last tabulation in September, 1975, these additional old-timers have passed on: G2s DN FO JY KO MQ NX QB QL RL VS VY YG YM, G3s BK DH FN HZ LO OJ, G4s IB PF PL, G5s CD FA HK IV LB LO PP PX RS SQ UU VZ ZG, G6s FO FV GA JK TA TN UF, G8s BI DU HX KU PL RQ SG SJ, GJ's 2TR 3GS, GM4HR, GWs 2BG 2RV 5KK. Incidentally, please urge your Novice chaps to tune very carefully after calling CQ DX. It's singularly maddening to answer them and hear them respond to U.S. locals. (G3IDG) . . . I trust that Grommethead Schultz is well and that we'll hear more of him in '78. (G3XCS) . . . 9H1FF is increasingly active on 10, 15 and 20 voice and code. (K9DID) . . . Nice visit with YL2s ARS and HL at the Rijeka club station while sailing as a passenger aboard a foreign-flag freighter. (W1QQ) . . . Enjoyed my first 15-w European breakthrough in early October when DJ's 1BZ 7CP, DKs 1ER 1KQ 3KD, DLs 3BA 6MK, F6s AOH CYM, YLs 2CCB and 3TEW answered my 75 watts and dipole. (WA6ARP) . . . GB3MSA, at the Poldhu end of Marconi's 1905 transatlantic circuit, was sponsored by Cornish Radio Club in parallel with KM1CC festivities on our side. (W1GAY) . . . Scandinavian Amateur Radio Teleprinter Group's 1977 DX test saw U.S. single-op entries scoring in this order: W3FV, K8JUG, WD8KBL, W4CQI, K3KD, KH6AG, K6WZ, WA9AKT, W6JOX, W3KV, K8UFW, WA9TAS and W4YZ. VE's 5RG 2QC 7DLX and 8CM were the Canadian sequence. Continental leaders: 15GZs, W3FV, KH6AG, CE3MA, ZS6BLV and JA1DI. 15WT turned in the top multiop tally. See you in August for SARTG's next worldwide RTTY battle! (OZ2CJ) . . . N3ED's 80-meter radiotelegraphy netted 300 Europeans in 43 countries during eight hours of contesting last fall. 3A2HB is a Tuesday regular on 14,240 kHz at noon UTC. (WA6AUD) . . . I2NSF/mm voyages around the world accompanied by a 215X and dipole. Watch 14,170 kHz around 1230 UTC. (VERON)

AFRICA — 7X2BK, an air traffic controller, anticipates a two-year Libyan tour and hopes to unarily the 5A prefix. (K1VSK) . . . WA6OXZ/VQ9 and WD9FCC/VQ9 expect to roam DX bands from Diego Garcia until July. WA4TWE/VQ9 shows near 14,240 kHz at 1200-1400 UTC. (Ks 5HW0 9GM) . . . 3D6BP, ex-VQ9HCS, busies himself with Swaziland's broadcasting system. Harry's chief engineer is a former W

who may also become a 3D6. (W2AG) . . . ZS3BT is a popular fixture on 10 cw. (W8BO) . . . The many long-time DX pals of former VQ8AB-VQ8CB-SZ4GT will find Leny holding forth on 21 MHz almost daily from F6BHY. (W9WHM) . . . Pleasant recent visit in Johannesburg and Port Elizabeth with ZSs 61W 2AG and 2PR, premier DX veterans. The ZS2s are father and son. (W6MI) . . . WB7TKB/SU represents the Sinai Field Mission near 14,235 kHz at 1600 UTC. (K6MT) . . . G4DHA signs ZS5IB/mm on 10 through 160, code and voice, aboard MV *Tugela*, plying waters between South Africa and the Seychelles. (G3XCS) . . . TT8HV, TT8SM's replacement, is amply audible from Chad on 14,240 kHz at 0900 UTC. (VERON) . . . More from Africa from WA6AUD's archives: Bophuthatswana's December birthday party was attended by 7P8BC, VE3FXT, ZSs 4MG 6AW, K9VCM and WB9QMJ with on-the-scene radiations as H5s JER FXT AMG AAW VCM and QMJ respectively. H5COA, a YL named Jim, also participated. . . . ZS3WB, son of ZS6ANE, is heard on 14,205 kHz from Walvis Bay. . . . VE3HRS/TZ6 skeds dad VE3AMC on 20 with a 215X and linear. . . . 5R8AL's HW-100 does well on 10 through 80 most weekends. . . . ZD9GG makes the Gough-inspired mob scene on 14,320 kHz at 1500-1700 UTC. . . . CN8CX, formerly EL2DT, HS1WF and SV0WF, digs 15 and 20 sideband with a 14AVQ. . . . A dozen assorted EA8s and OHs pushed the elaborate EA8CR layout to dizzying contest heights in October. More than 10,000 QSOs with 553 band-countries were logged, including 126 contacts with 26 countries on 1.8 MHz, 3085 with 102 on 28 MHz. Talkers and keys included EA8s BW CR IT LO OU OZ ZS, OHs 2BAD 2BH 2MM and 3XZ.

ASIA — Hope to radiate from the Andamans or Laccadives this month or next while visiting VU-land. My favorite DX from Guadeloupe is always India. (FG7XA) . . . I concentrate on QSOs with U.S. Novices on 21 MHz at 1300-1400 UTC. Openings to North America from Kuwait are happily much more frequent. (9K2EZ, WB7DEB) . . . JAs 1UTE 7GNI, JH1WDN and JR1ADZ were welcome comebacks near 21,120 kHz at 1900-2100 UTC. (W0BQZ) . . . My 25,000th QSO for 1977 went to JA4HFL in early November. (KV4AA) . . . AP5HQ welcomes WANKs on 20 sideband almost daily at 1300-1400 at 0230-0330 UTC. Watch 14,230 and thereabouts. (N0RR) . . . I'm still busy with QSL fallout from 18,000 QSOs with 95 countries as EP2OD and 9D5B. (K4OD) . . . EP25V amassed some 35,000 contacts with 220 countries in 20 months at Tehran before heading back to California. Wonder if North Dakotan W0ZTL realized that Iran was chasing him up and down 14 MHz to complete WAS. (K5MM) . . . VU2s AID CJ IJ TN and YK are behind recent VU4 DX excitement out Laccadives way. (VERON) . . . K7JA took time out from business in U.S. and Japan for thousands of autumnal, multi-band QSOs from KG6SW's superb Saipan setup. A highlight was the contest crown on 28 MHz. (WDDXC) . . . Asiatic static via WA6AUD's grapevine: Some 175 DXers from 15 countries attended Southeast Asia Net's November Bangkok rock. . . . 9K2DR, a rare cw type in Kuwait, infests the very low edges of 20, 40 and 80 at 0130-0430 UTC. . . . SM0AGD/YI was granted an 18-contact ham radio demonstration by nervous Iraqi officials in early December. . . . Author-scientist-explorer Thor Heyerdahl's raft *Tigris* signed LI2B near 14,200 kHz in November while drifting down the Euphrates. . . . A6XB, AP2TN, EP2LA, HM2s JN KH, JD1YAA and 5B4DI are 20-meter prey for CW-DXCC hunters.

NORTH AMERICA — WA9FXJ and I expect to be active on 10 through 160 from Jamaica into the first week of this month with a TS-820, SB-200, rotary tribander, and assorted wires. Our '78 Twin-City DX Association officers are W0NG president, WA0TUW secretary-treasurer and myself, director. (W0UO/6Y5) . . . With improved conditions on higher frequencies I



XF4JJ was a '77 DXpedition highlight from the Revillagigedo thanks to XE1s UFA and VW, left and right. Jim, the former, signs WB4KPKZ when home in the Carolinas.

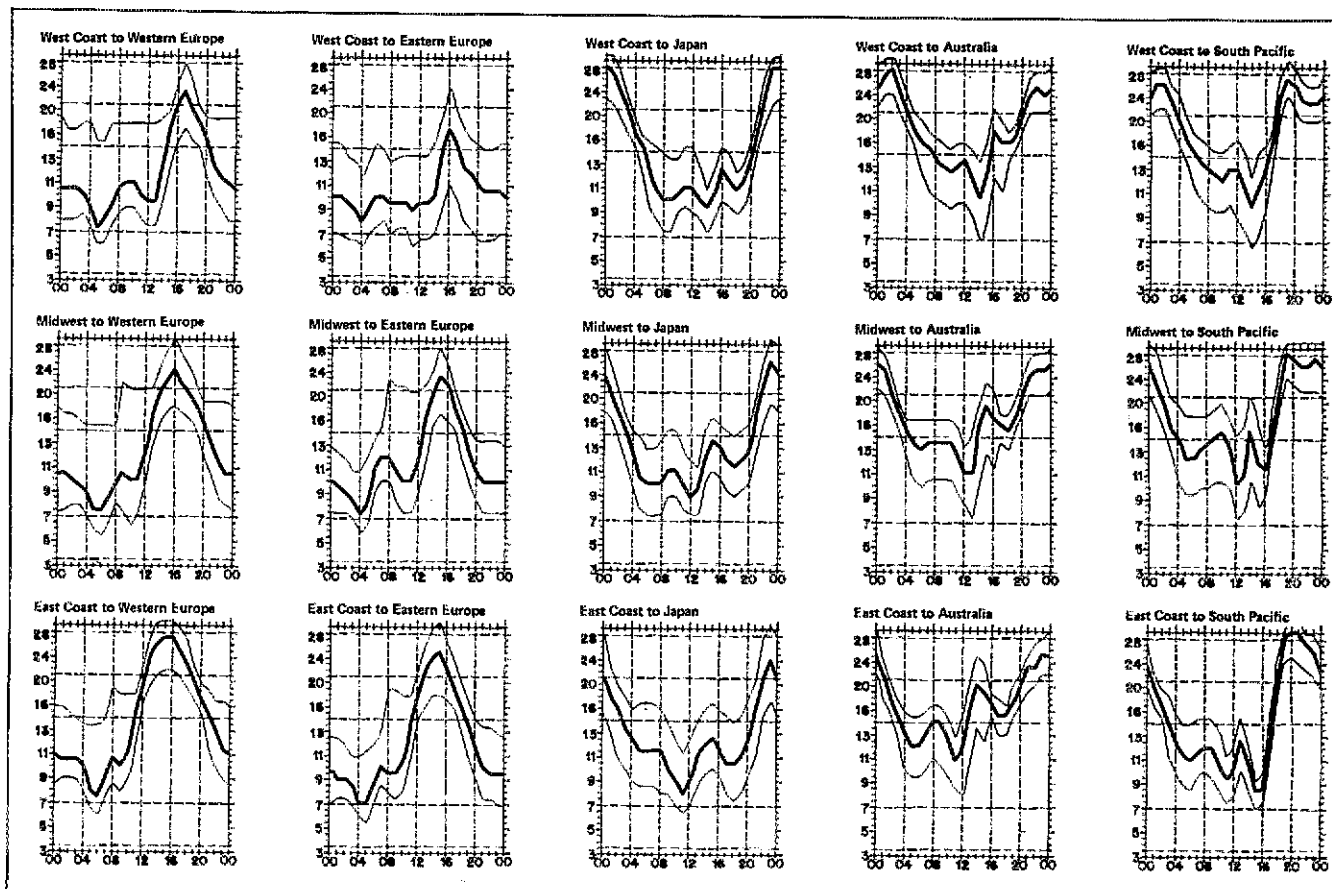
after three years and 265/242 countries worked/confirmed from Florida as W4LBT. I previously signed such calls as 3A2CH and DL4YE. (K9RN) . . . I've collected 75 countries as a Novice since working all states but North Dakota in last year's Novice Roundup. (WB2JGQ) . . . October 21-MHz DX was fantastic for my 100-watt and dipole. (WB8WTS) . . . The passing of WITX was a severe loss for the 160-meter DX gang. Bear in mind that the first 10 minutes of each hour get heavy DX emphasis when 1.8 MHz verges on opening, particularly for first-timers on the band. (W1BB) . . . Ill-timed tail-ending by too many DXers, even by OTs who should know better, drives me up the shack wall. At 14Z/97 the next batch from the bureau should mean DXCC. (WB0ONN) . . . Very enjoyable Montserrat action recently as VP2MJD on 10 through 75, mostly ssb. (W5SJD) . . . Current Kansas City DX Club officers are W0YR president, W0JU vice president and WB0EZQ secretary-treasurer. Ssb pioneer W0MNN was an interesting guest at our November meeting. (W0YR) . . . DXpedition plans for the future are indefinite but we'd like to get away again soon to put more rare regions on the air. (W6s KG QL) . . . I'm still on the comeback DX trail after fire destroyed my station and all records last March. At that time I was WA8CAL. (VE5JU-N8JA) . . . DX was a dandy diversion during my Thule tour. (ex-OX5AB) . . . Seems to me that the "T" in RST reports is an increasing waste of time and QRM. It is really necessary these days? (WA1SPM) . . . How about revising the entire RS and RST tool somehow? Weird to go through a DX contest hearing everybody give "5NN" to lower-layer signals. (W9BRD) . . . Great fun and 66 quick countries on rejuvenated 28 MHz with an FT-101E and mismatched 15-meter dipole. When my back injury mends I'll be back on the roof rigging proper skywires. (W3OJS) . . . YS DX Association officers are YS1s RRD president, AJE secretary and SRD treasurer. (YSDXA) . . . Four months on a revived 10 meters brought me 72 countries on a hundred watts and ground-mounted 14AVQ. (VE1BNN) . . . Several thousand QSOs from ZF2AP kept N4IZ, WD4AXM, myself, a TS-820 and



FG7XA is proud of his ARRL CW-DXCC diploma, the first on Guadeloupe. Jude likes speedy radiotelegraphy best but his bag includes OSCAR and SSTV, almost 20,000 QSOs worth in two short years of hamming.

note more low-powered WANKs getting their share of DX. (W7HP1) . . . DX Club of Puerto Rico, founded in 1960 by KP4RK, is again active with KP4s AM president, CL vice president, W1 secretary-treasurer, RF RK and CLB directors. Contact KP4WI for data on DXCPR's 8X8X8 and All-Puerto Rico DX operating certifications. Hams visiting the San Juan area should write us in advance so that our hospitality committee can cooperate. (KP4AM) . . . It's a relief to see 10 getting hot again. Frequency-grabbers won't get the erroneous idea that our 28-MHz band is "unused." Early autumn supplied a DX logful for my 150 watts and tribander on 15 and 20 as well, including KC4AAC, VR3AO and ZD8EW. (WA7GUD) . . . An operational visit to ARRL's WIAW gave me unique experience as the object of a pileup, 32 QSOs in 45 minutes. (WA1ZXB) . . . Back at DX in Illinois now

215X very QRL in November. (W4YKH) . . . Scratch another; VE3MJ says the call VY0C was never issued. (K4MZE) . . . K1MM and N4WW managed 7000 Juan Fernandez QSOs in late fall as CE0s ZE and ZM. PY7APS plans multiband Fernando de Noronha maneuvers by April. (WA6AUD) . . . WA9UES becomes amateur radio editor of Newark News Radio Club's *Bulletin* as NNRC enjoys its 51st year. . . . On December 4th VK3AZY and I worked each other on 75, 40, 20, 15 and 10 meters within 80 minutes. The same band-hopping job took 10-1/2 hours on October 16th. I run an ssb kW, but Jim makes it with a barefoot FT-101B. We've contacted 421 times on 3.8 MHz. (K4RF) . . . Much monthly "How's" material is appreciatively culled from Canadian DX Association *Long Skip* (VE1AL/VE3), Columbus Amateur Radio Association *CARAScope* (WBZCQ), *DX News-Sheet*



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

(G. Watts, Norwich, England), Long Island DX Association *Bulletin* (W21YX), Newark News Radio Club *Bulletin* (WA9UES succeeding M. Witkowski), Northern California DX Club *DXer* (K6SSJ), North Florida DX Association *News* (N4UF), VERON's *DXpress* (PA0TO) and Western Washington DX Club *Totem Tabloid*. Keep those DX presses rollin'!

THE ARRL DX QSL BUREAU SYSTEM

The ARRL DX QSL bureau system distributes cards free of charge from DX stations to amateurs within the League membership area (see page 8). Every active DXer should keep several 5 x 7-inch envelopes on file with the bureau of his home district. Place your call sign in large block letters in the upper left corner, and attach a single first-class stamp, unless you normally receive more cards. Unclaimed cards are discarded after one year. For more details on the bureau system, write ARRL hq.

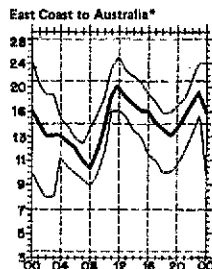
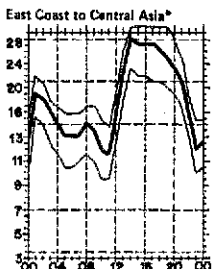
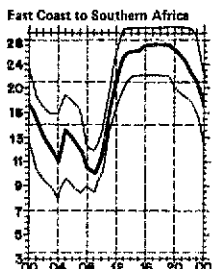
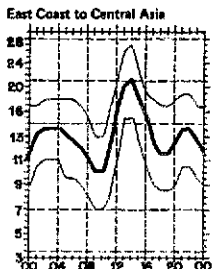
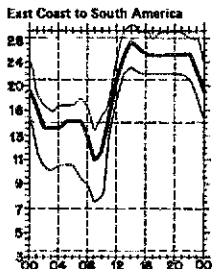
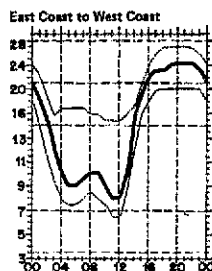
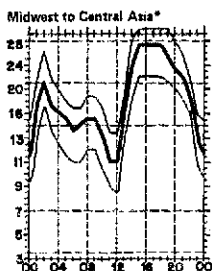
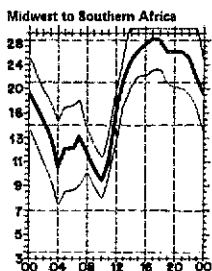
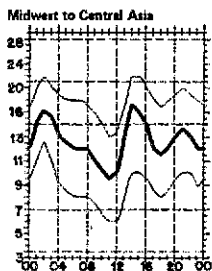
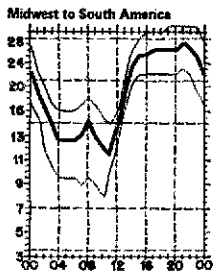
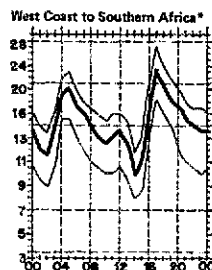
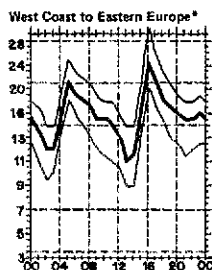
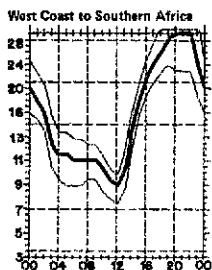
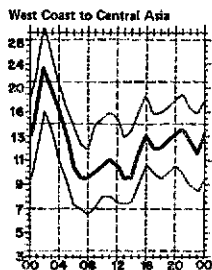
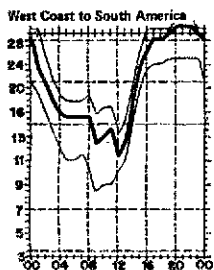
- First Call Area: all calls* — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.
- Second Call Area: all calls* — North Jersey DX Assn., P. O. Box 8160, Haledon, NJ 07508.
- Third Call Area: all calls* — Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.
- Fourth Call Area: K4, N4, W4 — National Capitol DX Assn., Box DX, Boyce, VA 22620.
- Fourth Call Area: AA4, WA4, WB4, WD4, WN4 — Sterling Park Amateur Radio Club, P. O. Box 599, Sterling Park, VA 22170.
- Fifth Call Area: all calls* — ARRL W5 QSL Bureau, Box 1690, Sherman, TX 75090.
- Sixth Call Area: all calls* — ARRL Sixth (6th)



KM6FC (WA9CHG) does his best to supply Midway ssb QSOs on 10 through 40 meters. Sailor Len is active most Saturdays, Sundays and Mondays. XYL Barb is frequently workable in the Novice subbands as KM6FD. KM6FC and neighbor WD8KLN/KM6 occasionally DX-pedite to Kure Isle.

- District DX QSL Bureau, 2814 Empire Avenue, Burbank, CA 91504.
- Seventh Call Area: all calls — Willamette Valley DX Club, Inc., P. O. Box 555, Portland, OR 97207.
- Eighth Call Area: all calls — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.
- Ninth Call Area: all calls — Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.
- Zero Call Area: all calls — W0 QSL Bureau, Ak-Sar-Ben Radio Club, P. O. Box 291, Omaha, NE 68101.

- Puerto Rico: all calls* — Radio Club de Puerto Rico, P. O. Box 1061, San Juan, PR 00902.
 - U.S. Virgin Islands: all calls* — Graciano Berlaro, KV4CF, P. O. Box 572, Christiansted, St. Croix, VI 00820.
 - Panama Canal Zone: all calls* — KZ5 QSL Bureau, KZ5OD, Box 407, Balboa, CZ.
 - Hawaiian Islands: all calls* — John H. Oka, KH6DQ, P. O. Box 101, Aiea, Oahu, HI 96701.
 - Alaska: all calls — Alaska QSL Bureau, 4304 Garfield St., Anchorage, AK 99503.
 - SWL — Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.
 - QSL Cards for Canada (VE and VO) may be sent to: ARRL Central QSL Bureau, P. O. Box 663, Halifax, NS, Canada, B3J 2T3. Or, QSL cards may be sent to the individual bureaus.
 - VE1* — L. J. Fader, VE1FQ, P. O. Box 663, Halifax, NS B3J 2T3.
 - VE2 — A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal, Quebec H3R 2E3.
 - VE3 — The Ontario Trilliums, P. O. Box 157, Downsview, Ont., Canada, M3M 3A3.
 - VE4* — W. A. Stenden, VE4BJ, 578 Oxford St., Winnipeg, Man., Canada, R3M 3J9.
 - VE5* — A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, Sask., S4S 5E3.
 - VE6* — G. D. Holton, VE6AGV, 4003 1st St., N.W. Calgary, Alta T2K 0X2.
 - VE7* — Howard Martin, VE7AFY, No. 45-9960 Wilson Road, Ruskin, BC V0M 1R0.
 - VE8* — Al Sturko, VE8NS, P. O. Box 72, Fort Smith, NWT X0E 0P0.
 - VO1, VO2 — William Coffen, VO1KM, P. O. Box 6, St. John's, Nfld., A1C 5H5.
- *These bureaus sell envelopes or postage credits. Send an s.a.s.e. to the bureau for further information. QSL bureaus for other areas can be found in the December, 1975, issue of *QST* page 64.



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 February, 1978, assume a sunspot number of 62, which corresponds to a 2800-MHz solar flux of 113.

DX Century Club Awards



Administered by Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from November 1 through November 30, 1977. An s.a.s.e. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed

W8QNM/330 PY1DG/264 JA2EIV/231 VE5YA/218 W3GIA/180 N8AT/160 K5SHQ/159	JF1HOH/150 9J2CL/144 F6DJV/119 WB9EEE/111 WA4EGP/109 WB8LUG/109 WB9YHP/109	XJ3GCO/109 JA4EY/107 VE7DFW/107 DK7SD/106 ON4UN/106 K5EJO/105 N8SW/105	N9NO/105 WB8HOG/105 WB0CHW/105 WA1OLK/104 WA6NKK/104 DL8TV/103 K2AW/103	K9UWY/103 W6SL/103 W4BFB/102 YU2ABD/102 JA4LD/101 K5QEA/100 WB5OAS/100
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Radiotelephone

ON4UN/314 W3AP/231 DL6BQ/153 JF1HOH/150 LU4MBI/144 N8AT/144 OZ2OL/143 PJ2FR/141	I0RKF/124 SV1CS/124 CT1NQ/118 DK9QD/117 KH6HHN/117 WA6JZ/113 I0ICM/110 W6PVE/110	WB6EYQ/110 WA4EGP/109 WB8RMD/109 H18EJH/107 CT26H/106 DK7SD/105 WA3AXV/104 WB5LDN/104	WB8VZU/103 WA1OLK/103 DJ8HK/102 WA4PLA/102 F3PD/101 K3IXD/101 K9EQY/101 K1WH/100	K3MWV/100 K4LNO/100 KL7HKE/100 V56GG/100 W4TAC/100 WA1TMN/100 WB9MSZ/100
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CW

JA2EIV/165 W5OB/121 SM5AKT/120 OZ1AC/114	W1NHJ/108 I6AYS/106 ON4JV/106	W1EWD/105 K9UWA/104 W2PQZ/104	JA3ARM/103 W7IGE/103 JA1BGS/101	JA7EWS/101 K5NW/101 VE3BX/101
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5BDXCC

N4RB LU1BAR/W3	W8RT G3YDX	DJ1XP EA2IA	I3DVN W7OK	W6TC W2NJ
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Endorsements

Mixed

DL7AA/356 VK4QM/355 W1GKK/353 HB9MQ/350 W2AY/J350 IT92GY/346 W9DY/346 HB9KB/343 W2IRV/343 OH2QV/338 W4WDI/334 YU1BCD/332 W6EUF/331 YV5AHR/331 DJ7CX/328 W4BBP/328 W4MGN/328 JA1MCU/326 VE3NE/326 SM1CXE/325 K2CL/324 W1HRI/324 I6JX/323 ON4UN/318 W8YA/318	W9TKR/318 W8ILC/316 Z56IW/316 W4XR/314 N4XX/313 WA2BRI/313 DJ4AX/312 K6LQA/310 OK1MP/310 W5XJ/310 K6PZ/308 W4QQN/306 W9DE/305 JA1AAT/300 W6CS/300 VE4XO/298 VE4SK/293 JA1JAN/292 W2MPP/292 DL1LD/290 K0IFL/290 WA4HHW/290 W9ZWH/290 W8QFR/288 DL1FK/284	WA9JCO/284 W4TK/283 WA4LDM/280 DL1FK/274 K3LWM/270 WB8OFG/266 YU4HA/265 W1LQO/260 W0JS/260 VE3II/253 K2PP/250 PY2BBO/250 W9BGG/250 W0BX/249 EA2IA/241 WA4JTI/240 N4CQ/237 ZP5AO/232 G3JFF/227 DL1RB/226 K0IFL/226 WB5EAY/223 DL8TQ/222 W4VN/222 N8BB/221	W4WXZ/220 WB8CTR/220 W2MT/212 WB8OBA/209 W9TA/207 WB4OSN/206 O8ESH/204 K6MT/203 K0DEQ/202 N6NP/200 W2TS/200 W7GUR/199 WA4JTC/194 JA8SW/191 W1AGA/191 WA1TAI/190 K1OT/185 JA3ANW/182 VE3HLC/182 DL1EV/181 FG7XA/180 WA4UVG/179 VE7IO/170 HB9AXB/161	KP4EBQ/161 K7PY/160 ON4JV/160 Z56BOK/143 VE3MV/143 I0UCM/141 K0KES/141 JR1FYS/140 K4KBL/140 W2XL/140 W3UM/140 WA4OUF/140 K2JT/139 K6ASI/139 W9LJ/139 SM5AKT/133 WA7PQL/121 JA3ARM/120 K5IO/120 VE3HHS/120 W1QD/120 WA1POJ/120 WB4BHQ/120 N8HI/119
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Radiotelephone

YV5AHR/331 DL7AA/329 W8EUF/329 VK4QM/328 I6JX/323 VE3NE/321 WB2WOU/318 I5FLN/317 W6ARJ/316 N4XX/311 K4CAH/308 OK1MP/300 DJ7CX/298	JA1AAT/297 CT1FL/295 W8ILC/290 K6PZ/287 W1HRI/287 JA1JAN/284 W9ZWH/280 WA4ZLP/280 W9DE/269 W2MPP/253 WA9JCO/252 VE3II/251 WA8GKW/251	K0IFL/250 WB5HGS/250 W7BKR/249 WB9BGJ/249 I3RC/245 WA4QON/245 VE4XO/240 I3DHN/234 N4CQ/234 I5AFC/231 ZP5AO/227 I6JH/222 W2NZG/222	EA5TD/220 W3FZE/220 N8BB/216 I5MXP/213 W9TA/204 WA4JTI/200 WB8CGJ/200 W7GUR/179 W3GIA/174 WA1TAI/163 DK6XR/161 HB9AXB/160 WB4QWM/160	W9CYL/157 VE3MV/143 K1PKT/140 WB4QVZ/140 K6ASI/137 G3MJT/125 W4SRH/123 WB6LYN/123 HB8CDS/122 W8CY/122 I3RAF/120 WA1GFA/120 WA7PQL/120
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CW

K4PI/240 K6JG/205 DL7AA/184	JH1VRQ/180 FG7XA/165	ZP5AO/144 DJ7CX/143	DL1EV/142 W8RT/130	OH2BN/124 K0KES/123
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Notes

The following should have appeared in the September 1977 DXCC Honor Roll listing. Phone: EA4JL 311/334, PY2PC 310/326. December Listing Phone: WB8GH should have been listed as WB8GU/331.

QSL BUREAU NOTES

ARRL VE4 QSL Manager VE4BJ reports bureau activity at an all-time high, averaging about 800 cards per month. Electronics has been a family way of life with Bill, with a father as Radio Inspector (4IC VE4HQ, VE6HQ and VE7HJ) and brother VE7YC as well as a son that is with CBC TV in Toronto, ON. VE4BJ has been licensed over 40 years, formerly as VE4GS in Calgary, AB and VE8AJ in Whitehorse, YT. His amateur radio involvement carries through to club activity, as a member of the Amateur Radio League of Manitoba, Winnipeg Amateur Radio Club, Winnipeg Repeater Society and the Winnipeg DX Club. Bill retired a year ago after 35 years with the Department of Transport in Telecommunications and Electronics Branch. Retirement has brought more time for household chores and other hobbies — coins and stamps. With his efforts, and the cooperation of his wife Vivian, the ARRL QSL Bureau continues to serve amateur radio. Is *your* envelope on file with your QSL Bureau?



Amidst home chores, four radio clubs, two new hobbies, and management of the VE4 QSL Bureau, Bill Stunden, VE4BJ, still finds time to get on the air himself.

CAN YOU HELP?

□ A community school in Portugal is looking for equipment in order to build an amateur radio station that will help train youths to become licensed amateurs. Located in Alcochete-Valhomb, the school has asked League hq. to help it secure simple, use gear. "The enthusiasm of the youth for amateur radio means for us an extension of friendship all over the world and would be at the same time an introduction to electronics, which holds out an excellent prospect for a future profession for our youth," they wrote.

Isn't that what amateur radio is all about? If you can help, please call or write the International Services Officer, ARRL hq. We can help with shipping and may be able to assist in reducing the normally high duties levied against imports in Portugal. Thanks! — WAGIDN

The World Above 50 MHz



Conducted By
William A. Tynan,* W3XO

Polarization Revisited

The question of the best polarization for use on 2-meter ssb, cw and a-m was aired in these pages over several months last year. A guest editorial by WA0DXZ, which appeared in the July column advocating that vertical become standard for all 2-meter work, certainly brought forth some spirited responses. Bob's contention was that since so many new people are coming to 2-meter ssb and cw these days by route or virtue of buying multimode rigs for fm, they, quite naturally, already have vertical antennas. Since they represent a very large influx of new population, possibly even a majority, he reasoned that the rest of us should join them and adopt their stand-up antennas. He contended, quite rightly, that one can put up a much more effective antenna by concentrating on one polarization instead of installing an array for each. The August column carried another guest editorial, this time by a veteran of the original horizontal-versus-vertical battle fought over 25 years ago, Ed Tilton, WIHDQ. Ed presented a review of the experimental work done at that time which indicated a slight edge for horizontal. It was this evidence, presented in the late '40s and early '50s, that swung the tide to horizontal almost universally. The only area to hold out was the West Coast. Even there, many 2-meter operators, bent on pushing their stations to the ultimate DX limit, went along with the trend in the rest of the country.

Following the appearance of the WA0DXZ guest editorial, the letters started coming in! They continued for some months after, generally favoring horizontal by about a five-to-one ratio. Most cited the earlier work by WIHDQ and others. Many noted that noise pickup is less with horizontal antennas, an important factor in weak-signal work. One stressed the better isolation from surrounding objects such as trees, towers and so on, most of which are vertical.

A different note was sounded by K4MSG with his guest editorial appearing in the October column. Paul favored circular polarization, principally on the basis of reduced fading. Since one source of fading is a shift in polarization with time, he argued that the use of circular polarization would eliminate it. Indeed, circular polarization is used on many commercial circuits where freedom from fading is of great importance. Some, including WIHDQ, suggested that fm repeaters go to horizontal polarization because of its lower noise performance and improved propagation, particularly in rough country. K4MSG quoted G3JVQ/DJ0BQ as recommending that fm repeaters switch to circular or dual polarization so that vertical or horizontal users would be equally at home. Another advocate of circular polarization is W6MGI/8. Ernie, who has recently taken up residence in the Cleveland, OH, area, feels that circular has advantages for long haul at vhf and uhf. He promises to build some

2-meter helixes and find one or more cooperative amateurs at the right distances to put his idea to the test.

The proponents of circular polarization may have a point. Reduction of fading would be nice, but is it really all that important when one considers that stacking circular antennas for more gain is more difficult than it is for plane-polarized arrays? Fading is more of a problem for commercial users who require uninterrupted service than it is for us. It should also be remembered that the use of a circularly polarized antenna at one end of a circuit and a plane-polarized antenna at the other results in a loss of 3 dB. This may not seem like much but it could be important under very weak signal conditions.

There is another factor which should be considered: It could become of increasing importance if fm repeaters are to move down closer to the portion of the band used for weak-signal work. This factor is overload due to strong, local signals. The extra isolation provided by cross polarization very often makes the difference between experiencing cross-modulation problems or not. It can work the other way, too. Many participants in weak-signal work run quite high effective-radiated powers. Signals from such stations could conceivably cause significant problems to repeaters, particularly if the isolation due to cross polarization is not present. In this writer's opinion, this factor should be considered before either repeaters or others adopt new polarization standards.

In summary, it appears that we made the right choice when we went to horizontal polarization for most home-station, weak-signal work 25 years ago. In addition, it's hard to fault the fm gang for using vertical. It is so much more convenient for vehicular antennas. Automobile environments are noisy anyway, so it's hard to see that a great deal of advantage could be had by using horizontal under such conditions. Since fm is generally conceded to be more in the nature of short- to medium-range mode, vertical polarization appears, on balance, to be the logical way to go. Finally, the isolation afforded by cross polarization between the two modes should not be overlooked and may become more important as our bands become increasingly crowded.

As to our proponents of circular for weak-signal work, I'll certainly devote column space to reporting any findings they may come up with.

In the meantime, let's all get solidly behind promoting horizontal for weak-signal work on all of our vhf bands.

ACTIVITY NIGHTS

A practice which has now become well established in New England and the Middle Atlantic states is that of concentrating activity for the various bands on designated evenings of the week. The plan presently in use calls for Monday nights to be devoted to 2 meters, Tuesdays to 1-1/4 meters, Wednesdays to 70 cm, and Thursdays to 23 cm. The plan is generally credited with increasing the occupancy on these bands at all times since new converts know when they have the

best chance of finding someone to talk to. Many have suggested that the same procedure be adopted nationwide.

What do you think?

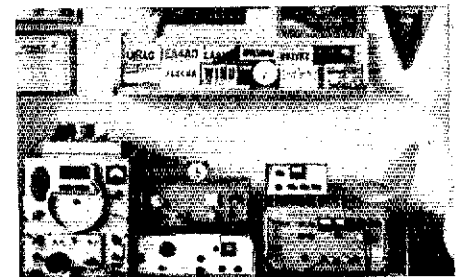
ON THE BANDS

6 Meters — Es seems to have been with us more this fall than we are accustomed to expect. From the mail received it appears that there have been good openings somewhere in the country every few days during September, October, November and early December. Here are just a few samples: WA0MRH, Omaha, NE, reports Es sessions on four days during November. On the 11th, LA, GA and FL stations were workable at John's QTH. On the 22nd it was AZ, CA and TX, with the opening lasting from 0100 to 0315 UTC. On the 28th, a 3-1/2-hour affair beginning at 2205 UTC brought in signals from VA, PA, NY and MD. Finally on the 30th, John notes a weak, 20-minute opening to the ones, twos and threes. From his Cincinnati, OH, vantage point WA8OGS cites an opening the evening of the 28th, beginning about 0300 UTC. Things got underway with KITOL's scatter signal going from the usual residual level to S9 plus in just a few minutes. After KITOL faded at about 0130 UTC, John went on to work a string of fives, including KSZMS, San Antonio, TX.

This conductor caught two openings the week of November 27. The first, November 28-29, was apparently in progress when I discovered it with FL stations having been in for several hours, but just going out. The band then shifted to the west. I was able to work several stations in KS and MO, including a lengthy QSO held with N0LL before he faded at 0130 UTC. Six nights later, beginning about 0000 UTC December 4, we were presented with a very fine Es opening for this time of year. This conductor hooked up with a string of Midwest stations, including some quite short skip with S9 signals coming out from areas as close as Cincinnati and Dayton. W3ILG (ex-W9NKQ), now of Williamsport, PA, took advantage of this same opening to complete contacts in MO, OK, TN, IL and AR. What makes Mick's accomplishment unusual is that his 11-element KLM was sitting on a couple of sawhorses just 2-1/2 feet off the ground at the time. Seems he had put the antenna together earlier in the day after recently moving into the new QTH, but bad weather prevented him from putting it up.

A very informative letter from LU8BF updates the situation with respect to the 2-meter TE contacts being made between Argentina and Venezuela as well as passing along some tidbits of 6-meter news. According to Lucho, the first TE opening of the fall season was on September 21 with a QSO between himself and YV4BE. The band was open four more evenings that month followed by 18 nights in October and 11 in November. Stations worked include KP4AAN, PJ2DW, TI2NA, TI2HI and YV5ZZ. LU8BF runs a pair of 6146s delivering about 75 watts of ssb to a four-element Yagi and is looking for DX contacts.

KSZMS passes along more exciting news which we can only hope is a harbinger of things to come. PY2CSS tells Ray that he has been working KP4, LU



To show that all hamshacks do not look alike, here is the setup at OK3CDI, an OSCAR and 2-meter enthusiast. Everything is homebrew except for the Russian-made Volna K-7 receiver on the left.

*Send reports to Bill Tynan, W3XO, P. O. Box 117 Burtonsville, MD 20730 or call 301-384-6736 and record your message.

Two Meter Standing

Figures are states, call areas and best DX in miles.

K1WHS	43	11	10749	W5SXD	25	6	1265
K1FO	40	10	4500	W6PO	32	10	8000
K1MNS	38	10	2675	K9QEH	21	10	5500
K1HTV	38	9	2616	W6GDO	18	5	1326
WA1OUB	36	8	1525	W8WSQ	16	4	1390
W1FZA	35	10	2750	W6BNMT	15	4	1250
W1XU	35	8	1478	K6HAA	13	4	2580
K1PXE	35	8	1400	K8JYO	13	4	1240
W1JR	34	9	2674	WA6JRA	11	5	2591
W1IAZK	34	8	1412	K8HMS	11	4	1258
K1BKK	33	8	1450	K8GAO	6	5	2500
W1JSM	33	8	1440	K7NII	36	10	2289
W1YTV	33	8	1430	WA7KYZ	30	10	6000
K1MNS	32	10	2675	WA7BJU	30	10	2600
K1UGQ	30	8	1370	W7CI	28	9	2200
W1VTU	29	8	1296	W7JF	28	9	1320
K1MNS	28	8	1368	W7BBM	21	7	2175
W1AAI	28	7	—	K7CVT	20	5	1325
W1FUH	27	8	1300	K7ICW	19	4	1278
K1MTJ	26	7	1250	K7CVT	18	5	1370
W1HDD	24	7	1040	W7VEW	17	7	1300
K1RJH	22	7	1450	W8WJ	47	10	10500
K2RTH	44	11	11000	K8AT	45	10	10100
W2AZL	41	10	3770	K8AXU	38	8	1275
W2ABIT	39	11	10000	W8IDU	38	8	1150
W2CUX	38	8	1334	K8JUN	38	—	1152
W2NLY	37	8	1300	W8IDT	36	8	1150
W2CXY	37	8	1380	K8HWW	36	8	1100
W2ORI	37	8	1320	W8YIO	36	8	1100
W2BLV	37	8	1150	K8DEO	35	8	1200
W2BWK	35	8	1650	W8ABIE	34	8	1100
W2PFGK	33	8	1340	W8NOH	31	8	1185
W2CRS	30	8	1230	W8ABL	28	8	820
W2VWV	29	8	1232	W8HTL	27	8	1102
K2CFH	29	8	1200	W8TJU	24	8	1000
W2VWVW	28	8	1350	W8KBC	24	7	900
W2JZL	27	8	1310	K8ZES	22	8	675
K2QVS	27	8	1250	K9HMB	47	11	9894
W2PMW	28	8	1245	W8DNT	46	10	9909
W2CNS	27	8	1150	K9UIF	45	10	1874
K2DNR	27	7	1200	W9YF	44	10	4500
W2TCC	25	8	1250	K9CT	42	9	1100
W2B2CUT	28	8	1200	K9SGD	42	9	1300
W2S5IH	25	6	1000	W9AAG	41	9	1200
W2AUDT	24	7	1020	K9AAJ	41	9	1200
W2EMB	23	6	1335	W9CAW	41	—	—
K2BWR	27	7	1350	W9OII	41	9	1158
K2DVIJ	23	5	860	N9SS	41	9	1010
W3BHG	40	10	2488	W9WHJ	41	—	—
K3QQC	37	8	1375	W9JD	39	9	1800
K3CFY	37	8	1250	W9QJ	38	9	1400
W3RUE	36	8	1250	K9UNM	38	8	1046
K3AP	33	10	2500	W9BRN	36	9	1281
W3OMY	33	8	1200	W9EUA	35	8	880
W3BDP	32	8	1275	K9OXY	34	9	1350
W3TMZ	31	9	2410	K9KQF	34	8	1105
WA3JUFU	31	8	1280	W9PBP	34	8	820
W3XO	31	8	1200	K9VWV	30	8	1052
K3WHC	30	8	1700	W9JDJ	29	8	1000
W3LND	28	8	1200	K9RVG	22	7	1100
W3LNA	27	8	970	K9MQS	50	12	8008
K3CFA	25	8	1200	N9JA	48	11	2165
W3ZDF	24	8	1350	W6LER	46	10	1620
WA3JUF	22	8	1350	W6EMS	44	10	1320
WA3KPS	22	8	1200	K9CJ	42	9	1450
W3TFA	21	8	1342	W6RLI	42	9	1345
K3OBU	21	7	930	W6DGY	41	9	1300
W4AMVI	43	10	12000	K9DAS	40	9	1148
K4GL	41	10	4850	W6TG	37	10	1448
W4AGPM	41	10	4250	W6PW	35	9	1380
K4XC	40	10	4850	W6BNC	35	9	1380
W4HJO	40	10	2000	W6PN	35	9	1187
W4DFK	39	11	12000	W6OHU	33	9	1203
W4CCG	39	8	1350	W6SD	32	9	1312
W4HJK	38	8	1280	W6WFEY	29	8	1254
K4EJQ	38	8	1350	K6TLM	27	9	1230
K4QIF	36	8	1225	W6DRL	27	9	1295
W4DGXN	36	8	1175	K5BXG	26	9	1149
W4VHH	36	8	1125	W6BVC	26	8	1181
K4VW	35	8	1440	W6IUT	24	8	1312
W4AMKJ	33	—	1285	K6HNS	3	2	8000
W4FJ	33	8	1150	K6YNB/KL7	15	11	2800
W4ISS	33	8	1000	VE1ASJ	18	6	—
K6RIJ	32	8	1475	VE1ZN	7	2	500
K6KAE	32	8	1200	VE2DFO	41	10	10600
K1FJM/4	31	8	1190	VE2YU	32	8	1300
W4WNG	30	8	1330	VE2HW	18	6	800
W4AW6	29	8	1350	VE3ASO	38	9	2140
W4WD	25	8	1277	VE3BQN	37	8	1250
W5ORH	48	11	4800	VE3DSS	37	8	1203
K5CM	45	10	4800	VE3FN	34	8	1390
K5MB	45	11	4500	VE3E2C	33	8	1283
WB5LUA	44	10	1684	VE3AIB	29	8	1340
K5SW	43	10	1490	VE3EUV	29	8	1100
W5UGO	43	10	1398	VE3EMS	27	8	1100
K5MWH	42	10	1609	VE3FKX	24	7	1070
W5RCI	42	9	1289	VE3AQG	18	8	1300
K5WXZ	40	10	1450	VE7BQH	12	3	7920
W5FV	38	10	1285	VK3ATN	4	4	10417
W5FF	38	9	1980	VK3MC	7	7	10000
W5HN	37	10	1500	W1NU/VP9	8	3	800
K5FF	36	8	1980	SM6CKU	4	4	4200
W5SWV	34	8	1260	SM7BAE	15	9	11055
K5VWV	33	10	5200	ZL1AZR	2	2	11055
W5HNNK	33	10	1540				
W5UKQ	33	9	1290				
K5PTK	29	9	1350				
W5BKY	29	9	1407				
W5UWB	27	7	1339				

and YV, and hearing the TI2NA beacon. At 2355 UTC November 15, Ricardo heard WBSVWV and W5EUB, both of south TX, but wasn't able to attract their attention. That's not all. PY2CSS has on three occasions, November 4, 16 and 17, heard the KH6EQI beacon. Things are looking up!

2 Meters — The big 2-meter news this month is the continuation of what is almost certainly TE propagation. As reported last month, YV5ZZ was successful in working three LUs in one long week — October 28-November 7. The distance — over 3000 miles. It's not a fluke and it has been happening in other parts of the world as well. Letters from Argentina and Japan provide more facts in this latest propagation discovery by amateurs. LU8BF writes from Buenos Aires that on November 25 and 26, 2-meter contacts were made by him as well as LU2BG, LU3AAT, LUIDAU, LU9AEP and LU9EO with YV5ZZ, YV5LW and YV6ASU. During the first of these openings signals were running S4 while the next evening they were up to S6 to 7. This work, which started in the OSCAR band where many of the LUs had crystals, has now moved to 145.1 MHz. Many of the fours in south FL, including WA4JID, have reported hearing snatches of Spanish-speaking voices on that frequency; so who knows what may happen? Also, K4VAD has definitely identified the signal of LU7DJZ in the OSCAR-uplink band.

From the other side of the globe, letters from JAILZK and JAIVOK both pass along information from VK8ZCJ, Darwin, Australia, concerning Graham's reception, at 1230 UTC October 27, of a number of JA 2-meter stations during a 6-meter TE session. Most of them were on fm which Graham could not copy on his receiver, but he did get a partial call of one JA sber. Needless to say, many ears in that part of the world will be listening intently to the designated frequency of 144.1 MHz.

Here at home the principal news concerns aurora and m.s. The big aurora of October 27-28 was widely reported. The timing of this buzz session is interesting in light of the fact that the initial 2-meter TE contact between YV5ZZ and LUIDAU and LU7DJZ was reported on almost simultaneously. WIJR reports aurora signals from ones, twos, threes, eights, nines, zeros and VA fours. To illustrate how good the opening was, Joe says he was able to work 30 stations in 13 states. WIJR's son, WA1UHA, got his father away from the key long enough to work IA station WB9ZXU. An interesting observation made during that session by WIJR was that if he turned his antenna to the east the frequency of the station being received increased by about 200 Hz.

To demonstrate that you don't need high power for success on aurora, WA1HYN, running just 10 watts of cw, came up with five contacts including three nines, a VE3 and a one. From the Pacific Northwest WATDU, Klamath Falls, OR, says that this particular aurora even got out his way, where the buzz mode is rather rare. Sam managed a contact with VE6HR and heard W7FN working an SD station.

As proof that m.s. contacts can be made during nonshower periods, take the DXpedition of K6MQS. Just to provide the state to some state-hungry, 2-meter operators, Dick, assisted by WB0RWM, took a TS-700A, a 160-watt KLM amplifier and a 14-element KLM beam to a campsite in eastern UT. Operating from a car battery, they completed QSOs with N9JA, MO, for his 48th state and W5UWB, TX, for his 27th, along with several others. This should be ample evidence that you don't need high power and a large array to be successful on m.s. Incidentally, N9JA now needs only NV and HI to join K6MQS in the 2-meter WAS club. Naturally John is looking for skeds in these two states.

WA0RDX comments that the 2-meter preamp that took top honors at the Central States VHF Conference with a noise figure of 0.9 dB was his. But Jim wasn't satisfied. He writes that he now has a GaAs FET going which gives an incredible 0.3 dB!

70 Cm — The Gulf of Mexico treated those vhf/uhf hams who live near it to another one of its fine tropo shows over the weekend of December 3-4, according to WA4JID. Dick says that signal levels from stations in OK, TX and LA were running quite high at his QTH near Fort Lauderdale, FL, on both 70 cm and 2 meters. From New England, WIJR reports the continuance of his regular Wednesday evening skeds with VE2LI. It is at 0230 UTC (Thursdays) on 432.085 MHz. The schedule with W4ISS, Augusta, GA, did not bear fruit and has been terminated, at least for the time being. Maybe you fellows will have better luck next spring. From the West Coast, WA6EXV, of Ridgecrest in the Mojave Desert, has been running with W7GBI, Scottsdale, AZ and W7LFX, Tucson, AZ, on Sundays at 1600 UTC and Wednesdays at 0400 UTC. Chuck reports success with W7GBI on several occasions.

According to the K2UYH *432 EME Newsletter*, the move to the vicinity of 432.1 for modes other than

moonbounce has pretty much been completed by early December in his part of the country. It appears that most stations were not waiting for the suggested January 1 changeover date.

In the moonbounce department, that same newsletter reports that the gang at K3NSS had especially good results during October, having made 15 QSOs with nine different stations. K3LFO, one of the mainstays of the group, reports to this conductor that they are now achieving their goal of providing the initial contact for many new EMEers. There are still some improvements that can make, so the time may come when they can work almost any well-equipped, 70-cm station off the moon. This should provide a payoff in getting additional stations into 70 EME.

The group at 15MSH reports good results with the K3PGP front-end protection circuit. Even with its 0.2-dB insertion loss, their system noise figure using a V244 is 1.2 dB. This seems worth the loss in performance to keep such an expensive device going. Both JA1A1L and F2TU can both attest to this after having had V244s destroyed, apparently due to relay timing problems which did not affect less susceptible bipolar devices.

The November issue of the *EME Newsletter* also carries an interesting preamp circuit using an MSC 88000 power GaAs FET. K2UYH says that the noise figure is not as good with the V244 but he expects performance on the order of 1 dB along with very good dynamic range. It is anticipated that units not meeting power specs may be available to hams at reasonable prices in the near future. I'll provide a copy of Al's circuit to anyone sending an s.a.s.c.

Many amateurs have shown an interest in radio astronomy. ZESJJ is one. Peter has been experimenting with reception of Cygnus A and reports obtaining signals about 2 dB above cold sky levels. He would be interested in hearing from others with similar interests.

23 Cm and Down — That veteran of 23 cm, K6UQH, writes from Saratoga, CA, to fill us in on the status of the band in northern CA. Bill lists some 23 stations in the area capable of putting signals on 1296 MHz. Powers range from the 200 watts at K6ZMW and Bill's 110 watts down to 0.1 watt; however, most stations appear to be in the 10-watt class. Approximately half have ssb capability and all are listed as being able to work cw. Many are using right-hand circular polarization. Bill reports success with a seven-foot dish consisting of a Channel Master TV antenna with hardware cloth added to improve its performance at higher frequencies. A dual-band, 23- and 13-cm-circular feed completes the assembly. K6UQH says the mountainous paths of 100 miles are being negotiated every night of the week by stations with stable equipment and reasonable-sized antennas. He pleads for more activity, especially from southern CA. K6UQH will schedule any 23-cm station having reasonably good equipment and within tropo range. He counsels 23-cm operators to monitor 1296 just as 6-meter devotees listen for every ping on 50.110 and 2-meter followers keep glued to 145.1 MHz!

WA6EXV's OVS report is brimming with information on his activities. One project which Chuck is completing is a 2-watt, 2304-MHz beacon to be installed at Crestline where it should have a good shot into the L.A. basin and the Mojave Desert. The antenna will be an omnidirectional affair with 6.25 dB gain and a 2-1/2-degree downtilt. Chuck says that the device may eventually become a 13-cm repeater. WA6EXV also wants it known that he has now completed his 10th solid-state "RocLoc" system for use with Microwave Associates Gunnplexers. He can supply schematics while Dana Atchley, W1CF, in MA has the undrilled boards and, of course the Gunnplexers themselves. Speaking of W1CF, Dana tells me that he has put together a 10-GHz repeater that will be tried first in Germany where a great deal of activity exists. Later it may be installed in this country, possibly in the L.A. area. I'll have more on this interesting project as it develops.

Not all of the microwave news is from CA. WA0RDX sends along the information that he, in company with WB9BVC, operating portable near Wichita, KS, with a 10-foot dish on the ground, completed a 23-cm contest with W0ZJY, Kansas City, a distance of 160 miles. The K.C. station was also using a 10-foot dish, but at 30 feet above the ground. The QSO took place on the evening of November 6 when W0ZJY, from his regular monitoring of TACAN stations, believed conditions to be about average. Rigs at both ends consisted of 10-watt transmitters with diode front-end receivers having noise figures of 6 dB. Cw was used to start the contact but they later switched to fm for a two-hour ragchew. Why don't you fellows apply for RCC?

From Racine, WI, WB9CYY says that he has a Gunnplexer feeding a 34-inch dish and would like to find someone to work. His address is 4040 Marquette Dr., ZIP 53402.

Coming Conventions

February 17-19
Florida State, Orlando, FL

March 18-19
South Carolina State, Greenville, SC

April 1-2
Roanoke Division, Charlotte, NC

April 8*
Great Lakes Division, Muskegon, MI

May 5-7
Delta Division, Baton Rouge, LA

May 13-14
Alabama State, Birmingham, AL

May 19-21
New York State, Rochester, NY

May 20
Wisconsin State, Lake Delton, WI

May 27-28
Tennessee State, Knoxville, TN

July 1-2
West Virginia State, Jackson's Mill, WV

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

September 22-24
ARRL National, San Diego, CA

October 13-15
Midwest Division, Kansas City, MO

October 14-15
New England Division, Boxboro, MA

November 11-12
Hudson Division, McAfee, NJ

November 18-19
South Florida Section, Clearwater, FL

*Date Change

FLORIDA STATE CONVENTION

February 17-19, 1978, Orlando, FL

That great Florida time of the year is upon us once again! The Orlando Amateur Radio Club proudly announces the Florida State ARRL Convention and Hamcation '78 to be held on February 17, 18 and 19, 1978.

The Sheraton Twin Towers Convention Center will be the site of this activity. Convention Chairman "Buzz" Showalter, W4UJL, has lined up a great convention program with Southeastern Division Director Larry Price, W4RA, presiding. ARRL hq. representatives Lew McCoy, W1ICP, will cover the subject "Microprocessors" and Pete O'Dell, WB8NAS, will talk about "Amateur Public Relations," a subject most important to all amateurs. Many other items will also be on the agenda.

The commercial exhibition area is expected to be completely sold out, with many of the major manufacturers represented. The Swap Shop area houses 350 tables. Great ladies programs have been lined up. Important meetings such as MARS nets, OSCAR, AMSAT, QCWA, OOT and Floridoras have been programmed.

Advance admission is \$3, \$4 at the door.

Swap shop tables are \$5 per day per table. Advance table reservations will be honored from 4 to 6 P.M. prior to the general public opening at 6 P.M. on Friday, February 17, and for one hour on Saturday, prior to the 7 A.M. general public opening. Sunday activities will commence at 8 A.M. Persons ordering tables for Saturday, or Saturday and Sunday, may operate free of charge Friday evening until 9 P.M.

Admission to all activities will be free to ladies and children under 14 accompanied by a ticket holder. The banquet on Saturday night will feature a speaker and entertainment. Tickets are \$8 per person. Order early as seating is limited. For advance registration, swapfest and banquet tickets, send a check payable to The Orlando Amateur Radio Club, Inc., Hamcation Chairman, WB4HAK, 6 Camellia Drive, DeBary, FL 32713. Last postmark for advance reservations is February 12, 1978.

For Sheraton Twin Towers room reservations call toll-free 800-327-2110 (non-FL residents). Charge cards honored at that number. Also toll-free 800-325-3535 (Sheraton national hq., MO residents call 800-392-3500), charge cards not honored. Always mention "Orlando Hamcation."

Convenient to the convention site are Disney World, Sea World, Circus World, and easy access to Atlantic and Gulf beaches. So, "You-all come, hear!" General Chairman Al Canning, WB4HAK and his committee are waiting to welcome you.

NOTE: Sponsors of large ham gatherings should check with League headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL hq. for up to two years in advance.

Hamfest Calendar

Connecticut: Dimar Electronics of Greenwich holds its first midwinter hamfest on February 26 at the Byram Veterans Hall (exit 2 on I-95, CT Turnpike). Talk-in on 52. Doors open at 9 A.M., admission \$2. Refreshments. Tables are \$1.50 per half-table and sellers will be asked for small door-prize donations. Send space reservations to 234 Mill St., Byram, CT 06830. Tel. 203-531-8257.

Illinois: The Wheaton Community Radio Amateurs will have their 16th annual Midwinter Swap & Shop on Sunday, February 5, from 8 A.M. to 5 P.M., at the DuPage County Fairgrounds, Manchester Rd. (near County Farm Rd.), on the west side of Wheaton. Some tables provided, but bring your own if possible. Large, heated buildings are at the fairgrounds. Tickets at the door are \$2. Write Don Snyder, WB9VFC, 623 Meadows Blvd., Apt. 3C, Addison, IL 60101.

Illinois: The Sterling-Rock Falls Amateur Radio Society's 18th annual hamfest is March 5 at the Sterling High School Field House, 1608 4th Ave. Only radio and electronic items at flea market. Tables, obtainable at door, are \$3 per half-table. Talk-in on 94 simplex. Free parking, including area to accommodate RVs. Advance admission \$1.50 until February 15, \$2 after. Write to Don Van Sant, WA9PBS, 1104 5th Ave., Rock Falls, IL 61071.

Indiana: The LaPorte ARC's winter hamfest is Sunday, February 26, at the LaPorte Civic Auditorium, main floor. Plenty of room, free tables, and good food. Talk-in on 01/61 and 52. Donation is \$2 at the gate. For more info write LPARC, P. O. Box 30, LaPorte, IN 46350.

Iowa: The annual Davenport Radio Amateur Club

hamfest is Sunday, February 26, at the Masonic Temple. Advance admission is \$2, or \$2.50 at the door. Talk-in on 28/88 and 52. Refreshments and tables will be available. Send an s.a.s.e. to Dick Lane, WA0GXC, 116 Park Ave. S., Eldridge, IA 52748.

Massachusetts: The fifth annual Norwood Amateur Radio Club auction is Friday, February 24, at the Norwood VFW Post 2452 on Dean St. Auctioneers: W1WSN and KN1FPQ. Activities begin at 7 P.M. Talk-in on 69/09 and 52. Info available from Dave Doe, K1HRV, 58 Lincoln Rd., Walpole, MA 02081. Tel. 617-668-4259.

Michigan: The Cherryland Amateur Radio Club's fifth annual Swap 'n' Shop is Saturday, February 11, from 9 A.M. to 4 P.M. at Northwestern Michigan College in Traverse City. Donations of \$1 in advance, or \$1.25 at the door. Free tables for electronic equipment and parts. All welcome. For more info write Greg North, WB8TPR, P. O. Box 115, Lake Leelanau, MI 49653.

Michigan: The Livonia Amateur Radio Club presents its eighth annual Swap 'n' Shop on Sunday, February 26, from 8 A.M. to 4 P.M. at Stevenson High School. Plenty of tables, door prizes, refreshments and free parking available. Talk-in on 52. For further info write Neil Coffin, WA8GWL, LARC, P. O. Box 2111, Livonia, MI 48150.

Ohio: The Cuyahoga Falls Amateur Radio Club's 24th annual Electronic Equipment Auction and Flea Market is Sunday, February 26, from 9 A.M. to 4 P.M. at North High School in Akron. Easy access, located at Tallmadge Ave. off-ramp from North Expressway (Rte. 3). Tickets \$1.50 advance, \$2 at the door. Bring your own table, some available at \$1 each. Refreshments available. Five main prizes, including a Triton IV. Check-in on 52, 04/64, 84/24, and 223.5. Write to CFARC, P. O. Box 6, Cuyahoga Falls, OH 44222.

Ohio: King of the Pumpkin Ham Fiesta, sponsored by the Teays Amateur Radio Club, will be held on Sunday, March 5, from 9 A.M. to 5 P.M. at the fairgrounds coliseum in Circleville. Indoor flea market, new and used equipment, door prizes,

refreshments and free parking. Advance admission \$1, at the door \$2. Tables are available at \$3 each. Contact Dan Grant, WBUCF, 22150 Smith Hulse Rd., Circleville, OH 43113. Tel. 614-474-6305.

*ARRL Hamfest

Club Notes

Building the same old memory keyers and 24-hour digital clocks for your club's home-brew projects? Local club bulletins we read ask for new construction ideas. Step up to some more advanced, yet perfectly buildable, undertakings. We've gone through past QSTs and made up a list of articles that would be exciting to try, both for hf and vhf buffs. Now that used gear is scarce, and new gear is expensive, why not build? When a group of people orders parts in quantity, components are cheaper. We'll also send along a list of where to look for parts. Now that there are numbers of new hams who could put a good club station to use, why not do as Superstition ARC (AZ) members did — build a receiver and transmitter for the club shack? Write!

And while you're sending in for the lists, why not tell us if your club has videotape capabilities? We are again thinking of going to training and entertainment videotapes. Are your VTRs 1/2- or 3/4-inch cassette, or 2-inch quad? Black and white, or color?

Did your club receive our mailing at the end of last year of a complimentary copy of *Getting to Know OSCAR — from the Ground Up*? Want to know other benefits of being an affiliated club besides building up your club library? Write us. — *WA1STO*

NTS Staff Meeting Report

The Central Area Staff of the National Traffic System met in St. Louis, MO, on October 14-16, 1977. In attendance were WAS1QU W5KLV, RN5 (Fifth Region Net) managers; W9FC, 9RN-E (Ninth Region Net-Evening) manager; K0EVH WB0HOX, TEN (Tenth Region Net) managers; W0HI W5KLV, CAN (Central Area Net) managers; W5GHP, TCC (Transcontinental Corps) director; W9QI.W, member-at-large; W0AM, CAS chairman and member-at-large; and observers W9NXG, W0NUB and WINJM. Member-at-large W5MI resigned due to health reasons and 9RN-D (Ninth Region Net-Daytime) manager WB9FOT resigned just prior to the meeting, due to other pressing commitments. The following report of the proceedings was filed by W0AM.

CAS agenda items and their proposed solutions/recommendations are set forth below:

1) Staff vacancies — CAS recommends the following to fill existing staff vacancies: N5YL, member-at-large; WB5CDX, RN5-D manager; W9JII, 9RN-D manager; W9NXG, TCC-D director. WB0HOX, TEN-D manager, had recently been appointed Minnesota SCM and desired to resign her NTS appointment. After lengthy discussion, WB0HOX agreed to continue as TEN-D manager until such time as a

suitable replacement could be recommended.

2) Composite region net reports — CAS recommends that region net managers continue old net reporting procedures to ARRL and that present QST format be retained as is. CAS recommends that both EAS and PAS consider this matter during their next meeting.

3) Annual SET procedures/functions — CAS recommends that NTS follow ARRL

Table 1
NTS Central Area Emergency Contingency Plan

CST	NET
1200	Region
1300	CAN-D section
1400	Region
1430	CAN-D section
1530	Region
1630	CAN-D section
1730	Region
1830	CAN-E section
1930	Region
2030	CAN-E section
2130	Region
2230	CAN-E*

Central time zone indicated — may be adjusted for other time zones.

*This function Saturday night only.

CD's published data in order that we may all function as an integrated unit.

4) NTS Emergency Contingency Plan — CAS proposes and recommends the NTS emergency contingency plan, shown in Table 1, which was used by the Central Area during the 1977 SET.

5) Inter-area staff deliberations — CAS recommends inter-area staff deliberations be accomplished by each staff sending its chairman plus three elected officials to an annual joint staff meeting to be held each year prior to the individual area staff meetings.

6) Dual CAN sessions during heavy holiday traffic sessions — This agenda item was discussed at great length with no recommendation forthcoming.

7) Publicity and recognition of higher-echelon NTS individual performance — CAS again recommends that ARRL CD develop special recognition, awards and plaques for NTS region and area net managers plus a different recognition award/medallion for deserving NTS liaison stations.

8) NTS certificates — CAS recommends NTS section and area certificates be redesigned to incorporate provisions for endorsement stickers and that suitable endorsement stickers be made available. — C.W. Wade, W0AM

FROM MURPHY TO MANTEO ON TWO

It was a carefully planned exercise. N4UE wrote letters to W4PCN in Manteo, NC and K4AIH in Murphy, NC, outlining plans to see just how long it would take to relay a formal piece of traffic from Murphy to Manteo, and another from Manteo to Murphy via VHF repeaters. Statewide publicity supported the plan, originating out of the NC Emergency Coordinators Net. The only unknown piece of information . . .

How long would it take?
On October 18, the NC amateurs found out. Thirty-four minutes from Murphy to Manteo, and one hour from Manteo to Murphy. The two hams involved originated their messages, dated and timed them October 18, 2030 local, and sent them on their way through the local repeaters. At the same time, the Murphy-to-Manteo Tracking Net was instituted on 3923 kHz for tracking the messages but not assisting in any way. This tracking was done by monitoring repeaters and reporting in on 3923 as the message cleared the repeater.

After the messages were reported received by the addressees, an air of jubilation moved over the 3923 net. Many expressed surprise, but all were quite excited and pleased at the response of their 2-meter comrades. Some of the "old" 2-meter traffic handlers were heard to chuckle, knowing well the capabilities of vhf repeaters.

Tracking the messages while enroute was done well, although at times it got confusing when the traffic hopped from repeater to repeater faster than the reports were reaching the net.

The Murphy-to-Manteo message moved rapidly and smoothly, originating on the Franklin, NC, repeater, then to Mt. Pisgah, Morganton, Roaring Gap, Greensboro, Durham (through a 220 machine), Raleigh, Grifton and Elizabeth City. Some 10 amateurs relayed the traffic eastward through nine repeaters. The Manteo message was successful, making a speedy trip westward via Raleigh.

Two meters has proved to be an excellent vehicle in the North Carolina area for statewide traffic handling for years. This exercise proved it to low-band traffic handlers. Still, the question remains: How well can unannounced traffic be moved across the state, or into Virginia or South Carolina, without waiting for normally scheduled 2-meter nets? We may find out soon.

Several repeater owners have been discussing statewide repeater linking for months. Linking is already being conducted in several areas of the state. The future of 2 meters (and 220) for statewide relay is on the horizon. . . . Someday it will be a common occurrence. — Wayne C. Williams, K4MOB

PUBLIC SERVICE DIARY

□ New Orleans, LA — September 24. W5PZA discovered an armed robbery in progress and contacted the police via the WR5AMD autopatch. The robber fled in an automobile after he saw W5PZA using his handheld transceiver. The victim sustained only minor bruises. (GNOARC)

□ Myrtle Beach, SC — October 12. When W4TMS reported that he was aboard a boat that was damaged and about to capsize, W4YPZ relayed the distress call to W4NTB, who telephoned the Coast Guard to assist the stricken vessel. (WA4UTA)

□ Carbonado, WA — October 25. Pierce County

ARES members provided communications assistance via repeater WR7AHD in the early-morning search for a lost hunter on the northern slopes of Mt. Rainer. After the search had commenced, the hunter walked out of the woods unharmed. (WB7AJR, EC Pierce Co.)

□ Toccoa, GA — November 6. In the wake of the flood in northeastern Georgia, amateurs organized a massive network to provide emergency communications for c.d., Red Cross and law-enforcement agencies. Alerted to the disaster by the Georgia SSB Emergency and Georgia Cracker Nets, WA4BZY, accompanied by N4FU and WB4TOW, drove his RTTY-equipped motor home to the site of the calamity, joining others who were handling health-and-welfare traffic pouring in from the whole nation. (WA4BZY, EC RTTY GA and WA4HFB)

□ Asheville, NC — November 6-7. Numerous hams provided communications where there were none due to the disastrous flooding in this area. An emergency net was activated, which relayed information concerning people in distress and the severity of the flooding to the Civil Preparedness Agency. (WB4TTJ)

□ Morris and Passaic Cos., NJ — November 8-9. During heavy rains and rising river levels, the Ramapo Valley Emergency Net relayed river level readings and road flooding conditions to the c.d. via repeaters WR2AM and WR2ANA. (WB2VUF, SEC NNJ)

□ Gulf of Honduras — November 12. WB4HDX contacted the Coast Guard upon hearing the distress call of VP5JIM and his wife aboard a yacht which had lost its sails and was taking on water in a severe storm. W8EH notified the FCC's direction-finding network, which pinpointed the vessel's location, thus simplifying the rescue of the couple by the Honduran Army, who were alerted by HR2AAW and HR2VFB. (K4SCL, SCM SFla)

*Asst. Communications Mgr., ARRL

□ K.I. Sawyer AFB, MI — November 14. When a civilian pilot was unable to receive weather conditions by normal means, Air Force pilot WB8YIG contacted WD8OEO, who obtained the weather information from WB8SYA via the Michigan Upper Peninsula Evening Traffic Net. The information was relayed to the civilian and resulted in his reversing course to avoid landing in deteriorating weather conditions. (W8DHB)

□ Knoxville, TN — November 27. Fifty amateurs took part in an emergency weather net after a severe ice storm struck eastern Tennessee. The net assisted authorities in unsnarling traffic jams and accidents caused by the storm. (WB4ANX)

□ Repeater Log. According to reports received to date, repeaters were used to report 23 automobile accidents and related incidents, five fires, two searches, one assault and one rescue. Repeaters involved were WR1s AAC ABU, WR2s ABV AJX, WR3s ABM ACR, WR4s AZD, WR5s ARP, WR6s ACJ AFV ASM, WR7s AFJ ANE, WR9s ACU ADJ ADS, VE1ASQ.

□ For the month of November, 37 SEC reports were received, showing a total ARES membership of 14,397. Last year at this time, 36 reports were submitted, with membership totaling 13,263. Sections reporting were Alaska, Alta, Ariz, Ark, Colo, Conn, Del, ENY, EMass, Ga, Ind, Iowa, Kans, Me, Mar/NFid, Mich, Minn, Mo, NC, NFla, NTex, Ohio, Okla, Ont, Ore, SV, SDgo, SJV, SCV, Sask, SFla, SNJ, STex, Va, Wash, WVa, WMass.

NATIONAL TRAFFIC SYSTEM

W7DZX has succeeded W7EP as PAS chairman; Best of luck to Jack and our sincere thanks to Bob for an excellent job. K1BA has officially been appointed manager of IRN-E, likewise WB5CDX with RN5-D. W7VSE (RN7-E mgr.) reports that he has become a real gadabout since retiring. K0EVH reports that TEN-E had an excellent month — traffic, rate and representation climbing. He has issued certificates to the following: W0AM K0BM W0BV K0CW K0EZ W0FKD K0FLY W0FT W0HH W0HI N0HY N0IE N0II N0IN W0LK W0LKA W0NZA W0OBH W0OTF W0PGZ K0PZ W0RF W0RQJ N0SM W0SS K0SSN W0TNN W0VEA N0YL W0YLS VE4PG VE4RO VE5EK. CAN-E certificates went to WB4IGX K4KWQ K4QCQ N5ES K5MC W5MI W5RB N5TC W9CXY K9DC W9NWX WA9OBP WA9OCF W9QLW W9AM K9CW K0EVH W0HH W0HI N0IN W0LKA W0OBH W0NSD W0YLS. 4RN-D certificates to WB4AID WB4DBK WB4DQZ W4EAT W4FKE W4FMZ W4FOE K4FTB W4GH W4AKXZ W4LXB W4ANBE AA4NC W4NMMU W4OCX W4A0EM W4APNY N4PQ W4ARDI W4AUKU W4AULX W4WNY W4WYQ N4ZH WB4ZIQ WB4ZNB. W2CQB K2PL W2WSS received 2RN-E certificates. W9HOT became 9RN-D manager, replacing WB9FOT and (briefly) W9JLJ.

November Reports

Area Nets						
(evening sessions)						
(daytime sessions)						
1	2	3	4	5	6	7
EAN	30	1785	59.5	1.426	98.3	
EAN	60	986	16.4	690	84.7	
CAN	30	1317	43.9	1.048	99.4	
CAN	60	502	8.3	314	98.3	
PAN	30	1270	42.3	1.155	100.0	
PAN	30	432	14.4	333	100.0	
Region Nets						
1RN	90	825	9.1	.490	91.5	94.1
2RN	119	730	6.1	.438	90.4	95.8
3RN	90	472	5.2	.450	98.3	99.1
4RN	120	1640	13.6	.564	70.1	99.1
RN5	90	1399	15.5	.535	94.6	99.1
RN6	90	663	7.3	.338	90.0	100.0
RN7	120	679	5.6	.389	88.2	100.0
8RN	86	478	5.5	.401	85.2	97.5
9RN						98.3
TEN	90	679	7.5	.402	65.6	99.1
ECN	60	321	5.3	.434	92.8	100.0
TWN	88	819	9.3	.358	92.0	100.0
TCC						
TCC Eastern	117 ¹	806				
TCC Central	85 ¹	745				
TCC Pacific	116 ¹	902				
Sections ²	4851	24024	4.9			
Summary	8134	49866	8.1			
Rcord	5573	31076	18.4			

¹TCC functions not counted as net sessions.
²Section and local nets reporting (143): BCEN (BC), MTN MTTN (MB), APN (Mar/NFid), CMN GBN GBSSN LN ODN OPN OSN (ON), SATN (SK), AENB AEND AENJ AENW SENS (AL), ASN (AK), ATEN HARC (AZ),

ARN (AR), NCN NEN SCN (CA), CWN (CO/WY), CN CORN CPN NVTN (CT), DTN (DE), FAST FMTN FTPTN NFPTN PBTN QFN SPARC TPTN (FL), CGVN CVEN GARES GCN GSN GSSB NGSN (GA), IMN MTN (ID/MT), ILN (IL), INTN ITN QIN (IN), I75m TLCN (IA), KPN K5BN KWN QKS QKS-SS (KS), KNTN KSN KTN KYN (KY), LAN LRN LTN (LA), MSN PTN SGN (ME), MDCTN MDD MEPN (MD/DE), EMRI EMRIPN HHTN NENN WNN WMPN (MA/RI), MACS M6B: MWV QMN WSSBN (MI), MSN MSPN MSSN MWX PAW (MN), MLWN MTN (MS), CN WNN (NE), NHVTN (NH/VT), NJN NJPN NJSN (NJ), SWN (NM), NLI NLIPN NLIV NLS WDN (NY), A2m CNN NCSSN PX SCSSN (NC/SC), ONN OSN OSSBN (OH), OAN OFON OLZ OPEN OTWV STN (OK), BSN OSN WCN (OR), EPA EPAEP&TN PTTN WPA WPAP&TN (PA), SDN SSSN (SD), TN TNN TPN (TN), TEX TTN (TX), UCN (UT), VFN VN VSN VSN (VA), WVN (WV), BEN BWN WIN WNN WSBN WSSN (WI).

1 — NET	5 — RATE
2 — SESSIONS	6 — %REP.
3 — TRAFFIC	7 — %REP. TO AREA NET
4 — AVG.	

Transcontinental Corps

K5MAT reports that this was the highest total traffic month (except December) since he became Director. It also was one of the highest success ratios in many a moon. TCC-Eastern Certificates: K3KW, W3YQ (first annual), WA2ICB (third annual), W8PMJ (seventh annual), W4UQ (16th annual).

1	2	3	4	5
Eastern	122	95.9	2185	806
Central	90	95.5	1490	745
Pacific	120	96.7	1823	902
Summary	332	96.0	5498	2453

1 — AREA	4 — TRAFFIC
2 — FUNCTIONS	5 — OUT-OF-NET TRAFFIC
3 — % SUCCESSFUL	

TCC Roster

The TCC Roster (November): Eastern Area (VE3SB, Dir.) — W1s KX NJM QYY, WA1ZAZ, K1s BA EIR GN NIA PAD SSH XA, W2s CS FR GKZ MTA RO, WA2ICB, N2GM, W3s PQ YQ, K3s KW PA, N3HR, W4s SQQ UQ, K4s BKX KNP, N4KE, W8s LTA PMJ, K8KMQ, VE1AAO, VE3s GOL SB. Central Area (W5GHP, Dir.) — W4ZJY, WB4SKI, W5s GHP RB, K5s GM MC TTC, N5s TS YI, YX/O, WA5s HNN IOU, W9s CXY DND FC NXG, N9TN, W9s AM HI, K0EVH, WA0TNN. Pacific Area (K5MAT, Dir.) — N5MR, W5KH, K5MAT, N6GW, W6s EOT MLF OA VZT ZRJ, K8HW, WB6PKA, KH6IQ, W7s DZX EP GHT KZ, K7IWD, W0s ETT FG FV IW LQ, K0BN DJ TER, VE7ZK.

Independent Nets (November)

1	2	3	4
Amateur Radio Telegraph Society	30	687	500
Central Gulf Coast Hurricane	30	244	3138
Clearing House	30	401	556
Hit & Bounce	60	1118	496
IMRA	26	418	927
North American SSB	25	256	214
North American Traffic and Awards	29	80	1090
Southwest Traffic	30	133	1319
Washington Region PON	17	38	355
20 Meter ISSB	26	617	503
75 Meter ISSB	30	775	1392
7290 Traffic	45	642	2588

1 — NET	3 — TRAFFIC
2 — SESSIONS	4 — CHECK-INS

Public Service Honor Roll November 1977

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each,

max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points. This listing is available to Novices and Technicians who achieve a total of 20 or more points.

74	56	K3ORW	K7GXZ
K4VHC	W1KX	WA3PRW	N8CW
64	K1PAD	W4FMN	W9MR
WB2IDP	N2GM	WB4NJU	W9NXG
N3HR	WB2KIH	W85FH	W0IX
K4ZN	W2MLC	W8YIQ	WB0UJ
WB5NKD	N5TS	WB5N	N5YX/O
WA5RKU	W8IQ	WB0FOQ	WB0ZAL
61	W6OA	WA0TNN	VE1AMR
K1BA	K0EZ	VE1ACU	VE1HJ
WA1UWF	VE4PG	VE3DPO	VE1LCR
WA2ECO	55	VO1GW	VE3GOL
N2YL	W6RFF	48	VE4IZ
K4BKX	K0DJ	WB0VEZ	VE4QU
WB4DBK	53	47	43
N5RB	W2YJR	WB5LBR	W2CS
WA5YEA	AA4CK	WB5OYU	WA8VBS
N5YL	N5TC	N6GW	K0EVH
K8JT	K5OVK	WA8WTS	K9LGU
WA6UAZ	WD9AUD	WB8YVI	VE2EOH
W7VSE	WD9CQC	45	42
WB8JGW	WA9OCF	WA2BMI	W2J
W8SOP	52	WA5VBM	WB2LCC
WB8VLR	W4MEE	44	WA5JWD
W0HXB	51	WB1CPF	41
60	K4YRL	K1MUJ	WA5JYH
WB5NKC	N5ES	W3PQ	K9MX
59	K5DG	W3YQ	WA6VGN
WA4JDH	WB6NEZ	WA4NK	40
N4PQ	WB5OSN	WB4EKJ	WA1YUJ
58	WB6PVH	K4EV	K2SE
WA2ERT/1	WB9FTC	W4LXB	WB0MCL
W5KLV	50	WA3NAZ/4	29
WB0HOX	AA4NC	44	29
W0OYH	49	N5DP	WB8YO/T
57	W1BVR	K5MC	25
N2MW	W1DWW	W5UYH	WA7ZAP/T
WB8DL	WA1MJJ	WB6FTY	22
W0TGO	WA1POJ	W6JTK	WA4QGV/T
	W1RWG	WB7AAK	WB8WUUT
	WA1TBY	W7DAN	

Brass Pounders League November 1977

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	753	1590	1896	74	4313
K3NSN	1200	1150	150	40	2540
W0WYX	52	1067	449	618	2186
WA4JDH	2	542	541	2	1087
K0YFK		523	10	513	1048
N4PQ	1	431	460	4	896
WB9NEH		429	429		858
W4MEE	5	439	391	17	852
W3VR	351	159	291	21	822
W5KLV	3	446	326	19	794
WA3ZRY	62	311	347	11	731
N5TC	148	191	282	68	689
W2YJR	59	266	258	63	648
WA4WBM	280	32	300	18	630
K0ONK	5	111	498	12	626
N3HR	11	235	306	55	607
W7DZX	15	296	291	4	606
WB0HOX	11	257	320	2	590
WB2IDP		326	242	7	575
WB6EIG	13	275	273	2	563
WB5NKC	10	214	307	15	546
K7VVA	53	305	71	114	543
W9ZGQ		270	270		540
K4ZN	14	270	249	4	537
K4TH	21	241	159	103	524
N4MD	3	271	241	7	522
K4SCL		280	240	1	521
WA3WQP	59	191	256	11	517
W7SQT	5	337	13	161	516
WA8MCR	7	273	225	3	508
W9JLJ	19	242	232	10	503
WB5NKD	11	227	240	22	500
K3NSN (Oct.)	1300	2386	2300	86	6072
WB4SKI (Oct.)	8	248	259	4	515
WB2IDP (Oct.)		249	236	7	506

BPL for 100 or more originations-plus-deliveries

W7TZK	225	K9CPM	134
WA1TBY	209	VE2JN	128
WA3ATQ	201	W5GM	117
VE3CDK	157	WA3THT	108
WD4IO	148	WB5LBR	107
WA6VAS	142	WA9VGV	107
W1TR	142	W0FQB	103
WA5VBM	142		

1 — CALL	4 — SENT
2 — ORIG.	5 — DEL.
3 — RCVD.	6 — TOTAL

Results, 1977 IARU Radiosport Championship

A good start for an international event

By Bill Jennings,* K1WJ and Tom Frenaye,** WB6KIL

It is doubtful that the 250 delegates representing 25 nations, who met in Paris on the afternoon of April 14, 1925, to form a representative organization to "coordinate and foster international two-way amateur communication" could have imagined the impact that their actions would have on amateur radio as it exists today. In fact, probably only a very few, the starry-eyed dreamers, of those 250 delegates, who met to establish the International Amateur Radio Union, envisioned amateur radio today, a scant 52 years later.

Who could foresee the number of active amateurs approaching seven figures in 1977, when in 1925 the numbers were counted in the tens of thousands? The airplane was still a "newfangled contraption" in 1925 and who could envision supersonic transports or multistage rockets, lifting satellites into orbit around the earth, specifically to support amateur radio communications? Commercial television, in 1925, was a seedling of an idea in some creative minds. Who could even guess that in less than 50 years, "that high-school-aged ham" down the street would be capable of beaming live pictures of himself to his amateur friends, halfway around the world? The moon of 1925 was just an object of lovers' fixations, an easy rhyme for June or spoon. Who could envision a time when the moon would become a passive repeater for the signals of two earth amateur stations, much less the possibility of man setting foot there? Amateur radio equipment in 1925 was for the most part a homebrewed affair. Transmitters and receivers were lovingly and furtively assembled with parts purloined from the family car and pantry. Who could envision the 1977 multi-million dollar amateur radio electronics industry, where for less than an average month's wages, one could walk into a store and emerge with state-of-the-art

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K5MM, left and K6KM, right, put 9D5A on the air to the tune of 1424 QSOs to capture the number 11 spot for DX multiplier stations.

amateur gear, capable of virtual "plug-in" communications with any area of the world at any given time?

What was clear to those present at that first IARU Conference was that because of the first two-way transoceanic amateur communication a mere two years previous, on November 27, 1923, between stations 8AB in France and IMO in the United States to be precise, the scope and direction of the future of amateur radio was unequivocally altered. The delegates realized also that in the founding of the Amateur Radio Service lay the potential for international personal contact, a way for people from different countries of the world to "meet" and exchange ideas. It was a way to transcend cultural, linguistic, political and socio-economic barriers on a person-to-person level.

It was the propagation and proliferation of amateur radio, as well as the assurance of amateur radio its rightful place in

the radio spectrum, that prompted the founding which to this day is, indeed, the basic goal of the IARU. The founding fathers of the IARU at that 1925 meeting realized that unless a united effort on the part of amateurs throughout the world could be coordinated, the Amateur Radio Service would surely lose (if not be forced entirely out of existence) ground to greedy, shortsighted, commercial and governmental interest, that could not understand the value of sharing "valuable radio spectrum space" with a service that neither directly showed great monetary profits nor was able to produce much in the way of usable national propaganda. Amateur radio, although as old as wireless capabilities, was still a youngster, and the value of capable communicators, culled from the Amateur Radio Service, to be used in times of national crisis, was doubtful. The value of the technological advancement of the communications art.

due directly to amateur radio involvement was also unknown. The value of amateur radio as a national resource, rather than a liability, in 1925, had yet to be proved and the IARU was founded to coordinate efforts aimed at ensuring that amateur radio would be around to be able to prove its worth.

From that first IARU meeting the number of member-societies has grown from 25 to the 1977 total of 99 (representing that many countries), with hopefully more to follow as newly emerging nations realize what the benefits of an amateur radio program can mean to them in terms of international goodwill and technological advancement.

What better way could we as amateurs honor and show our unified support of our IARU than by taking to the "airwaves," showing off our operating proficiency and in so doing, reinforce the fundamental goal upon which the IARU was founded, by encouraging "international two-way amateur communications?" Thus the first IARU Radiosport Championship, held July 9-10, 1977.

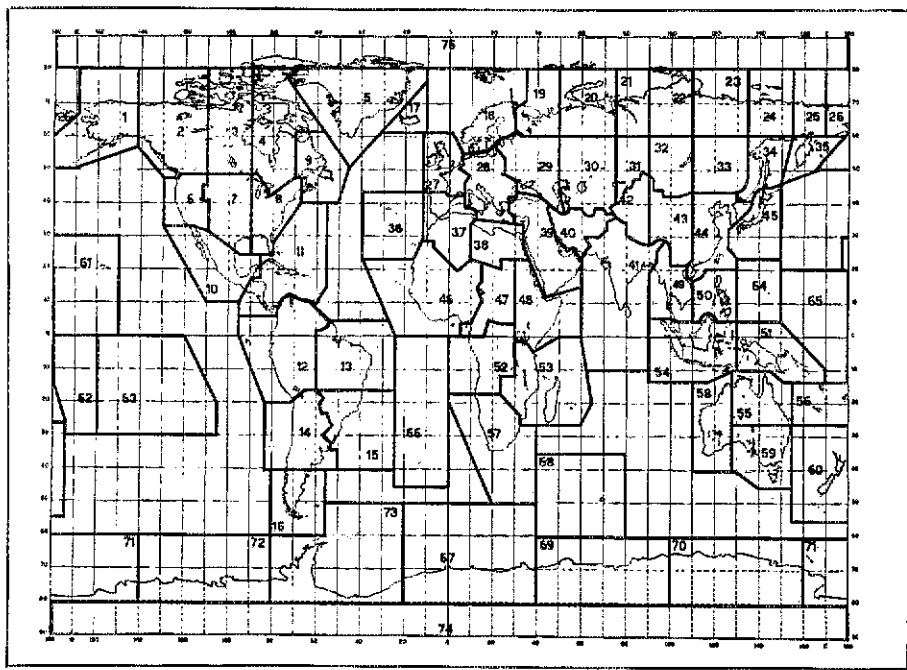
The nice thing about a first-year event such as this is that there are no set guidelines as to "how or where" or what direction an operator should take to achieve his goals. Participation and band conditions being the unknown factors, the operator looking to achieve the top score for his zone/country/state/section or to work a personal high QSO rate/number of DX stations, and so on, could not rely on the experience of previous operations, either his or that of others, for help in formulating his "plan of attack." Innovation and experimentation were the name of the game.

Who turned out for the IARU Radiosport Championship? Despite what could be called mediocre band conditions at best, logs were received from a total of 1563 stations, including 532 W/VE and 1031 DX competitors. These logs represented 48 of the possible 90 ITU zones, including 47 "land" zones and 1 "water" zone. Of the 90 ITU zones, 75 contain land and 15 contain no land. All but six of the "land" zones (and 202 DXCC countries) were on to be worked and were found in the various entries, the six exceptions being zones 42, 43, 67, 70, 71 and 72.

Dennis McAlpine, W2FVS, Contest Advisory Committee member, undertook the task of devising a questionnaire which was mailed to those requesting Radiosport entry forms. The survey contained questions dealing with present as well as proposed rules and suggested changes in the administration and running of the Radiosport Championship in the future. After receiving 289 replies to the survey, Dennis tackled the time-consuming job of compiling a comprehensive set of results based on the returns. The results of the survey go into great statistical detail, but four general conclusions were drawn: (1)

DX Top Ten Single Operator Phone + CW		DX Top Ten Single Operator CW		W/VE Top Ten Single Operator Phone + CW		W/VE Top Ten Single Operator CW	
JA1KSO	726,516	LU8DQ	814,104	CY7CC	840,735	K1ZZ	495,444
UA4RZ	578,016	PJ2VD	735,462	KH6GQW	762,936	N2LT	488,612
UA1DZ	497,550	UP2NK	576,306	N7XX	741,855	N6RO	458,034
G3FXB	497,340	UP2CY	430,404	VE5DX	518,778	W2GD	452,928
UC2ACA	414,781	OZ1LO	426,468	KH6JJ	505,080	W2IB	441,830
UA4HAL	393,718	ZS6WW	423,400	WB2RJJ	363,440	W3RJ	440,736
UY500	393,030	YB0ACT	371,070	VC9UM	344,172	K7GM	360,005
UL7EAJ	350,364	UW3HV	354,406	K1ZX	294,063	WA1QNF	354,132
UL7QH	343,140	UW9WL	292,723	W2PV	288,903	N6CJ	354,000
UQ2GDQ	336,320	UW0FM	235,911	K1IR	196,944	K3UA	275,198

DX Top Ten Single Operator Phone		DX Top Ten Multioperator		DX Top Ten Single Operator Phone		DX Top Ten Multioperator	
UW9WR	735,214	PJ9MM	1,512,000	N6EE	410,967	VE7WJ	1,107,236
UA9BE	652,505	UK9AAN	1,266,517	K5MY	308,402	CY3AKG	806,112
JA6BSM	310,695	PY3EE	1,041,164	KL7GRP	187,550	W6RDF	689,080
G4DMN	261,777	K2BA/4X	960,942	K1GSK	158,828	KL7HCN	560,468
UA6LBC	257,370	UK2GKW	908,596	WB0RET	104,768	K5JA	537,888
VK3BHN	249,711	DT7DK	861,795	N6AW	98,688	W3LPL	523,110
WA4AQW/		UK2BBB	855,228	N5CR	81,310	W4WS	427,500
DU2	241,956	UK2PAF	744,876	W7AEK/VE6	78,310	N4BP	421,234
EL3A	240,968	UK1AAA	671,766	W9RE	66,880	W7OX	419,040
PJ2FR	238,040	UK0LAB	635,888	N2SW	64,130	CY2UN	409,565
HB9BAM	229,712						



The spiderweb of ITU zones. Out of the possible 75 ITU land-based zones, you could have netted a total of 69, this year.

the present scoring structure is a little too complicated, (2) participants would like to see a greater number of awards available (achievement levels, for example), (3) a more definitive and flexible "times out" schedule is needed, and (4) despite lousy band conditions, participants enjoyed the contest.

As with any new venture, the Radiosport can be changed and improved in some ways. Changes are implemented based on input from, among other sources, the ARRL Contest Advisory

Committee, the W2FVS survey, and ultimately based on input from you the contest participant. Revisions of rules are now being considered for the 1978 Radiosport Championship. See future issues of QST for details and May 1978 QST for complete rules.

Well, the 1977 IARU Radiosport Championship was the first of many more to come. Was the Radiosport successful? In terms of participation, yes, it had an excellent turnout for a first-time event, which promises to turn into one of the

World Top Ten Phone

QSOs

ITU Zones

	160	80	40	20	15	10	6	2	160	80	40	20	15	10	6	2	Score
UW9WR		118	38	796	351	251				10	12	43	23	15			735,211
UA9BE		23	59	937	344	30				8	16	45	26	8			652,500
N6EE		30	93	672	394	69				8	17	38	20	10			410,966
JA6BSM		5	7	750	347	14				2	4	41	24	6			310,699
K5YMY		32	95	1093	398	69				6	14	34	23	5			308,407
G4DMN		32	6	702	91	41				9	4	36	16	6			261,777
UA6LBC		84	34	559	193	210				6	5	28	14	16			257,370
VK3BHN		8	9	695	39	1/2	1	1		4	8	42	11	1/1	1	1	249,711
WA4AOW/ DU2		2	2	341	768	2		4		1	1	24	16	1		1	241,956
EL3A			2	559	304						1	32	23				240,968

World Top Ten Multioperator

QSOs

ITU Zones

	160	80	40	20	15	10	6	2	160	80	40	20	15	10	6	2	Score
PJ9MM		76	331	1960	868	171				13	19	34	19	5			1,512,000
UK9AAN		162	304	1129	702	226				12	22	46	28	11			1,266,511
VE7WJ	8	134	596	958	1008	53		5	2	12	27	39	20	7			2,110,233
PY3EE		23	23	1150	975	106				7	11	34	28	12			1,041,161
K2BA/4X	1	65	158	1275	285	182	0	7	1	8	15	43	23	8			4,960,944
UK2GKW		175	243	1483	232	119				9	21	46	18	7			908,599
DT7DK		105	213	1623	186	123				11	14	44	17	13			861,799
UK2BBB		117	369	1316	291	210				13	22	44	25	11			855,228
CY3AKG	2	213	184	1395	195	38		3	2	11	22	42	23	6		2	806,112
UK2PAF		329	461	909	384	149				17	20	37	18	7			744,876

biggest events on the operating calendar. Is the Radiosport a fitting way to honor the IARU, its founding, present and future? We think so. The spirit of the IARU Radiosport Championship seems to be best summed up by Doc Morse, W8EY, who, having been in amateur radio for 53 years (one year longer than the IARU has been in existence), made the IARU Radiosport Championship his very first contest and wrote, "It's sure a good way to meet a lot of friends in a short time."

IARU Member-Societies (1/1/78)

Algeria: Amateurs Radio Algeriens; *Angola:* Liga dos Amadores de Radio de Angola; *Argentina:* Radio Club Argentino; *Australia:* Wireless Institute of Australia; *Austria:* Oesterreichischer Versuchssenderverband; *Bahamas:* The Bahamas Amateur Radio Society; *Bahrain:* Amateur Radio Association Bahrain; *Barbados:* Amateur Radio Society of Barbados; *Belgium:* Union Belge des Amateurs Emetteurs; *Bermuda:* Radio Society of Bermuda; *Bolivia:* Radio Club Boliviano; *Botswana:* Botswana Amateur Radio Society; *Brazil:* Liga de Amadores Brasileiros de Radio Emissao; *Bulgaria:* Bulgarian Federation of Radio Amateurs; *Burma:* Burma Amateur Transmitting Society; *Canada:* Canadian Radio Relay League; *Chile:* Radio Club de Chile; *Colombia:* Liga Colombiana de Radio Aficionados; *Costa Rica:* Radio Club de Costa Rica; *Cyprus:* Cyprus Amateur Radio Society; *Czechoslovakia:* Central Radio Club of Czechoslovakia; *Denmark:* Experimenterende Danske

Radioamaterer; *Dominican Republic:* Radio Club Dominicano; *Ecuador:* Guayaquil Radio Club; *El Salvador:* Club de Radio Aficionados de El Salvador; *Faroe Islands:* Foroysskir Radioamaterar; *Finland:* Suomen Radioamatooriliitto r.y.; *France:* Reseau des Emetteurs Francais; *Germany (Democratic Republic):* Radioklub der DDR; *Germany (Federal Republic):* Deutscher Amateur Radio Club; *Ghana:* Ghana Amateur Radio Society; *Gibraltar:* Gibraltar Amateur Radio Society; *Greece:* Radio Amateur Association of Greece; *Guatemala:* Club de Radioaficionados de Guatemala; *Guyana:* Guyana Amateur Radio Association; *Honduras:* Radio Club de Honduras; *Hong Kong:* Hong Kong Amateur Radio Transmitting Society Ltd.; *Hungary:* Magyar Radioamator Szovetseg; *Iceland:* Islenskir Radioamatorar; *India:* The Amateur Radio Society of India; *Indonesia:* Organisasi Amatir Radio Indonesia; *Ireland:* Irish Radio Transmitters Society; *Israel:* Israel Amateur Radio Club; *Italy:* Associazione Radiotecnica Italiana; *Ivory Coast:* Association des Radio-Amateurs Ivoiriens; *Jamaica:* Jamaica Amateur Radio Association; *Japan:* The Japan Amateur Radio League; *Jordan:* Royal Jordanian Amateur Radio Society; *Kenya:* Radio Society of Kenya; *Korea:* The Korean Amateur Radio League; *Lebanon:* Association des Radio-amateurs Libanais; *Liberia:* Liberian Radio Amateur Association; *Luxembourg:* Reseau Luxembourgeois des Amateurs d'Ondes Courtes, a.s.b.l.; *Malaysia:* Malaysian Amateur Radio Transmitters Society; *Malta:* Malta

Amateur Radio League; *Mauritius:* Mauritius Amateur Radio Society; *Mexico:* Liga Mexicana de Radio Experimentadores, a.c.; *Monaco:* Association des Radio-Amateurs de Monaco; *Morocco:* Association Royale des Radio-Amateurs du Maroc; *Mozambique:* Liga dos Radio Emissores de Mocambique; *Netherlands:* Vereniging voor Experimenteel Radio Onderzoek in Nederland; *Netherlands Antilles:* Vereniging voor Experimenteel Radio Onderzoek in de Nederlandse Antillen; *New Zealand:* New Zealand Association of Radio Transmitters; *Nicaragua:* Club de Radio Experimentadores de Nicaragua; *Nigeria:* Nigerian Amateur Radio Society; *Norway:* Norske Radio Relae Liga; *Oman:* Royal Oman Amateur Radio Society; *Pakistan:* Pakistan Amateur Radio Society; *Panama:* Liga Panemena de Radio Aficionados; *Papua New Guinea:* Papua New Guinea Amateur Radio Society; *Paraguay:* Radio Club Paraguayo; *Peru:* Radio Club Peruano; *Philippines:* Philippine Amateur Radio Association; *Poland:* Polski Zwiasek Krotkofalowcow; *Portugal:* Rede dos Emissores Portugueses; *Rhodesia:* Radio Society of Rhodesia; *Romania:* Federatia Romana de Radioamatorism; *Sierra Leone:* Sierra Leone Amateur Radio Society; *Singapore:* Singapore Amateur Radio Transmitting Society; *South Africa:* South African Radio League; *Spain:* Union de Radioaficionados Espanoles; *Sri Lanka:* Radio Society of Sri Lanka; *Surinam:* Vereniging van Radioamateurs in Suriname; *Swaziland:* Radio Society of Swaziland; *Sweden:* Foreningen Sveriges Sandreamaterer; *Switzerland:* Unio

World Top Ten Phone + CW

QSOs	ITU Zones							Score							
	160	80	40	20	15	10	6 2								
CY7CC	2	41	195	1330	626	92	5	2	10	20	42	23	6	2	840,735
KH6GQW		12	85	723	1027	5	1		5	18	40	18	1	1	762,936
N7XX	4	39	288	893	983	116		3	14	16	35	20	7		741,855
JA1KSO	1	13	127	967	347	15	1 1	1	12	22	48	32	9	1	726,516
UA4RZ		160	234	833	376	61			9	16	40	22	9		578,016
VE5DX	7	37	308	1732	50	3	1 2	5	5	16	37	11	2	1	518,778
KH6IJ		16	124	936	582	1	8		5	11	32	11	1	1	505,080
UA1DZ		164	217	856	102	109		15	20	41	11	6			497,550
G3FXB		29	122	1084	110	23		5	12	38	19	7			497,340
UC2ACA		81	114	479	99	334		10	17	43	20	13			414,781

World Top Ten CW

QSOs	ITU Zones							Score							
	160	80	40	20	15	10	6 2								
LU8DQ	1	15	363	808	291	48		1	12	26	33	26	9	1	814,104
PJ2VD	1	49	239	915	348	77	1	1	11	20	29	21	8	1	735,462
UP2MK		175	232	732	252				14	22	37	20	8		576,306
K1ZZ	2	123	202	934	276	33		1	14	19	38	26	8		495,444
N2LT	2	35	318	1015	154	4		2	10	23	34	19	4		488,612
N6RO	3	100	544	825	246	12		2	16	24	36	15	4		458,034
W2GD	10	94	276	999	158	56		4	9	24	32	20	8		452,928
W2IB	9	71	192	724	133	29		7	11	22	36	22	7		441,630
W3RJ		47	255	769	219	78			10	22	35	21	8		440,736
UP2CY		152	198	665	177	76			9	21	35	16	8		430,404

Schweierischer Kurzwellen-Amateure; Syria: Technical Institute of Radio; Thailand: Radio Amateur Society of Thailand; Trinidad & Tobago: Trinidad and Tobago Amateur Radio Society; Turkey: Turkiye Radyo Amatorleri Cemiyeti; USSR: Radio Sports Federation of USSR; United Kingdom: Radio Society of Great Britain; United States: The American Radio Relay League, Inc., Uruguay: Radio Club Uruguayo; Venezuela: Radio Club Venezolano;

Western Samoa: Western Samoa Amateur Radio Club; Yugoslavia: Savez Radioamatera Jugoslavija; Zaire: Union Zairoise des Radio Amateurs; Zambia: Radio Society of Zambia.

Soapbox

I was unhappy that I hadn't made more QSOs, until I got around to filling out the score sheet. WOW! Hope something can be done to simplify this problem for next year. Otherwise, it was a fun contest, a

combination of Sweepstakes and the DX Competition. Hope that you run it again next year. (W5VIW) We enjoyed the contest and despite the poor band conditions, there seems to have been a good turnout. (PY3EE/PY3APH) I made a very few contacts, but enjoyed those very much. As a Novice, the band conditions were not especially favorable for me. I had a three-element, 15-meter beam and a 40-meter inverted V set up on top of a 2500-foot mountain. Generator power and a tent for a shack. (KL7IXZ/KL7) I went in for this event expecting really big things, but somehow I felt that it never really got going. As a DX contest man, I feel that there were two factors that contributed to a certain amount of apathy here: (1) The incorrect differential between DX and non-DX QSOs of five versus three points. I really can't get fired up running European contacts and feel that there should be more incentive for DX contacts on a differential of at least five to two points, and (2) the IARU zone multiplier was not enough to sustain interest. No pileups, no real fun in searching, and no activity from many zones. Much as I feel that country multipliers are unfair, I think that we are stuck with them. As a result of these factors, I in fact only operated for 34 hours out of the possible 36 . . . quite unusual for FXB. (G3FXB) Enjoyed the Radiosport Contest, but with 30 percent of the hams in the world located in Zone 8, multipliers did not come easily. Very strong signals and receiver overloading did though. Worked a little DX and a number of states still needed for WAS.



HM2JN, Ha IL Park, with a respectable 18k points in the cw-only (B) category, was a welcome Zone-44 multiplier to many other stations.

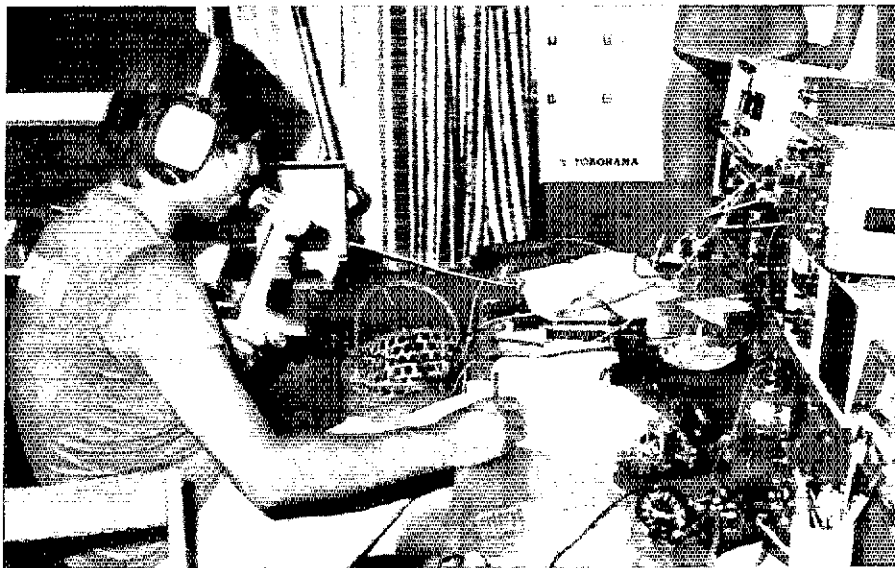
When the next *callbook* comes out, I expect to decipher all the new W-K-N-XX calls and pick up a few more states! (K1MC) I never heard but one station west of the Rocky Mountains. (OX5AP) This one has all the makings of a super contest, and I especially like being able to jump between phone and cw as conditions and rates dictate. I hope that you have some tentative plans for moving this truly worldwide test into the February-March time slot to eventually replace the four-weekender, which just isn't very exciting to us DX stations. (9D5A/K6KM) Really liked the contest format. . . . My equipment worked fine this time — that's promising. (WBØRET) It is good to have a worldwide, summertime, DX contest. Looking forward to next year's event. (W4YE) Kunle and I operated for about 30 hours and felt thoroughly exercised by the contest. The pileups were fantastic and at times Kunle and I had to sort stations out by call areas alone . . . and even then it was a chore, hi! (5N2NAS/5N2AAX/WB9SYA) I appreciate the short and uncomplicated rules, but would like to see better definition of the "off" times. May I suggest something like: "The 12 hours of off time may be taken in no more than five periods and shall be clearly marked in the log." [sounds good to us. — Ed.] For a new contest, I found that the interest was excellent and am looking forward to the future. (OZ1LO) Activity was quite good on the DX bands, but much less on 40 and 80 as compared to other contests. Usually I'm able to run about 30 contacts an hour on 40 meters and about 40 to 50 QSOs per hour on 80 meters, but not so in this contest. Why was there so little activity on those bands? Well, I guess that the reason is just simply that people did not need contacts on those bands. Working 30 minutes on 80 will bring you all the multipliers possible on this band, and about the same is true for 40 meters during the daylight hours. Therefore, I think that everybody concentrated on 20, 15 and 10. I think that you should change the multiplier structure for next year. I would like to see it changed to a country-per-band system. Then it would be necessary to work every band to be competitive. . . . I also assume that this change in multipliers would encourage more people to make DXpeditions to rare or semi-rare countries. With the rules as they are, there is no reason to go to another country if you are still in the same zone. (OE5CWL) I think that this contest could become the premier activity of the year. The strategy involved should give stations with only moderate equipment a chance to make it big. (NØDX) Some thought might be given to single-band award categories. . . . Also, please use white log sheets as green sheets do not reproduce well! (W2GD) Suggest moving contest out of the middle of the summer. How about early May or late

W/VE Zone Winners

Zone	Phone + CW	CW	Phone	Multiop
1	WB6TQS/KL7	KL7IOG	KL7GRP	KL7HCN
2	CY7CC	VE7CMK	W7AEK/VE6	VE7WJ
3	VE5DX	VE4OY		
4	VE3GCE	VE2YU	CY3GCO	CY3AKG
6	N7XX	N6RO	N6EE	W6RDF
7	K5KLA	KØMM	K5YMY	K5JA
8	WB2RJJ	K1ZZ	K1GSK	W3LPL
9	VE1AI	VE1AJP		CY1NN
61	KH6GQW	KH6BYG	KH6IMB	KH6HGP

DXpeditions

PJ9MM (W1s GNC XX, oprs.)	9D5A (K5MM K6KM, oprs.)
WB2CHO/VP9	5N2NAS (+ WB2SYA)
K1TN/VP9	K9PNT/DU2
8P6IM (8P6s AH FV N2BA, oprs.)	WA4AQW/DU2
W2JGR/OH2	WAØJRZ/KG6
4U9ITU (HB9AW N6TV WA6QAU, oprs.)	WB6TQS/KL7
WB2GSW/4X	W7AEK/VE6
K2BA/4X (+ 4X4s KK NJ, 4Z4s TA US, WB2CMV)	VE7WJ (VE7CGY, WA6s MQS VEF, oprs.)
	VE3FXZ/VE8



Nobuyasu Itoh, JA1KSO, turned in the number four score, worldwide, for single operators, mixed mode (A). His 126 multipliers is the contest-high total for any entry in any category.

September . . . might help to improve the use of 160 and 80. (W9RW) I believe that more should be done to encourage the Novices to take part in this contest. (WB4NQG) How about an IARU QRP activity (i.e., under 10 watts) on the same order as the Radiosport Championship, perhaps in the winter or spring? (W3AZR) Didn't participate much, but feel that this contest could be fun for a noncontester! (N6KM) The summary sheet requires an awful lot of bookwork. The sadist that designed the summary sheet, probably likes income tax forms. (WØBF) The signal report of the exchange is meaningless. All (or almost all) send a simple "5NN" to formally comply. Replace the

RS(T) with a three-letter identifier; for example, the operator's initials. (W5NR) There should be a low-power (under 200 watts) multiplier or a high-power (over 200 watts) divider (W6SUJ) Would like to see a multioperator-multitransmitter category. (PP5AJ) Multioperator effort should be encouraged through good awards and recognition, in this contest especially. Multioperator can be a very important and valuable part of learning contesting. . . . "We don't get no respect. . . ." (W2PV/N6DE) Really enjoyed this "everybody-works-everybody" contest. With a few improvements, this could become the best and most popular of all the contests. (K4PB)

Scores

Scores are listed by zone (in numerically ascending order), then by country within that zone. Note that the United States and Canada are listed separately, and that scores are further divided into call areas, and ARRL sections. The line score (example OX3VO 57,891-463-31-C) indicates the call sign used, total score, number of contacts, number of ITU zone multipliers, and entry class. The entry-class letters are A — single operator, mixed mode (phone and cw); B — single operator, cw only; C — single operator, phone only; D — multioperator, single transmitter.

Main table containing radio contest scores for various countries including Denmark, Netherlands, Austria, Czechoslovakia, Mexico, Bahamas, Guatemala, Haiti, Ecuador, Peru, Surinam, Venezuela, Argentina, Brazil, Iceland, Norway, Finland, Belgium, Luxembourg, and others. Includes call signs, zone numbers, and scores.

Table of scores for European Russian S.F.S.R., Kaliningradsk, UA2EC, UA2WJ, UA2FBA, UA2FAY, and UA2FBZ.

Ukraine

Table listing Ukrainian call numbers (e.g., UY50D, UY51AM) and their corresponding numbers.

UK2BAG

Table listing call numbers under UK2BAG and UK2PAA (e.g., 62,928-463-38-D).

Latvia

Table listing Latvian call numbers (e.g., UQ2GDD, UQ2GDF).

Estonia

Table listing Estonian call numbers (e.g., UR2REZ, UR2AW).

Zone 30

Table listing call numbers for Zone 30 (e.g., UA4HAL, UA4HDV).

White R.S.S.R.

Table listing call numbers for White R.S.S.R. (e.g., UC2ALC, UC2XAK).

Azerbaijan

Table listing call numbers for Azerbaijan (e.g., UK61AA, UK6DFD).

Georgia

Table listing call numbers for Georgia (e.g., UF6FD7, UF6FQ).

Armenia

Table listing call numbers for Armenia (e.g., UK6GAE, UK6GAF).

Moldavia

Table listing call numbers for Moldavia (e.g., UO5AP, UO5BDB).

Lithuania

Table listing call numbers for Lithuania (e.g., UP2OM, UP2WAR).

UA9DAA

Table listing call numbers under UA9DAA and UA9UBG.

Zone 34

Table listing call numbers for Zone 34 (e.g., UA9NH, UA9NLF).

Zone 35

Table listing call numbers for Zone 35 (e.g., UA9ZB7, UA9ZAB).

Zone 36

Table listing call numbers for Zone 36 (e.g., CI3EM, CI3BD).

Zone 37

Table listing call numbers for Zone 37 (e.g., CI1QG, CI1QG).

Zone 39

Table listing call numbers for Zone 39 (e.g., BA9XS, BA9XS).

Zone 40

Table listing call numbers for Zone 40 (e.g., EP2VW, EP2VW).

Zone 41

Table listing call numbers for Zone 41 (e.g., UK6AA, UK6AA).

Zone 31

Table listing call numbers for Zone 31 (e.g., UJ8JAS, UJ8JCL).

Zone 32

Table listing call numbers for Zone 32 (e.g., UA9YAR, UA9YCN).

Zone 33

Table listing call numbers for Zone 33 (e.g., UA9JCH, UA9JCM).

UJ5YMB

Table listing call numbers under UJ5YMB and UJ5YMR.

Zone 65

Table listing call numbers for Zone 65 (e.g., UJ5YMR, UJ5YMR).

Marshall Islands

Table listing call numbers for Marshall Islands (e.g., KX6DC).

W/VE

Table listing call numbers for W/VE (e.g., Zone 01).

Zone 01

Table listing call numbers for Zone 01 (e.g., Alaska).

Zone 02

Table listing call numbers for Zone 02 (e.g., Alberta).

Zone 03

Table listing call numbers for Zone 03 (e.g., British Columbia).

Zone 04

Table listing call numbers for Zone 04 (e.g., Yukon-N.W.T.).

Zone 05

Table listing call numbers for Zone 05 (e.g., Quebec).

Zone 06

Table listing call numbers for Zone 06 (e.g., East Bay).

Zone 07

Table listing call numbers for Zone 07 (e.g., Los Angeles).

Zone 65

Table listing call numbers for Zone 65 (e.g., UJ5YMR).

Marshall Islands

Table listing call numbers for Marshall Islands (e.g., KX6DC).

W/VE

Table listing call numbers for W/VE (e.g., Zone 01).

Zone 01

Table listing call numbers for Zone 01 (e.g., Alaska).

Zone 02

Table listing call numbers for Zone 02 (e.g., Alberta).

Zone 03

Table listing call numbers for Zone 03 (e.g., British Columbia).

Zone 04

Table listing call numbers for Zone 04 (e.g., Yukon-N.W.T.).

Zone 05

Table listing call numbers for Zone 05 (e.g., Quebec).

Zone 06

Table listing call numbers for Zone 06 (e.g., East Bay).

Zone 07

Table listing call numbers for Zone 07 (e.g., Los Angeles).

Zone 08

Table listing call numbers for Zone 08 (e.g., Santa Barbara).

The Honor Roll: Not for the Faint-Hearted

Ever wonder what it takes to garner amateur radio's most elusive prize, the DXCC Honor Roll? The answers may surprise you.

By L. Foord,* VE3FLE

Many times I've leaned back from the rig after giving up a futile battle for a new country, looked up at my DXCC certificate, issued six years ago and still resting around 200, and wondered how many centuries would pass before I made the Honor Roll. What could I do to speed up the process? Raise the antenna, buy more gear, give up golf — perhaps remortgage the house, or even get a divorce? What were the secrets; how do those illustrious and elite members who get their calls printed twice yearly in *QST* find the time, maintain the incentive, and do whatever else it may take to reach that pinnacle?

In search of those answers I prepared a survey, mailed it to a statistically accurate sample of Honor Roll members, and sat back to wait for the replies.¹ The first came in four days, and within a month I had a 75-percent response. About 20 percent never did reply, despite the inclusion of a self-addressed stamped envelope. One rather prominent DXer scrawled "too much trouble" across the envelope and returned it unanswered. For the most part, though, the respondents were enthusiastically cooperative; some even sent me lengthy letters. Plowing through the bulk of information was exhausting, but certainly worth it. What I found may surprise many: There is no "secret." The key to success lies with us all: in one simple word, determination.

Mr. Average Can Do It

The one thing I had to know was could "Mr. Average" — the guy running 200

watts to a tribander at 40 feet — make the Honor Roll. Three-quarters of those surveyed felt it was possible. In fact, W2GLF managed it on 20 meters with a Yagi at 32 feet (although it did take him 20 years).

There is no "secret." The key to success lies with us all: in one simple word, determination.

But it doesn't come easily. The average member took 13.4 years to make the Honor Roll, and he's been there for 10 years. Two-thirds of them presently hold Extra Class licenses, while one-third are Advanced licensees, and fewer than one percent are Generals. At the point of making the Honor Roll, however, 10 percent were Generals, 44 percent were Advanced, and 46 percent Extra Class. One-half fall into technical occupations, often relating to electronics, a third are retired, and about 13 percent are in the blue-collar category. They currently average 60 years of age, but were 49 years old when they attained the Honor Roll.

The DXCC Honor Roll

It was 1946, just after WW II and the five-year hiatus in amateur radio. Hams were back in civilian lives and anxious to chase awards. In June of that year, *QST* announced the reactivation of the already-famous ARRL DX Century Club Award (for confirming contacts with 100 or more countries). Just a year later (October, 1947), *QST* announced that 30 candidates had qualified for the post-war DXCC. The number one DXCC-holder, still prominent as a DXCCer without par, was Charlie Mellen, W1FH.

A demand immediately surfaced for some sort of separate status for the top-ten DXCCers, and the Honor Roll was born. Members of the DXCC Honor Roll have worked

One would think their stations were the best in the country, but the survey quickly destroyed that myth. Only three percent of the stations were rated as "elaborate," only 30 percent "above average," and 13 percent were actually "modest." Fewer than half have any spare equipment, such as a second receiver, and only a quarter use any specialized equipment like a programmable keyer (and no one was using computer-related gear). They are antenna conscious; better than one-half of the installations are "above average," 13 percent "elaborate," and less than three percent were deemed "modest."

When asked if they felt their particular stations were necessary to achieve or maintain the Honor Roll, respondents were divided. With no particular pattern, 50 percent said their type of station was necessary, including many who had above-average installations.

There are various tools available to the DXer, ranging from DX nets to newsletters. The survey showed only seven percent completely refrain from their use. Half of the members like cw, 28 percent use phone, and 20 percent have no preference. And, although this fact means

the 10 highest number of countries. Those top-ten numbers at first ranged from 170 to 130.

The DXCC award continued to grow and evolve, from an all-mode award to the inclusion of DXCCs for phone, cw, RTTY, 160 meters and satellite. Nearly 26,000 have been awarded over the years. The September, 1977, DXCC Honor Roll listed approximately 500 members, while the top-ten numbers of countries, 319 through 310, represented an all-time total. Note that country totals do not include "deleted" countries, those no longer in existence. For a free list of official "countries" and further information about DXCC, send a self-addressed stamped envelope to League hq. — W1YL

*763 Gladstone Dr., Woodstock, ON N4S 3T1

¹The statistical approach was based on Mendenhall and Ott, *Understanding Statistics*, 2nd ed., Duxbury Press, 1976. Stations were selected for the survey based on Honor Roll membership population proportioned to amateur population by call area. Only stateside members were surveyed.

little, 83 percent prefer, and use, Yagi antennas.

Listen . . . Listen . . . Listen

So how did they get there? Well, for years the ARRL has been advising newcomers to DXing to listen . . . listen . . . listen. It is obviously well-founded advice; of the number of hours the average Honor Roll member spends on the radio, less than 20 percent is actually operating. The remainder is listening.

And he is dedicated, devoting nearly 10 hours per week on the air (both listening and operating), 26 percent of that time aimed at maintaining his position. Before he made the Honor Roll he devoted 85 percent of his air time to DXing.

When asked to rank gear, antennas, operating technique and long-term dedication, 60 percent chose dedication for the top, most of the remainder picked operating technique. Very few felt gear or antenna outranked these factors. And when rating propagation versus dedication, 60 percent chose dedication.

Asked if they believed their QTH had any geographical advantage over their

For years the ARRL has been advising newcomers to listen . . . listen . . . listen. It is obviously well-founded advice.

counterparts, only 23 percent felt it did. Slightly more than half thought their personal lives offered some advantage in DXing, such as shift work or being able to sneak home to work that new one. Thirty percent felt their climb interfered in some way with their home life, 10 percent felt it contributed to a better home life, and the remaining 60 percent thought it had no effect. When asked if either East or West Coast stations, or a particular call area, had an advantage, nearly 70 percent felt it averaged out. Those in the remaining 30 percent exclusively picked areas other than their own as the advantageous location.

Half by Chance

We were curious if the pursuit of the Honor Roll was a goal or merely a by-product of their interest in DX, and found almost one-half approached the Honor Roll by chance. Sixty-five percent view the Honor Roll as the ultimate goal for the serious DXer. A surprising 37 percent thought their interest in DX had decreased since making the Honor Roll, while three percent felt it had increased.

Ignoring sunspot cycles, what do they think of DXing? Nearly half felt it was becoming easier, while a third thought it harder. Only 10 percent felt it was becoming more fun and a startling 70 percent felt it was less fun.

We intentionally tried to avoid controversy, but a little managed to filter through. Forty-three percent came down hard on lists and 10 percent on skeds. In

Sixty-five percent view the Honor Roll as the ultimate goal for the serious DXer.

addition, there were a few other complaints on various operating methods. Only 10 percent would like to see the rules made easier, while 13 percent want it harder. One-third think the rules should include deleted countries and 29 percent think they should not have to maintain their listing in *QST* once they've made the Honor Roll. More than half feel the cost of IRCs has destroyed QSLing and would like to see an alternate method of confirming contacts.

Of those who can upgrade their license, a third intend to, and 17 percent plan to upgrade their stations. Three-quarters of those surveyed currently participate in other facets of amateur radio and 37 percent are in pursuit of other objectives, such as 5-band DXCC.


They Have No Secrets

As we mentioned earlier, there seem to be no secrets. Determination is the only apparent key. To illustrate this, those respondents who are in first place averaged nine years to make it. One particular operator did it in six with a modest station and an above-average antenna. To quote W6PT: "If it was easy, it would be worthless."

Because of the cost and the associated workload, we were unable to survey the entire membership. Our findings, however, should approach 95 percent accuracy. We hope we have revealed the relative simplicity in making the Honor Roll, paid a small homage to those who have made it, and perhaps offered some initiative to those who are still trying. If

"If it was easy, it would be worthless."

there is any advice we can offer, it is to move to either the second or sixth call areas; for some unknown reason they have the highest Honor Roll membership as a percentage of total amateur population.

Our thanks to the many people who helped with this project: the members of the Honor Roll who took the time to reply to the questionnaire and offered much assistance, the ARRL staff for their advice and encouragement, and, in particular, to the XYL, who permits me many hours behind closed doors. 

Strays

WAS ON 75, THE HARD WAY

□ One Friday night I ran across a bunch of fellow amateurs on 3787 kHz who caught my interest. They were giving signal reports, addresses — and they all had two-letter calls. It finally dawned on me that they were working at confirming stations with two-letter calls in all states.

I jumped in with both arms and feet and have been having a great time ever since. There's very little intentional QRMing, and few high-power egotists; just a bunch of regular guys working for a common goal and exemplifying the tradition of amateur radio. When conditions permit, we get out pretty well and commonly have 30 or more states in a gathering. The net, which has been in existence seven years, meets at approximately 0100 UTC Saturdays and Sundays (Friday and Saturday evenings, local time) on or around 3787. Any and all are welcome: If you can operate below 3800, hop aboard and have a go at a different challenge. Although the primary purpose is to see if you can work stations with two-letter calls in all states, lots of 1 × 3s plus several of our Canadian brothers often join in.

Working all 50 states isn't as easy as it may sound. Alaska and Hawaii just don't have that many 1 × 2s, and then there's North Dakota. . . . But after some dedicated work, I managed to do it. And I never ran more than 100 watts dc into a Zepp antenna at 44 feet, so you don't have to be a big gun! — Vern Van Valkenburg, W0VV



The author, with his collection of QSLs sporting two-letter calls.

Frequency Measuring Test

November 5 results. The beat goes on.

By Jean DeMaw,* W1CKK

Amid reports of man-made and "act of God" interference, all but three of the 118 participants checked in at better than 179 parts per million in the November 5 Frequency Measuring Test. The umpire was able to produce readings on 80, 40 and 20 meters during early and late runs. Readings are as follows for the early run: 14121.110, 7046.168 and 3519.538 kHz. Late run: 14099.311, 7052.481 and 3528.136 kHz.

Of the 118 partaking in this FMT, a total of 1917 measurements were taken, with 35 claiming the honor roll position.

The next Frequency Measuring Test is scheduled for February 12, 1978. Full rules are in the January issue under "Operating Events."

Honor Roll

This top listing is the standing of the frequency-measuring leaders. In consideration of the minimum possible error due to Doppler (and other unavoidable factors), we accredit as of equal merit all those reports computing 4/10th parts per million (or better) accuracy. Please note that a participant must submit a minimum of two measurements to qualify for this listing. Again, the following are of equal merit, and are most conveniently shown in an alphabetical listing by call area. K1BC W1BGW W1CQ K1VHO N2LI N4NE W4NHY W4NTO W4RHZ WA4YVQ W5IJW W5QIV WB6AAL K6IJ K6MZN W6OQI W6RQ W6WL W7ANF W7BUN K7QXL K7ST WB8BGY W8CUJ W8JLJ WA8NOI W8OK W9HPG W9KO W9TJ W0BJ W0KL Ireland VE2HN VE3UQ VE6GL VE6XO.

Better Than 35 Parts Per Million (Class I OO Qualification)

(0.5) N4VM W5FMO W6CBX, (0.7) W6ME, (0.9) WINN KH6BC, (1.0) K2LM, (1.2) K1GN, (1.4) W1PLJ Thomas, (1.5) W1AYG, (2.0) NIAS, (2.2) WB2FWS, (2.4) N4WF, (3.0) W6CBF, (3.2) K6HI, (3.3) W8MG, (3.7)

WA5NOM, (4.0) W4UCL WA0YCY, (4.3) K6EC, (4.5) WB8VNY, (5.0) WA8QBJ, (5.4) W9TG, (5.6) W4QN, (6.0) W2FFU K4XU, (6.5) WA7IJN, (7.3) W2AET, (7.4) W0SS, (7.8) W0GW, (7.9) W2ND, (9.1) K4ZN, (9.4) W1DDO, (9.5) N3AI, (10.0) WA2YPW W9AG WA9PVS VE6QM, (11.1) K9UQN, (11.7) W1QV, (11.8) W6SSB, (12.3) K1EB VE6MJ, (13.0) K6EPX, W0EUQ, (13.6) N1NH, (13.7) W9ZFA, (13.9) W1FYR W2XQ K4MZK, (14.4) N0ST, (15.7) K6QPG, (17.4) W9IL, (18.4) WA3CVM, (19.3) VE6NX, (19.5) W9KHH, (21.7) WA6GEN, (22.1) K4AO, (23.7) K9MX, (24.9) W6AEE, (25.0) W6ASH, (25.3) W1MK, (28.4) W9TGN, (29.2) K1OGF, (32.2) W8AYI, (33.4) W1EWD, (34.2) W4HU.


Better Than 179 Parts Per Million (Class II OO Qualification)

(37.6) WB8HWE, (41.0) VE3BAJ, (42.0) W1SPP, (49.4) VE3IRN, (58.2) N6MW, (74.4) W2ABE, (100.2) WA4AJO, (100.7) K4VZS, (103.1) K8ET, (114.4) K5DL.

QRGee

Is there such a thing as an FMT addiction? (N4NE) The first thunderstorm in a month occurred during the November 5 FMT, adding a bit of spice to the process. (WA4YVQ) This is my 100th consecutive FMT entry. (W6RQ) [Congratulations W6RQ on submitting constantly since 1953 — Ed.] Thanks for sending the early frequencies on the bulletins twice. The first time to write them down and the second to check. Many tnx, always fun. (W4QN) W1AW made it again on 20 meters. Viva la sunspots. (W0SS) Have been going to do this for a long time: finally did it. Enjoyed it. (N3AI)

Feedback

Umpire's late reading for September 18 FMT as follows: 20 meters — signal not heard. 40 meters — 7046.902. 80 meters — 3538.977. W1HJP scored 1.0 ppm instead of 10.0 ppm as reported. 

WANE, TSC OFFERED

Is your wallpaper on the wane? If so, you'll want to qualify for the Worked All New England Award, offered to W1/K1 stations who work two stations from each of the six New England states (CT, MA, RI, VT, NH and ME). Other call areas and DX stations need only work one station from each New England state. Contacts must be made on 50 MHz or higher. Contacts made since January 1, 1976, count. Endorsements for ATV, ssb, cw and OSCAR are available upon request. Log data consisting of date, time, call, name and state must be provided. Send check or money order for \$1.50 (or two IRCs) payable to Ron Pariseau, Chairman, Rte. 1, Box 213A, Thompson, CT 06277.

To qualify for the Tri-State Certificate, stations in the First Call Area must work three stations from the states of CT, MA and RI. Others need work only one station from the Tri-State area. All amateurs and all bands count for this award. Handwritten endorsements are available on request. Send logs and check or money order for \$2 or 2 IRCs to: Tri-State Amateur Radio Club, Award Committee, Rte. 1, Box 213A, Thompson, CT 06277.

SETTING HIS RECORD STRAIGHT

What's the world record for sending five-letter wireless code on a hand key? If you go back to November, 1942, says W9YZE of Alton, IL, you'll recall that he did it himself, while serving with the Army Signal Corps. The record? 175 characters, or 35 wpm. Harry Turner now serves as general secretary-treasurer of QRP International, the organization that encourages its members to use the minimum power necessary to communicate.

ALL IN THE FAMILY

During a random, late-evening QSO with Trina Degenhart, WD8LPQ, on 80 meters, D. L. Hughes, WB9WUT, found out that it was her first contact after receiving her license that day. Three nights later, Dr. Hughes unintentionally provided the first QSO for another new Novice — Ann Degenhart, WD8LPP, daughter of WD8LPQ!

I would like to get in touch with . . .

anyone who would like to set up a QRP schedule in the Novice bands. Tim Smith, WD4KIA, P. O. Box 4629, Spartanburg, SC 29303.

*Communications Assistant, ARRL

Contest Disqualification Criteria and Club Competition Rules

Here's how you play the game when it comes to contesting — both individually and via the affiliated-club aggregate route.

Various ARRL operating contests held each year are built around rules by which participants must abide. Through the years, means of enforcing those rules in a manner fair to all participants have evolved into a set of guidelines based primarily on recommendations of the ARRL Contest Advisory Committee. Those guidelines are called the disqualification criteria, and are used as the basis for examination of possible rules infractions. The Headquarters Awards Committee, composed of seven active staff members, provides a recommendation in each case to the communications manager, with whom responsibility for the final decision lies.

What follows are those disqualification criteria, along with rules for club competition in ARRL contests. The disqualification criteria apply to all ARRL operating activities, and the club competition applies to the VHF Sweepstakes, the DX Competition, and the November Sweepstakes. Rules for all contests throughout the coming year will refer the reader to this page concerning rules enforcement and club competition.

Club Competition

Only ARRL-affiliated clubs may participate in the club competition. A member must be listed in the regular score listings before he can be counted for a club.

In order for a club to be listed, two points must be met:

- a) At least three entries from members of the club must be submitted.
- b) All members wishing to be included in the club scores must indicate the club name on their summary sheet *and* the club secretary must send a list of all club

members eligible to compete for the club for each competition. Remember to meet the mailing deadline!

Members eligible to compete:

a) Bona-fide club members living up to 50 miles from the club affiliation address need not attend any minimum number of club meetings. However, to be considered bona fide, a member must be active in club affairs.

b) Members residing between 50 and 175 miles from the club affiliation address must attend at least 50 percent of the in-person club meetings during the year immediately prior to the date of the contest. If, however, he has not been a member for a year's time, he must have attended at least 50 percent of the meetings since he became a member.

c) Members living outside of 175 miles and/or members operating stations outside of 175 miles may not compete in the club competition.

Scores of members meeting the requirements of sections a, b and c may be submitted for club credit. Single- and multioperator station scores may be counted. At a guest-operated single-operator station, both the guest-operator and the station licensee must be members of the same club in order to count the score for that club. At multioperator stations at least 66 percent of the operators must be members of the same club in order for the score to count for that club.

In conjunction with the 50-percent attendance rule, the club must hold *at least* four in-person meetings per year.

It is not within the intent of these rules that a club should vote out a member or a member resign and then be voted back in to the club later in order that he can meet

the 50-percent attendance rule.

The highest affiliated-club entry will be awarded a gavel.

The highest single-operator cw score and the highest single-operator phone score in any club entry will be rewarded with a club certificate where at least three single-operator cw and/or three single-operator phone scores are submitted.

Disqualifications

If the claimed score of a participant is reduced by two percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, e.g., disqualification from the 1977 phone SS prohibits submission of an entry for the 1978 phone SS, but 1978 cw SS participation is OK.

The calls of all disqualified participants will be listed in the QST contest report.

Any participant on the borderline of disqualification but not actually disqualified, may receive a warning letter from the communications manager.

For each duplicate contact that is removed from the log by Hq., a penalty of three additional contacts will be exacted. The penalty will not, however, be considered as part of the two-percent disqualification criteria.

In all cases of question, the decisions of the ARRL Awards Committee are final.

The Ultimate DX Contest

More than 40 years ago, the ARRL International DX Competition had its beginnings. Except for the World War II years (when amateurs were off the air), every year has seen DX enthusiasts in there working to better their scores. And the scores have steadily increased. Better equipment and better operating have produced more and more QSOs with more and more different countries over the years. However, there's one amazing thing: The actual distances worked haven't changed that much since the 1930s. Once you've spanned the globe, there isn't much farther you can work, right?

Wrong!!!

Almost unnoticed by many DXers, a small but growing band of amateurs have found a way to work 20 times the distance around the earth!

How? By generating enough signal so that echoes off the moon can be copied by other stations. Whether those other stations are halfway around the world or in the next town, the distance worked is the same — it's about a half-million miles to the moon and back.

Moonbounce work (EME it's called, short for the German words that translate "earth-moon-earth") isn't new. The U.S. Army succeeded in copying radar echoes off the moon 30 years ago. But amateurs? "There's just no way they could do it with their power limits and backyard-sized antennas!"

That widely held belief was disproved in the early 1960s, as revolutionary improvements in receiver noise figure made it practical for properly equipped stations to make moonbounce QSOs at amateur power levels. "Doesn't properly equipped stations mean monstrous antennas?" Maybe it once did, but with modern, low-noise preamps and the new

families of high-gain antennas, a moonbounce station requires no more real estate than does a decently equipped 80- through 10-meter station. Numerous amateurs have succeeded in the moonbounce game with nothing more than four 2-meter, long Yagis, a kilowatt transmitter, and an inexpensive preamp ahead of a commercial receiver. And some say it's even easier on 432 MHz, where antennas are smaller yet!

But isn't moonbounce still the private domain of a few engineer-hams? During the November, 1975, EME operation at the Stanford Research Institute's 150-foot, dish antenna, nearly 100 different stations in 20 countries worked WA6LET by EME on 432 MHz alone — in one day's time! And since then several new product lines have been introduced, offering pre-packaged, vhf kilowatt amplifiers, super-hot preamps, and high-gain antennas, thus making it easier than ever to achieve EME capability with off-the-shelf items. If moonbounce DXing ever was the private world of technical specialists, it isn't now!

In view of all these developments, the ARRL is introducing a brand-new EME contest this spring (April 15-16 and May 20-21). Here's a new incentive for still more amateurs to join this 500,000-mile DX club. In several ways, the new moonbounce contest will be a "little brother" to the traditional ARRL DX contest. Both are open to amateurs everywhere, both are DX contests, and the two events will receive combined editorial treatment in *QST*. A portion of the article reporting the DX Competition will be devoted to the moonbounce contest results.

The rules are a little different from the DX Competition in some respects. The moon-

bounce exchange consists of call signs and a signal report (in any mutually understood format) plus acknowledgements, nothing more. The multiplier will be the 10 U.S. and eight Canadian call areas plus DXCC countries (including VE, KH6, KL7 and so on).

Another difference is that in the moonbounce contest everybody can work everybody else for equal point credit. When the signal has to go to the moon and back in any case, it can be just as tough to work a station on the next block as to work a station 10,000 miles away on the other side of the earth.

Still another unique feature in this contest is that there will be no "losers" who achieve scores above zero! Every station that succeeds in making one or more complete moonbounce contact will receive a certificate commemorating that accomplishment.

The EME test will also offer a new form of multioperator competition in which neighboring hams can set up a moonbounce system for different bands and compete jointly as a group.

To assist newcomers in getting ready for that most difficult of moonbounce contacts — the first one — there's an excellent series of technical bulletins available free of charge from the Eimac Division of Varian Industries. To get your set, write Bob Sutherland, W6PO, Eimac, 301 Industrial Way, San Carlos, CA 94070.

The March issue of *QST* will carry a complete set of rules. An s.a.s.e. to Headquarters will get you a summary and log sheets. There are two weekends in the contest. If you have no luck in the first one, you'll have over a month to track down the problem, not a year! Good luck in the "ultimate" DX Contest! — Wayne Overbeck, N6NB, Chairman, Contest Advisory Committee

W1AW Operating Schedule (October 30, 1977-April 30, 1978)

PST	CST	EST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6 A.M.	8 A.M.	9 A.M.	1400	Slow*	Fast*	Slow*	Fast*	Slow*		
7	9	10	1500			Cw Bulletins*				
8	10	11	1600			RTTY Bulletins*				
1 P.M.	3 P.M.	4 P.M.	2100	Fast*	Slow*	Fast*	Slow*	Fast*	Slow*	Slow*
2	4	5	2200			Cw Bulletins*				
3	5	6	2300			RTTY Bulletins*				
4	6	7	2400	Slow*	Fast*	Slow*	Fast*	Slow*	Fast*	Fast*
5	7	8	0100			Cw Bulletins*				
6	8	9	0200			RTTY Bulletins*				
6:30	8:30	9:30	0230			Phone Bulletins*				
7	9	10	0300	Fast*	Slow*	Fast*	Slow*	Fast*	Slow*	Slow*
8	10	11	0400			Cw Bulletins*				
9	11	12	0500			RTTY Bulletins*				
9:30 P.M.	11:30 P.M.	12:30 A.M.	0530			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.

Normal W1AW visiting hours are Monday through Friday, 8 A.M. to 5 P.M. and Saturday and Sunday 3:30 P.M. to 1 A.M. (all local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Maps with local street detail are available upon request. Please note that all footnoted frequencies are approximate. If you wish to operate when visiting, you must have your original operator's license with you. (Schedules can also be arranged to work W1AW.) The station will be closed Feb. 20, Mar. 24, 1978. Staff: Chief operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Stan Gibilisco, W1GV.

In a communications emergency monitor W1AW for special bulletins as follows (times in UTC): phone on the hour, RTTY at 15 minutes past the hour, cw on the half hour.

To improve your 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 0300 practice from the issue of *QST* two calendar months past: Feb. 8, It Seems to Us; Feb. 14, World Above; Feb. 17, League Lines; Feb. 23, Public Service; Feb. 27, Happenings; Mar. 1, Operating News.

AMSAT-OSCAR 7

Ref. Orbit	Date	Time (UTC)	Long. W.	15050A	1 Mar.	0023	62.1
14700B	1 Feb.	0152	84.1	15063B	2 Mar.	0117	75.7
14712A	2 Feb.	0052	88.9	15075B	3 Mar.	0017	60.5
14725B	3 Feb.	0146	82.5	15088A	4 Mar.	0111	74.1
14737B	4 Feb.	0045	67.3	15100B	5 Mar.	0010	59.0
14750A	5 Feb.	0139	80.9	15113B	6 Mar.	0105	72.6
14762B	6 Feb.	0039	65.8	15125A	7 Mar.	0004	57.4
14775B	7 Feb.	0133	79.3	15138B	8 Mar.	0058	71.0
14787A	8 Feb.	0032	64.2	15151B	9 Mar.	0152	84.6
14800B	9 Feb.	0127	77.8	15163A	10 Mar.	0052	69.4
14812B	10 Feb.	0026	62.6	15176B	11 Mar.	0146	83.0
14825A	11 Feb.	0120	76.2	15188B	12 Mar.	0045	67.9
14837B	12 Feb.	0020	61.1	15201A	13 Mar.	0140	81.4
14850B	13 Feb.	0114	74.6	15213B	14 Mar.	0039	66.3
14862A	14 Feb.	0013	59.5	15226B	15 Mar.	0133	79.9
14875B	15 Feb.	0108	73.1	15238A	16 Mar.	0033	64.7
14887B	16 Feb.	0007	57.9	15251B	17 Mar.	0127	78.3
14900A	17 Feb.	0101	71.5	15263B	18 Mar.	0026	63.2
14912B	18 Feb.	0001	56.4	15276A	19 Mar.	0121	76.7
14925B	19 Feb.	0055	69.9	15288B	20 Mar.	0020	61.6
14938A	20 Feb.	0149	83.5	15301B	21 Mar.	0114	75.2
14950B	21 Feb.	0048	68.4	15313A	22 Mar.	0014	60.0
14963B	22 Feb.	0143	82.0	15326B	23 Mar.	0108	73.6
14975A	23 Feb.	0042	66.8	15338B	24 Mar.	0007	58.5
14988B	24 Feb.	0136	80.4	15351A	25 Mar.	0101	72.1
15000B	25 Feb.	0036	65.2	15363B	26 Mar.	0001	56.9
15013A	26 Feb.	0130	78.8	15376B	27 Mar.	0055	70.5
15025B	27 Feb.	0029	63.7	15389A	28 Mar.	0149	84.1
15038B	28 Feb.	0124	77.3	15401B	29 Mar.	0049	68.9
				15414B	30 Mar.	0143	82.5
				15426A	31 Mar.	0042	67.4

NOTES

- 1) All time and date references are in UTC.
- 2) The times and longitudes are for OSCAR's first equator crossing each day, which is called the reference orbit.
- 3) A-O 7 will operate Mode A only on days of the year fully divisible by three (February 2, day number 33, 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: authorized users only. This includes Tuesday evenings for the Western Hemisphere.
- 5) The Mode B transponder inverts signals. Upper sideband on 432 MHz becomes lower sideband on 145 MHz.
- 6) A-O 7 progresses an average of 28.737317 degrees west per orbit in a period of 114.945161 minutes for the month of February.
- 7) A-O 6 has been permanently removed from active service.

Haven't listened to OSCAR yet? Try this: If you live in the eastern half of Canada or the U.S., listen to the reference orbit given in the chart (don't forget times are in UTC). If you live in western North America, listen about one hour and 55 minutes later. Give OSCAR plenty of time to cross your QTH's horizon — a pass lasts a maximum of 25 minutes. There are several other passes each day that you'll be able to hear or talk through, both in the morning and in the evening. Consult your OSCARLOCATOR to determine their times and directions. (Note: A complete A-O 7 reference orbit schedule for 1978 is available from ARRL headquarters for an s.a.s.e.)

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 1sb; Mid States at 0200 UTC; West Coast 0300 UTC).

Spacecraft Frequencies

Spacecraft	Uplink	Downlink	Beacon
A-O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz

This schedule of orbits for AMSAT-OSCAR 7 is a regular feature of QST. 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, A-O D, to be launched in early March, 1978, 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.

SCM ELECTION NOTICE

To all ARRL members in the Wisconsin, Illinois, Northern Florida, Manitoba, Santa Clara Valley, Indiana, Vermont, Maine and Oregon sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures on that petition. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)
 Communications Manager, ARRL
 225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.
 (Signature . . . Call . . . City . . . ZIP . . .)

SCM candidates must have been a member of the League for a continuous term of at least two years and a licensed amateur of General class or higher (Canadian Advanced Amateur certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M., Eastern Local Time, March 10, 1978.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on April 3, 1978, returns counted May 23, 1978, and SCMs elected as a result of the above procedures will take office July 1, 1978.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition, for a two-year term beginning July 1, 1978.

If no petitions are received for a section by the specified closing date, such section will be resolicited in July QST, and an SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.

George Hart, WINJM
 Communications Manager

SCM ELECTION RESULTS

The following were elected for two-year terms of office beginning April 1, 1978:

Uncontested
 Eastern New York Guy L. Olinger, K2AV
 Maritime/Nfld. Aaron D. Solomon, VE1OC
 Pacific George H. Morton, N7HR/KH6
 San Diego Arthur R. Smith, W6INI

The following was elected for an 18-month term of office (due to resolicitation) beginning April 1, 1978:
 Sacramento Valley Norman Wilson, N6JV

Balloting results: In the Delaware Section, Roger E. Cole, W3DKX, defeated Robin McCray, WA3QLS, 127-55.

In the Kansas Section, Robert M. Summers, K0BXF, defeated Richard "Rick" Link, WB0KDE, 385-284.

In the Michigan Section, Stanley J. Briggs, W8MPD/K8SB defeated Henry R. Kohl, K8DD/W8GLC, 1390-394.

In the Tennessee Section, O. D. Keaton, WA4GLS, was elected with 466 votes, William W. Fulcher, N4WF, received 342 and David H. Knight, W4ZJY, received 316.

☐ photographers who would be interested in on-the-air discussions about the historical processes of carbo, oil, bromil and so on, with the hope of working together to preserve the knowledge of these beautiful processes for future generations. Tracy Diers, W2OQK, 58-14 84th St., Elmhurst, NY 11373.

Strays 

I would like to get in touch with . . .

☐ past or present members of the 49th Fighter Group/Fighter Wing who would like to meet on the air. Al Meschino, WB9WGI, 9328 Clancy Dr., Des Plaines, IL 60016.

☐ other twins in amateur radio. Lloyd Bumpus, N6EL, 7204 Rosewood Dr., Stockton, CA 95207, and Floyd Bumpus, N5EL, Rte. 4, Box 229, Alexander, AR 72002.

☐ hams who are professional clowns. "Tiny" the Musical Clown, W6JCR, 903 Mission St., Santa Cruz, CA 95060.

Operating Events

FEBRUARY

- 2: West Coast Qualifying Run**
- 4-5: DX Competition phone (Dec.)
- 4-12: Novice Roundup*
- 11-12: NH QSO Party, QCWA QSO Party, Ten-Ten QSO Party*
- 12: Frequency Measuring Test*
- 15: WIAW Qualifying Run**
- 18-19: DX Competition cw (Dec.), YL/OM Contest phone*
- 22: WIAW Qualifying Run**
- 25-26: French Contest phone*

MARCH

- 4-5: DX Competition phone (Dec.)
- 8: West Coast Qualifying Run***
- 11-12: Commonwealth Contest cw, Trieste DX Contest**
- 16: WIAW Qualifying Run**
- 18-19: Dx Competition cw (Dec.)
- 20: WIAW Qualifying Run***
- 25-26: BARTG Spring RTTY Contest, WPX SSB**

APRIL

- 1-2: Tennessee QSO Party, SP DX Contest cw
- 1-3: QRP QSO Party
- 6: West Coast Qualifying Run
- 8-9: "Open" CD Party cw, Swiss Contest (H-22)
- 11-12: DX/YL to Stateside YL Contest cw
- 14: WIAW Qualifying Run
- 15-16: "Open" CD Party phone, SP DX Contest phone, EME Contest (first part)
- 22-23: Zero District QSO Party, Bermuda Contest
- 25-26: DX/YL to Stateside YL Contest phone
- 29-30: Dutch Contest (PACC)
- 30: WIAW Qualifying Run
- May 20-21: EME (second part)
- June 10-11: VHF QSO Party

*Detailed last month

**Details this issue

***Detailed next month

FEBRUARY

- 2: West Coast Qualifying Run, (W6OWP prime, W6ZRJ alternate) 10-35 wpm at 0500Z (Universal

Coordinated Time, abbreviated UTC, with Z used as a designator), on approximately 3590/7090 kHz. This is 2100 PST the night of February 1 (9 P.M. PST). Please note that dates are always shown at least two months in advance and times are always the same local "clock time," i.e., 9 P.M. local Pacific time. Underline one minute of the highest speed copied, certify that the copy was made without aid and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A large addressed stamped envelope will help to expedite your award/endorsements.

15: WIAW Qualifying Run at 0300Z, 10-35 wpm, transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 and 147.555 MHz. This is 2200 EST (10 P.M. local Eastern time) the night of February 14. Underline one minute of the highest speed copied. Certify that the copy was made without aid and send it to ARRL per instructions above.

22: WIAW Qualifying Run at 2100Z (4 P.M. EST). Other instructions/frequencies above.

MARCH

11-12: Commonwealth Contest cw, 1200Z Mar. 11 to 1200Z Mar. 12, open to all members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories. Operation only on 80, 40, 20, 15 and 10 meters. Contacts may be made with any station using a British Commonwealth call sign, except those within the entrant's own call area. UK stations may not work, each other for points. In accordance with current IARU recommendations, contestants are requested to confine their operations to within the lower 30 kHz of each band. Each completed contact counts five points. In addition, a bonus of 20 points may be claimed for the first, second and third contacts with each commonwealth call area. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as one call area. Separate logs for each band. Each band-log should be separately totaled and should include at the end a check list of call areas worked on the band. Separate band totals should be added together and the total claimed score entered on the cover sheet. Entries may be single or multiband (multiband will not be eligible for single-band awards). Include usual signed declaration. Entries go to D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, East Sussex TN22 1UB, England, to be received no later than mid-May. Awards. Trieste DX Contest, sponsored by the Trieste DX Radio Club honoring the decennial of their foundation. The contest is between 13 stations and the rest of the world; 80-40-20-15-10-2 meters, single operator only. (SWL category permitted). The contest takes place the full 48-hour period UTC, cw or ssb. Call CQ 13 Test. 13 stations will transmit RS(T) and province — all others transmit report only. The following provinces are valid: BL Belluno, BZ Bolzano, GO Gorizia, PD Padova, PN Pordenone, TN Trento, TV Treviso, TS Trieste, UD Udine, VE Venezia, VR Verona, VI Vicenza. Score one point per QSO. QSOs with Trieste stations (TS) also count as multiplier. Each station may be worked once per band. Cross-band not permitted. Score: total QSO points from all bands times the sum of multipliers from each band. Awards. Usual logs, separate summaries. Send no later than May 31 to the Trieste DX Club, Contest

Committee, Box 1342, 34100 Trieste, Italy. Include 10 IRCs or \$2 U.S. for mail charges.

25-26: BARTG Spring RTTY Contest, from 0200Z Mar. 25 through 0200Z Mar. 27. No more than 30 hours of operation is permitted. Times spent in listening count as operating time. The 18-hour, non-operating period can be taken at any time during the contest, but off-periods may not be less than three hours at a time. (Note times on/off on your entry.) Separate categories for multiop and SWLs, in addition to single op are 80 through 10 meters. Stations may not be contacted more than once on any one band. Additional contacts OK if different bands used. Multipliers are countries per the ARRL DXCC list, and — in addition — each W/K and VE/YO call area will count as a separate multiplier. Exchange: time in UTC (full four-digit figure), RST and message number (starting with 001). All two-ways with stations within one's own country earn two points, contacts with stations outside one's country earn 10 points; a bonus of 200 points per country worked (including your own). Scoring: two-way exchange points times total countries worked; add to this the total country points times bonus points times number of continents worked. Use one log for each band and indicate rest periods. Logs must contain date/time(Z), calls, exchanges. Logs must be received by May 31, 1978 to qualify. Awards. The judges' decision will be final. Send entries to: Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex, England EN1 4DX. CQ World Wide WPX SSB Contest, full 48-hour period UTC. Only 30 hours of the 48-hour contest period permitted for single-operator stations. The 18 hours of operating time may be taken in up to five periods anytime during the contest and must be clearly noted in the logs. Multiops may utilize the full period. Two-way ssb only, all bands 160 through 10 meters. Competition categories: single op all band; single op single band; multiop all band only, single transmitter, only one signal permitted and multi-transmitter, one signal per band permitted. Exchange RS plus serial starting with 001. Multitransmitter stations use separate numbers on each band. Points: contacts between stations on different continents count 3 points on 20-15-10 meters, 6 points on 40-80-160 meters. Contacts between stations in the same continents but not in the same country count 1 point on 20, 15 and 10 meters, 2 points on 160, 80 and 40. (Exception: Contacts between different North American countries count 2 points on 20, 15 and 10; 4 points on 160, 80 and 40. This applies to North American countries, only.) Multipliers are prefixes, to be counted once only. A prefix is considered to be the two or three letter/number combination which forms the first part of an amateur call, as in W1, WA2, 4X4, 5A1, etc. For single op: score is total QSO points from all bands multiplied by the number of different prefixes worked; for single band score, QSO points on that band multiplied by the number of prefixes. Scoring for multiops is the same as the all band scoring for single ops. A station may be worked once on each band for QSO point credit. However, prefix credit can be taken once only regardless of the band. Awards. Usual disqualification criteria. Entries must be received by May 1. Send to CQ WPX SSB Contest Committee, 14 Vanderventer Ave., Port Washington, L.I., NY 11050.

Strays

I would like to get in touch with . . .

members of amateur explorer posts who would like to set up a net with Amateur Explorer Post 632 of the General Greene Council. Michael Cassell, WD4DUS, 1706 Glenwood Ave., Greensboro, NC 27403.

other 12- or 13-year-old hams and pre-hams worldwide for correspondence. Aurelio Alcazar, WD6CND, 4309 Shadyglade Ave., Studio City, CA 91604.

any former radiomen of the USS Pensacola for information on our reunion in San Diego, CA, in June,

1978: George McMillen, 8112 McNulty Ave., Canoga Park, CA 91306.

Tempo One owners to exchange info, hints and so on. Dave Warheit, KN3ZAN, 214 Terrace Dr., Sarver, PA 16055.

objective, science-oriented hams with 10-meter ssb capability, located either due north or due south of Putnam, CT, and within groundwave distance, for evening experiments in step-attenuated, weak-signal-to-subaudible communication. Robert Eslinger, WA1BZS, 36 Letters St., Putnam, CT 06260.

Station Activities

SCM 5 AREC 5 ORS 5 OVS 5 SEC 5 OBS 5 TCC 5 OO 5 NTS 5 WAC 5

CP 5 A-1 OPR 5 EC 5 DXCC 5 CLUBS 5 RM 5 OPS 5 RCC 5 PAM 5 WAS

CANADIAN DIVISION

ALBERTA: SCM, S. T. Jones, VE6MJ — SEC: VE6XC. PAM: VE6AFO. Congratulations to VE6BCE and his new XYL on their recent marriage. VE6FS has indicated that he is interested in starting a slow speed CW net so here is a chance for those interested in learning more about traffic handling to get your hand in. Contact Walter in Lethbridge, VE6HO and VE6MJ attended the DOC symposium in Ottawa and report an interesting conference. I would appreciate more news from the amateurs in Alberta for inclusion in this column. Club activity and items of personal nature will be most welcome, and should reach me not later than the 5th of the month. Traffic: VE6FS 110, VE6AAT 40, VE6HO 26, VE6AMM 10, VE6MJ 8, VE6XC 6, VE6AKY 4, VE6UF 4, VE6AFW 3, VE6YW 3, VE6COJ 2.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — The local nets are suffering from the winter local band conditions, but the activities and check-ins remain high. Point Grey ARC 1977/78 officers VE7AXJ, pres; VE7XQ, secy, tres. Burnaby ARC VE7AJH, pres; VE7CBK, secy. The club has a large code and theory class. VE7HQ was guest speaker, his subject Intruder Watch. VE7DTK reports they are installing a two meter repeater to cover Fort Fraser, Fraser Lake and Vanderhoof, frequency 14634/94. VE7CB and XYL enjoying their trailer down south. VE7LL is making signals into Vancouver from Messa. Traffic: VE7ZK 170, VE7DKY 124, VE7FB 84, VE7COA 45, VE7BLO 24, VE7BOT 23, VE7HQ 13, VE7BSL 7.

MANITOBA: SCM, Steve Fink, VE4FO — Asst. SCM: VE4PQ. RM: VE4UL. PAM: VE4JP. MTTN, the new RTTY Net on a trial run and doing better than expected. Contact VE4UL for more info. All nets improved as conditions improve. VE4UL attended a DOC and CARF symposium in Nov. on behalf of the Man. amateurs, our views were well presented. New White Cape operator, Don Stadnyk at Carberry will soon be active. MEPN 30 sess., 436 QNI, 31 QTC, MTN 29 sess., 211 QNI, 98 QTC, MTTN 23 sess., 61 QNI, 30 QTC. MTTN had 11 different RTTY stations. More traffic needed on all nets. Traffic: VE4PG 173, VE4QU 80, VE4UL 30, VE4IX 19, VE4RO 19, VE4IZ 16, VE4LU 9, VE4DX 9, VE4CR 8, VE4ABB 8, VE4AAD 7, VE4AAU 6, VE4JP 6, VE4NE 6, VE4LB 5, VE4NM 4, VE4TF 4, VE4OE 3, VE4DE 2, VE4OD 2, VE4RW 2, VE4FK 1.

MARITIME-NEWFOUNDLAND: SCM, Aaron D. Solomon, VE1QC — Asst. SCM: VO1FG. SEC: VE1DI. PAM: VO1JN. RM and APN Mgr.: VE1AGU. RM and NTN Mgr.: VO1GW. Silent Key: VE1VR. VE1AI and VE1MX ops at CKEPA, Goose Bay during CQ WW CW contest with high score reported. VE3FXT, ex-VE1PV operating from 7PB, H5. SONRA: VO1FX, pres.; VO1MR, vice-pres.; VO1IM, secy.; VO1KM, HP, MG, VO1BL, dir. HOWL: VO2AH, pres.; VO2BF, vice-pres.; VO2AC, secy.; VO2AY, treas. RTI ARC: VE1AWD, pres.; VE1BLM, secy-treas.; VE1UH, Tech. HARC & CARC re-elected officers. VO1HL new EC for N. Nfld. & Labrador. VE1AUF awarded "Paraplegic of Year" by G. Para Assn. VO1MG recd. VE8RCS plaque for phone patch tic. VO1GP awarded Silver Jub. Medal for work with M.D. Assn. APN, sess. 30; QNI 116/22; QTC 96/80; NTN, sess. 24; QNI 111; QTC 6. Traffic: (Nov.) VE1ACU 226, VE1HJ 75, VE1AMR 65, VE1LGR 44, VE1AMB 28, VE1ABG 27, VE1CH 24, VE1EJ 21, VO1GW 20. (Oct.) VE1EJ 15, VE1OC 15.

ONTARIO: SCM, Larry Thivierge, VE3GT — Asst. SCM, Noreen Nimmons, VE3GOL. Congrats to VE3HC on being awarded the Clifford Marsh trophy. Presentation was made by RSO pres. VE3CDM with VE3s DWH and HGZ present. Aurora ARC, VE3BPC celebrated their 5th birthday. Ont. Trilliums hosted the annual Christmas party at QE Hospital for their VE3QEH friends. Many repeaters throughout the province now providing code practice for beginners. Welland County ARC enters their 10th year with VE3AID at the helm for his fourth term with VE3s ISD CIW and CUN completing the executive. VE3DPB addressed the Burlington ARC on the operation of "AMSAT" and the Oscar satellites. OVMRC celebrating their 20th year with club dinner. Please amend your ARRL 1977/78 Repeater Directory: VE3III, Windsor, is 146.46 in, 147.06 out, VE3WIN, Windsor, is 146.40 in, 147.00 out. Note — VE3HFR is not a Windsor repeater. Kitchener-Waterloo ARC's Ham of the Year Award was presented to VE3AMZ by club prez VE3GYC. VE3FHJ has joined VE3s GEO and AFP on 1297.12 MHz. VE3BDM moving to Fort McMurray while VE3IXF on the move to Edmonton. VE3FHQ manages the Sat. session of the Trans Canada Net on 1440 kHz at 1800 UTC. A cursory examination of the 1977 CARTG RTTY DX Contest logs revealed an all-time high in the number of VE stations participating. VE3IVA now VE3BYO. VE3FXG leaving for Australia where he will have the call VK3BBD. London ARC held a successful "Old Timers Night" meeting with a "surprise" talk by VE3BMZ. Oxford ARC's new call is VE3OH in memory of Ross Walker, a charter member. For stations submitting traffic reports, originations are messages originated by someone other than yourself and if sent over your station, count as 1 originated and 1 sent. Individual station originations are counted in the sent category only. VE3s EBL, DDO and DZC have become Silent Keys. Traffic: (Nov.) VE3CDK 448, VE3SB 343, VE3GOL 277, VE3DPO 183, VE3HGJ 163, VE3JSW 156, VE3GFN 153, VE3BDM 63, VE3DV 59, VE3DVE 54, VE3EWD 51, VE3JG 44, VE3ATR 38, VE3GT 36, VE3GN 51, VE3HCS 19, VE3XJ

18, VE3FZG 17, VE3FHQ 16, VE3FGV 12, VE3DH 11, VE3GCC 10, VE3GEQ 10, VE3IFP 8. (Oct.) VE3APK 1.

QUEBEC: SCM, Ed Sieb, VE2BAQ — A very active VE2EC reports from the St Maurice Valley that the VE2MO club meets first Wed., every month at CEGEP de Trois-Rivieres, at 8 PM. VE2EMO, charming voice is heard on 2-meters. Newcomer VE2EAY is very active, has perfect CW list. It is my sad duty to report VE2ABJ a Silent Key. Flo had been active on 2 meters since 1945! Thanks to VE2EOH for excellent NCS operation. VE2AED is very busy these days, reports making drastic improvements to his HW101. Newcomers VE2FCA VE2FFS are busy building antennas, and portable operation, both are graduates from CB, and are ecstatic about the "change." Traffic: VE2EOH 343, VE2UN 168, VE2BP 64, VE2EC 62, VE2APT 15, VE2BAQ 4.

SASKATCHEWAN: SCM, P.A. Crosthwaite, VE5RP — The Saskatoon Amateur Radio Club have officially taken possession of the Strawberry Hills Repeater. The club is expecting to install Solid State equipment with standby power. The Lucky Lake group have installed a repeater at Rock Point on 13:73. The repeater call VE5RPR is working on wind generation for its power. Saskatchewan now have fourteen operating repeaters and four are proposed for 1978. They are in the following areas: 1) Stranraer 2) Moosomin 3) Sintaluta 4) Anglin Lake. A word of caution for those pilots who take their two meter gears in the air. Please do not use the repeaters on their simplex frequencies for a gab session. Make your contact and then move off to a standard simplex frequency. What is happening is that the pilots are triggering more than one repeater while they are flying high. (PUN) Traffic: VE5DN 70, VE5RP 20, VE5QV 10, VE5NJ 8, VE5UX 6, VE5DF 4, VE5OL 4, VE5QY 4, VE5HL 3, VE5RB 2.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PQ. RM: W3QQ. PAM: W3WD. PSHR: W3PO 44. W3ZNF continues to prove his excellence as a publisher with his Delaware Newsletter and News from Newington accompanying many club bulletins in the state. Earl will furnish one copy to any Club Editor who desires to duplicate it and would appreciate a Club bulletin in exchange. "Snowbirds" W3WYO and W3BSS are already en route to Florida with W3FEG preparing his "Winnie" for the trip South. Upgrading licenses are WB3DUG and WB3IGG to General, W3IGM and WB3FUO to Advanced, and W3EIX and WA3BQT to Extra. Congratulations! Dec.: DTN QNI 366, QTC 64. Traffic: W3PQ 196, W3DKX 57, W3QO 32, WA3WYI 29, W3WD 18, W3YAH 12, WB3DUG 10, W3HKS 1.

EASTERN PENNSYLVANIA: SCM, Geo. S. Van Dyke, Jr., W3HK — SEC: W3FBF. RMs: K3NGN K3KW. PAMs WA3PZO W3AVJ. Net reports: EPA QNI 561, QTC 286; PFN QNI 396, QTC 617; AREC (2) QNI 12; PTTN QNI 370, QTC 188; CARC QNI 9. K3IAZ will be new PAM for PFN replacing W3AVJ. Many thanks to AVJ for a job well done for a long time! PSHR N3HR, BPL: W3CUL K3NSN W3VR WA3ZRY N3HR WA3WQP WA3ATO. OVS reports: K3YD N3EG W3CL W3GOA WA3BSV WB3CTU WA3BJQ. OBS reports: K3NSN K3SD W3ID W3CL W3TI. OO reports: K3RDT WA3TMP W3NC K3NSN K3SD New officers: Lehigh Valley ARC K3AI, pres.; W3IGC, vice-pres.; WB3EVL, secy.; W3SCT, treas.; WB3FXF, finc. secy.; W3OP W3GCN N3EX WA3EWW K3UC, governors. Anthracite Rptr Assn.: K3IJ, pres.; WB3ADT, vice-pres.; WA3TMV, asst. treas.; WB3BYP K3ARR K3BS W3OHX, dir.; W3FCU, trustee. Central Penna. ARC: WB3AMO, pres.; K3SEW, vice-pres.; WA3JLP, treas.; WB3BHM, secy.; K3BZO, trustee; W3CGK, WA3GQM, asst. 2M FM dir. K3SME again active, got his big E also reports Overbrook School for Blind needs some volunteers to teach Ham Radio. WA3ZRY really busy on CAND! Two new hams on PITTN WB3EUM & WA3ZPA. K3KW & K3NGN have a presentation "Getting Started In Traffic Handling." If your club would like to hear it drop them a line. Warrington Rptr Assn. gang did a fine job of assisting Police on mischief night! Those involved were W3ETM WB3DJF WA3VFM WB3HOF K3GBA WB3IEH W3GJC WB3CFE WA3ZID WA3ZU WA3USY WB3GXP WB3HTX WA3KIJ WB3GBN WA3ELQ K3TPM W3ELX! FCC gave 96 Exams at TASBAR Banquet! W3BUR out island hopping again. Traffic: (Nov.) W3CUL 4313, K3NSN 2540, W3VR 822, WA3ZRY 731, N3HR 607, WA3WQP 517, K3KW 382, WA3ATO 355, WA3THT 306, K3NGN 266, W3IPX 138, K3SD 78, K3FD 60, W3ATJ 58, WB3BKV 41, K3YL 41, WA3YDC 36, W3WRE 35, K3GJL 30, W3ID 28, W3VA 23, W3ADE 15, K3HXS 12, WA3YHR 10, W3AXA 8, W3CL 8, W3TI 7, W3BUR 6, WA3TMP 6, K3AI 3, W3HK 3, K3YD 2, N3EG 2, WA3BJQ 2, W3KCM 1, WB3CFU 1, W3GOA 1, W3EU 1, K3IAZ 1, WA3VQE 1. (Oct.) K3NSN 6072, W3PD 28, W3WRE 14, WA3BSV 5, K3FD 4. (Sept.) K3FD 12.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — Nov. was contest month for everyone it seems. SEC N3II is looking to the SET. You ready? W3ZNW welcomes EST. The nets are adjusting to it too. Manager: Sessions/TFQ/QNI average. W3QQ/MDD, 57/189/8.0. Top Brass WB3JSL W3PO and WA3WPY. WA3PRW/MEPN 22/76/24.5. Toppers W3ADQ W3LDD WA3ZRY others WA3PRW and K3RIJ. W3DFW/WR PON 1738/20.8. K3ORW/MDCNTN 1760/14.8. Top Honors to WB3AOB K3ORW WA3ZRY W3DKX and WA3PRW. W3OYY/MDC PON 4/24/27.0. New calls for old: N3SF

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was WB3EDX, N3LE was WA3PAA, WA3RSK found 3 intruders. W3WBY haunts 8 meters. N3RL enjoys home between trips. WB3CGG runs the VN Phone net, and is the new pres. Montgomery ARC. Congrats. W3XE and K3WX trying out an 80-meter beam. W3JZY shifts from MARS to deliver some traffic. N3IT posts a nice traffic total. W3CDQ was visited by twin YL's K4JE and K4JA. W3ECN and WA3JYF lost dipoles in the winds. W3ZNW battles Murphy in the big rig. W3EOV is looking for an old ARC 5. W3FZY plans a trip mid-winter. WB2Y/3 and N3QA hold down liaison spots to 3RN. WA3PRW is winterized. Cold and snow are W3OY's meat. W3DFW owns a ponderosa hideaway. W3UO has a new VFO and gear for 2 meters. WA3RC will be out of the navy this summer and then to Purdue. W3KA is going to KC4 Land on the Polar Star. W3BE and the Mountain ARC are training and upgrading. The BARC Modulator will be commercially printed! Nice CVRA Journal with up to date info. WB3AOB, WB3CGG and WB3EDX were close to PSHR. The Brass Pounders ARC has on the air code Sat. Sun. 2100 GMT on 7040 kHz and Tue. Sat. on 3560 kHz at 0200 GMT says W3CVL traffic (Nov.) WB3AOB 182, W3FA 80, N3QA 83, WA3JYF 52, N3IT 46, K3ORW 46, WA3PRW 38, WB2Y/3 31, WB3CGG 26, W3FZY 20, W3EOV 16, W3ECN 10, W3WBY 8, N3RL 4, W3JZY 2, W3ZNW 2. (Oct.) WB2Y/3 80, WB3EDX 51.

SOUTHERN NEW JERSEY: SCM, Raymond F. Clancy, WB2GTE — WA2EMY an EC? W2UJ makes PSHR. WB2ANJ's broken leg heals. W2XG makes WAC on 40m cw. W2ZQ has asked with KC4USV for phone patch traffic. W2GQD Silent Key. W2KI new ORS. N2CQ wkd 120 JA in contest. WA2EHU wkd 32 countries as Novice then upgraded to Advanced. K2IOY active. WB2EYF asst. EC. WB2JUN nw N2XW, WB2GFG nw N2FG, WB2EOC nw K2XE. W2SUX new. Advanced, WA2NKL new Tech. WA2KKW upgrades Burlington Co. ARC's pres. K2TD: VP. K2UXB; secy. N2WV; treas. W2CSV. SJRA starts Novice class Feb. 6. Maple Shade ARC pres. K2BLD; VP WB2RUY; treas. W2DEE; dir. WA2WRS. Gloucester Co. ARC FD held at County College. SPARC's WA2AML K2TON K2VRK WA2MCO W2WLN are computer freaks. Salem Co. ARC Novice class taught by W2JUN, WB2KSS, N2RE. West Jersey RA's W2HOB, WA3PZO WB2LCC explained ham radio to Phila's WPIV Chan. 6 TV Perspective Show Audience. Delaware Valley ARC had msg booth at Quakerbridge Mall. Congrats to new Novices WA2 OAK ONS OIT ONX ONZ OCO OOO OOV OOX OYW OZE OZH OZG OZI OZF OZL PSJ TSK. KN2OWO. WB2 OOA OOB OOM OON OOR OOS OOW ONS ONW ONX OYX OYZ OZA OZH OZI OZE OZF OZK OZI OZG OZD PSJ. Another class of 75 new novices ready to take test. NJP sess. 3D, QNI 569, QTC 295, QSP 188, mins. 772. NJPN ev. sess. 4, QNI 63, QTC, 14, QSP 13 mins. 571 traffic: W2ZQ 231, WB2AWU 120, WB2LCC 52, W2UJ 42, K2BG 11, WB2EYF 5.

WESTERN PENNSYLVANIA: SCM, Donald J. Myslewski, K3CHD — SEC: WA3VUP. SECs: K3SMB WA3LJW. PAM: K3SMB. VHF PAM: W3GGJ. 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

New appointments: WB3DKT as ORS and OPS, WB3COR as EC for Cambria County. WB3EYH as OPS, K3KAP as OBS. It is with deep regret to note the Silent Keys of W3YD and W3MLT. WA3DER has upgraded to Extra Class. WB3GTO and WA3YAI to General and WB3DKT to Advanced. Steel City ARC officers for 1978 are: W3SVJ, pres.; W3TVB, vice-pres.; WA3VXJ, treas.; N3DQ, secy. The Western Pa. Repeater Council officers for 1978 are: WA3JDX, chmn.; K3VYI, vice-chmn.; K3ISO, secy-treas. The Radio Amateurs of Corry officers for 1978 are: WA3CIT, pres.; W3KJE, vice-pres.; K3KAP, secy.; WA3SJB, treas. Welcome to DF1AI/W3 who is in the USA as an engineer at the VW Plant in New Stanton. The WPA (Pgh) 2-Meter Traffic Net had 30 sessions with 414 check-ins and handled 60 messages. The WPA CW Traffic Net had 30 sessions with 433 check-ins and handled 191 messages. The WPA Phone & Traffic Net had 29 sessions with 337 check-ins and handled 94 messages. The traffic total is up from last month with many new stations reporting. Keep up the good work fellows and remember to report your traffic totals to me on a regular traffic: W3YQ 248, K3AT 172, W3EGJ 145, N3FM 107, WB3HGL 101, WB3DKT 59, WB3AGB 56, W3GOJ 55, K3CHD 49, W3KUN 47, WA3YEQ 47, K3HCT 47, WB3CDA 41, K3SMB 40, K3HI 35, WB3EYI 34, W3RUL 33, WB3EYH 28, WA3QNT 28, WA3YXJ 22, W3SN 13, WB3GZT 11, WA3ZAO 10, W3UE 8, W3IDO 8, W3ITN 8, WA3YIR 8, W3ATG 5, W3AS 4, K3VQV 4, WA3QER 4, W3LOD 3, K3CR 2, WB3EKQ 2, K3JA 2.

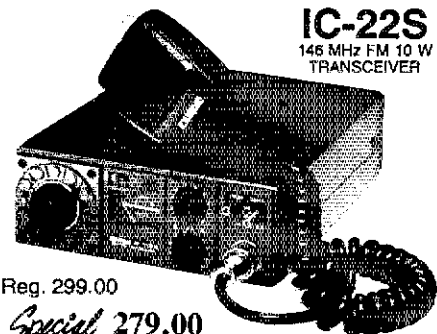
CENTRAL DIVISION

ILLINOIS: Edmond A. Metzger, W9PRN — Asst. SCM, Harry Studer, W9RYU. SEC: W9AES. PAM: WA9KFK. RM: W9NJP. Cook County EC: W9HPG.

Net	Freq.	Time(D)Days	Tlc.	Sess.
ILN	3690	0030/0400 Dy	326	58
Ill Phone	3915	2245 Dy	212	18
NCPN	3915	1200/1700 M-S	248	51
IEN	3940	1400 Su	7	4
INTN	3710	1300 Dy	11	17

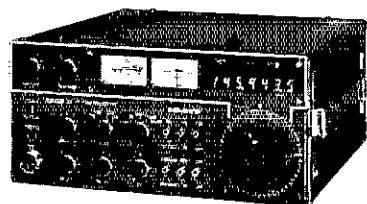
W9CJ WB9UQL W9IWI K9WNG and W9FO are the new officers of MAC (Metro Amateur Radio Club). The Central Ill. DX and Contest Club of Trivoli, Ill. and the Lincolnway High School Amateur Radio Club of Mokena, Ill. have been approved affiliated ARRL clubs by the League's Executive Committee. WB9IEE is now K9KV and W9PLF is now N9DR. New Novice calls thru CIRC (Central Ill. Radio Club) are WB9GAK WB9GQS WB9GAL. W9KST has moved to the Eastern Mass. section. WA9EBT has a new call. N9BT. The 1978 officers of the Northern Ill. DX Assn. are K9DX (ex-W9MEM), K9RA

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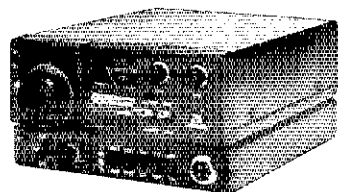
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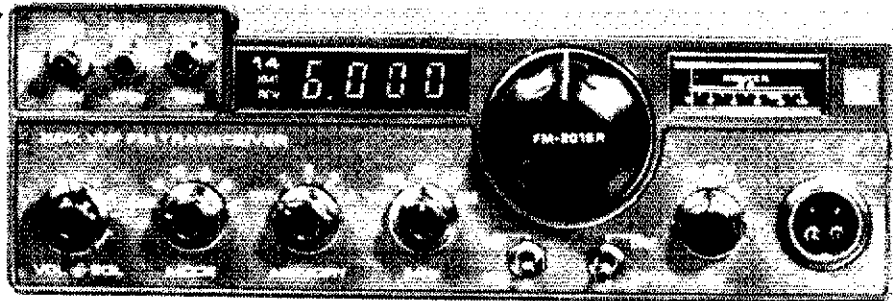
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- **4 CHANNEL RAM SCANNER WITH IC MEMORY:** Program any 4 frequencies and reprogram at any time using the front panel controls—search for occupied (closed) channel or vacant (open) channels. Internal Ni-Cad included to retain memory (no diode matrix 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 Braille dial 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.
- **MODULAR COMMERCIAL GRADE CONSTRUCTION:** 6 Unitized modules eliminate stray coupling and facilitate ease of maintenance.
- **ACCESSORY SOCKET:** Fully wired for touch tone, phone patch, and other accessories. 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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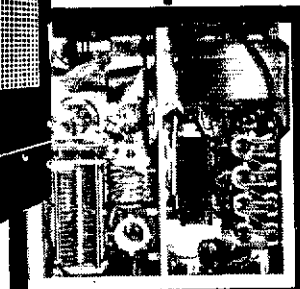
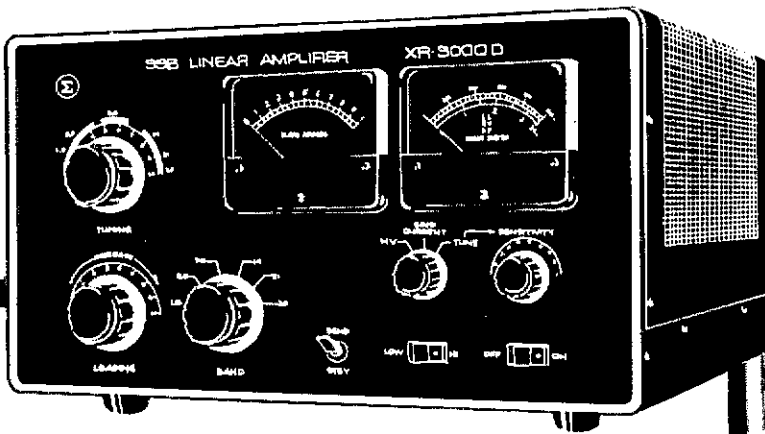
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Features:

Custom computer grade commercial components, capacitors, and tube sockets manufactured especially for high power use—heavy duty 10Kw silver plated ceramic band switches • Silver plated copper tubing tank coil • Huge 4" easy to read meters—measure plate current, high voltage, grid current, and relative RF output • Continuous duty power supply built in • State of the art zener diode standby and operating bias provides reduced idling current and greater output efficiency • Built in hum free DC heavy duty antenna change-over relays • AC input 110V or 220V AC, 50-60Hz • Tuned input circuits • ALC-rear panel connections for ALC output to exciter and for relay control • Double internal shielding of all RF enclosures • Heavy duty chassis and cabinet construction and much, much more.

- Full band coverage 160-10 meters including mars.
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New! Sigma Model AF250L Deviation/Modulation Meter

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Fully Certifiable for Commercial Use

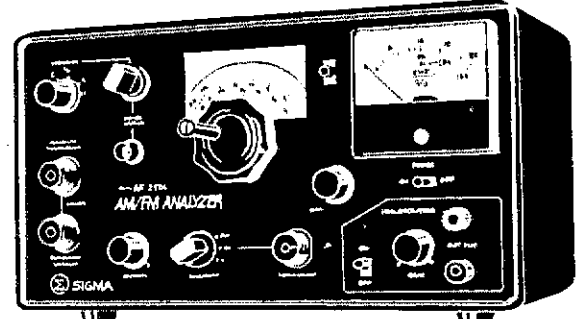
\$169

Features:

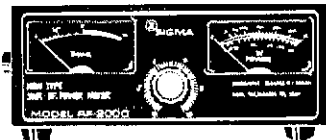
Extremely stable local oscillator for easy measurement of HF, VHF, and UHF bands employing negative feedback to insure extremely high stability • Easy to read, accurate linear scale • Direct off the air signal measurement capability.

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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, EXT. range: 1.8MHZ-520MHZ (Need Signal Generator) • Generous overranges • Input level: (1) Through type input level: 1W-200W (RF Input Terminal) (2) Direct input level: More than 80db/50ohm impedance • Amplitude modulation degree: 0-100% • Frequency deviation: 0-20KHZ • Accuracy: +/-3% of full scale • Intermediate frequency: 10.7MHZ • Local input frequency (EXT Range) • Measuring 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 • Power Source: AC117V • Dimensions: H-5½" (140mm), W-10¼" (260mm), D-7¼" (184mm) • Weight: 7 lbs.



SIGMA RF-2000 SWR & POWER METER



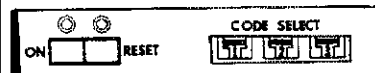
Cal PWR Scales 200W-2000W Freq Range 3.5-150 MHz. Please do not confuse the RF2000 with similar appearing lower priced units. RF2000 is an individually calibrated professional quality instrument. Unequaled at many times the price. Size 7" (w) x 2 1/3" (d).

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Introductory Price

Shipping Anywhere - \$7

GO PRIVATE! on 2 meters with the FMTD-1*



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.

FMSS	FM2015R Accessories	KDK SPECIAL SALE FM144 Accessories
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	Regulated AC/PS \$49	FM0F-2 1 MHz Offset Option Kit (No Crystals to Buy) \$10
	FMCC-1* Microphone with Built-in Touch Tone Pad \$49.95	MARS-CAP Option Kit - Any Frequency Any Split \$12
	FMTD-1* Private Call Decoder for use with and Programmed by any Touch Tone Pad \$75	
	MARS-CAP and Multiple Offset Kit* - Any Frequency, Any Split, No Crystals \$5	
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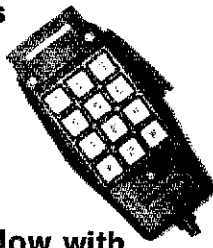


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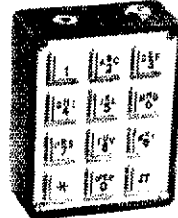
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CES Model 230 has Snap Action Tactile Keys and is only 3-3/4 x 2 inches. A 500 ohm Dynamic Mic with built in Tone Pad has adjustable balance and level controls and can be used with any transceiver using a 500 ohm mic. Model 225 with non-tactile keys \$44.95

Battery Powered Tone Encoder with Snap Action Keys

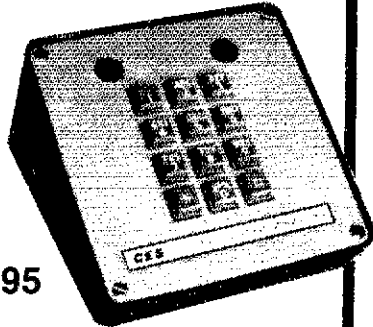
The CES Model 300 is powered by a 9v self-contained battery and includes an integral, rear mounted speaker with external volume control. This acoustically coupled tone pad is small enough to be carried in shirt pocket.



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Autodialer

CES Model 251 stores up to 10 twenty-two digit phone numbers including access and clear codes. Autodialer is programmed from the keyboard. Internal battery holds memory when disconnected from 12v supply. Numbers not in memory can be dialed from keyboard. Available in tone or pulse dialing.



\$99.95

Thin Tone Encoders

2-7/8 x 2-1/4 x 7/16 inches with Snap Action Keys



CES Model 211 has a Snap Action Keyboard with standard dual tone frequencies. Other features include a .2% accuracy and is crystal controlled. MOS Digital IC provides high immunity to R.F. and voltage fields regulated for supplies of 7 to 35v. Easily mounted to Transceivers.

\$39.95

Model 210 same as 211 but with non-tactile keys.

Miniature Tone Encoders

2-3/8 x 1-11/16 x 3/8 inches Smallest



Model 215

CES Model 215 is the smallest the industry offers — with all the features of the above Model 210. Order Model 216 with Snap Action Tactile Keys.

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Model 216 with Snap Action Keys \$44.95

Pad Mounted on Standard 146 A or Motorola HT

CES Model 220 offers complete back assembly with Touch Tone Encoder already mounted and ready to plug into the private channel connector. With an LED Tone indicator.

Model 220 for Standard 146A

Model 221 for Motorola HT

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(ex-WA9LZA), K9KM (ex-K9UKM) and W9ZA (ex-K9KWK), Lewis G. McCoy, W1ICP of the ARRL spoke at the Nov. meeting of the Sangamon Valley Radio Club (Springfield) and the Moultrie Amateur Radio Club (Bruce). The new call sign of ex-WB9YOB, WA8AWJ, WB7CJJ and WR8AFF is K9XI. W9HOT has been appointed as manager of the Ninth Region Net (daytime) of the ARRL National Traffic System. New Advanced licenses reported are WB9WQR, WB9YJU, WB9VLY & WB9YTO. W9LIG is a new Advanced and WB9ZFO K9CFM are Generals. WB9YJL is now a Technician. WB9WPE has a new call, N9DH. A new SloSpeed net called the Illinois Novice and Technician Net (INTN) meets on 3710 at 1300 daily. Contact WB9YAS for further details. Our sympathy to the families and friends of W9VHD and W9SIV who have joined the ranks of Silent Keys. W99IPZ has a new Kenwood 700-S two-meter rig. CAND for Nov. was 502 messages in 60 sessions and the 9RN was 98.7%. W9ZTK was the guest speaker at the Nov. 20th meeting of the Starved Rock Radio Club. W9CJL reports that W1ICP will be guest of honor at their Hamfest on June 4th. 220 NOTES, a Metropolitan Chicago Area Two Twenty MHz Repeater Operations News publication has just been published by W9MOL. WB9UFV is business manager. The Sterling-Rock Falls Amateur Radio Society new officers are WB9MCOZ, WB9RZQ, WA9PBS and WA9NXX. The Hamfesters' new officers include: W99BBB, K9UAA, W9DASP, WB9NAR, WB9ETF, WA9EOM, WA9AWS, K9MDK, WB9KOY and WB9EUJ. WB9NEH and W9JJJ are the BPL recipients for the month. Traffic: WB9NEH 858, W9JJJ 503, W9NKG 306, N9TN 232, K9DAC 176, K9MX 166, W9HOT 148, WA9VGW 148, WA9KFK 123, W9OK 120, N9DR 100, K9EEA 95, WB9JSR 94, W9KR 90, W9BEX 81, W9NJP 76, N9BT 74, W9OBS 70, WB9YAS 39, W9LNO 28, W9OYL 23, WB9RFC 27, K9SW 26, W9PRN 24, N9MX 15, WB9ZED 14, WB9EC 11, W9PE 8, N9NA 6.

INDIANA: SCM, M. P. Hunter, W9LF — SEC: W9UMH. Several stations reported active in CW SS but no scores have reached me yet. Congrats to the new FWRC officers K9TUS, N9TE, WB9RUS and K9DC. Some time scores are showing for the CQWW CW Test. Several of the ITN crew have departed for the warmer parts of the country. FD results are in and many good scores were made by the Ind. contesters. Reviewing the latest FMT results, it would appear that except for WA9ITB this is a dying art from our section. K9VCM and WB9QMJ were to be a part of the Bophuthatwana DXpedition. W9HUF says that INTN has reestablished liaison with D9RN. N9MM is stretching his recovery time from surgery to get in a few extra DX QSOs. DX continues to be good on 28 MHz. Several Ind. stations were heard during the ARRL 160 Test but I failed to get the antenna finished in time. FCC reports that there are 326,100 amateur licenses in the U.S. as of Nov. 1 and received 230,000 CE applications during the month of Oct. Nets: ICN 49, ITN 49, INTN 39, IPON 8, QIN 244, Hoos VHF 2. Traffic: W9FC 303, WB9YXN 244, WA9OCF 173, W9HUF 139, W9QLW 134, WB9PIR 110, W9ZW 108, W9LJU 100, W9EI 88, W9MR 84, WA9TJS 49, W9DLF 34, WA9ITB 34, K9YBM 33, K9EQT 21, K9RPZ 20, K9WDX 19, K9WJW 17, W9PMT 17, WB9ORM 14, WA9OHX 13, K9FG 12, K9CGS 10, W9RTH 7, W9BDP 1.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: K9ZZ. PAMS: W9AYK, W9IEM, K9UTQ. RMS: WB9ICH, K9KSA, K9LGU, K9EN, W9SFL. Nets, Freq., Time, QNI, QTC, Mgr.: BWN, 3985, 1245Z M-S, 671, 610, W9AYK; BEN, 3985, 1800 Dy, 779, 148, W9IEM; W9BN, 3985, 2300Z Dy, 1400, 266, K9UTQ; WNN, 3725, 2315 Dy, 30, 9, WB9ICH; WIN-E, 3662, 0100 Dy, 279, 139, W9SFL; WIN-L, 3662, 0400 Dy, 160, 52, K9LGU; WSSN, 3662 M-W-F, 28, 6, K9KSA; WRN, 3662 S, 0400, K9EN; WI Ex PO, 3925, 1801 M-F, 623, 58, WA9NIX, W9DHF, WB9TKO, W9DDEH, WB9VSA upgraded to General. Sheboygan Radio swapfest Apr. 8. Regret to report WA9YAN a Silent Key. Sheboygan has 220 MHz repeater up. Don't forget to attend the WNA picnic at Oshkosh July 9, 1978. Make plans for next years ARES conference at Wisconsin Rapids. BEN certificate to W9GKO, WA9WYS, W9ZFC is the new SEC for Wisconsin. K9ZZ is in charge of PR under the SCM. Tri-county swapfest Mar. 19, 1978 Jefferson County Fairgrounds. K9SM has WAS via OSCAR. W99AYE is new General, W99BCN, W99WCD are Techs. (from Kettle Drums). Is your Section net certificate up to date, must be endorsed yearly. W99REB is now N9RB. W9BN certificate to WB9YXV. BWN certificate to WB9JJP. K9CPM will be off the air for 6 to 7 weeks for checkup and therapy we wish lots of luck at Great Lakes. W99NRK handled emergency traffic in Green Bay. W9ZGQ made BPL Traffic (Nov.) W9ZGQ 540, K9CPM 411, W9DND 301, W9SFL 207, W9IEM 150, W99CQC 123, WB9KPX 121, W99AUD 91, K9FHI 88, W99FTC 78, W9IHW 74, N9CP 67, K9AKG 63, WB9JSW 54, K9LGU 54, K9UTQ 51, W9AYK 50, WA9GJU 44, W99UJ 43, W99PY 38, K9JPS 37, W99BRE 31, W99ICH 30, WA1VKB 29, WB9TXE 28, W9KU 23, W99ESM 21, W99RRU 21, W99MPF 20, W99GBG 18, W99YCO 14, WB9YXV 14, W9NQ 13, W99DHF 11, K9KSA 10, W9JW 10, WA9WYI 8, K9RTB 6, K9ASC 4, W99NRK 4, W9UT 4, K9ANV 3, W99RD 2, WA9BZ 1. (Oct.) WA1VB/9 27, WA9GYF 3.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes WB9HOX — SEC: W9SA. Minn. Nets.

Net	Freq.	Time/Day	QNI	QTC	Manager
MSN 1	3885	6:30 PM	301	157	WB9OFQ
MSN 2	3889	10:15 PM	70	14	N9HY
MSPN 1	3945	12:05 PM	78	146	WB9JYT
MSPN E	3925	5:45 PM	693	176	W9DUW
PAW	3925	9-12:1-5PM	4104	364	WA9YVT
MSSN	3710	5:30 PM	263	58	K9OW
MVX	3925	8:15 PM	252	188	WB9PKG

Congratulations to W99BXD and WA9CXW on passing their General. WB9SNA and W99FMG are new Novices.

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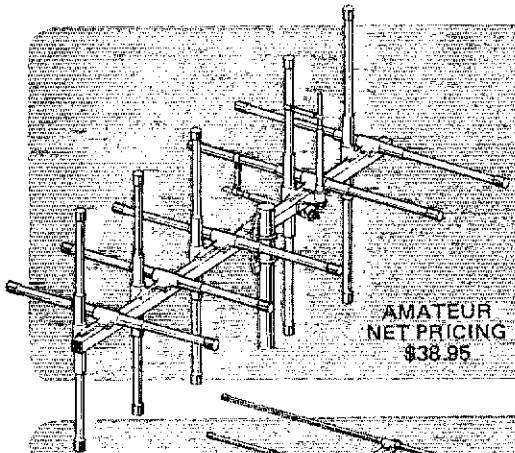
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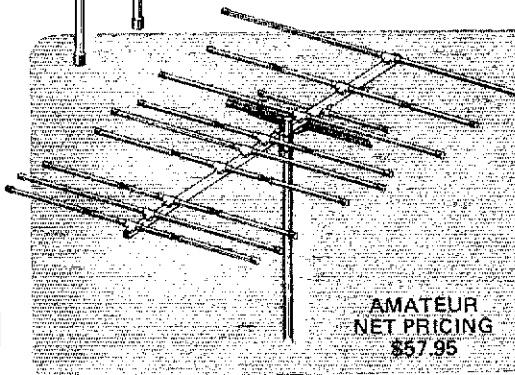
FINCO STINGER A 2+2

2 Meter

The model Stinger A 2+2 is a ten-element, dual polarization 2-meter antenna designed for OSCAR communications or where switching from horizontal to vertical polarization is required. The A 2+2 can even be phased to operate on both horizontal and vertical polarization at the same time (circular polarization). This is not only ideal for OSCAR work but gives your station versatility for ground communications.

Wide, non-linear element spacing gives the A 2+2 superior gain. However, since it is a five element beam in one given plane, the half power beam width does not make satellite tracking difficult because of sharp directivity. The dual gamma match assemblies provide for a very low V.S.W.R. and will withstand 2,000 watts P.E.P.

The Stinger construction features make the A 2+2 extremely heavy duty. Provisions are made for mounting the antenna at the end of the boom — for azimuth control — or at the middle of the boom for normal applications.



AMATEUR NET PRICING
\$57.95

FINCO STINGER A62

6 & 2 Meter

The model Stinger A 62 is a truly remarkable combination 6 and 2-meter beam designed for optimum performance on both bands yet only requiring ONE transmission line. This is accomplished through the use of exclusive phasing elements to accomplish dual band operation with no sacrifice to either band — NO SWITCHING REQUIRED!

On 2-meters, the A 62 has 6 colinear elements — equivalent to three 1/2 A 6-element yagis stacked side by side — thus giving outstanding performance. Maximum forward gain is assured on 6-meters through the use of four wide spaced elements. The heavy duty Stinger construction is used throughout so that the antenna will withstand 100 mph plus wind loads.

The A 62 is ideal for mounting on the same mast as your tri-bander or other antenna thus easily opening up the world of 6 and 2-meter VHF communication.

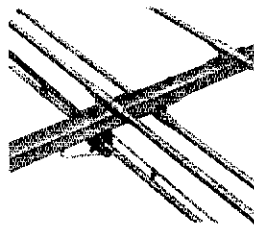
OTHER FINCO STINGER AMATEUR BEAMS AVAILABLE:

MODEL	AMATEUR BAND	ELEMENTS	BOOM LENGTH	AMATEUR NET PRICING	MODEL	AMATEUR BAND	ELEMENTS	BOOM LENGTH	AMATEUR NET PRICING
A10-4	10 Meter	4	16'	46.95	A2-5	2 Meter	5	5 1/2'	21.95
A6-3	6 Meter	3	6'	23.95	A2-10	2 Meter	10	10'	34.95
A6-5	6 Meter	5	13'	35.95	A1 1/2-10	1 1/2 Meter	10	8'	24.95

ENGINEERING FEATURES:

All Stinger Series Amateur Antennas incorporate heavy duty fully adjustable gamma matching systems to allow for maximum power transfer. The design provides for minimum V.S.W.R. and a wide bandwidth. A built in SO-239 type connector assembly is utilized plus the matching systems are power rated at 2,000 watts P.E.P.

A 4" x 6" x full 1/8" thick heavy duty plated steel mast to boom mounting assembly is used on all Stinger Series of Amateur antennas. The bracket assembly locks permanently on the square boom and thus withstands high wind loads and torque without twisting or becoming misaligned. The assembly accepts mast diameters of up to 2" O.D. Provisions for mounting either in a vertical or horizontal plane is incorporated in several models.



Exclusive Stinger square boom construction is used on all amateur antennas. The 1 1/2" square booms are of .064 wall high tensile strength aluminum which is many times stronger than its round counterpart. Also, special bracket assemblies have been developed to allow instant element to boom alignment — plus they stay aligned in the highest wind and ice loads. All elements are of thick wall high tensile strength aircraft quality aluminum.

Antenna design engineering is a specialty at FINCO. Top quality lab standard test equipment is used throughout the development and design of all antennas. The FINCO antenna test range has been carefully checked for erroneous reflection characteristics that could cause errors in antenna designs. Shown is the sophisticated stub and matching system that has been developed for the Stinger A62, 6 and 2-meter dual band beam. No traps or coils to burn out or detune, thus assuring you of the highest possible performance on both 6 and 2-meters.

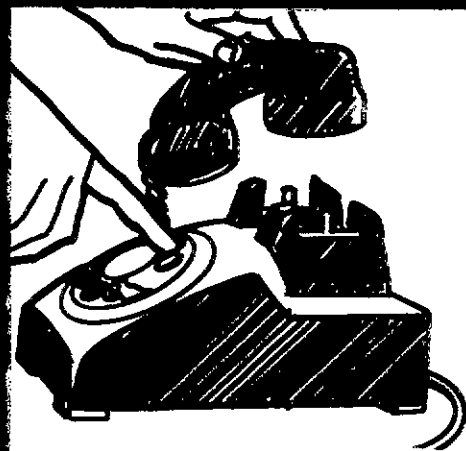
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Microprocessor controlled using a Motorola 6800 system.
128 Character text memory.
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ASCII option 110 baud.
Power required — 117 VAC/60 Hz at 20 Watts.
Dimensions — 3.7 H, 17.8 W, 9.5 D.

AVR-1 \$349.⁰⁰ (RTTY ADD \$50.⁰⁰)

Decoder converts Morse code and RTTY to plain text for display on a Video Monitor

Microprocessor controlled using a Motorola 6800 system.
Digital signal analysis.
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Welcome to the Amateur ranks fellas. WB0ZFG WA0PZ and W0RCJ have deserted the cold northwest for the sunny southwest, good luck and have fun. We understand that W0PAN has left this section for greener pastures. We'll miss you, Larry. Please note the change of time for the Minn. Slow Speed Net. Traffic: WB0HO 590, WA0VAS 206, WA0YYT 180, WB0OFQ 147, WB0JY 118, WA0YWA 108, N0HY 105, W0DUW 103, WA0TFC 8, WB0UIP 77, WB0PKG 68, K0PIZ 68, WB0YJA 64, K0CS 63, K0QW 61, W0RCJ 54, WB0WJE 53, WB0NZB 50, WA0G 42, W0PET 34, W0ZUJ 28, K0ZBI 25, K0RMX 2, W0PNE 20, WB0UKI 20, W0WCL 19, K0FLT 13, W0RRI 11, WA0CCA 10, WB0FJZ 10, WA0EZQ 8, N0JP WB0ZUR 6, K0SXQ 5, W0UMX 4.

NORTH DAKOTA: SCM, Mark J. Worcester, WA0WLP - The Fork ARC did well with their auction and enjoyed the talk by Div. Dir. after the dinner. A fire at State MI threatened the Fork repeater but no damage sustained. K0FRP's tower went with the last blizzard. Dickinson repeater is waiting for the weather to go on. The Nov blizzards kept the hams busy in ND. W0CFU WB0UOR and WA0WLP have worked K0RDF on 2 ssb, Bismarck to Epping, and WA0WLP worked WA0ZJJ, Bismarck to Fargo. Novice classes at Minot started about Jan. 10th and W0BMMG should be contacted if you know of someone that is interested. W0APE from Williston reports their club is getting active with K0AYZ, pres.

Net	kHz	CST/Days	Sess.	QNI	QTC
DA Fa	3996.5	1700 S-S	79	701	340
WB0WSQ		1800 M-F			
YL Wth.	3996.5	0730 S-S	30	689	704
WA0RWM					
Goose River	1990	0900 Su	4	38	0
W0CDO					
YL Wth. Blizzard	3996.5	Nov. 9	10	25	20
		Nov. 19&20		243	173

Traffic: WA0RWM 1441, WB0WSQ 234, WA0SUF 108, WA0CRH 93, W0DM 50.

SOUTH DAKOTA: SCM, Ed Gray W0SD - A new two letter call is K0OR formerly WB0JUA. New Amateur Extra class licensees are WA0VPY WA0NRE W0PUF, of Rapid City and WA0LYO and W0PHF of Spearfish. The Hub City ARC of Aberdeen has been issued the club call WB0JZZ and the official location is the Brown Co. Court House. Net reports: WX Net Active, NJQ 916 QNI and 26 QTC, Evening Net, 1704 QNI and 46 QTC, SDN CW, 153 QNI and 141 QTC, SD Slow Speed Net, QNI 88 and QTC 11. Traffic: WA0VRE 282, K0FRE 243, WA0TMM 150, WA0NZA 117, WB0EVQ 96, W0DVB 58, WB0VGN 52.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5UAU - SEC: W5VNV. PAMS: W5POH WA5ZWZ K5MEA. RM: W5MYZ. Nets kHz, Time/Day, QNI, QTC, Mgr.: ARN, 3995 0030/Dy, 1242, 68, K5MEA; DZK, 3760, 0100/Dy, 238, 322, W5MYZ; APN, 3937, 1200/M-S, 943-51, W5POH; M-Bird, 3529, 2230/M-F, 711, 37, WA5ZWZ. Regret to report W5VM as Silent Key, our sympathy to his family, Salina Co. 28.7 kHz Net 0230 Sun, 0130 Mon, QNI 78 Tlc 7. W5VEA now K5GK. W5KL had ball in SS. New OBS appt. W5WVA. Cancel OBS W5IGF. PSHR: WA5HNN 43, W5EIJ 41, W5POH 39. Traffic: WA5HNN 127, K5AO 63, K5MEA 58, W5POH 36, W5UAU 32, W5UO 30, W5BNZL 18, W5VNV 15, K5DW 12, W5BGWU 11, W5KL 6, W5BED 5, W5BGH 5, W5WVA 4.

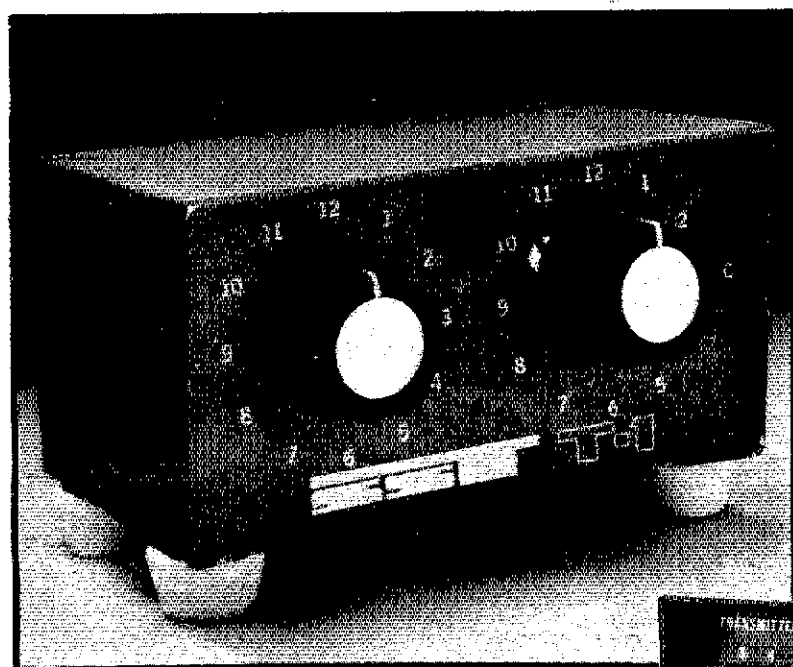
LOUISIANA: SCM, Robert P. Schmidt, W5GHP - Asst. SCM: John Meyer, N5JM. SEC: W5GICQ. RM: N5TS. PAM: W5SNEZ. VHF PAM: W5VBX. New RM is N5TS (ex-W5SPTH). Please remember to forward all net reports to him. Officers of the Baton Rouge ARC are WB5LNZ, pres.; K5EOA, vice-pres.; WA5ZBA, treas.; W5RYD, secy. Their raftie to support their repeater work won by W5SWE. SELARC of Hammond has elected W5VRO, secy-treas. to complete the turn of W5BAV who resigned. Regret to accept the resignation of W5TPG of many. His work has been appreciated. Lafayette ARC says their Hamfest will be a two day affair this year on Mar. 11 and 12th. New Extra licenses in the New Iberia area are W5BCCZ and W5QYH. W5KYC now active on 2 meters. Congrats to W5LBR who again made BPL. W5VJZ of Metairie plans to start a 40-meter Novice net. Interested parties should contact him at 4300 Haring Road, Metairie, LA 70002. Two new clubs have recently affiliated with ARRL - The West Louisiana Amateur Radio Society of Leesville, WB5JZQ, pres. and the Opelousas Area ARC with W5CGX as pres. N5RB did an excellent job as acting SEC during SET.

Nwt	Freq.	Time/Days	QTC	QNI
Mgr.				
LAN	3615 kHz	7&10 Dy	320	485
N 5 T S				
LTN	3910 kHz	6:30 PM Dy	132	510
WB5NEZ				
LSN	3703 kHz	8:30 PM M-F	25	77
W5SOOM				
LRN	3587.5 kHz	6:30 PM Su&W	6	12
N5RB				

Traffic: W5GHP 343, K5TTC 279, N5YL 276, W5LBR 261, N5TS 241, K5MC 204, N5ES 148, WA5IQU 124, N5RB 83, W5SNEZ 71, N5DP 60, W5SOOM 42, K5BLV 13, W5BKT 6.

MISSISSIPPI: SCM, E. Ed Robinson, W5YTN - SEC: W5FXA. MSBN has begun weather reporting daily and swapping wx info with TN. Work under way on new motor vehicle license tag law so tags available for pickups, vans, etc. Please talk to your Senator and Representative. Sorry to hear W5NGF antenna down. W5LSG moving to Gautier, MS. MTN and MSBN welcome W5GNN and Amory, MS welcomes new General class W5ZBE. New net mgr. for Central Gulf Coast Hurricane Net as of Jan. 1, '78 K5CWB. Tnx K5OWK for gud job '77. WB8FBN/5 reports plans beginn-

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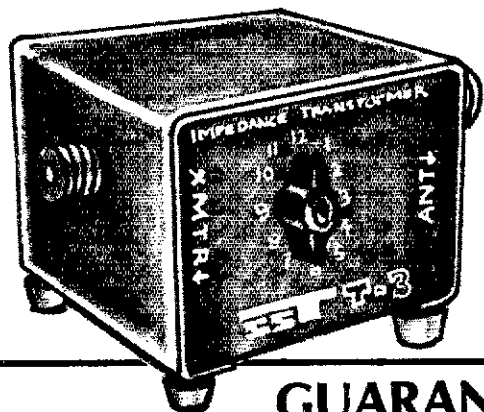
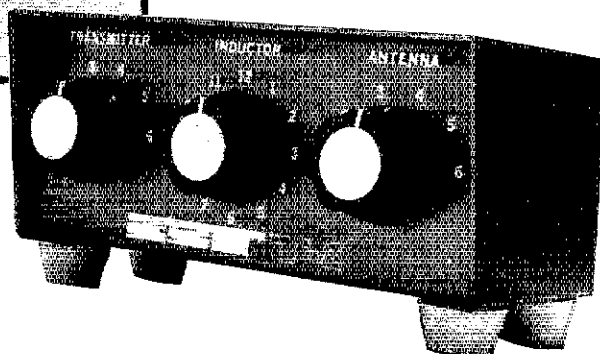
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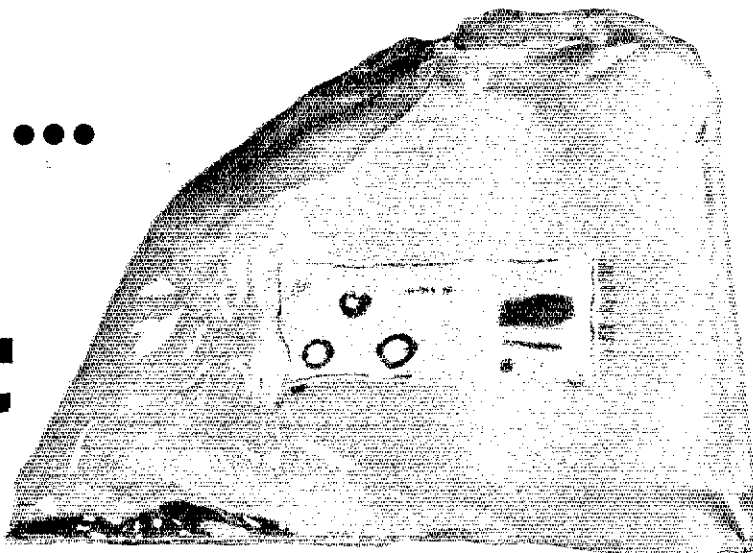
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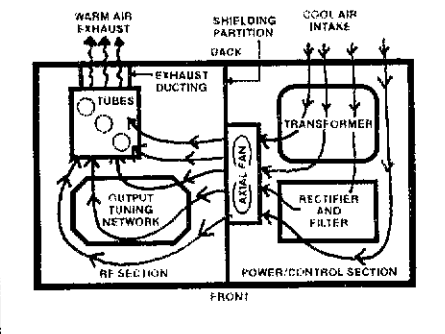
The standard **ALPHA 76** that ran key-down for 18 days at 1000 watts d-c input was finally shut down for inspection. It was in perfect shape, ready to go on indefinitely.

26,000 minutes key-down at full ratings! That typical **ALPHA** performance illustrates why every model—including the value-packed **ALPHA 76** and the No-Tune-Up **ALPHA 374**—can carry both a No-Time-Limit (NTL) full-power rating and an 18 month factory warranty!

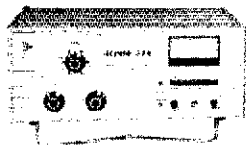
(In shopping for a linear, it pays to investigate very carefully. Most manufacturers *do not* provide positive cooling for critical power supply or plate circuit components. Some widely-distributed models have their transformers located in virtual 'heat chambers'—with even natural air convection cut off—and blow heated air (from the tubes) over other circuitry before exhausting it *forward!*)

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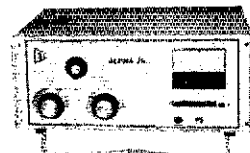
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- 0.9 cu. ft.; 52 pounds
- 18 MONTH WARRANTY**



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MODEL	FREQ RANGE (MHz)	WEIGHT (lbs.)	LENGTH (ft.)
20109 9 ft	144-148	4.2	11
20118 16 ft	144-148	9.7	21
20421 21 ft	432-435	9.7	15
20199 9 ft 19 ft	OSCAR 144-148 432-435	3.5	11

ing for Gulf Coast Hamfest with 1978 state convention in Nov. Contact Chris WB8FBN/5. DRN5 needs more representation. DRN5, WD5CDX, 30 sess. with QTC 328. Ms. Rep. 70% by W5EDT W5QDC K5QNE K5MK WB5NGF WB5KJR WD5GPI WD5GSR. CGCHN, K5OWK, QNI 3138, QTC 244, MSBN, WB5SNB, QNI 1852, QTC 80, MTN, WB5FHA, QNI 154, QTC 58. Ms-Lou Wx Net, K5VXV, QNI 38, QTC 2. Traffic: N5RN 250, WB5FHA 183, W5EDT 34, W5YTN 32, W5LSG 27, K5OAF 25, WD5GSR 22, K5MK 20, WB5SNB 16, WA5JWD 14, WD5BVY 12, W5LL 5, N5XA 5, W5RUB 3, WB5NGF 2, WB5VFS 2.

TENNESSEE: SCM, O. D. Keaton, WA4GLS -- SEC: WB4DYJ. PAM: WB4PRF. RM: WB4DJU.

Net Mgr.	Freq.	Time(2)Days	Sess.	QNI	QTC
TPN	3.980	1140 M-F	83	4471	401
WA4EWW					
W4PFP		1245 M-F			
WB4YPO		0030 M-S 1400 SSuH			
WB4WHE		0300 M			
IN	3.635	0100 Dy	28	204	96
K4YFC					
TNN	3.710	0300 Th	9	62	20
WA4CNY					
ETVHFN	50.4	0200 MWF	13	111	2
WA4WZJ					
ETVHFN	145.2	0200 TTh	8	32	0
WB4DZG					
MTTMN	28.8	0200 TTh	9	88	0
W4EAY					
EITMN	28.7	0200 WF			
WB4NFI					
WTVHFN	146.37	0030 Dy	31	888	487
WA4VX	148.97				
WMARCN	148.07	2100 TThSu	13	101	0
W4TZG	148.87				
MSVHFPSN	148.34	2100 W	4	187	2
WA4WHQ	146.94				
JCARCN	148.19	2200 Th			
	148.79				
JCARCN	145.1	ssb 2100 Dy			

Will all the net managers please send me the info concerning your local nets. I need the day, time, frequency and manager. I would like also for each club to send me the meeting times, dates and locations and let me know who the newly elected club officials are each year. Most of the clubs are now teaching training courses, everyone join in and assist in this worthwhile effort. Due to having to take a trip on business, this is an early report; all other material will be reported with next month's material.

GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID -- SEC: WB4ZML.

Net	QNI	QTC	Net	QNI	QTC
KRN	395	33	KNTN	329	142
KTN	1384	120	8DAREC	63	13
KPON	75	10	LEX 2M	113	13
Cent. KY	64	0			

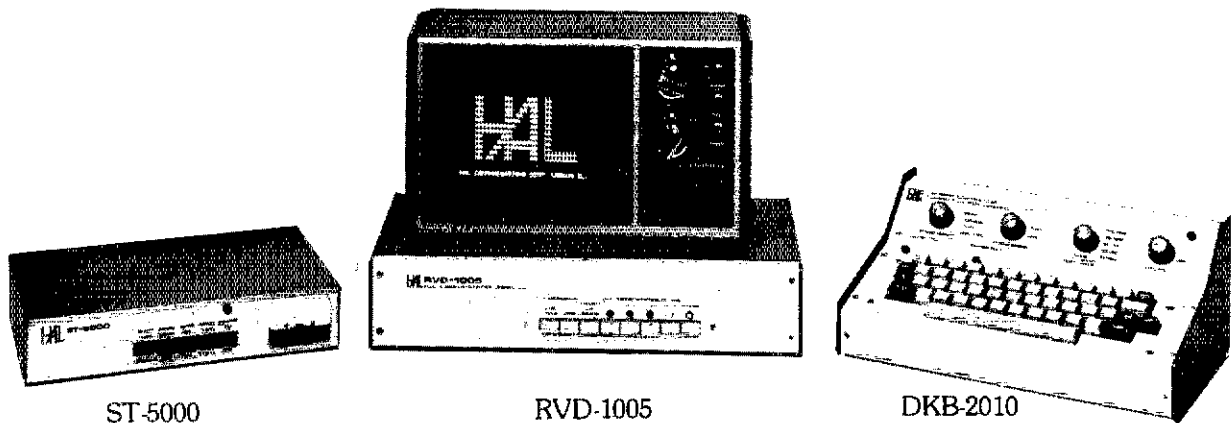
Lots of weather activity in Central KY due to snowstorms. EC WA4KKV and others were active for many hours aiding passing motorists and providing shelter when needed. District 13 also participated in a simulated explosion with 23 stations participating. The Hazard Repeater is being moved to a higher location. WA4GHO and WB4EAK now have their Advanced while WB4FOT has his Extra. The new disaster communications plan was presented to the State Adjutant General and was received enthusiastically. Congrats to W4OYI WB4IGX WB4ZML WB4ZMK and WB4NHO for a job well done. Traffic: W4BAZ 151, WA4AVV 67, WB4JAV 58, WB4NPD 49, N4GD 44, W4CID 41, W4RHZ 40, K4HRF 25, K4HOE 23, WD4CQF 21, WB4AUN 17, WD4ANY 15, WB4EAK 14, W4IQZ 14, WB4EOR 13, WA4FAF 10, W4CDA 9, WA4AGH 9, WA4EAG 6, WA4YPO 2.

MICHIGAN: SCM, A. L. Baker, W8TZZ -- Asst. SCM: WBMPD. SEC: WA8EFK. RMs: WB7YA WB8NCD. PAMs: K8LNE W8SOP. VHF PAM: WA8WVV.

Net	Freq.	Time/Day	QNI	QTC	Sess.
MACS	3953	1800 Dy	933	354	35
QMN	3683	2300/0300 Dy	916	331	89
W5SBN	3935	0001 Dy	1156	187	30
GLETN	3932	0230 Dy	811	94	31
UPEN	3922	2230 Dy	804	79	34
BRMEN	3930	2230 Dy	484	49	29
VHF PAM Report			633	12	29
M8M	50.7	0001 Dy	150	7	19

With this writing my stormy career as SCM is ended. During my time in office I have been threatened with physical harm and petitions for my recall have been circulated. I have embarrassed some of the Headquarters staff, enraged The Old Guard, and alienated many members in the section. Clearly it has been a bad time for the larger egos among us. I have thoroughly enjoyed deflating several of our most prominent stuffed shirts, and they in turn have been cheering for my speedy departure. There is no doubt I am leaving the section in better shape than I found it. Even those who disagree with my methods have grudgingly acknowledged the results. For me it is enough. 73 Al. Traffic: WB8ITT 198, WB8PW 171, K8LNE 142, WB8YQ 123, WB8JET 98, K8FE 97, W8SOP 96, K8DTG 94, WA8DHB 94, K8RV 77, K8ZJU 75, W7KQU/8 72, WB8POL 62, WB8ZNS 52, K8DYI 50, WA8WZF 47, K8CN 45, K8KC 45, WB8HX 43, WB8DJS 30, WB8NOH 27, WD8LRT 26, WB8JUP 25, WB8CN 23, WB8UCQ 21, K8DD 18, WB8WY 18, WB8APN 17, WA8AXF 16, WB8ZYC 15, WB8VAI 14, WB8YIG 14, K8AXL 13, WB8WC 13, WB8CUP 12, K8JED 12, WB8JIX 11, WD8JYT 10, WB8VZ 10, WB8SYA 9, WB8DB 9, WB8PDP 8, WA8WVV 8, K8GXV 8, WB8VY 5, WB8UC 5, WB8HL 3, N8NA 2, WB8LD 2, WB8LOU 2.

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RVD-1005

DKB-2010

Active amateur, short wave listener, beginner, or old-timer—you'll enjoy RTTY with the HAL component system. Shown above are our ST-5000 Demodulator, RVD-1005 Visual Display Unit, and DKB-2010 Dual-mode Keyboard. The RVD-1005 is a time-proven display generator that converts BAUDOT coded RTTY pulses into a video display. It receives the 4 standard RTTY speeds (60,66,75, and 100 words per minute) and generates a 25 line, 40 characters per line display. The low-bandwidth video output can drive either a TV monitor or a modified TV Set (power transformer and video connection required). The DKB-2010 will transmit these same four RTTY speeds as well as MORSE code at 8 to 60 wpm. The DKB also features N-key rollover, adjustable CW weight, HERE IS message, and internal CW side-tone oscillator. The 3-key standard buffer can be extended to 128 keys with the EMO-128 buffer option. The ST-5000 is the newest of HAL's line of RTTY equipment, offering 2-shift operation with high-performance active filter circuitry. It also has built-in AFSK oscillator and loop supply and can be factory tuned for either the "High" or "Low" frequency tone pairs. Autostart and printer control circuitry make the ST-5000 ideal for both electronic and mechanical RTTY terminals. For a high-performance and cost-effective RTTY station, the RVD-1005/DKB-2010/ST-5000 combination is hard to beat!

ST-5000

- 170 and 850 Hz Shift
- Low or High Tones
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- Active Filters
- Autostart
- Meter Tuning Indicator
- Internal Loop Supply
- Attractive, Small Cabinet
- High-gain, Wide-bandwidth Limiter
- For either HF or VHF operation
- 120/240V, 50/60 Hz Power

ST-5000 \$275.00
(Specify High or Low Tones)

RVD-1005

- 4 RTTY Speeds
(60, 66, 75, 100 wpm)
- Crystal Controlled
- Baudot RTTY Code
- Unshift-on-Space
(Switch Selectable)
- Loop or RS-232 Input
- 40 Character Lines
25 Line Display
- Table or Rack Cabinet
- Use with modified TV Set
- 120/240V, 50/60 Hz Power

RVD-1005..... \$395.00
(Specify Table or Rack Cabinet)

RVD-2110 Quasar TV..... \$150.00
(Shown above)

DKB-2010

- Baudot RTTY & Morse Codes
- 4 RTTY Speeds (60,66,75,100 wpm)
- Crystal Controlled
- 8 to 60 wpm Morse Code
- Programmable HERE IS message
- N-Key Rollover
- 3-Key Buffer Standard
(128 Key with 128 EMO option)
- Quick Brown Fox test message
- Automatic FIGS/LTRS for RTTY
- Internal CW Sidetone Oscillator
- 120/240V, 50/60 Hz Power

DKB-2010..... \$395.00
(Specify HERE IS message)

EMO-128 Buffer Option \$ 85.00

Write for our new catalog and RTTY guide.



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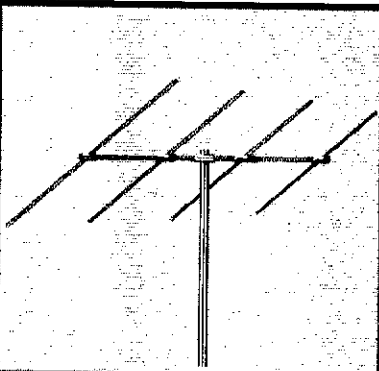
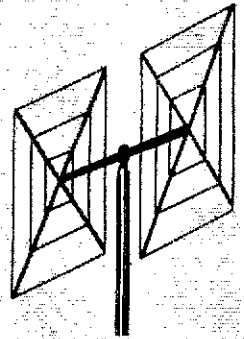
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Now check this super price: 10/15/20 quad, complete, ready for simple assembly... **JUST \$59.95**



CHAMPIONSHIP BEAMS

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" aluminum alloy tubing for maximum strength and low wind loading.

12 EI 2M Beam \$56.95
6 EI 6M Beam \$54.95

4 EI 10M Beam \$49.95
4 EI 15M Beam \$59.95

FREIGHT PREPAID on 2, 6, and 10M beams shipped to the 48!

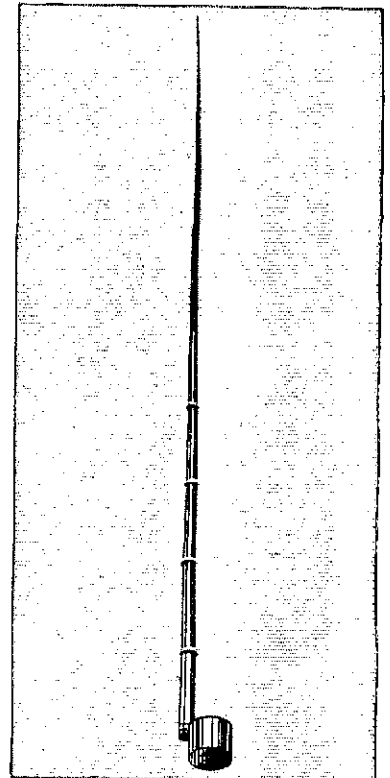
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THE GROUND.**

If you have a Rohn 25G Tower, you can convert it to a Fold-over by simply using a conversion kit. Or, buy an inexpensive standard Rohn 25G tower now and convert to a Fold-over later.

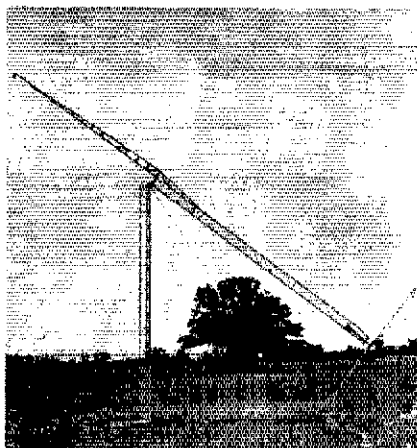
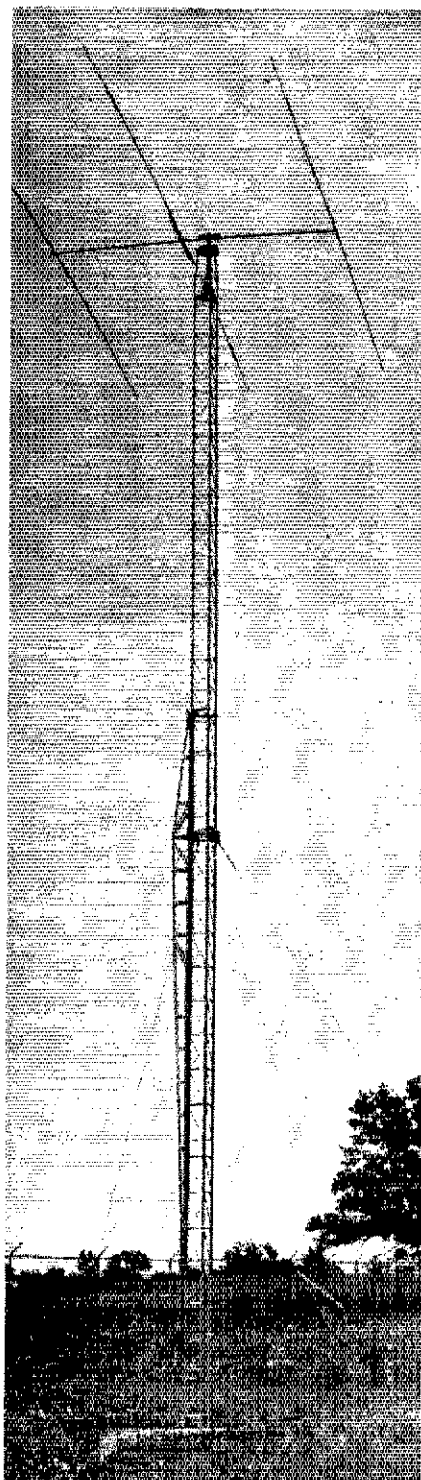
Rohn Fold-overs allow you to work completely on the ground when installing or servicing antennas or rotors. This eliminates the fear of climbing and working at heights. Use the tower that reduces the need to climb. When you need to "get at" your antenna . . . just turn the handle and there it is. Rohn Fold-overs offer unbeatable utility.

Yes! You can convert to a Fold-over. Check with your distributor for a kit now and keep your feet on the ground.

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OHIO: SCM, Hank Greeb, W8CHT/N8XX — Asst. SCM: W8BMC. SEC: K8AN. PAMs: W8DIL W8FU W8SSSI. RMs: W8BJGW W8BKKI W8TP W8BWTs. Net Reports (Nov.)

Net	Freq.	Time(Z)	Sess.	QNI	QTC
ONN	3.708	2330	26	80	19
O6MN	50.16	0200	30	350	42
OSSBN	3.9725	1530/2100/ 2345	90	2187	695
BN	3.577	2345/0300	60	347	219
OSN	3.577	2310	30	218	80
BNR	3.605	2300	30	124	137

W8QCU reports deteriorating condx for National PON on 40 meters. W8ARW reports 18 new Novices in Greenville. N8AA operated from ZF2AY. New code/theory classes are starting in Urbana, Dayton, Cleveland, Lima, Cincinnati and elsewhere. Ottawa County ARES net meets Tue. 0100Z 147.68/06 Northwest Ohio ARC (Lima) received plaque for efforts during Soapbox Derby race. WA4RIJ/8 won second place in Manatoba QSO party. Ashland Area ARC, Lake Erie ARA, Society of Physics Students (Wittenberg U) and Student Electrical Engineers ARC are among newly affiliated clubs. Apricot Net helped with Veterans's Day parade, Nov. 11. Hancock Emergency Amateur Radio Service is getting organized in Findlay. W8SRK is EC for Ashtabuta County. Local nets include BRTN (NE Ohio), 146.48 MHz, 0230Z daily, QNI 208, QTC 77; Van Wert Co. Emerg. Net 3.920 MHz, 1800Z Sun., QNI 30, QTC 1. Fulton Co. ARES, QNI 21, QTC 1. New officers for Lake Erie ARA are W8BJR, pres.; W8APD & W8URX vice-pres.; K8AES, secy.; W8GRG, treas. Traffic: W8BMC 508, W8PMJ 318, W8BJGW 250, W8BKKI 219, W8BHG 184, W8IQ 181, W8BKW 163, W8DIL 158, W8BWTs 152, K8BYR 150, W8CJU 109, W8LTA 94, W8CZK 87, W8BVL 85, N8TM 83, W8MJL 78, W8GGX 77, W8TP 73, W8BYR 70, N8CV 69, W8TRK 65, W8SSI 64, W8CXM 61, K8DMU 60, W8LZE 60, W8BZD 48, W8BYO 48, W8OE 43, W8BQHV 41, W8BBQ 50, N8JR 40, W8TH 38, W8BOMQ 36, W8SED 36, K8ONA 34, W8VWH 33, W8BPI 30, W8SIO 27, W8KDR 23, W8SDIP 22, W8OUU 22, W8WEG 21, K8AN 20, W8BQX 20, W8VZY 20, N8XX 20, K8BNL 18, W8RG 18, W8BMO 15, W8BAJC 14, W8ARW 13, W8QCU 13, K8DL 12, W8BWXH 12, W8WUU 12, K8IOW 11, W8BFC 9, K8CVX 8, W8MGA 8, W8BOV 8, W8BTSX 8, K8JE 7, W8BVG 6, K8CKY 5, W8BLWY 5, W8BVE 5, N8AA 4, W8DYP 3, W8BOFH 4, W8BTJS 4, W8ZM 4, W8ZWX 4, W8BAWM 3, W8IM 3, W8BMO 3, WA4RIJ/8 3, W8BTOZ 2, W8JMD 1.

HUDSON DIVISION

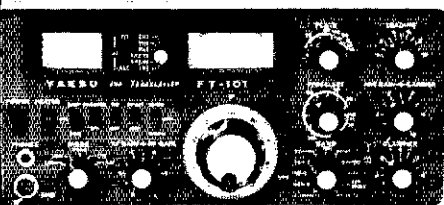
EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV — SEC: W82VUK, Asst. SEC: K2AYO. PAMs: N2YL W82QEI. RMs: W2CS K2OYG W82JXW. Nets: NYPON 3913 5 PM, ESS (slow) 3590 6 PM, NYSPT&E 3925 6 PM NYS 3677 7&10 PM. Congrats & best wishes to W2WSS on being elected new mgr. of ESS. Received his first newsletter. Really good stuff. WA2OTC is new ORS. Warm welcome to ORS/OPS/ASC/M W82WJF from NLI. Lemmeseenow Art — Neat story in Greenbush Area News about Maple Hill H.S. club station W82YCR. Seems they're running fine patches with CP5CL for an exchange student. Nice goin' fellas & tnx ter QSL. W82AJ Army MARS Op of the Month. Congrats to new General W82GEW. Overlook Mtn. ARC reports mammoth Novice & General class with 80 attending. Busy instructors K2IZE W2GHF K2RES. Also 7 new hams from Harmonic Hills R.L. Novice class. Tnx instr. WA2MOE. Have a nice letter from W2HZZ who's hanging up his OBS after 17 years. Tnx all that copy Bob, & best wishes. BPL getting to be a habit with W2YJR. Nov. PSHR: N2YL W2CS W2YJR. Traffic: W2YJR 846, N2YL 256, W2CS 131, K2AV 85, WA2SPL 65, W2BIW 57, WA2EQW 52, WA2YYM 49, N2JK 47, K2HNW 21, WA2CJY 18, WA2OTC 18, W2EFU 11, WA2PAU 8, W82GOJ 3.

NEW YORK CITY — LONG ISLAND: SCM, John Smale, W82CHY — SEC: K2HTX. PAM: WA2ECO. The following are traffic nets in and around the section:

Net	kHz	Time/Day	Manager
NLI*	3830	1900/2200 Dy	W82IDP
NLI Phone*	3928	1730 Dy	WA2ECO
NLS*	3725	1745 Dy	W82JAY
Clear House	3925	1100 Dy	W82AEK
Mic Farad	3925	1300 M-S	W1DFT
NYSTPEN	3925	1800 Dy	WA2RSP

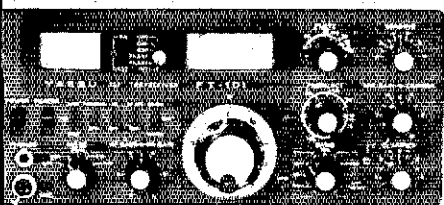
*Denotes section net, all times are local, please try to check in, help is needed from all parts of the section. Congratulations to WA2HWD and XYL on the birth of their 2nd girl. As of Jan. 1, K2QPF has been appointed to the VRAC. Officers for LIMARC for 1978 are: K2UDT, pres.; W2NXZ, vice-pres.; K2UJJ, treas.; K2QPF, secy.; W82BON WA2WKV W2TRP, board members. Congratulations to W2AAF and XYL on the birth of a boy. Officers for Suffolk County ARC for 1978 are WA2ATL, pres.; W82QIY, vice-pres.; W82TSB, treas.; W82LOD, corr. secy.; W82TYN, rec. secy. Congrats to WA2LPO and W82KZY who passed their Generals. LIMARC had W2HD K2SJO W82CHY and K2HTX as speakers for their Dec. meeting. Plan now to attend the HARC convention this year, dates are Nov. 10-12, the same location as the last one. Officers for Hall of Science are: W82TBC, pres.; W82YXB, vice-pres.; W2VZQ, treas.; WA2YUS, secy.; W82CJJ, sgt. at arms. Officers for TARCOC are W2VUS, pres.; W2MUI, vice-pres.; W2FPF, treas.; W82SLV, secy. Congrats to K2LUQ who upgraded to Extra and W82LFJ who passed his Tech. WA2BML now has an MFJ 8034 keyer and vibro-keyer. W2GKZ reports his new ant. system is doing FB job. Citibank ARC now has their new station, TR4CW, 18 AVTAWBL vertical and assorted other goodies. Great South Bay ARC Rptr is now back on the air; Officers for the club are W2TE, pres.; WA2SUB, vice-pres.; W82INI, secy.; WA2PXA, treas. The Telephone Future Pioneers will be sponsoring a special Olympics in May, there will be a need for stations to help out with the communications for the event, the location will be at Stoney Brook Univ. Traffic: (Nov.)

WITH COMPETITIVE PRICES GOING SKY-HIGH THE YAESU FT-101 SERIES IS STILL YOUR BEST BUY!



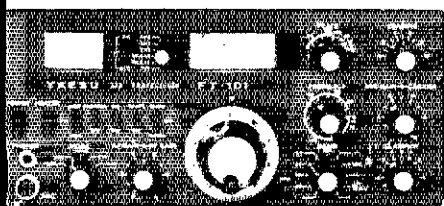
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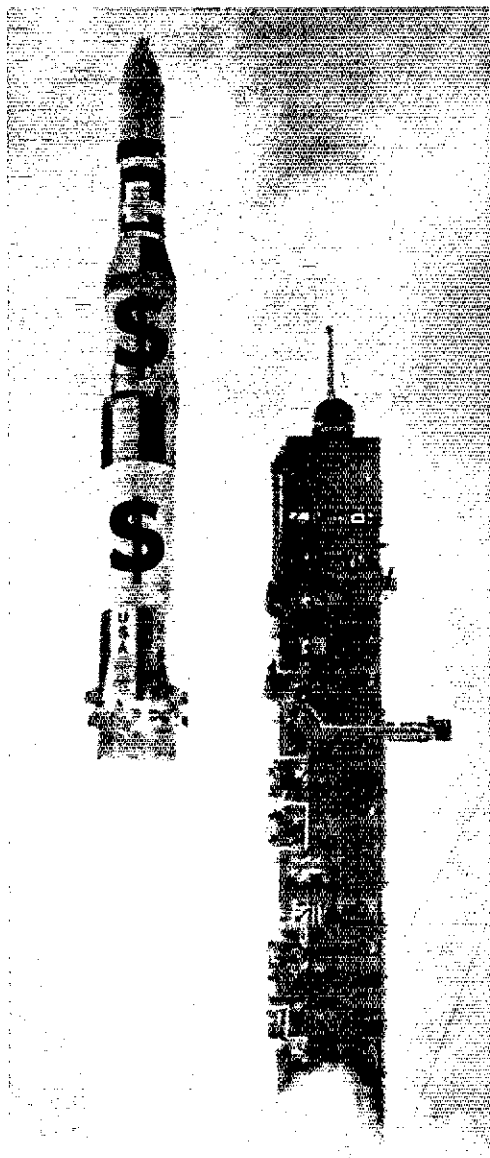
FT-101EE

Just one step down is the FT-101EE identical in every respect—but less the RF speech processor—an item many hams can live without, thus saving a few dollars.



FT-101EX

The FT-101EX is the same basic unit, less DC/DC converter, 160M, WWV, and three of four 10 meter crystals and the RF speech processor. Many hams do not need these features and would just as soon save the money. All accessories may be added later and the "EX" can then become an "E".



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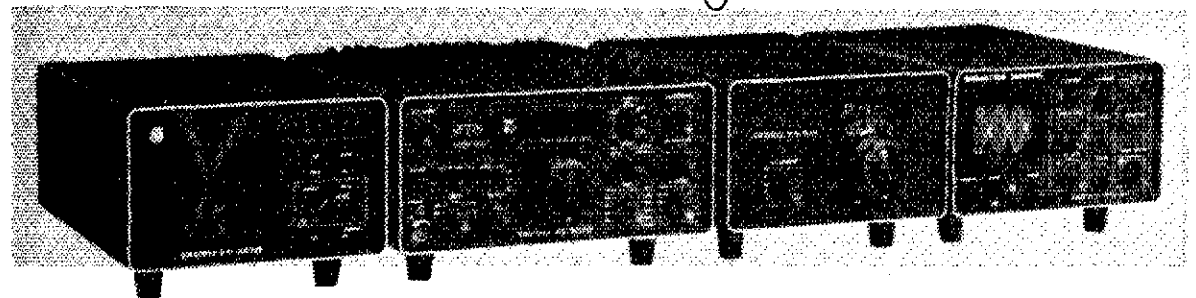
With it all, I'm very competitive. I will try to beat any equivalent deal you've got. (And, even if my price might seem a few dollars higher, I assure you it's still your greatest bargain, anywhere!)

So, drop me a line or phone me. Tell me what you want to get, what you have to trade in, what offers you have—and I'll do the rest. **TNX 73**

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FV301, VFO	\$125	YO100, scope	\$246	FL2100B, amp	\$479	FRG-7, SWRCVR	\$315
YO301, Scope	\$263	YC601, readout	\$199	SP101PB, patch	\$ 64	FT221R, XCVR	\$688
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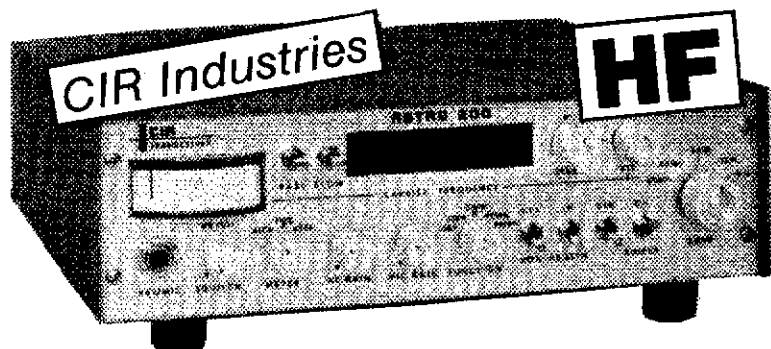


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TUG8D104	
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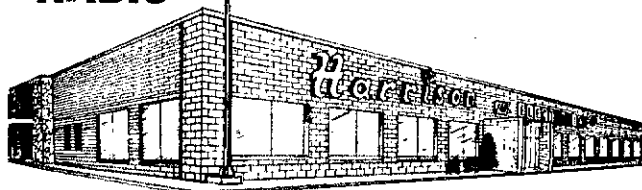
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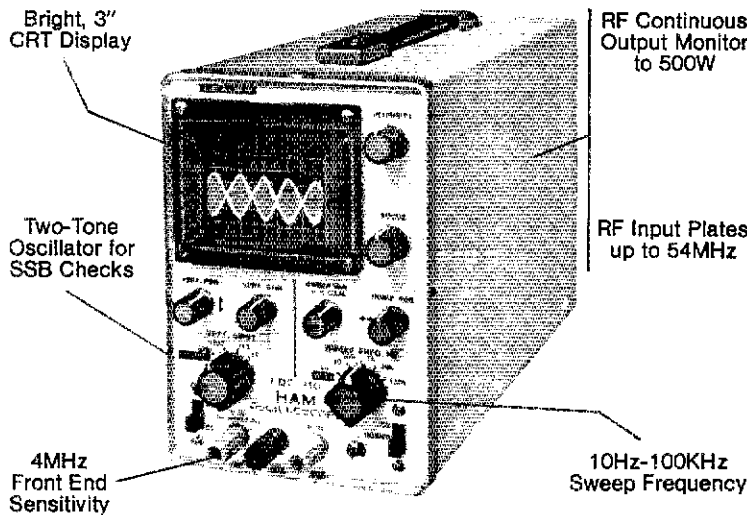
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WB2IDP 575, WB2KIH 366, WA2BMI 156, W2MLC 149, WA2ECO 135, W2GKZ 84, K2GCE 634, WB2HIQ 47, W2GP 20, WA2JKG 20, WA2YEI 11, N2LI 7, K2UB 5, K2JFE 4, WB2CHY 1. (Oct.) WA2IOP 508, WA2ECO 134.

NORTHERN NEW JERSEY: SCM, Bob Neukomm, WA2MVQ —

Net	Mgr.	Freq.	Time/Days	Sess.	QNI	QSP
NJN	W2ZEP	3695	7:00 PM Dy	30	304	95
NJN	W2ZEP	3695	10:00 PM Dy	30	142	39
NJNS	N2MW	3730	8:15 PM Dy	16	39	7
NJPN	WB2LCC	3950	6:00 PM Dy	30	569	65
NJPN	WB2LCC	3950	9:00 AM Dy	4	63	14
NJRTTY	W2PSU	147.51	7:00 PM Dy			
NVTN	WA2OPY	145.7	8:00 PM Dy			

Officers of Old Barney ARC: N200, pres.; K2RH, vice pres.; WA2HCV, secy.; K2IGH, treas.; WA2KNZ, act. mgr.; WB2UTF, trustee; K2TI, NTCV. Novice class (Wayne Adult School) winding up with probable 9 new hams. Also Tech/Genl. class winding up with WA2CKV as OI. Ridgewood Adult class for Genl/Adv graduated 20 out of 22 with WA2MVQ as OI and K2ETN graduated 8 new Novices. Ridgewood Adult School will continue classes for Novice, Tech, Genl and Adv starting Jan. 22, 1978. K2BHL active on EAN as NJN liaison. W2CVW got a couple new DX OSOs on 80 and was active on CW WW DX tests. W2ODV club station has a new Heathkit weather station. It's time to start planning for the HARC convention to be held this coming Nov. Your SCM has seen the program — it's outstanding — don't miss it! WA2MVQ is now on RTTY with a new ST-6 and UT-4 printing on a 28ASR. NJN-NJPN held a combined "Confab" Dec. 17 at Rutgers University. Thanks to W2ZEP for FE job as RM of NJN. We are still in need of 2RN reps from NNJ! OO report received from W2TPJ, lots of chirpy signals! K2AM along with his XYL. WA2KBD is teaching a Novice class as part of the Union Township Supplemental Education Program. WB2CHE upgraded to Advanced and is looking for contacts on 8 meters alone. Traffic: W2RQ 256, N2GM 178, K2BHL 107, N2MVA 103, K2RH 79, W2WHB 75, W2ZEP 80, N2GJ 44, WB2LCC 36, K2SE 36, WA2MVQ 35, K2ZFI 26, N2NS 22, W2DLZ 15, K2AM 9, WB2KAK 9, WB2JVE 8, WA2YWK 8, W2CG 7, W2CVW 6, WB2VFT 6, W2SQ 5, W2UH 5, W2XD 5, W2KE 2.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF — Quad City ARC has fifty in Novice classes. Iowa again 100% on TEN via W0SS K0EVH N5YX0 W0YLS K0FLY W0B0XA W0OMV N0SM W0YRH W0B0SS and W0AGG. Yours truly had nice eyeball with Muscatine ARC. Congrats to W0TGC for PSA certificate for help with Wisc. windstorm, and priority traffic to TF DU JR6 and KG-Land. WA0AUX W0LFF W0PYD and W0TGC helped to give Iowa 98% on DTRN. Linn County Sheriff gave pat on back to W0MTT W0EY W0AXU W0VDE W0FO W0YRX W0PXX W0NMU K0EGA W0TUF W0YDZ W0LL WA0QZL W0STZ and W0VUY for successful witch watch. Congrats for upgrades go to W0ANW W0DGG and K0DLL for Advanced; W0FCI W0ANM K0EFK W0TEH W0YNX and W0YRQ for General; W0VMV W0VMX W0TEU and W0TRI for Tech. K0ARR has new pilot's license. W0QFR worked a KH6 on SSTV Sioux City 7.66/06 back on and should have AP by now. W0LZS and W0VRQ have new T5820S. Happy Ground Hog day, have a sausage pizza. Nets: Tall Corn T1CNI 3560, 0030/0400 Dy, W0YLS Mgr., QNI 413, QTC 147 sess. 59. Iowa Code ICN, 3713, 0045 T-T-S W0NRN/W0YRH Mgrs., QNI 44, QTC 13, sess. 13 1a75M, 3970, 1830 M-S. K0JVO Mgr., QNI 1769, QTC 203 sess. 26, 2330Z, K0RN Mgr., QNI 1037, QTC 89, sess. 26 Traffic: WA0AUX 818, K0EVH 253, W0YLS 197, N5YX 157, W0SS 130, W0TCC 130, W0UPX 100, W0B0SS 76 W0LFF 30, W0LJW 23, W0YRH 19, K0CNM 11, K0GF 11, W0JYF 10, K0DBW 8, W0IKT 6, W0PYD 4.

KANSAS: SCM, Robert M. Summers, K0BXF — SEC W0KL. PAMS: W0OYH W0BCL. RM: W0FT. OVS stations report several openings during the past month on 2 meters. W0QQA handling traffic via the SWOT nets. George also keeping a daily sked tm St. George to Parsons (148 mile path). One OO report received this month. Net reports for Nov. QKS, QTC 224, QNI 539, KPN 20/266, KSN, 143/1255. GKS, SS, 42/118 and KWN 224/539. The Kansas EC net has moved time to 1 PM CST on 3920 kHz, looking for each EC or a Zone Rep. for each Sun. Let's get with W0KL each week to cuss and/or discuss the ARES activities in KS. All reporting stations are again reminded to please get your reports to the proper place at the appointed time to help us make the deadlines also. Each Net Mgr. should get your reports no later than the 3rd of the month, and all coming to SCM should be received by the 10th at the very latest! Many thanks to all who cast votes this way in recent SCM election. For those that didn't, if you got a gripe or suggestion — let's hear it. Traffic: W0OYH 156, K0JDD 136, W0HI 118, W0AM 116, W0FIR 100, W0BLKA 82, K0EZ 77, K0BXF 76, W0CHJ 73, W0IX 72, W0FT 71, W0VEZ 70, W0B0CX 63, W0LBB 59, W0LUN 40, K0KD 37, W0RFF 34, W0EPX 30, W0PB 30, W0HGCG 27, N0IN 19, W0BKE 18, W0FK 16, W0FDJ 12, W0BO 9, W0BBI 7, WA0WXY 6, K0FFC 5, WA0OWH 1, N0LL 1.

MISSOURI: SCM, L. G. Wilson, K0BWL — Asst. SCM Joe Flowers, W0OTF. SEC: W0BFKY. Officers of St. Louis ARC: W0IKR, pres.; K0YTI, vice-pres.; WA0KMF, secy.; W0RUR, treas. Officers of WECOMO ARC: WA0ZMF, pres.; WA0CBI, vice-pres.; W0LKV, secy. W0CSR, treas. Suggest everyone read the good state article by WA0WRC in the Heart of America Radio Club Newsletter. The Kansas City DX Club holding meetings the last Tue. of each month at the TWA Training Center, 1307 Baltimore, Room 500 at 7:30 P.M. Looks like W0YR pres.; W0JU, vice-pres.; W0BEZQ, secy.-treas. really have the ball rolling. WA0URJ is working several DX stations on 15 cw. The Phd Hamfest will be held Apr. 22-23. NEMOE new repeater 146.071.87 now operational. You

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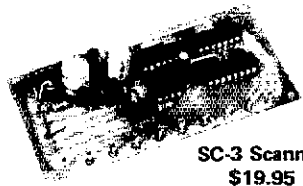
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A one watt exciter using four RF transistors, two diodes, and one integrated circuit. The RF transistors are operating well below their ratings allowing long keying periods without damage. • Nominal output 1 1/2 watts • Deviation adjusted to 10KHz • IC audio with clipping and active filter • All spurious outputs down 30db or more • Temperature compensation crystal trimmer • Zener regulated oscillator • Uses readily available 12 or 18 MHz crystals (18MHz for 220) • All tuning coils prewound • Predrilled and tinned G-10 Circuit board

Similar units available for
6 meters, 2 meters, and 432 MHz.



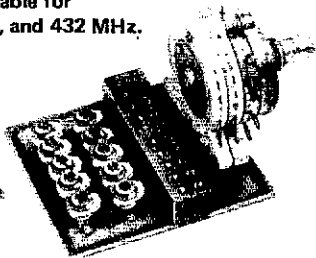
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\$19.95

Capable of scanning up to 10 channels. Scan delay allows both sides of a conversation to be monitored without the scan starting each time the carrier drops. The priority feature allows the user to program the scanner to return to his favorite channel whenever it is active. A ten channel receiver crystal deck which utilizes diode switching to select the crystal position required.



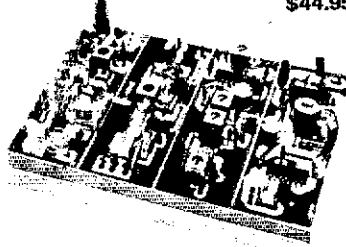
CD-1 Crystal Deck
\$7.95

A ten channel receiver crystal deck which utilizes diode switching to select the crystal position required.



CD-2 Crystal Deck - \$15.50

Designed to provide multi-channel operation for the TX-series transmitters. It features an extra set of contacts that may be wired to the CD-1 crystal deck for 10 channel transceiver. The extra contacts may also be used to switch L.E.D. indicators. The switch has 11 positions.



RX220C Receiver Kit - \$74.95

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Add our synthesizer 220 to your present rig.

2

Compatible with virtually all 220 transceivers; Clegg, Midland, Cobra, etc. . . .

The Synthesizer 220 is a 1 1/2 meter frequency synthesizer. Frequency is adjustable in 5 KHz steps from 220.00 MHz to 225.00 MHz with its digital readout thumb wheel switching. Transmit offsets are digitally programmed on a diode matrix, and can range from 100 KHz to 10 MHz. No additional components are necessary!

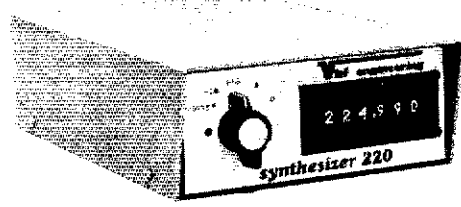
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- T²L Logic
- Maximum offset versatility - easily programmed to any IF and transmitter offset between 100 KHz and 30 MHz in even 100 KHz increments.
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- All frequencies locked to one master crystal oscillator.
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- Virtually no measurable difference in spurious outputs between crystal or SYN 220.
- Lockup time typically 150 milliseconds.
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- Also available for 2 meters.

SPECIFICATIONS

- Frequency: 220 - 225 MHz
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BLD 10/120	220 MHz	CW-FM-SSB/AM	10W	120W	\$259.95

Similar units available for 6 meters, 2 meters, and 432 MHz.

FEATURES

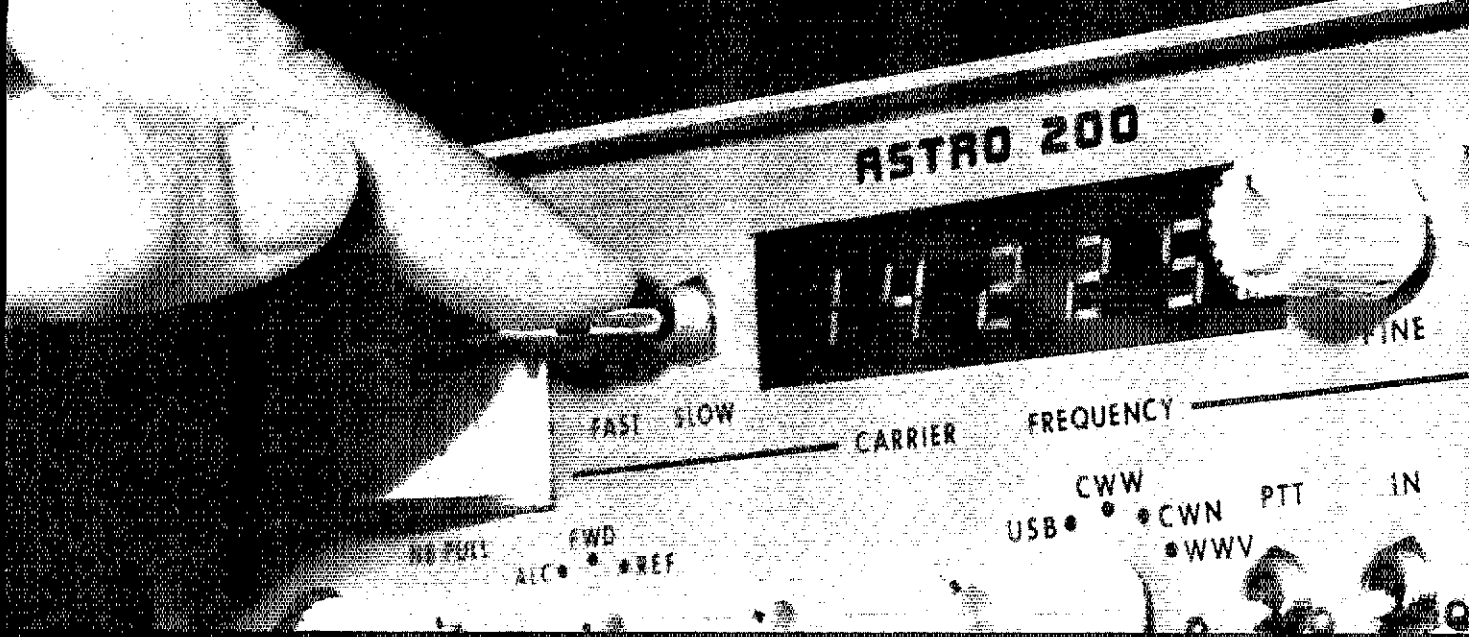
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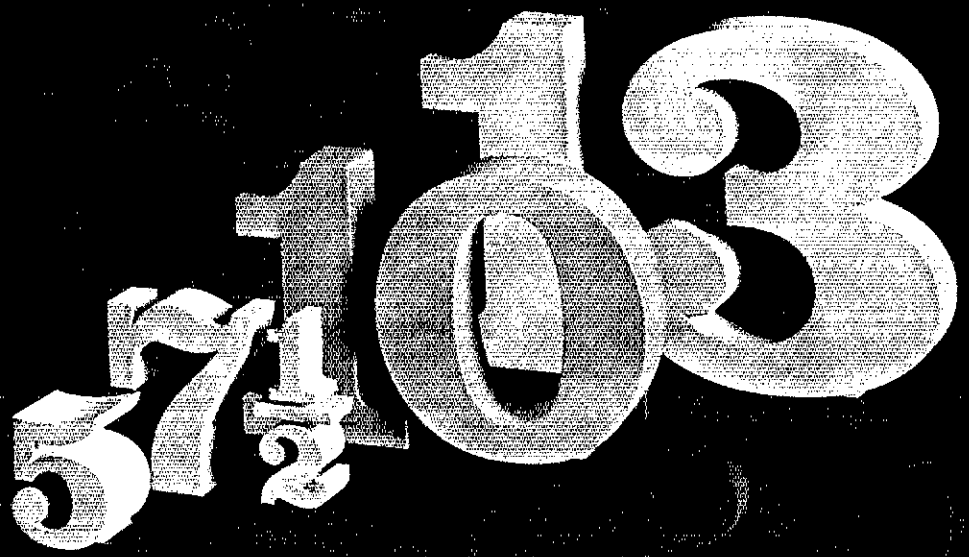
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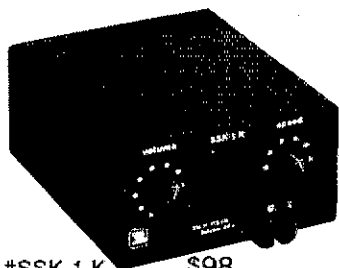


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Fast, comfortable, easy . . . and FUN for the "side swiper"! #SSK-3 (with sub-base for hand key) \$26.95.

Features include: extra long, finger-fitting molded paddles with adjustable spring tension . . . adjustable contact spacing; knife-edge bearings and extra large gold-plated silver contacts!



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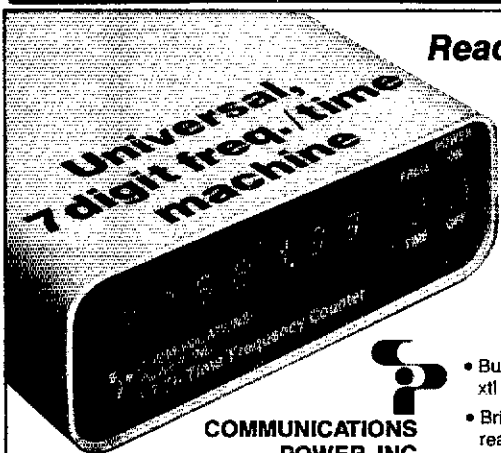
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SEC reports the ECs have been rather slack in reporting information. We would like to remind everyone that he should be kept updated on your needs and problems. Suggestions should be sent to your SEC by anyone interested in a new ARES net. Net, QNI, QTC, MOSSBN (Oct.) 1118, 220; MON, 251, 143; MON2, 151, 49; MSN, 94, 23; MOSSBN, 1204, 210; SCEN, 84, 6; PHD, 25, 7; WBZOF, blind since birth, passed Novice 1-77 and General 10-77. Congratulations. WBODF is sporting new call WB1ESP. NVC is relocated as N1VC, Deerfield, NH. Congratulations to Novices, WDPS CDB CFU, EZA FCE FCH FCJ and FCL; General, WB9YZT and Extra WB9LMW. N9HG in the hospital recovering from infectious hepatitis, K9MUX in the hospital in Joplin and WA9EEU in the hospital in Liberty. Best wishes to you all for a fast and complete recovery. Congrats to WB9QVP on becoming a new father. Your SCM would like to extend his thanks to WB9LFY and WD9AJB for helping me to get antennas up at my new location and to K9ZXA and WB9OUG for helping me get on RATT. With help like that and my new TS-520S I should be on the air more often. Again, thanks. Traffic: (Nov.) K9ONK 626, WB9SND 249, WB9VHN 211, K9SSN 163, W9HH 128, WB9LFY 104, WB9V 68, W9OTF 62, W9BMA 58, K9SI 56, WD9VDO 51, W9OUD 45, K9BM 41, W9BVL 35, WB9FND 28, K9RWL 25, WA9LCV 18, WB9OKK 17, WB9SSB 15, K9SSN 15, K9VBU 15, WB9FKY 13, W9EEE 11, WA9FKD 10, WA9MOF 7, W9EPI 6, WA9KUH 6, W9QAU 5. (Oct.) W9EEE 28, W9EPI 17, WA9FKD 12.

NEBRASKA: SCM, Claire R. Dyas, W9JCP — W9EUI was awarded a 50-year pin by OCWA. He also presented a HAM radio program over KNOP-TV. Everyone attending the Annual Creste ARC steak fry had an enjoyable evening. The Nebr 160 M Wx net meets each evening at 7:15 PM Central Time on 1995 kHz. All stations in the central area are cordially invited to check in. Net reports: 160 M Wx Net, QNI 159; OCWA, QNI 59; Cornhusker Net, QNI 1237, QTC 65; ARES Net QNI 185; QTC 2; Western Nebr. Net, QNI 580, QTC 24; Morning Phone Net, QNI 1253, QTC 42; Platte Valley 2M Net, QNI 41, QTC 3; Sandhills Wx Net QNI 288, QTC 4; Nebr. Storm Net, QNI 1329, QTC 601, PM Net, QNI 353, QTC 105. (Oct.) Platte Valley 2M Net, QNI 31. Traffic: W9FQB 208, W9VEA 102, W9EUT 32, W9SGA 31, W9ZNI 28, K9AIE 27, W9HOP 26, WA9PCC 21, K9DGV 18, W9FF 17, K9BRS 14, W9HTA 14, WA9JH 11, WA9CEX 11, W9B9JWQ 10, W9NIK 10, W9VYX 9, WB9NFG 9, W9DJU 6, K9HNT 6, W9OMN 6, WB9GWR 5, WB9GMO 4, WB9JTM 3, WB9NGF 3, K9SFA 3, W9ATU 2, K9BAB 2, WB9SAY 2, W9JUJ 1, WA9LOY 1.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, John McNasor, W1GVT — SEC W1XX RM: K1EIR. PAM: K1EIC. VHF PAM: WA1ELA.

Net	Freq	Time/Days	Sess.	QNI	QTC
CN	3840	1900/2200 Dy	60	346	280
CPN	3965	1800 M-S 1000 Su	30	463	216
VHF-2	28/88	2130 Dy			
CORN	147.75f	RTTY 24 hrs.	1	4	146

High QNI: CN — W1KV and K1GF. CPN — W1NQ and WA1ZVS. SEC W1XX attended several meetings that indicate a surge in interest and capability of Conn. Section EC Program. Each repeater in the state is encouraged to provide an EC for the repeater and so inform W1XX. Cooperation of present repeater clubs is appreciated. Director W1HHR reminds affiliated clubs an Annual Report to ARRL is required to continue affiliation. Net Managers: Please file report on net SET activities by Mar. 15th. Manchester RC appreciates monetary gift in memory of a recent member, W1KKS who is now a Silent Key. With deep regret we add WA1NBB to the list of Silent Keys. Send sase to K1IK for Conn. Ham Trader Bulletin. Appointees: Please read "Schedule for Restructuring" in Jan. GST — important to all and answers many questions. Congratulations to W1TR for Nov. BPL & appointed EC for Conn. Computer Operations; WA1VNZ appointed EC for Greater Waterbury; and, wedding congratulations to our Director W1HHR and his XYL. Sincere best wishes to W1BVR (W. Mass.) who retired after 42 years as an elected ARRL Official including SCM, ARRL v.p. and New England Director! News Flash: Make love, not QRM — Happy Valentines Day to All! Traffic: K1DFS 324, K1GF 282, W1TF 156, WA1ZVS 107, WB1CPF 95, WA1VVA 79, W1EPW 76, K1OQG 68, W1KV 40, K1XA 40, K1MUJ 36, W1GVT 33, W1AW 30, W1LXV 19, WA1HYN 18, WA1ZZO 14, W1JJ 13, W1QV 12, WA1UXA 11, WA1TUH 8, W1BDI 5, W1CUL 4, WA1LOU 3.

EASTERN MASSACHUSETTS: SCM, Frank Baker, W1ALP — Asst. SCM: WA1OWQ. SEC: W1AOG. Silent Keys: K1REW K1SGO W1FMW WA1FCZ WA1WJ W1MVQ. WA1RJK in the Army. K1RSZ in E. Wareham. Officers of Barnstable RC: W1QFO, pres.; W1HWO, vice pres.; WB1GUA, secy.; W1PLH, treas. NEEP had 7 QNI, 18 QTC. NENN had 151 QNI, 108 QTC. W1FJ is ex-W1FJJ. W9KST now in this section. K4JLM/1 in Marlboro. K1MRO retired and in Chatham. EM2MN has 182 QNI, 59 QTC. WA1UKJ back in section. NENN has 184 QNI, 85 QTC. WA1QMZ new EC for Medfield. WA1YOJ new OPS-OVS. W1PEX, WA1HVS endorsed a ECs. 2-meter ssb activity good on 144.110 MHz on Monday nights, reports W1GXT who is on 220.075 MHz 8:30 to 9:30 Tue. HHTN had 278 QNI, 95 QTC, reports WA1UWF. South Shore ARC held meeting. W1XA & K1TKI teaching Novice course at Foxboro ARC. Don Bosco Tech. HSR in Boston, WA1AUF now affiliated with ARRL. K1UN on Needham EC has a net going. EMRIPN had 391 QNI, 29 QTC. WB1FTF new Novice in Hingham. K1GVM worked his first meteor scatter contact into MINN on 2. K1C1 has a Kenwood 820S. W1XH is ex-WA1RNS. The 04/84 72/12 auction was a success. K1SC was W1PVF. W1JJ on 180. CARA & BARS groups another Novice plus General course. WA1UWF new dipole for 80. WA1YOJ has Advance: Billerica AREC out for Christmas Parade

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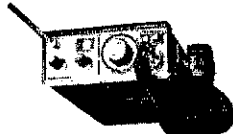
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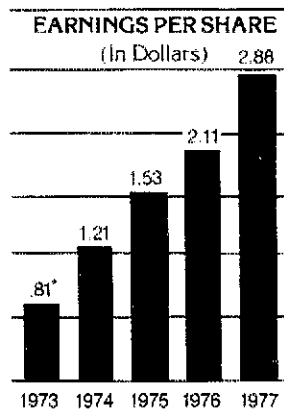
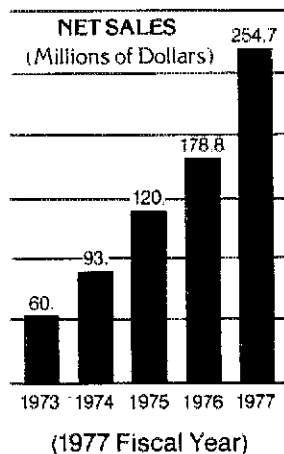
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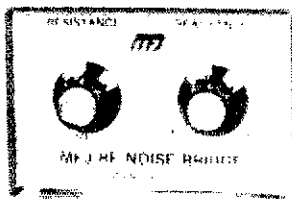


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WB1BUP has General. WA1ZGX has an HQ-110A. WA1YMD WA1YUJ now Advance. W1PL hosted YV1ACJ & OZ1VY. N1AS has Novice class at SEMARA. WB1ICPF & WB1AQL have Generals. K1SSH has Novice class at Concordiann ARC. WA1ZXB says 10 is good WB1DGG has Advance. New Generals: WA1s YRB RNK, WB1FOW. K1LWI worked ZK1DR. ZL1DH looking for W1s on 28,510 at 2000 UTC. K1EFU has indoor dipole. WA1MTN has MLA-2500 linear. WB1APV has DG5 digital. WB1ADF gave a talk on "photography" at Quannapowitt RA. Officers of Middlesex ARC: WA1UJY, pres.; WA1URF, vice-pres.; WA1RVZ, secy.; W1LJO, treas. Capeway RC met at W1YT's. Officers: K1KMM, group mgr.; K1VXB, asst. mgr.; K1LOE, treas.; WA1TPB, secy.; K1HGT, corr. secy. I received a very nice copy of WR1ACT News. WA1EZB spoke at the Massachusetts ARC on "Trouble Shooting." Chelmsford ARA had auction. WA1ZAZ, RM E. Mass, sends out a nice "Zero Beat." WA1JQH gave talk on "IC Chips" at the Framingham RC. W1HWK spoke about "Seismology" at Middlesex ARC. For the newcomers, this Section is made up of the following counties: Barnstable Bristol Dukes Essex Middlesex Suffolk Nantucket Norfolk Plymouth, all others are in Western MA Mass. Chapter NAHC officers: K1YBS, pres.; WB1A0Z, vice-pres.; W1DKD, secy-treas.; WA1EZA, awards custodian. Traffic: (Nov.) WA1UWF 422, WA1BY 411, K1BA 237, K1PAD 254, WA1YUJ 163, WA1EY 149, WA1YMN 136, WA1YMD 108, WA1RVZ 106, W1FJ 104, W1EMG 89, WA9NEW 86, W1DMS 77, WA1ZGX 68, W1DMH 61, WA1YWK 45, WA1DHW 31, K1ES 24, W1NF 24, WB1BUP 14, WA1YMD 14, W1PL 13, K1BZD 9, N1AS 6, K1LCO 5, WA1QAJ 4, WA1PQY 4, WA1IFE 3, WA1YQJ 2. (Oct.) WA1UNC 451, K1BA 251, WA1VEI 156, WA1YUJ 151, K1PAD 146, WA1RVZ 57, WA1YMN 56, WA1YQJ 26, W1DGD 18, K1LCO 11, WA1IFE 9, W1PEX 4.

MAINE: SCM, Bill Mann, W1KX — RM: W1RWG. PAM: K1GUP. SEC K1EF leaving ME. WA1YUW assuming SEC duties. K1EF did FB job as SEC. New OOs: W1GCM W1KX. OES appointments now available. See Jan QST Op News for other appt. changes, then contact SCM. Two meters used for public service: WB1DEG used WR1AHQ auto patch to inform hospital he was bringing in Ashland with WR1AHQ back-up. WB1DKN used WR1ACI to reach W1YTO about stranded auto in Dexter on Nov. 27. Police called. Waldo Co. RA formed; W1TJQ, pres. Members from Waldo Co. ARA, Ellsworth AWA, Pine State ARC and Mid-Coast had transmitter hunt. Franklin Co. area hams forming club. Androscoggin area hams bid adieu to K1MFT Dec. 9. See Op News this issue for SCM nominating info.

Net	Freq.	Time/Days	Sess.	Tfc.	Ck-in.
PTN	3596	7 PM Dy	30	182	272
SGN	3940	5 PM M-S	26	164	1310
MSN	3596	6:30 PM	13	15	74

BYN 3960 8 AM M-S 26 36 953
Traffic: W1KX 403, WA2ERT/1 210, W1RWG 88, W1ERW 62, K1EF 60, W1HDC 56, WA1QFX 51, N1RP 37, N2KC/1 33, K1TZH 20, W1CTR 12, WA2MEQ/1 6, WA1JCN 1.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1SWX/W1NH — SEC: K1RSC. RM: N1NH. Endorsements: W1AJJ & WA1PEL as OPS, W1YJ W1BXM & W1ELUJ as OVSs, WA1PSI & W6MZW/1 as OOs, K1NH & WA1UAV as ORSs, N1NH as RM, Dec. 1st marked W1JB as 54 yrs in Ham Radio. Congrats. New Manchester Repeater WA1YDC is 147,855 in & 147,255 out. N9VC now K1VC. WA1UAV now KILL. New member of the Old Timers Club is W1TN. N1CB on RTTY. The GSPN had 4022 check-ins & 130 traffic. WA1LNH now W1HD. W1VTP has new twenty-element 2-meter beam. W1GUN now W2IQK. WB1CTJ now General. WB9ODF now WB1ESP. Custodians of above listed repeater are W1HMP & WA1YDC. The NHVT net had 170 check-ins, 106 traffic in 28 sess. N1NH needs more help. Jim is in need of net controls & 1RN reps. ZL4CP needs NH only for WAS. WB1ELP K1NH & W1TN were the top three checking into the NHVTN over 20 times. N1JH has new Yaesu transceiver. Don't forget the big Horsetrader's Swap-Fest at the Deerfield Fairgrounds on May 13. W1ZKE vacations in NH often. Happy Easter to all. Winter is almost over. Traffic: K1BCS 339, W1TN 166, N1NH 63, K1PQY 54, K1ACL 45, K1NH 35, W1VTP 16, W1JB 12, WA1HOB 9, W1SWX 4, W1BYS 2.

RHODE ISLAND: SCM, J. Titterton, W1EOF — RM: WA1POJ. PAM: N1DM. RIEM 2-meter net, QNI 172, Tfc. 42. Nice going. WA1CSO! Fidelity ARC features a technical lecture every week. Teachers for Nov. were W1MB & WA1ET. Newport RC had successful Xmas Party at Stone Bridge Inn. First meeting to form a Federation of RI Ham Radio Clubs was held by N1DM. 15 people from 7 clubs attended. EBAWA participated in 160-meter contest. PRA has Novice class in full swing. Hope Valley Rpt. Assn. growing by leaps and bounds! W1SE a Silent Key. W1XJ (K1ABR) recovering in hospital after 35-ft. fall. Hope everyone enjoyed the holidays. Let's make 1978 better in Little Rhody! Traffic: WA1POJ 104, W1EOF 24, N1DM 18, K1QFD 16.

VERMONT: SCM, Bob Scott, W1RNA — SEC: W1VSA. Repeater ECs: WA1YEH WA1UQY and K1LEC. FCC tentative dates at Burlington, VT for license exams are Mar. 16 & 17, 1978. Form 810 should be filed with the FCC, Boston at least 3 weeks prior to Mar. 16 by those going to take any of the exams. WB2OYS has moved to Newfane, VT. WB1CZC, you made it! Welcome to all the new VT hams. W1BZR, secy. asst. Ec in Richmond, VT. G1MN 29/52/792. VT GSS 30/54/182. VT Fone 4/69/8, Carrier 26/475/64. Traffic: K1BQK 129, WB1AFY 30, WA1BZR 25, W1BKZ 7, W1RNA 5, W1KJG 2, WB1FQE 2.

WESTERN MASSACHUSETTS: Percy C. Noble, W1BVR — This is my last report as SCM. The Dec. activities will be in the new SCM's report. W1DVV is retiring as CV



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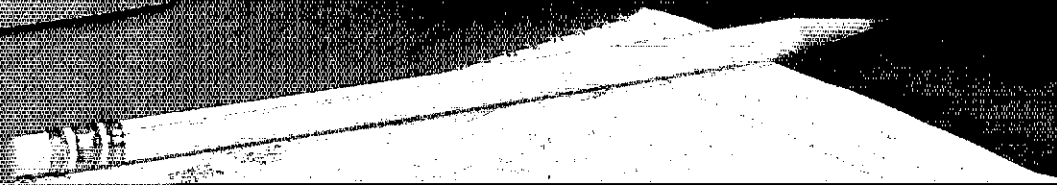
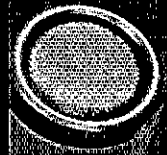
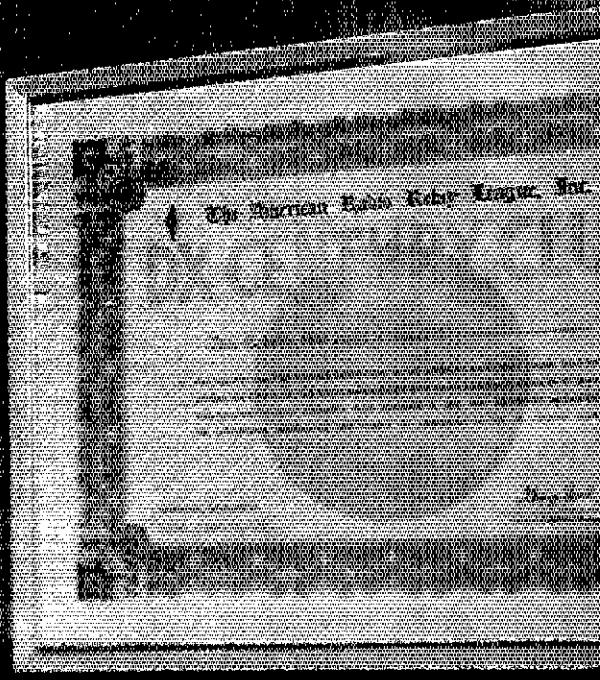
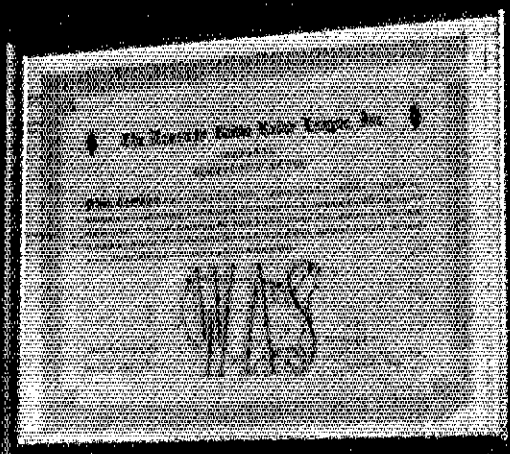


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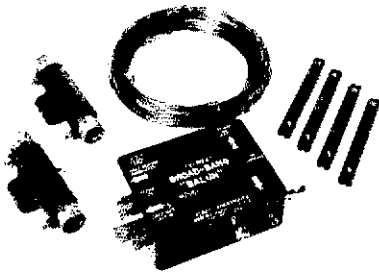
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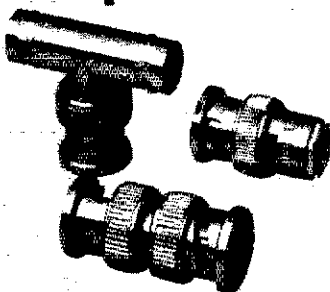
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RM after many years of very devoted service. We will miss him! WA1OLK now K1SF. W1YK at WPI is very active. New Hampshire Co. Asst. ECs: W1XL, K1FUL, New ORSs: W1NLE, WB1AUJ, (AUJ also OPS). WA1MJE for WMPN: sess. 22, QNI 339, traffic 65. Different stations 106. W1DVV for WMN: sess. 30, traffic 164, different stations 21. WA1DNB for WMEN: sess. 4, QNI 242 (78 sbs, 164 thru 2-mtr. repeaters). WMEN 3935 Sun. 6:30 AM. WMPN Mon.-Fri. 3935 4:30 PM. WMN daily 3562 7:00 PM. I have thoroughly enjoyed being your SCM and I thank you for your cooperation. Best wishes to all of you and success to our new SCM — William T. Lowe, W1TM, Commonwealth Ave., Great Barrington, Mass. 01230. Traffic: WA1MJE 433, W1TM 137, W1BVR 96, W1DVV 72, W1YK 69, W1ZPB 63, W1KX 56, K1JIV 55, W1DOY 49, WA1OPN 21, W1NLE 16, WA1OUZ 15, WB1CWH 12, WB1EHS 9.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davie, KL7CUK — We have a new ORS this month, KL7JDI who is meeting many of the nets in the lower 49 handling traffic into and out of AK. KL7AF reports the formation of The Alaskan DX Association. They meet nightly on 3895 at 0430 GMT. The Matanuska Susitna Amateur Radio Assn. will be sponsoring the Novice contest. The ASN reports a record of 1346 cdxs this month and now some 64 members. This net started in 1975 with 6 stations. KL7HAC finally has his arm out of the cast. Ten meters is open during the middle of the day. KL7FSE EC for Anchorage is working on a repeater for ARES to cover the Anchorage area. Congratulations to KL7HDS on his General ticket and is very active on HF. There are so many new stations coming on the air we can't keep track of them. The Anchorage Amateur Radio Club will be sponsoring the 1978 ARRL State Convention. Contact KL7ISB to help work on this project. Traffic: KL7JDI 52, KL7JDH 18, KL7HMH 15, KL7AF 8, KL7JFJ 6, KL7ILA 5, KL7CUK 4.

IDAHO: SCM, Ed Hamlin, W7KDB — SEC W7JMH. PAM: WA7HOS. The Pocatello ARC is upping dues to \$7.50. The Mt. Kinport Repeater is operating very good. WB7TFB, WB7PPT and WB7PUS are new hams in the Caldwell area. Boise Valley 2-meter net meets each sun. on 145.44 at 9:00 P.M. W7GHT has been NCS for RACES Net during WA7WXI's vacation. Payette hams will soon have a 2 meter repeater.

Net	Freq.	Time	QNI	QTC	Sess.	Mgr.
FARM	3935	0200 Dy	806	20	28	W7CJC
RACES	3990	1415	436	36	22	WA7WXI
IMN	3635	0300 M-F	174	93	22	WA7BD

Traffic: W7GHT 262, W7LLM 36, W7GBO 31, W7ASA 22, W7FOF 5, W7KDB 5.

MONTANA: SCM, Robert Leo, W7LR — OO WA7IJJN submits report with 24 hams receiving discrepancy reports. He also reports much intentional QRM, plus CB ops on 10, 15, and 20. We need more OO and Intruder Watch effort. EC WB7AZJ Bozeman plans early Dec. CAP airplane disaster test. WA7PZO after 10-mtr DX. W7LR has 195 countries CW DXCC. W7DB transmits ARRL Bulletins. WA7QBH remodels shack. WB7SWH new Hardin ham. K7SIK demonstrates talking calculator on Butte repeater. W7UEB a Silent Key. W7HAH reports Oct. aurora 144.1 CW QSOs with 5 states, says Nov. QST Quagi Ant FB. IMN QNI 174, QTC 93. MTN (Oct) QNI 1065, QTC 76. (Nov.) QNI 1049, QTC 63. W7IDK has Havre CD EOC going. Havre and Bozeman have fall Novice class plus spring General Class. W7IDK appoints 5 asst. ECs MT VHF hams busy with ballots, C&B. Traffic: (Nov.) W7NEG 26, W7DEO 23, WA7PZO 6, W7LR 4, W7HAH 3, W7DB 2. (Oct.) W7IXD 44, W7DEO 32, W7HAH 2.

OREGON: SCM, Dwight J. Albright, W7HLF — Chief PAM: WA7SSO. PAM: WA7GFE. RM: K7OUF. ARES, 39935, 5:15 & 7PM, QNI 508, QTC 8, QST 12. ARES, Linn-Benton, 501, 10, K7UGF, WA7RWM, WCN, 3702, 7 PM, QNI 514, QTC 202, K7UJY, OSN, 3585, 6:45 PM, QNI 222, QTC 104, (Oct.) N7NO, BSN 3908, 5:45 PM, QNI 599, QTC 82, QST 15, WA7GFE, BSN (Oct.) 454, QTC 33, QST 3, 28 Sess., WA7GFE, OSN (Nov.) 3585, QNI 219, QTC 134, 31 Sess., N7NO.SMIRK 6 Meter Net, QNI 6, 2 Sess., K7ZCH. More and better liaison from net to net here in Ore. will be noticed as traffic moves in and out of the state. This following a meeting of PAMS RM NMs SEC & SCM. RN7 mgr. There was a fine turn out at the K-BAR-A Xmas party in K. Falls. Grande Ronde Radio Amateur Club looking forward to being an ARRL affiliate. RACES & AES keep going on 3993, 5:30 AM weekdays. ARES moved to 5:15 early net and 7 PM second net. (which is QRM). Traffic flow OSN to RN7 and back FB now that OSN sends rep to BSN/ARES, has reps to RN7 too. N7SC set up for 160 meter contest using a BC tower (daytime station) had a lot of help watching for BC engineer to be sure they were unhooked when BC station went on the air! New call but same voice W7XI, was 7UJO heard as NCS on BSN. WA7SSO proud of YL Jr. Harmonic Traffic (Nov.) W7VSE 374, K7NTS 253, WA7IHS 114, K7OUF 78, WA7GFE 73, WB7AAK 64, W7HLF 50, W7DAN 44, WB7DPU 13, W7LT 11, K7QFG 8, WA7ZAP 8. (Oct.) W7DAN 57, WB7PDU 10.

WASHINGTON: SCM, Bob Klepper, W7IEU — NTN 30 sessions, 1760 QNI, 86 QTC; NWSSB 30 sessions 824 QNI, 37 QTC; WSN 30 sessions 336 QNI, 124 QTC; Clark County Information Net 147.84/24 4 sessions, QNI 53. Lots of ARES activity first of Dec. providing communication for floods, slides, and rescue work. Many repeaters involved in the operations. New officers of Evergreen Chapter CQWA are: W7DRD, chmn.; W7CFR, vice-chmn.; W7LKH, secy-treas.; W7NC, W7MKN, W7QC, W7QVB dir. Changes are being made in the appointment structure by the Communications Dept. Contact me for further information and application forms. WB7RSY new Novice in Oak Harbor. Others from Oak Harbor who have upgraded are: WB7BPM, WB7SPD, W5DGI7, WB7PAS and others, did a fine job handling emergency medical

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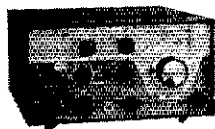
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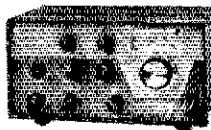
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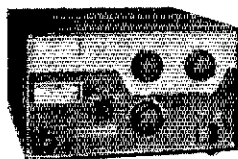
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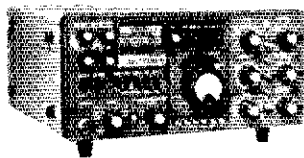
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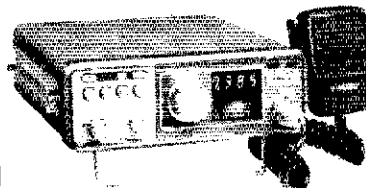
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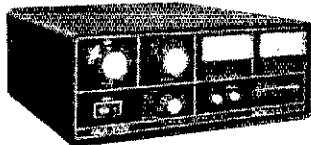


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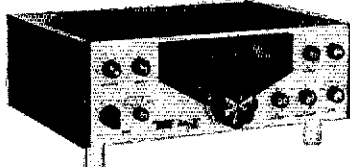
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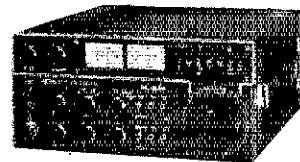


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traffic into Chile. WA7BLE new EC for grays Harbor/Pacific counties. W7ADM EC for Snohomish Co. K7MF on VHF mobile now. W7SAP and helpers did their usual line job in handling Christmas tlc from the Vancouver Veteran's Hospital. Spokane have WC calls for RACES. New officers for West Seattle ARC are WA7RUY, pres.; WB7RYC, vice-pres.; W7BQC, treas.; WB7DQI, secy.; W7IAZ, steward; W7PME, asst. steward; W7EWP, W7BCS, W7LGS, W7IYV, W7WOG, trustees. W7NG traveling in Russia. Son-King Rptr group and others used the 1979 repeater for a successful search for a lost youth. WB7CFH active in Pierce County ARES. K7XE, ex-K7CCJ and WA7JKD joined Silent Keys. N7CT working most contests and a regular with OB skeds. W7AIB able to make some of his WSN and RN7 skeds in spite of knee trouble. W7LG has completed his new hamshack, going to take a month off to move and install antennas. Ciallam City ARC graduated 22 Novices, General Class will start soon. WA7IKZ and WB7FCC were the first applicants for the new OES appointment. Mount Baker ARC still going strong on classes Novice thru Extra. Annual Challenge Cup bunny hunt between MBARC and Radio Amateurs of Skagit City was won by WA7UGB of MBARC. WB7BJB has upgraded. WA7BBC now K7NPN. New officers for Radio Amateurs of Skagit County are K7NTW, pres.; WB7BDQ, vice-pres.; WB7OPY, secy-treas. More than 2000 of you are full members of the League, but only about 90 hold appointments. With the restructuring there is an appointment that will fit everyone. Will you help me? Traffic: W7DZX 606, K7GXZ 110, WA7BDD 94, W7LG 79, N7AJ 60, W7APS 45, W7BUN 37, WA7LQV 33, W7EBU 32, W7IEU 18, N7CT 10, W7RXH 5, W7AIB 2, W7AXT 2.

PACIFIC DIVISION

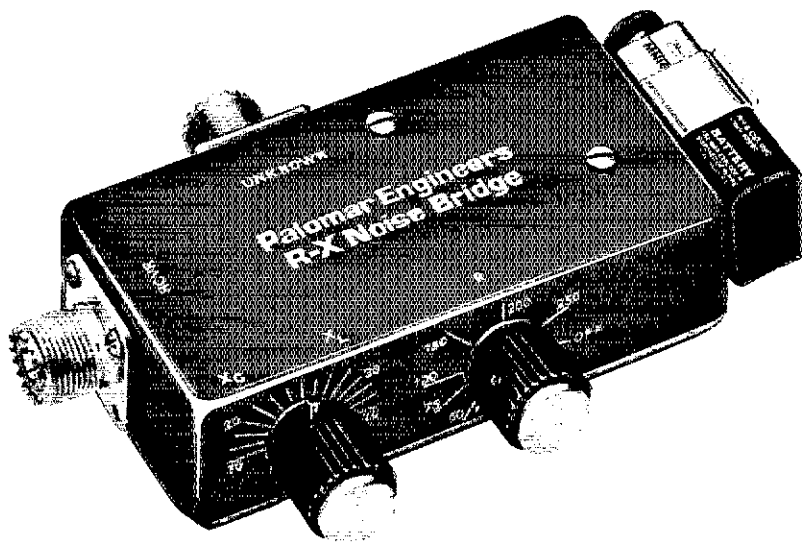
EAST BAY: SCM, Bob Valio, W6RGG — This is the first column from your new SCM. My mailing address is 18655 Sheffield Road, Castro Valley, CA 94549. Please drop me a line if I may be of assistance. Many thanks to Chuck Breeding, K6UWR, for his help in getting started as SCM, and for all that he has done in behalf of the ARRL and the East Bay Section. The Northern Calif. Contest Club took a run at their third consecutive Sweepstakes gavel with a club aggregate of over eleven megapoints. Their recently completed Calif. QSO Party had a record turnout. W6ZF busy writing an article on the 1927 Dole Air Race for publication in Worldradio News. Ronnie is the last living radio operator who handled the race traffic from Oakland Airport. W6JXK is still having trouble locating his Form 1s. N6NE was active in the Cal. QSO Party and SS. Alameda Co. is considering a new zoning ordinance for radio towers. Coordination with the County Administration has been handled by East Bay SEC W6IHH. Alameda County RACES meets the first and third Mon. of each month, 7:30 PM, at their Civil Defense Training Center, 2700 Fairmont Drive, San Leandro 94578. Call 276-0600, for further information. W6TI DX Bulletins on 1400Z each Mon. at 0200Z (Sun. evenings, 1800 PST). Traffic: (Nov.) K6HW 325, W6OA 212, W6JXK 174, WB6VEW 16, K6PMG 10, (Oct.) N6NE 8.

NEVADA: SCM, Leonard M. Norman, W7PBV — Asst. SCM: W7SK effective Nov. 1. SEC: K7ZAU. W7BIF home from cruise to Central America and was guest of the ship's Captain in Radio room enjoying many QSOs. W7PBV/KH6 handled emergency communications to the Coast Guard from KH6JBN aboard 40-foot ketch Ikane adrift without power and sail, for two days. W7OK received 5BDXCC certificate No. 589, believed to be the first one in NV. K7EP State RO visited with Southern NV RACES members. K7ZOK worked Phoenix on 432 MHz using 100 watts SSB. W7EJF WA7FCA W7FDZ WB7BDX W7IUC W7MWF W7PBV WB7PWL WA7RPZ and WA7JGI received KH6-land hospitality on recent visit to the islands. YK4AK and YK4VFJ recent visitors of W7OK. WB7UFD moved into new QTH. W7NVY moving. K7EC worked OA8V using .8 watt. W7FDZ apparently died of natural causes in the Humboldt mountains enroute to work on a repeater.

PACIFIC: SCM, Pat Corrigan, KH6DD — SEC: KH6CKJ. RM: KH6JAC. ORS: KH6ST New appointments: KH6BZF, OBS, OVS, OO, OPS; KH6DL OPS. Officers for the Hon. ARC: KH6EKQ, pres.; KH6IPQ, vice-pres.; KH6OM, secy.; KH6PR, treas. Contest season last fall had many KH6s active with new privileges on 160 adding to top band participation. It is hoped that all will support and correspond with our new director and vice-director. Keep us in the Pacific on their minds. ARRL Bulletins can be heard on Pac. Inter-isl Net, 14315 at 0800 UTC. EARC Tech. Clee worked on Diamondhead repeater. Should sound better. Bill Myers (former Chop at KH6RS) back in islands. KH6BZF reports VR3AK VK5CRG W5BE as visitors. It is hoped that everyone will support their local repeater group. They need lots of help in keeping the equipment running and updated. New classes for amateurs are starting all spring. Also, much additional news is needed for this column, which is your column. Traffic: (Nov.) KH6ST 53, (Oct.) KH6BZF 12.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — SEC: W6SMU. The River City Amateur Radio Comm. Society is now an ARRL affiliate. Their officers are: WA6RPE, pres.; K6CII, vice-pres.; WD6BWK, secy.; WB6YLJ, treas.; WA6ZDZ, act. mgr. WA6JKG WA6YUC WB6ROS WB6YLK and WB6YRO, board. They are presently assembling a station and teaching a radio class at the Sac. Easter Seal center. Officers for the Berryessa ARK are WB6FAA, pres.; K6HVM, vice-pres.; W6AAQ, secy-treas.; WB6VKH, trustee. W6CMJ WA6LKP and WA6FGZ dir. A new call in Sac. is WD6DPO. K6HTM has moved to a 1 acre antenna farm. W6NDT and K6RPN have 20 students in a radio class in Grass Valley. I regret to note the passing of WB6IAV, an active amateur in the Sac. area for many years. The RAMS provided communications for the Sacramento Marathon. WA6SBY was QRT while running the 26 miles. Traffic: W6RSP 52, K6RPN 26.

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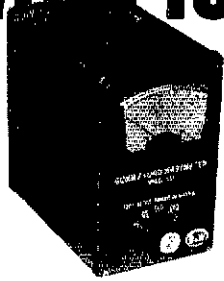
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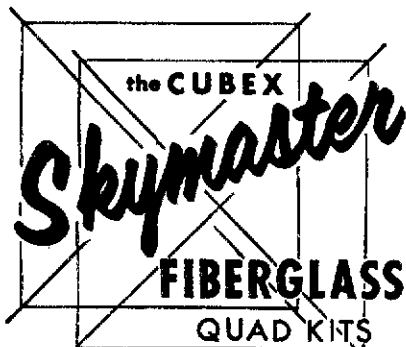
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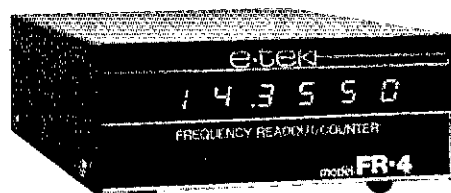
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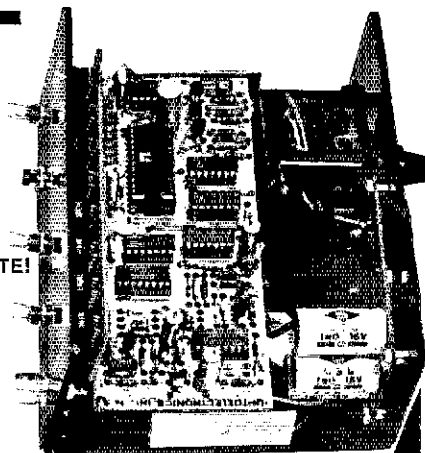
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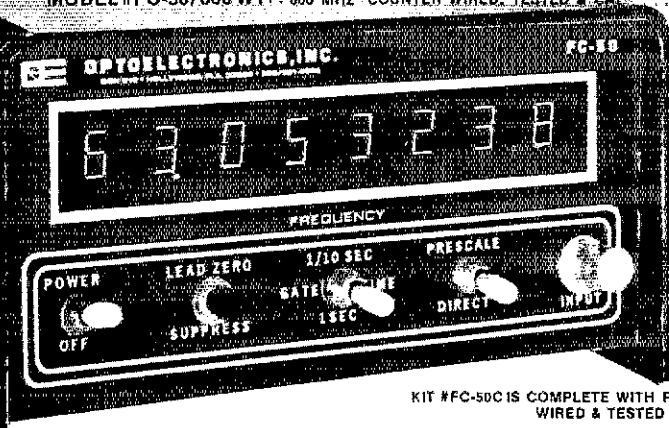
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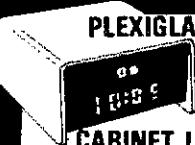
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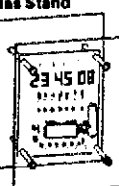
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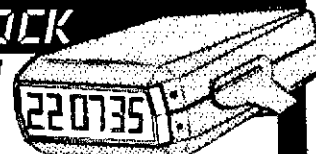
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SAN FRANCISCO: SCM, Mark L. Nelson, AA6DX — Late rpt. for Oct.: Note new call for SCM — Makes it easy to work "DX" — HII W6EAJ reports Jupiter PlusPlus came thru and water wheel power is alive and well. W6RQ will be on CD parties. WA6LLX is OBS on W6BACS, Mon. at 2000 PST. W6BADC ready to change sites — new freq. too pending FCC. New TS-520 and SB-200 for N6KM. W6KLU provided an excellent PR article in the Santa Rosa newspaper. More PR work by all of us should be the word of the day with WARC pending! TV stars W6RNL and W6GGR put in their 2nd appearance on a Eureka retiree program. Just great! W6QPG interested in 2M SSB. W6TFX has new home — above WA6ICB's precarious perch on Humboldt Hill! Keep those reports coming! Traffic: (Oct.) W6RNL 254, W6NL 178, W6IPL 142, K8TP 124, W6EAJ 2, WA6FPR 2, W6BSXJ 2, (Sept.) W6NL 267. (Aug.) N6KM 5.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD. Asst. SCMs: WA6YAK, W6TRP, WA6HIN, SEC: WA6YAB, N7EUJ is OO and active on cw nets, New officers of Tulare County ARC are W6THV, pres.; K6QXE, vice-pres.; WA6YLE, secy.; treas. The Madera Co. ARC now meets in the library in Madera on the 1st Tue. of each month. The Turlock ARC will celebrate its 50th anniversary this month. They will have a celebration/hamfest on Jun. 3, 1978 at the War Memorial Building in Turlock. All are invited to attend. The Central Valley RC K6BLI 2nd YL dinner with 108 in attendance. QCWA Chapt. 94 (Central Valley) held annual dinner in Porterville. Eligible amateurs contact W6BYH for info. W6ZNY now AA6AM. W6DCCF now N6PV. WA6CPP has TSB20S, K6YK an FT301. WA6IOZ a new linear and working DX. N6UR a Drake C Line and new Linear. W6EHH a KWM-2A. W6JPU a 312B-5. WA6HDA has Quad. WA6SHO a new tower and beams. WA6JDB and WA6KMW made NCN Honor Roll for Nov. Traffic: WA6GLV 16, W6DPD 14, WA6JDB 14, WA6YAB 12, N7EUJ 6, N6UR 1.

SANTA CLARA VALLEY: SCM, Jim Maxwell, W6CF — SEC: W6IZF. My thanks to W6IZF for filling in for me during the past two months. For those who missed it, IZF's article on the Marble Cone Fire in Nov. QST makes for interesting and informative reading. W6RFF made PSHR. The Amat-Oscar-D aircraft flight test on Dec. 3 was a rousing success, reports W6ETR. Activity was intense, with DX of hundreds of miles worked through the 146 to 435 MHz link. The popular SPARK auction is scheduled for Feb. 25, as usual at the Ford Aerospace cafeteria near Bayshore in Palo Alto. Congrats to new Pac. Div. Director W6ZM and Vice Dir. W6JUZ. It's also election time in the clubs. New West Valley ARA officers: W6SIU, pres.; W6BQOX, vice-pres.; WA6AGA, secy.; W6BHT, treas.; W6LH, WA6HZO, WA6OHT, N6TY, N6KZ, WA6WEO, WA6UKE, Dir. Meanwhile, up Palo Alto way, the PAARA gang have selected W6BFH, pres.; VE3EZK, vice-pres.; WA6LNV, secy.; WA6OFN, treas.; K8FS, W6NIR, W6DVD, W6AIN dir. W6RFF, W6YBV and K6YK all made the Northern Calif. Net (NCN) Honor Roll for Nov. Interest in the 2M outlet of NCN remains high, reports manager W6RFF. The 2M session meets daily at 1930 hours local on WR6 ADC (84/24). W6MMG reports he is recovering from the strenuous activity of basking in the sun on Ewa Beach, Hawaii. Some JKH6 activity was sandwiched in between sessions in the sun. Congrats to new Extra WA6DFM, who now holds N9K. Traffic: W6YBV 131, W6RFF 74, W6AUC 50, W6OII 33, W6KZJ 27, W6OII 24, W6SHAD 11, N6AU 10.

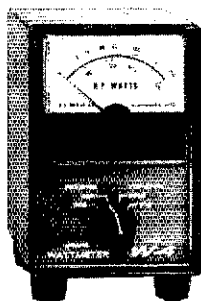
ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, K4GHR — SEC: W4EHF, PAM: W4QFO, RM: K4MC, VHF PAM: WB4VIM. New officers for the Gaston Co. ARS include: K4AFU, pres.; W4QPO, vice-pres.; W4TIL, secy.; K4JDD, treas.; W4FSA & W4REW, dir. Preliminary SEI exercises have been held by the ARES groups in Haywood & Alamance Co. New calls on the bands include N4SM, ex-WB4LDO & AA4NC, ex-WA4PSL. Officers of the Forsyth ARC are WA4WKW, pres.; W4DBT, vice-pres.; WB4STU, secy.; WB4USP, treas. The Forsyth ARC now has the call WD4LZR. Plan now to attend the Roanoke Division Convention at the Metrolina Hamfest in Charlotte on Apr. 1-2. Many ARRL activities planned, see you there. I would like to receive more net reports each month. ONN & CNCTN are very regular. New Net Mgr. of the Carolinas Novice Net (CNN) is WA4OOS, already doing an excellent job, join them on 3718 at 2230Z. Thanks to K4FTB & W4EAT NC is always represented on the daytime nets. The Raleigh ARS & Cary ARC had a very successful Christmas Message Center set up again this year at Crabtree Mall, lasting 6 days this time. Raleigh ARS new officers, K4HF, pres.; WA4YOM, secy. Cary ARC now has net on 146.88 Mon-Fri at 2130 local. Both the Raleigh & Mecklenburg ARSs started a wide range of Ham classes last month. New appointments this month include WB4TTJ, W4EAT, OBSs: WA4LZD, EC Sampson Co; WB4VQP, EC Johnston Co. Officers of the Mecklenburg ARS(Charlotte) are: W4FKT, pres.; WB4ZIQ, secy.; W4MFE, WA4OBO, WB4BXW & K4SFI, dir. Traffic: W4EAT 408, AA4NC 332, WB4ZIQ 184, W4QFO 156, WB4MXG 150, N4UE 126, W4FMN 106, K4MC 96, N4ZH 71, WA4UTC 64, K4FTB 55, WA4OOS 50, WA4SRD 50, K4VHT 49, WB4DAR 47, K4TTN 47, WB4ULP 32, K4GHR 28, W4IZI 28, W4EHF 13, WB4WII 8, WB4CES 7, W4WXZ 4, WB4TOP 4.

SOUTH CAROLINA: SCM, Tom Lufkin, WA4DAX — Asst. SCM: WA4MDD. SEC: WB4TNS, PAM: W4MTK, Asst. PAM: WA4DZG, RM: WB4CAK. Congrats to the Keowee-Toxaway ARC on their ARRL affiliation. WB4JNE is pres. N4RM reports 11 new Novices from last class of the N. Augusta-Belvedere Club with a general code and theory class planned. They also may have a 220 machine planned in the future. WB4TCT/4 reports the Sumter club had a real nice amateur radio display at the Shaw AFB open house. K4GL reports good DX on 6Mtrs with an OE3 looking for a schedule. K4ZN appointed an OO with a score of 10 ppm in last FMT. N4EE won CD contest for section, he was only entry! See QST for info on CD par-

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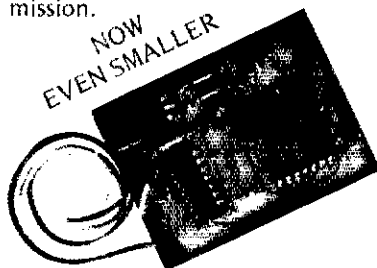
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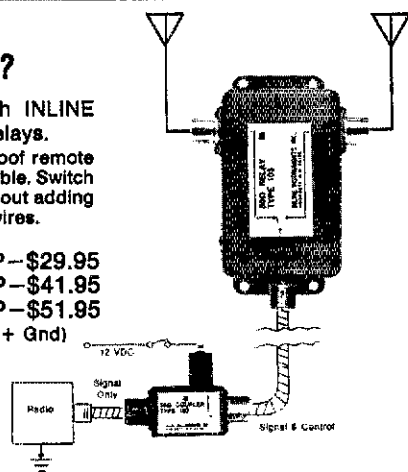
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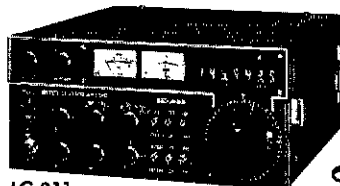
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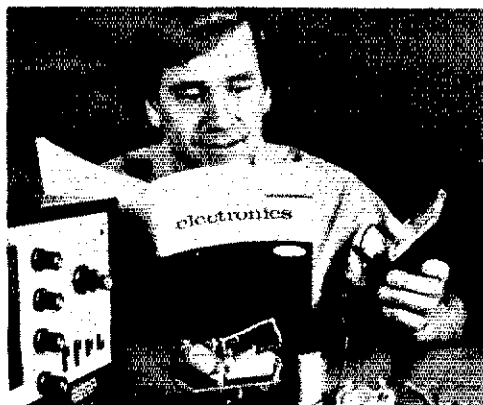
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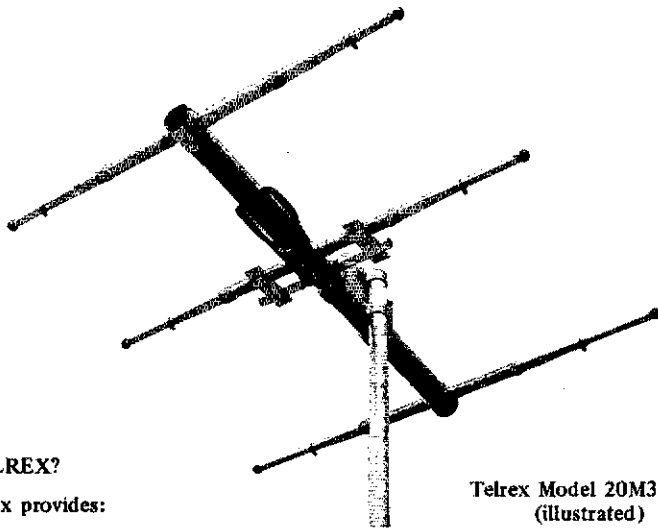
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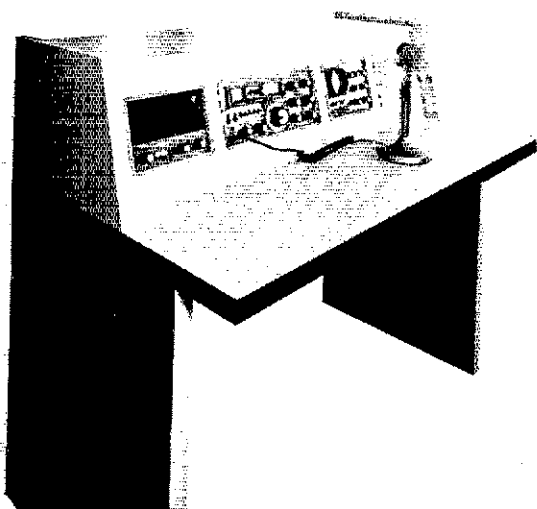
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ties. K4ZN again thanks SC gang for 100 percent participation in D4RN. Chuck also writing a column in World Radio News on simple equipment to build for your shack. Trident ARC now has operational repeater on 87/27 with auto-patch. Also a Novice and General class in session. Net reports: PX QNI 240. QTC 82. SSBN QNI 1423. QTC 193. Anderson 2Mtr QNI 585. QTC 25. Tri-Stat N4PQ 896. K4ZN 537. WA4KXZ 27B. WA4ANK 134. W4WTO 110. W4FMZ 71. W4MTK 58. K4FRX 49. W4BGA 42. W4UDK 37. W4FVV 27. W88TCT/4 16. W4JUNE 9. N4EE 5.

VIRGINIA: SCM, Robert L. Follmar, N4RF — SEC: W44ZNB. PAM: W4DBK. RMs: VN K4BKX; VSN: AA4CK; 4RN W4SHF. Too hvy a wrk load, what with law studies, has forced W4DBK to resign his PAM spot. His recommended replacement is LeRoy J. Kniskern W44DQZ who picked up the PAM slot on Dec. 1. Good wishes to both men! W44JUX hopes for a new rig from Santa on Xmas. Hi. W4TMN built 3 new pcs of test eq. (Transistor/FET checker, RF sig generator & freq. counter. W44JUX recd award (hi score) in 1977 Washn. state QSO Pty. W4ZM says too many contests in Oct./Nov. Hi. OO W44AJB out of town due to changing jobs. OO W44HU handled one of 1st local fone patches out of 9G1-hand for 9G1RP. OO W445BC adding 6 mtr capability to stn. OBS rpts fm W44DRC; N4GI. W4UQ rpts both ants. gave up the ghost after 15 yrs. Now looking for someone to climb trees! K4GR has new ELF II computer (so far, it has me sez Bob) N4FM sez K4BKX gave FB talk on NTS at SVARC meeting. N4RF attendd ham jamboree in Norfolk Dec. 4. W44FNV along with 8 others operated club sta in Sweepstakes phone & made over 50k pts! W4OOL gng back to studios (integrated cks). K4DHB tapes EAN late sessions & plays em bk in morning. WOW sez Lynn, "How do they do it!" W44FTJ ran tic for WPA flood comm. & also Toccoa flood! W1 try to get more on this. W4NWM notices that more stns tuning up without dummy loads & wonders if there "isnt a dummy on each end?" Hi. N4UY rpts his 80M ant. inop for 3 wks. Hung-up on a branch 65 ft high. They had to shoot it down! W4ZWT getting started in tic, FB! Vic 1st VeePee took part in CW SS; attendd Exec. committee in Hq. and took part in DX Contest. W44STO got his new HW101 perking. He is teaching Novices most every eve as wrking 6-7 days a week, PHEV sez he. Sad day, W44AJF lost bet with W44DBK in CW es Fone SS with scores of abt 53.8k es 71k! EC W44FDV held planning sessions for 1978 SET; FB Ruth! K4LEF recd PRA appt fm Director Phil Whicker W4ACY. Also has new 70ft tower with T433 & eight-element 2mtr beam on top. W4YE busy in Phone & CW SS plus QX DX Phone es CW tests. he says "Try 160 for fun." W44NOB rpts his new 15 mtr beam "wrks sometimes", hi. N4DR/W44DRB has true break-in using dual downspouts. Front downspout is rcv, rear downspout xmit. How do you like them that apples? Traffic: (Nov.) W44JUX 338, K4BKX 313, W44DBK 267, K4KNP 245, AA4CK 237, W4UQ 172, K4GR 145, W4SQQ 144, K4MLC 136, W44ZNB 105, K4JM 121, W4LXB 114, W44KIT 100, N4FM 97, N4RF 95, W44FNV 85, N4FP 77, W44PNY 58, W4SHJ 55, W44DQZ 53, W4YVG 27, W4OOL 27, K4DHB 25, W44FTJ 24, W4SUS 23, W4NWM 23, N4LE 17, W44YU 16, W44ZWT 15, N4UY 16, W4KFC 14, W44STO 14, W47SVK/4 13, W44QQI 11, K4EJ 10, W42YYK 9, W44AJF 8, W44FDV 8, K4LEF 6, W4YE 5, W4OKN 5, W4JHF 5, W4KXE 4, N4DR 3, W44NOB 2, AA4IT 1. (Oct.) W44WLJ 40, W44PNY 34, N4UY 17, W4KFC 15, W4YVG 15, W44AJF 4. (Sept.) W4YVG 11, W44AJF 4, N4DR 2, W4DM 1.

WEST VIRGINIA: SCM, Donald B. Morris, W8JM — Our deepest sympathy goes to the family and friends of W48HSZ and W48HVM, Huntington, who became Silent Keys. New officers: Kanawha ARC are: K8BS, pres.; K8MBH, vice-pres.; K8BT, secy.; W48FLF, treas.; N8BP, prog.; K8AKC, PR. New General W48EOM. New officers Monongalia Wireless Assn: W48AFJ, pres.; W88ZM, vice-pres.; W88YFC, secy./treas. Tri-State ARC of Huntington has new club paper, "Modulator," named by K8LC.

Net	Freq.	Time(Z)	Ck-in.	Tfc.	Sess.
Hillbilly	14290	1700 Su	151	50	4
CW	3567	0000 Dy	210	56	30
Novice	3730	2215 Dy	149	58	28
Phone	3990	1700 Dy	654	48	29
Phone	3990	2300 Dy	1318	216	28

W88PKW now N8BP. W48ZGX now N8ER. W88NMP is N8FB. Traffic: W88VAZ 78, W88YMJ 61, W88CKX 50, K8BT 43, W8JM 42, K8YL 40, W88II 33, W8HZ 29, K8KT 27, W88EGW 24, W88CNM 24, W8JWX 23, W88JYM 13, K8MS 12, W88TDA 12, K8ZDY 9, W88YTP 9, K8MHR 9, W88JYN 9, W88CDQ 8, W88DHC 5, W88LDY 4, K8MZM 4, W8AHZ 4, K8VNL 4, W88ZTL 3, K8GEW 3, W88TJN 3, W88NXO 3, W88COS 3, W88YSM 2, W88NDY 2, W88ILK 2, K8CFT 2, W88UC 2, W88FG 2, W88TJO 2, K8GEP 2, W88WNZ 2.

ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Clyde O. Penney, W4HLQ — SEC: K8FLQ. RM: K8TER. PAMs: K8CNV W48YGO. I am very happy to advise of an error in the Colorado Section Station Activities Report appearing on page 144 of the Nov., 1977 issue of QST. I mistakenly reported W8SKL as a Silent Key, when in fact he is still very much alive and active on the bands. I extend my deepest apologies to W8SKL, his family, friends, and my fellow-amateurs everywhere for this unfortunate error on my part. W8OPQ is trying out an HT-32 in his shack, and is also converting a Motorola T33 and building a 40-meter CW QRP rig. W8SIN is enjoying his new SB230 and SB220 rigs. K8SPR reports the Royal Gorge Net has resumed activities following summer lay-off. Net tic for Nov: W40umbine QNI 1422. QTC 142. Informals 449. QNF 1740 min.; Hi-Noon 1195. QTC 82. Informals 184. QNF 1301 min.; 29 sessions. Late net tic for Oct.: Columbine QNI 1339. QTC 144. Informals 423. QNF 1508 min.; SSN QNI 183. QTC 37. QNF 678 min. Traffic: (Nov.) W88VYX 2185, K8YFK 1046, K8DJ 417, W88FV 254, W88IBS 204,

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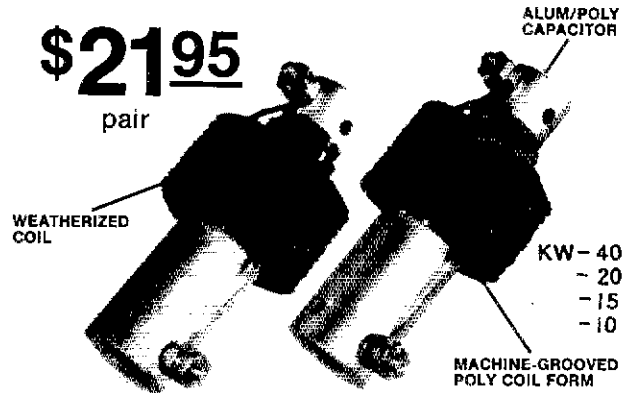
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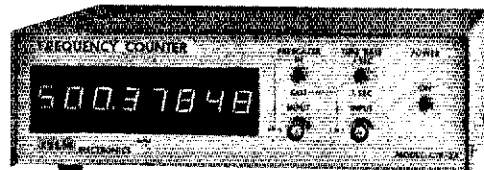
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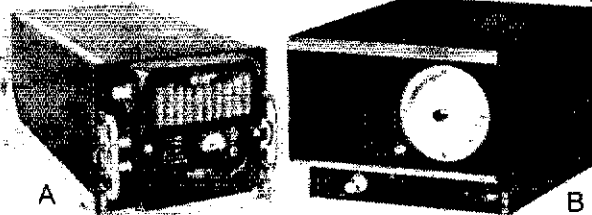
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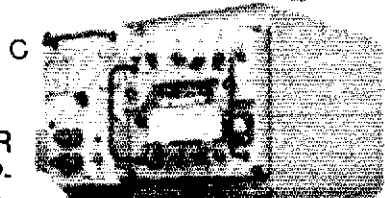
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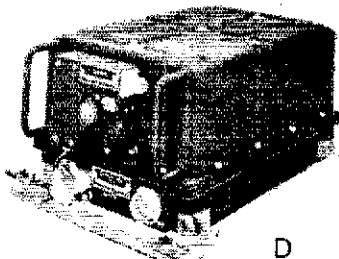
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Dear Al:

After reading the extremely informative article in December 73 I felt compelled to write and express my feelings on my new TEN-TEC 544 and accessories. Actually to try to express pleasure or displeasure on a warranty card, in my case, quite a few warranty cards, does not do justice to the rig or its companion pieces.

Before making a purchase, I wrote and asked a number of questions, some of which, the answers to were not what I wanted to hear; however, they were honest and they were from you directly. Later, after making the acquisition, I wrote on the warranty card concerning the 262G that I was surprised to see zip cord on the connecting cables. Within a few days, I received a letter from you and a short piece of shielded cable that, if I had taken the time to take the jack apart, I would have noticed.

Also, in mentioning a number of birdies present in the rig, I found that once my beams were in place and I could peak up on the proper antenna, the birdies were suppressed nicely.

I was licensed in 1960 at age 24 and left the hobby in 1970. After coming back to it with an Extra Class ticket last March, I found the technology radically changed, and being completely void of any gear, I started to scan the ads and attend hamfests.

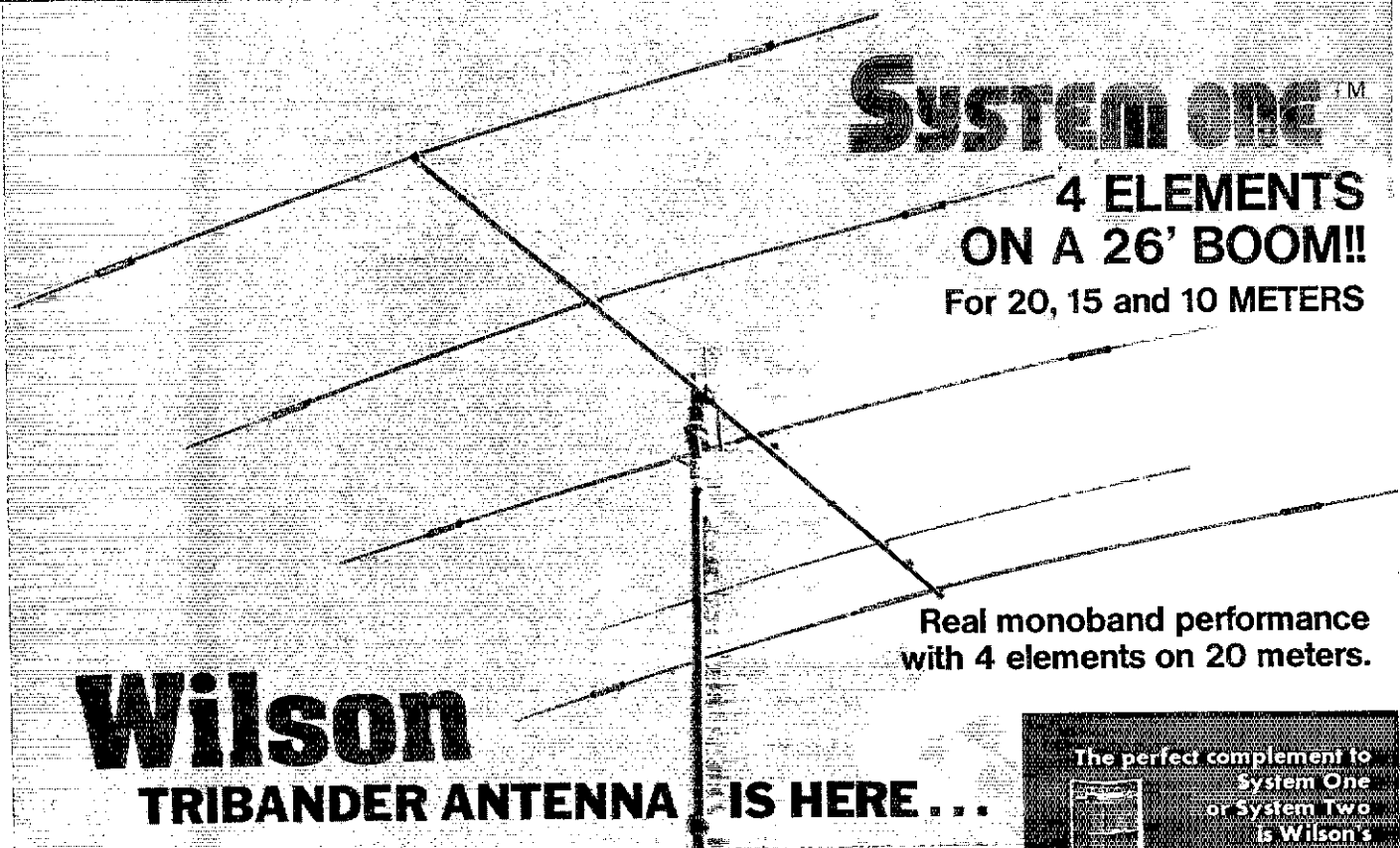
Even though the Japanese imports dominated the market apparently, I still felt that I wanted an American-made rig, one that was technically up-to-date with the latest that the state-of-the-art had to offer. Hence, the purchase of the 544, and after the first full weekend of operating (Veteran's Day weekend), I found the rig was extremely stable, beautiful to operate, with sufficient power to W.A.C. in a few hours and be heard world-wide without a whole lot of difficulty. The low end of 80 produced some fine QSO's and a number of comments on the CW note. In fact, two full pages of log produced a number of comments from locals, as well as DX.

So, in closing, I'm not sorry in the least that I chose the 544. I will enjoy it for years to come...

Sincerely,
Larry Armstrong, K8ZIP

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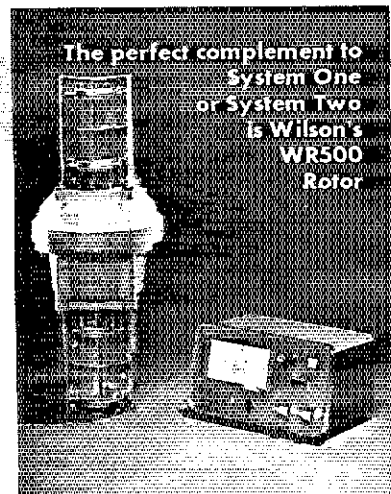
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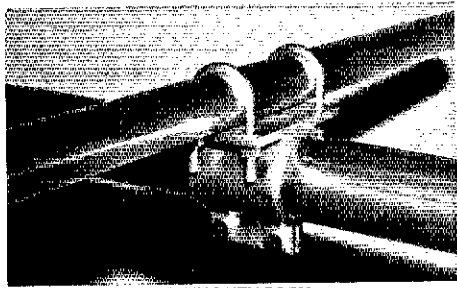
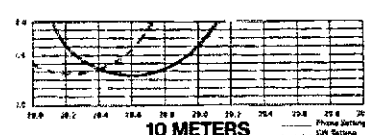
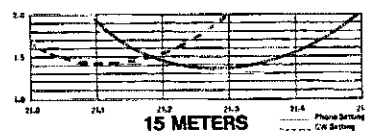
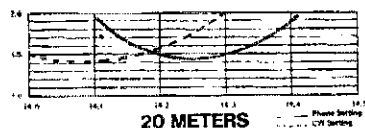
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Matching Method Beta	Boom Length 26'	Boom Diameter 2" O.D.
Band MHz 14-21-28	No. of Elements 5	Surface Area 8.6 sq. ft.
Maximum Power Input . . Legal Limit	Longest Element 26' 7"	Windload 215 lbs.
VSWR (at Resonance) . . . 1.5 to 1	Turning Radius 18' 6"	Shipping Weight 65 lbs.
Impedance 50 ohms	Mast Diameter 2" O.D.	(UPS Shipment in 2 Cartons)

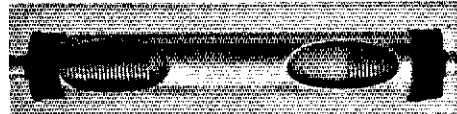


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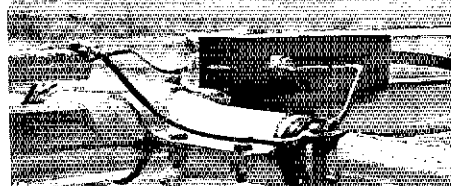
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SY-2 SPECIFICATIONS

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

Band MHz 14-21-28
Maximum Power Input . . . 4 Kw
VSWR (at Resonance) . . . 1.5:1
Impedance 50 Ohms

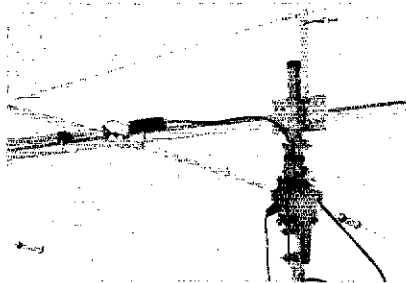
Boom (O.D. x Length) . . . 2" x 18'6"
No. Elements 4
Longest Element (Ft.) . . . 26'7"
Turning Radius (Ft.) . . . 16'4"
Mast Diameter 2" O.D.
Boom Diameter 2" O.D.

SHIPS BY U.P.S.!!!

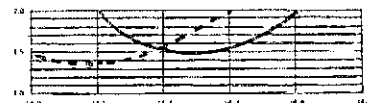
Surface Area (Sq. Ft.) . . . 6.15
Wind Loading
at 80 mph 153
Assembled Weight
(Lbs. - Approx.) 47
Shipping Weight
(Lbs. - Approx.) 50
Matching Method Beta
Only One Feed Line Required

SYSTEM TWO™

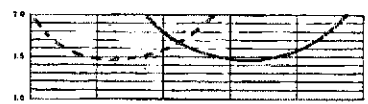
. . . a space efficient, high performing, cost effective new tribander . . . value priced at \$199.95!



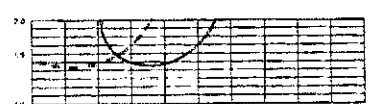
Wilson's WR-500 Rotor and SST-64 Crank-Up Tower used with System Two



20 METERS - MODEL SY-2 Phone Setting CW Setting



15 METERS - MODEL SY-2 Phone Setting CW Setting



10 METERS - MODEL SY-2 Phone Setting CW Setting

40 THRU 10 METERS VERTICAL TRAP

WV-1 WILSON VERTICAL TRAP ANTENNA

No bandswitching necessary with this vertical. An excellent low cost DX antenna with an electrical quarter wavelength on each band and low angle radiation. Advanced design provides low SWR and exceptionally flat response across full width of each band. Featured is the Wilson large diameter High-Q traps which will maintain resonant points with varying temperatures and humidity. Easily assembled, the WV-1 is supplied with base mount bracket to attach to vent pipe or to mast driven in the ground. The new WV-1 Antenna is priced at \$65.00 . . . and ships via UPS!

SPECIFICATIONS

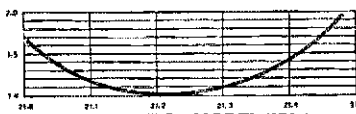
Input Impedance: 50 Ohms • Powerhandling capability: Legal Limit • Two High-Q Traps with large diameter coils • Low Angle Radiation Omnidirectional performance • Taper Swaged Aluminum Tubing • Automatic Bandswitching • Mast Bracket furnished • SWR: 1.5:1 on all Bands • 1½" O.D. Heavy wall aluminum tubing • Does not require guying • Overall length: 25' 1½".



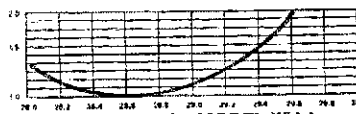
40 METERS - MODEL WV-1



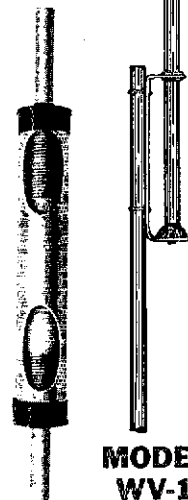
20 METERS - MODEL WV-1



15 METERS - MODEL WV-1



10 METERS - MODEL WV-1



MODEL WV-1



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WB0QPQ 188, WB0MCL 181, W0HXB 148, WA0YNP 138, WB0ZQG 111, K0TER 101, W0LQ 88, W0IW 79, WA0YGC 69, W0SIN 58, WA0REX 48, WD0AIT 34, WD0CHX 13, WA0YED 12, W0LAE 10, W0MYB 10, K0SPR 8, WB0LFG 6, W0GG 1, W0LCE 1. (Oct.) WB0IBS 248, W0RE 214, WB0LFR 158, W0LQ 135, W0IW 78, W0ETT 70, WA0YGC 43, K0OTU 15, K0CNV 10. (Sept.) WB0LFR 59, W0IW 31.

NEW MEXICO: SCM, Joe T. Knight, W5PDY — SEC: W5ALR. PR: W5QNR. PAM: K5IKL. RM: K5KPS. Southwest Net (SWN) meets daily on 3585 kHz, at 1915 local time and handled 289 msgs with 270 stations reporting in. New Mexico Roadrunner Net (NMRN) meets daily on 3940 kHz at 1800 local and handled 65 msgs with 574 stations reporting in. New Mexico Breakfast Club meets daily on 3940 kHz at 0700 local, handled 71 msgs with 996 check-ins. W5TDB & XYL of W5QNR have been in hospital but are improving. Congrats to Socorro ARA on the National Certificate of Merit Award and to WB5ORR and Sherrle on their Dec. 3 marriage. Good ltr fr W5PQL now JY9DS. Regret passing of K5VQU. Traffic: W5UH 342, W5JOV 269, N5NG 248, W5KH 229, W5DAD 216, K5KPS 169, W5ENI 163, W5TWZ 46, W5VQK 34, W5SMY 20, W5YQ 20, W5STGL 11.

UTAH: SCM, Carl R. Ruthstrom, W7GPN — WA7OAU again active on TWN/PAN. K7HLR busy on UCN/TWN/PAN. W7UTM reports good signals on 220 MHz repeater, 223.18/224.78. Pocatello repeater (147.66/06) being worked in Salt Lake City. Hidden Peak repeater, WR7AKO now linked with Monroe Peak to WR7AIX in Richfield. K7FJ moving to Dallas, TX. W7KHY moving to GA on new assignment. UARC homebrew contest winners were: WB7COU for combo, CW7ITTY keyboard, WA7ZBO for Quagi antenna, and WA7ZVF for amplifier and tuner. WB7BEG caught illegal operator with stolen transmitter. W7KC recovered 2-meter transceiver, WA7UJJ has new QTH with built in tower and beam. WA7BWF new EC for Box Elder Co. Officers of UARC are WA7ARK, pres.; WA7SYV, exec. vice-pres.; W7CRU, vice-pres.; K7TB, secy.; W7KCC, treas.; WA7UJJ, editor; K7HFV, assf. editor; WA7WKQ and K7JL, pro. chmn. Ladies Aux. elected WA7RHH's spouse, pres. K7HEN visited your writer, reporting good activity in the Roosevelt area. With the growth there, it is hoped that ARES can be activated for NE UT. W7COX in new home and on air with indoor antenna. Traffic: K7HLR 209, WA7JRC 56, W7MZL 51, WB7DMI 11, K7UT 9, W7UTM 7, W7COX 6, W7NZZ 3.

WYOMING: SCM, Chester C. Stanwalley, W7SDA — Asst. SCM: Tom Graham, W7KHH. PAM: WA7WFC. RM: K7KSA. W7YLA, ex-W7HSD KL7HSD W3YSU and W6YSU now resides in Story. WB7THK upgraded to General. WB7UCS new Novice in Cody. W7CGK reports Cheyenne Club qualified five new Novices last week. K7WY resides in Saratoga. WA7IXH heard on 2-meter FM. It has come to my attention that more liaison stations are needed between local nets and NTS. If you can help please do so. NTS meets at 8 and 10:30 PM on 3570 kHz and at 7 AM on 3930 kHz but may move to 3897 kHz son. K7SLM reports Wyoming Cowboy net 21 sessions, 729 QNI, 21 QTC. Traffic: K7VWA 543, W7SQT 516, W7TZK 490, K7KSA 11, W7SDA 5.

SOUTHEASTERN DIVISION

ALABAMA: SCM, Jim Brashear, WB4EKJ — I regret to report the following as Silent Keys: WA4LCV WB4CFX WB4ZID. Thanks to WA4FO WA4JDH WA4RAJ and WB4ZAJ the AL Section 100% QNI on DRN5 for Nov. Congratulations to WA4EF on receiving his 50-year OCWA Gold Certificate (50 years continuous, that is); WB4SFV and wife for daughter born Nov. 17 and to N4KC for daughter born Nov. 8; our most recent affiliated clubs — Walker County ARC and West Ala. AR Society. New officers of the Twin Base ARC are: WA8KLI/A, pres.; WA4ZEC, vice-pres.; K4JYA, secy.; WB4OZN, treas.; WA4YGM and WB4TKU, dir.; K4JYA, newsletter editor. W4MHO again operating at new location. K4JK resigning his appointment as OO after serving since Feb. 1965, with a "break" Jan. '69 thru Mar. '71; many thanks Mr. Ed. The Huntsville ARC provided communications for the Arabian horse endurance ride (50 miles) at Bankhead Forest. Thanks again to all who helped while I served as SCM. Congratulations to W4LNN, our new SCM — don't forget to support him and send him the monthly reports. Appointed K4JIE as EC. Endorsed W4ROS (N4MD) as ORS and OPS. Endorsed K4EF as OPS. WA4JDH and N4MD each made BPL again, congratulations. Traffic: (Nov.) WA4JDH 1087, N4MD 522, WB4EKJ 124, K4AOZ 98, WA4RND 79, WB4KSL 62, WA4VKD 30, WA4RAJ 29, K4UMD 18, W4EF 7, W4A4YO 6, W4AGRJ 4, W4BT4V 4, W4WRM 4, W4MHO 4. (Oct.) WA4RAJ 52.

CANAL ZONE: SCM, Paul F. Ebdon, KZ5TJ — 1978 officers for CZARA are KZ5BA, pres.; KZ5BV, vice-pres.; KZ5PM, secy-treas. Good luck with your new duties. Congratulation to KZ5S DS JM SD and SX on upgrading to Advanced. A special congratulations to KZ5GE on upgrading to Extra. John had a letter perfect copy on his code test with the exception of an extra letter that the accidently hit at the start of the test. KZ5HW is in Gorgas Hospital with a broken leg suffered in a motorcycle accident. All KZ5s send their best wishes for a speedy recovery KZ5s FR and JM are experimenting with Atlantic to Pacific Ocean communication using 2-meter simplex. KZ5VV's Novice class came to a successful end this month with a special Novice exam given. KZ5VV's annual foot race was held with KZ5s BV DS FTN GE RH MC LD PD THN and TON supplying 2-meter communications.

GEORGIA: SCM, A. H. Stakely, K4WC — SEC: K4YRL. RM: N4UZ. PAM: K4JNL. Congrats to the many who did a superb job in the Toccoa dam disaster. The hams of Georgia have reason to be proud of their organization and actions under the leadership of K4YRL and K4CRO.

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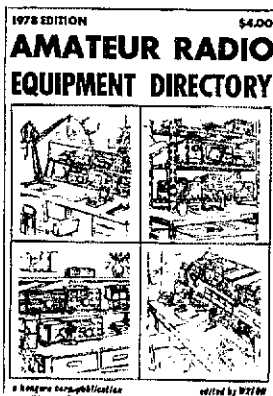
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THE POWER SUPPLY. Built-in, AC operated, and regulated. Monitors current demand, shuts down automatically when necessary for protection. Lighted input current meter shows proper Drive setting.

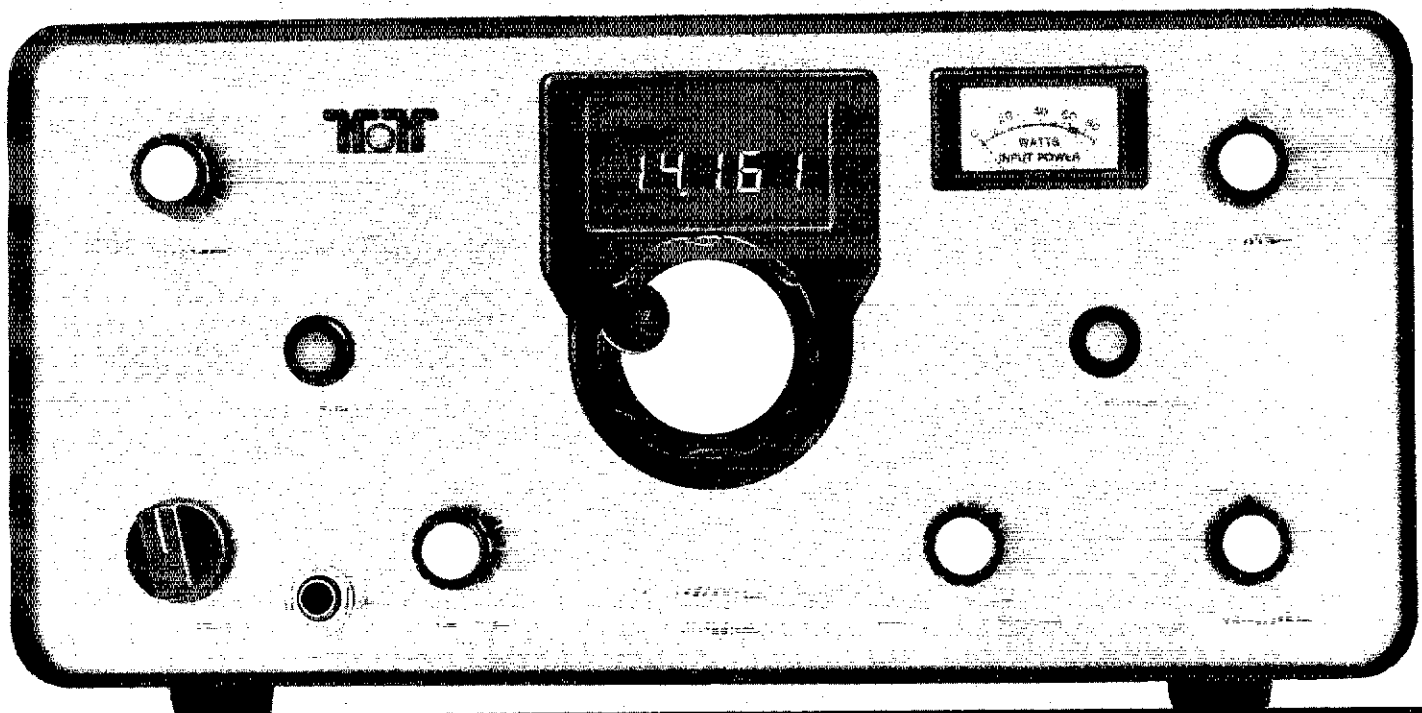
MATCHING ACCESSORIES. Model 277 Antenna Tuner/SWR Meter. Model 670 Electronic Keyer, 6-50 wpm, self-completing characters. Model 276 Calibrator for markers at every 25 and 100 kHz. Model 273 Crystal for 28.5-29 MHz. Model 1170 12 VDC Circuit Breaker for mobile operation of models 574 and 570.

574 Century 21 Digital Transceiver	\$399.00
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276 Century 21 Calibrator	\$ 29.00
273 Crystal for 28.5-29 MHz	\$ 5.00
274 Digital Mod. Kit for Model 570	\$ 90.00
1170 DC Circuit Breaker	\$ 8.75

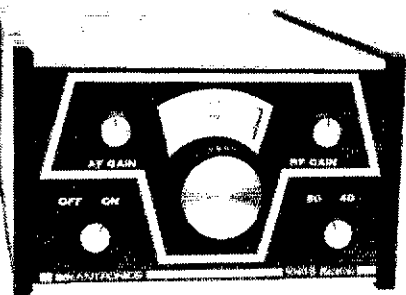
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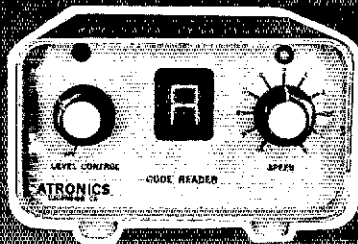
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Well done! Congrats to K4VHC K4YRL K4EV and WA3NAZ4 for making PSHR. GTN is not dead; it meets at 2330Z on 3.718 MHz with WB4FAS as net mgr. Try it; you'll like it. GA Cracker net QNI 858, QTC 199. GARES net QNI 86. CVEN No. 1 QNI 61, CVEN No. 2 QNI 991, QTC 71. N GA Skywarn net QNI 35, GSBN QNI 2332, QTC 281. Cntrl GA VHF net QNI 117, QTC 7. Amateur Radio Emergency Corps now has 651 members and 10 active ECs with 12 nets. WB4DHC starting club at the Citadel. WA3NAZ4 received a 4RN certificate. Atlanta Chapter of QCWA now active and their net meets at 1400Z Sat. on 3.930 MHz. WD4DEV and WB5OLL conducting Novice classes at Naval Air Station, Atlanta. Savannah ARC new officers: WA4CTY, pres.; WA4MX, vesp.; WD4AFY, secy.; W4GRH, treas.; WA4TKU, act. mgr. Additional honorees to those reported last month by Albany ARC were: W4PVV W4LPG W4IYD W4KPGK and Sam Howard. WD4IBQ is WAS, Novice. WB4TYF is WAS. Americus rpt on 8/27. Milledgeville now on 66/05. WA4CFI and WB4TYF conducting Novice classes at Albany Junior College. Traffic: W4FOE 475, W4PIM 191, WB4WQL 94, W4NAI 87, WA3NAZ4 87, W4VHC 71, K4YRL 50, K4NM 44, WA4OZT 37, W4ELO 35, W4HON 35, K4EV 26, W4BIA 20, W4CZN 12, WB4DHC 4, K4WC 4.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr., W4RH --- SEC: WA4WBM, RM: WB4GHU. PAMS: WA4TNC/75, WA4TXM/40, WB4BSZ/VHF.

Net Manager	Freq.	Time(Z)/Days	QNI	QTC
NFPN	3950	2330 Dy	1283	215
WB4PGB				
QFN	3651	0000/0300 Dy	889	724
WB4GHU				

WB4PGB aptd. NM of NFPN; WA4TNC still receives Net Reports for computer input. SNCs earned by WB4DTS WB4LNO & WA4TNC on FMTN; and by WD4BBB and WB4PGB on Ala. Net AENM. Ham radio exhibits boosted traffic totals this month --- WB4SKI WD4IIO and WA4WBM made BPL. A record 51 reports received. EC WB4SKI had communications well-organized for recent Pensacola train wreck. A weekly net has started on the WR4ACZ repeater, Tue. at 7:00 PM. WB4QBB is NM, with WA4KST NCS. K4VWE going to SSTV. Okaloosa Co. 146.52 ARES Net (Tue. at 7:30 PM) had 38 QNI recently. WB4YKV sporting new FT-101E. WD4MMK & WD4MMN new hams in Port St. Joe. W4MNV and WA4RPS won Tallahassee xmtr. hunt; AA4US was hidden bunny. New NOFARS officers: N4UF WA4CCX WA4QHV and W2KGI/4. WD4GUS & WA4CQQ won prizes in homebrew contest. WD4MRCWD4FJC taking orders for NOFARS T-shirts. Jax RANGE also has new officers: N4VU WB4URU WA4JZD and WD4AOG. WB4URU new Editor of Squelch Tale. WB4EEK recovering from hospital visit. WB4JMM new NCS on GATOR Net. NFDXA members active from Haiti during WVDX contest. N4IB has a 2048A up 100 feet in High Springs. WB4VJZ and WA4ZIT got General tickets from Hambone college. WA4CRI top QNI on QFNS. K4YX now Sun. NCS on QFN. Newold calls in Orlando area: N4EF/WB4WJK; N4GG/WA4BTG; N4SA/W4YUU; N4WW/W4YFG; K4X/W4VJH; AA4MMW/WA4MUB. Traffic: (Nov.) WA4WBM 630, WD4IO 306, N4WA 252, WB4QBB 212, W4LDM 189, WB4TZR 186, N4PL 182, W4JL 168, WB4DTS 163, WA4OEM 152, WB4RIS 151, WA4FKE 144, WA4EYW 128, K4YX 120, WB4GHU 92, WA4CRI 90, W4KX 82, K4DDY 79, WB4EXA 65, WD4HF 45, WA4STZ 45, WA4TNC 45, W4RH 40, WB4YKV 38, K4OER 34, WB4VDL 30, W4MGO 25, WB4NJI 25, K4BBV 24, W4MVG 24, WB4FAJ 23, WA4EYU 22, WB4VAP 22, WB4WYX 18, K4RNS 17, W4DFU 17, WB4WVP 16, WB4LNO 14, W4DTV 11, WA4BZV 9, N4DY 9, WB4OWX 8, WB4FHT 4, W4SDR 4, K4IEX 4, WB4VMP 2, (Oct.) W4SKI 515, WB4HRG 129, WA4FKE 106, WA4STZ 27, W4MGO 14.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL --- SEC: WB4ALH, Asst. SEC: W4YR. RM: W4MEE. PAMS: WB4AJD WA4NBE. No new appointments this month. Endorsements: K4TH ORS, N4TW OPS/ORS. Three BPLs this month: W4MEE K4TH and K4SCL. W4OA reports upgrading to Extra. Likewise W4CSH. And W4BAV is now a General. WD4SHY is sporting a 7P upgraded to Technician. A new Novice is WD4NH "TJ." The new surge of stations on 445.0 MHz in Pinellas County now numbers about 15. N2CR/4, from N. NJ, is a freshman at U. of Miami in E.E. W4YW has been hamming for 51 years! W4BK tuning up to QSY to Chicago for QCWA board meeting Feb. 4. K4RXO is new QCWA member and ARRL Life Member. K4ISS has new 70-ft. tower and 2-meter beam at his "country home." WB4HDX did an outstanding job in assisting distressed vessel "Pegasus." Better write-up may be in Public Service section. We are very pleased with the new Official Station appointments OES, OTS, OO, OVE, NM and STM to be effective in 1978. Kind of hate to lose PAMS and RMs, but the new organization is logical. We hope everybody is checking out their emergency gear and tuning up for a real big SET. Traffic: (Nov.) W4MEE 852, K4TH 524, K4SCL 521, WB4WYG 485, WA4NBE 309, K4SJK 242, WB4AID 235, WA4SC2 212, WA4YR 202, WB4ALH 195, WA4PFK 161, N4KB 136, WB4NJI 98, W4NTE 95, W4GFL 94, W4WYR 87, WD4ABT 75, WD4KPG 74, K4NAN 71, WB4PIB 73, WA4QGV 70, W4KMN 68, K4BLM 64, WA4EIC 60, K4EUK 53, W4BK 52, WB4AOC 50, W4IRA 49, WB4K5J 22, WA4MNB 22, K8PXM/4 20, W4ZJ 20, W4SMK 17, N4XR 13, WB4FVN 11, N2CR/4 8, W4KGJ 8, WB4SNX 7, N4TW 7, WA4ZQH 6, W4YV 5, (Oct.) N4TW 23.

WEST INDIES: SCM, David Novoa, KP4AM --- SEC: KP4CV. Upgradings continue: KP4DIW passed the Extra Class exam. WP4DSZ and KP4ENI are now Generals. KP4AWX passed his Advanced exam and now is very active working DX. Other DXers heard daily in the pile-ups are KP4s APT PR and EKI. KP4DID is now KP4TV. KP4AM has a 70-ft. tower, put up with the cooperation of KP4s ABN EDH WI CLB DBB and EIQ. Also a new Drake C line thanks to the XYL. We are very glad to have W4RA reelected as the Division Director. ARES groups headed by KP4s CV and BSQ, and the Weather Net led by KP4s

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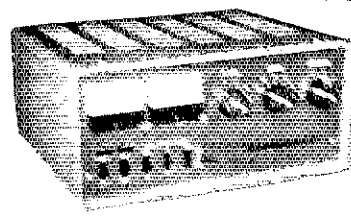
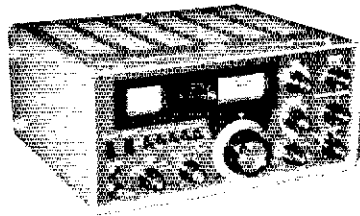
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PM-2 Port AC PS	95		
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R-4B Ham Rcvr	339		
R-4C Ham Rcvr	449		
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FL-500 500 Hz filter	35		
FL-4000 4 KHz filter	35		
FL-6000 6 KHz filter	35		
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SW-4A SWL Rcvr	225		
SCC-4 Xtal cal	19		
SSR-1 SW Rcvr	249		
DSR-1 SW Rcvr	1295		
SC-6 6m conv	69		
SCC-1 VHF cal	19		
MMK-3 Mobile mt	6		
TR-6/NB 6m Xcvr	589		
T-4X Transmitter	339		
AC-3 AC supply	65		
DC-3 DC supply	65		
DC-4 DC supply	85		
MN-2000 Matchr	175		
ML-2 2m FM Xcvr	119		
TR-22 2m FM Xcvr	139		
TR-22C 2m FM Xcvr	149		
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22 VFO adaptor	19	ICAF Notch/peak	19	WILSON	
412 DC supply	39	AF-800 Audio filter	39	1402 2m HT/TT/etc	\$249
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SS-200 Xcvt	349	210 Remote VFO	75	FT-101 Xcvt	489
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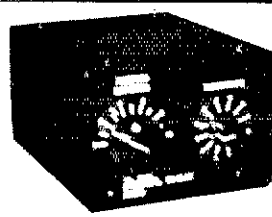
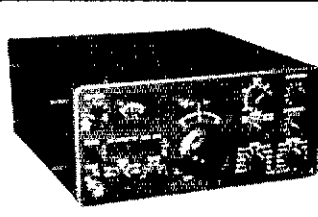
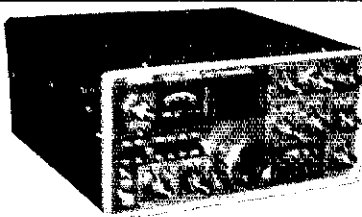
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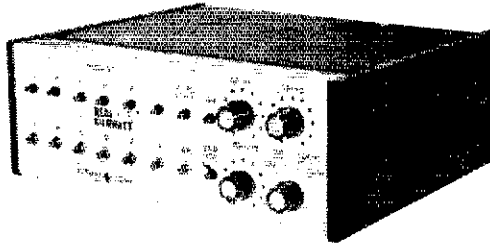
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EBQ and DPA had good participation in emergency communications during the Nov. floods in Caguas, Carolina, Patillas and San Juan. KG4TS active on 75 meters. KV4AA as usual handling dozens of QSOs daily, mostly on CW. Please keep those reports coming.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DQS — PAMs: WA7KQE W7JQQ. RM: W7EP, WB7CXO, driver of the payson ambulance, and K7CXA, with a phone patch, provided medical information to the Payson hospital during an emergency ambulance run after the regular ambulance radio was stolen. WB7ESQ has made tapes of the ARRL license manual for blind persons studying for a license. The emergency drill net on the Kingman repeater has operated with NCSs at police and fire stations in the area to demonstrate its coverage area and capabilities. New officers of the Scottsdale ARC are WB7WNM, pres., WB7PXP, vice-pres.; WB7PXD, secy.; WB7PXQ, treas.; W7FCQ, trustee. Explorer Post 599 will be sponsored this year by the Arizona Repeater Assn., instead of the Arizona ARC. WB7CHQ is the new public service chairman for the ARA, replacing W7FEZ. The flagstaff Jr. HS ARC and the Marcos de Niza HS ARC at Tempe now are affiliated with the ARRL. W7AMM reports he will be out of the state for two years and hopes to operate as a 7Z or HZ. ATEN 95, SWN 289, (Oct.) Cactus Net 166, SWN 223. Traffic: W7EP 307, K7UXB 164, W7AMM 138, WB7TPY 60, WB7CAG 47, WA7IYG 43, W7HFR 39, WA7KQE 26, K7NTG 20, WA7JCK 16, K7GH 16, WA7WEB 13, K7NMW 12, W7HFR 9, W7DQS 6, K7JKM 4, K7GLA 1.

LOS ANGELES: SCM, Stanley S. Broki, K6YYQ — Due to an unforeseen opportunity at the time I ran for SCM I have been forced to resign as SCM. I will be moved to New Jersey by the time this is printed. Your new SCM will be the runner up Perry Masterson W6RHS. His address is 485 S. Euclid Ave., Pasadena, CA 91101. Please forward any further reports to him. I wish that I could have stayed to help the section out. Again thank you for your support and please give Perry your help. My new address is 28 New Brunswick Rd., Franklin Township NJ 08873. Traffic: W6EOE 140, N6PZ 116, W6SGZ 92, W6INH 76, W6QAE 43, W6BWW 22, W6BNC 22, K5DYJ6 21, W6USY 20, N4HE 9, N6VI 1.

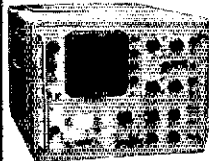
ORANGE: SCM, Wm. Heitritter, W6AKR/6 — Asst. SCM: K6KNC. SEC: W6AQB. RM: K6JT. PAM: W6CPB. ECs: W6BARK K6GGG W6LKN K6KNC W6WPP WA6YWS. Murphy has visited Garden Grove as K6LL who recently installed LM-470 tower has relocated to AZ. Hemet ARC reports W6TFH has new ICOM 245 SSB. Hughes Aircraft ARC in Fullerton has resumed MARS phone patch service with Navy ships at sea. Saint Jude Hospital ARC station W6BPT is on the air from the Occupational Therapy Department. Riverside ARC new officers are: WA6NVN, pres.; WA6RGH, vice-pres.; K6AJJ, secy./treas.; WA6CEN, editor; WA6QMW, comm. dir.; WA6SVS/W6PLR, hospitality. New officers of the Orange ARC are: WA6FF, pres.; WB6IHZ, vice-pres.; WA6FIT, secy.; WA6HEL, treas. Orange ARC donated 2-meter equipment to Long Beach VA Hospital with WA6SFP supplying an Icom IC-230 and WA6TEY and associates building a four-element vertical antenna. Congratulations to WA6SFP as new Squadron Commander of the Happy Flyers. Orange Council of Amateur Radio Organizations planning a picnic Apr. 16th at Mile Square Park in Fountain Valley. Contact WA6WZ0 at 549-8516 for details. Your SCM needs your input to write a column of interest to members of the section. Please supply news relating to club officers, radio classes, new equipment, license up-grades and public service events. Ten lines are not being utilized this month due to lack of news. Traffic: (Nov.) WB6EIG 563, WA6KHB 141, K6JT 130, W6RE 65, W6QBD 25, W6CPB 23, WA6YWS 8, (Sept.) WA6WDZ/6 9.

SAN DIEGO: SCM, Arthur R. Smith, WBINI — Only seven months to the ARRL National Convention in San Diego, Sept. 22-24, 1978. Early hotel reservations strongly recommended. Contact Convention Chairman, K6BWT, 13031 Papago Dr., Poway, CA 92064 for Town & Country Motel reservations. New ARRS members: N7PF WB6SDI WA6SHT W6THR WB6TFJ. Upgraded: WA6TQ WB6OXM to Gen.; WD6BLR to Tech. Six Meter Operators Group (SMOG) is new club to generate more activity on six meters. Palomar ARC officers for 1977: WA6EJL, pres.; WA6HPP, vice-pres.; WB6AUK, secy.; K6SLA, treas. North Shores ARC 1977 officers: WB6OJA, pres.; WA6HCA, vice-pres.; WB6JXA, secy.; WB6RKK, treas. Poway ARS has repeater operating on 147.225/825 MHz. WB6DPO ran phone patches with HL9UF in Pusan, Korea, during the Xmas season. W6DEY operated in Mexico as XE2DEY with special permission during the Ensenada meeting of Colegas and Amigos. ARC of El Cajon licensing class has moved to Office of Emergency Services, 7939 John Towers Dr., 1830 each Mon. ARRL pancake breakfast first Sat. each month at 4650 Mansfield, 0800-0900. Traffic: (Nov.) WB6PVH 377, WB6FTY 167, WB2BK 148, WA6UAZ 119, N6AT 106, N6GW 85, K6HAP 60, K5LKW 30, W6DEY 27, N6RD 27, WA6JUF 8, (Oct.) WB2BK 56.

SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — W6PA/N6HA had a nice trip to Europe. K6TQE traveled to MO. KH6IQU visited in NE. W6JRV now lives in Lompoc. K6XO moved to northern CA. W6KRO moved to northern CA. WA6VBS lost his 80M antenna but passed his Extra. WB5FTY passed her Tech. WD6DGG and WD6BNH are new Generals, K6LPZ is Advanced, W6LNU is now N6PI. New Canelo Valley ARC officers are W6JL, pres.; K6PHT, vice-pres.; W6BQX, treas.; WA6TAM, secy. W6BCYF spoke on RF amplifiers at SBARC. WB6OLE/W6BCNF spoke on 450 repeater and autopatch at Simi Valley ARC. W6EMS is newly appointed contest group chairman for SBARC. NSMR is sporting a new Triton IV for his net work. The Section ARS net has moved to 12 noon on Sun. on 3935. N6MA N6NB WA6IJZ WA6DJS and WA6LBP operated phone

SURPLUS TEST EQUIPMENT

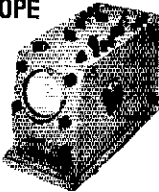
AN/USM-140C DUAL-TRACE SCOPE



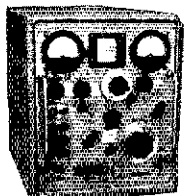
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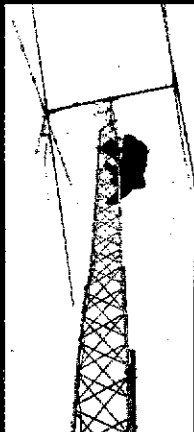
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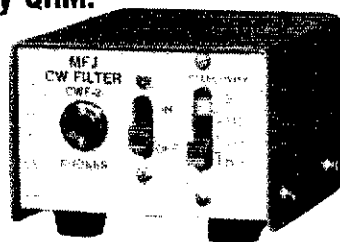
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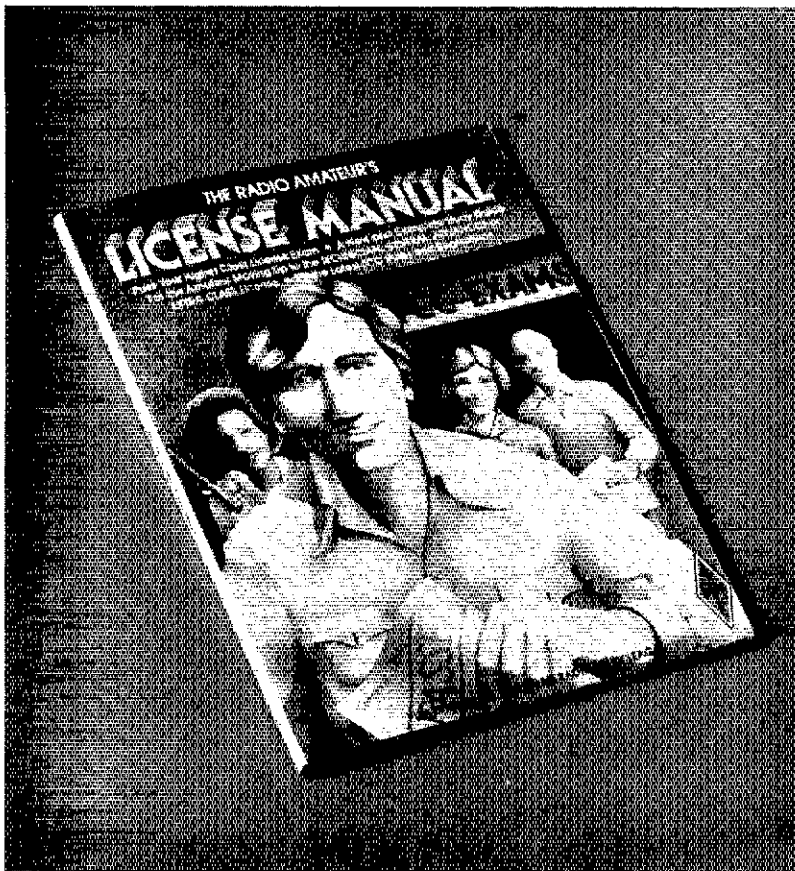
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WEST GULF DIVISION

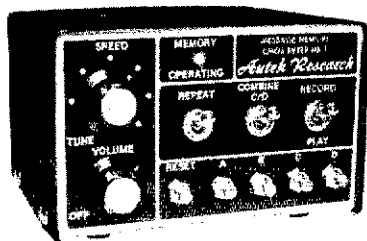
NORTHERN TEXAS: SCM, Ted Heithecker, W5EJ - SEC: K5PC also serving as Asst. SCM and bringing a Section appointments up to date. If you've heard from Phil, please answer immediately so we can get things moving. W5LA has been accepted at ARRL headquarters in Communications Department and we're wishing him well. The Office of Route Manager in North TX is open - any takers? The Pampa ARC winding up a course in General Class theory with a good group already upgrading. WB5BKL very complimentary to League course materials. Fort Worth's KC Club active in all phases, and sponsoring transmitter hunts with good attendance. Last club auction netted \$285. Red River Valley ARC reported lots of activity with club elections due in Dec. Many members participated in Texom Hamarama, winning some prizes and having a plain good time. Grapevine has it that WB5VOW got his Extra. The FCC sent examiners to Texoma, with approximately 150 examinations given, they've promised to come back in '78. SWOT continues to grow, with much interest in the lower portion of 2 meters. SWOT has a nice set of Certificates well worth working for. The West Coast group filed a petition regarding Docket 21033. Contact K5ASZ if you are interested in VHF. DARC elections in hull swing and looks like a hot race between fine candidates. Much RTTY activity here, and we're glad to notice that all clubs are pushing donations to MSA for purchase of power cells and so forth, it's a good project at low cost for clubs in the Section. Richardson Wireless Club elections coming up. Probably more 2-letter calls in RWK than anywhere else in the country. WB5MRB passed the Advanced test and just barely missed the Extra Class exam at Texoma, we've got a bottle of champagne for the happy day coming. Texom Hamarama announces the first Scholarship in the area. Rules and planning under direction of the Committee including K5BTT, N5EW, W5ATO, W5LWB and W5LWK. Key City Amateur RC participated in Red Cross Disaster Demonstration in Westgate Mall, Abilene, reported by WB5UXG. SCM letter being prepared for North TX ARRL members. Happy New Year to All. Welcome to WB5BKL in tm MS with good tlc. count. Also, Lake Region ARRL will have repeater on before Christmas on 34-2. KCARC, at Abilene reports the new repeater on 28-88 is working. W5GSSN received the Public Service Award for work in connection with hurricane Anita. WB5SVS has been appointed EC, and there's 220 activity in the area. WD5BDC and W5GSSN both made Public Service Honor Roll for Nov. North TX PAM is W5GSSN, get in touch with Gene! W5QPX is top OO in North TX, fine reports every month! Traffic: W5GSSN 144, WB5BKM 73, K5PC 7, WB5BDC 67, WA5INJ 35, WB5LAT 33, W5YK 12.

OKLAHOMA: SCM, Leonard Hollar, WA5FSN - I am very proud of the fine work our nets did during Nov. Much traffic was handled in line shape. Originations and deliveries were up over Oct. Also total traffic count on the increase. I hope that Dec. shows the same improvement. BUT! all our nets need your help as traffic handlers, and as net controls. This is the training ground for good emergency operation. Have you checked your antennas, towers, etc., for winter damage? Spring storm season is just around the corner. Are you ready? Only time will tell how the new C.D. appointment scheme is received. The new OES appointment took good to me. Very glad to see W5FKL's name back in the traffic report column. Dutch was out with illness for some time. SEI '78 has come and gone. Did you participate, if not, why not?? The 33rd annual Lawton-F. Sill Harvest will be Apr. 8-9. See you there? How about WB5NKD & NKC making BPL for second consecutive month? Traffic: WB5NKC 546, WB5NKD 500, W5SRE 412, K5OWK 340, W5RB 203, WB5SOH 150, W5GM 121, WB5KKT 80, W5UYH 73, W5SUG 72, WB5TTU 60, WB5OYU 55, WB5OSN 51, W5BYC 32, WA5FSN 30, W5FV 29, K5KXL 28, WB5ELG 24, WA5ZKI 23, WA5OJU 18, W5VOR 17, K5CAY 15, W5JJ 4, WB5UGM 4, WB5AOH 3, W5FKL 2.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR - Asst. SCMPAM: N5TC. SEC: W5TOP. RM: WA5RKU. OOs rptg this month: K5MUK, K5DQ (Oct. and Nov.) GVA rptg this month: N5AF. BPL this month: W5KLV, N5TA, WA5VBM, WA5VBM ran 35 phone patches, 7290 Traffic. Net elected new officers: K5HZR, Net Mgr.; WB5TNN, Asst. Net Mgr.; W5KLV, Secy.; W5TYS, Treas. Brazoria County ARC conducted Amateur Radio demonstration at Brazos Mall in Lake Jackson; club pres. WB5TNN, OPS WA5RVT, and others helped make day a big success; the 7290 Tfc. Net held special Sat. sessions to help with traffic (did the same on another Sat. for Key City ARC, Abilene, and their Amateur Radio demonstration). License upgrades from BARC: EC WB5TNN to Extra Class, W5DOLF and W5DQO to General Class. WA5RVT thanks Amateur Radio (via W5SAUD and WB5UER) for big assist when car overheated on trip to beach. OO N5AF reports W5RANB, 148.311/91 on air at Cleveland; also reports W5SHAY and W5DHEW two new stations on air. Aggeland report: W5BTA is new General Class; W5AC now on 29.6 MHz fm, thanks to WB5AZI; Aggeland Club station will provide communication for annual bonfire, W5SEGK coordinating Traffic: (Nov.) W5KLV 794, N5TC 689, K5HZR 465, WA5VBM 425, WA5YEA 405, WA5RKU 236, W5HKO 205, WB5TNN 157, WA4RVT 120, K5DG 115, WA5JYH 81, K5GDH 60, W5TOP 40, K5MLK 30, W5KR 28, W5BGE 22, K5RVF 2. (Oct.) WA5RKU 248, K5ZSI 54, W5BDQE 8.

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ROCHESTER hamfest & NY State ARRL convention, May 19-21. Add your name to mailing list — write: Rochester hamfest, Box 1388, Rochester, NY 14603 — phone 716-424-1100.

CLUB STATION must sell: Collins 75S-3 receiver, 32S-3 transmitter, speaker, ps. K2APZ, Brooklyn College Amateur Radio Society, Brooklyn, NY 11210.

17TH ANNUAL Michigan Crossroads Hamfest Saturday, March 4, 1978, Marshall High School. Doors open 8 A.M., 7 A.M. for commercial exhibitors. Exit 110 from I-94 near I-69. Check in 146.07/67 146.52 for Hamfest QSL card. Donation \$1.50 advance, \$2.00 at door, table donation 50c each foot. Contact K8UCQ, Goodrich, 110 Perrett, Marshall, MI 49068, 616-781-3554.

ANNUAL Flemington, New Jersey Hamfest, Saturday March 11th from 10 to 5 at the Hunterdon Central High School Field House. Over 20,000 sq. ft. of heated IN-DOOR area. Major manufacturers will be represented as well as a gigantic flea market. Informative seminars on ATV, Computers, etc. will add to the event. Bring the XYL, kids, and friends. Flemington is located between Philadelphia and NYC at the intersection of Routes 202, 31 and 12. Talk-in 146.52. Admission \$2 donation, flea market sellers additional \$1/table. For reservations or info call 201-735-7360 or write: Cherryville Repeater Assn. c/o WA2CVK.

TAKE the family on a holiday. Midwest spring convention. April 1 — Holiday Inn — Holidome, Kearney, Nebraska. Flea market, auction, "ladies day," and banquet. Top exhibitors, great convention, recreation center. For further details and registration contact "Chuck" W8CRK, Midway Amateur Radio Club, 3605 Third Ave., Kearney, Nebraska 68847.

27TH DAYTON Hamvention at Hara Arena April 28, 29, 30, 1978. More room this year! Technical forums, exhibits and huge flea market. Program brochure mailed March 6th, to those registered with past three years. For accommodations or advance flyer, write Hamvention, P. O. Box 44, Dayton, OH 45401 or call 513-854-4126.

QSL Cards

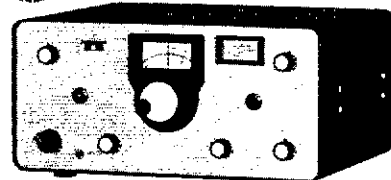
TRAVEL-PAK QSL Kit — Send call and 25c; receive your call sample kit in return. Samco, Box 203, Wynnanskill NY 12198.

DELUXE QSLs, Samples 25c. Petty, W2HAZ, P. O. Box 5237, Trenton NJ 08638.

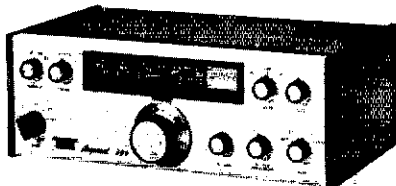
DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Little Print Shop, Box 9848, Austin TX 78766.

\$3.60 PER 100-up post paid. Fifteen two color styles satisfaction guaranteed. Send 26c stamps for samples. VP5QED Press P. O. Box 1523 Boca Raton FL 33432.

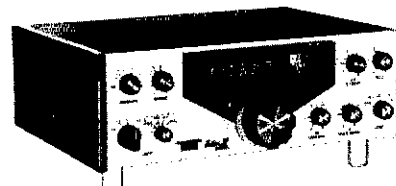
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574 Century 21/Digital.....	399.00
670 Keyer.....	29.00
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274 Century Digital Mod Kit.....	90.00
247 Antenna Tuner.....	69.00
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206-A Crystal calibrator.....	29.00
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210 AC power supply.....	30.00
210/E 110/220vac ps.....	92.00
215P Microphone w/plug.....	29.50
405 80-10m 50w linear.....	159.00
251M AC ps for 405 & 509.....	95.00
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252M 18A 110vac power supply.....	119.00
262M As above, w/VOX.....	145.00
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670
(for Century 21)



KR-50

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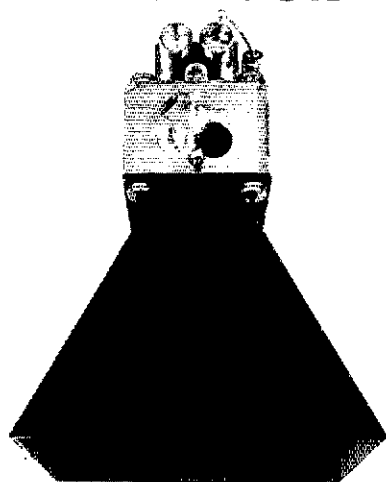
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KR2A Single paddle assembly.....	7.00
KR5A Single paddle keyer, DC.....	39.50
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KR50 Dual paddle Ultramatic, AC/DC.....	110.00



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General

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CALL Toll-free (800-327-7798). Ask for Bob Hoffman. Jaro Electronics Corp. We buy all types of tubes. Top prices paid for Varian, Eimac, Amperex, RCA, Western Electric, Raytheon. In Florida Call toll-free: 800-432-8524. Address: 412 27th St., Orlando, FL 32802.

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Need Help For Your Ticket?

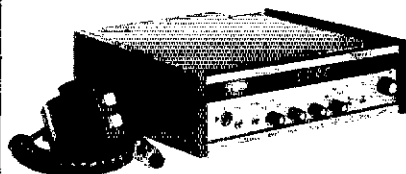
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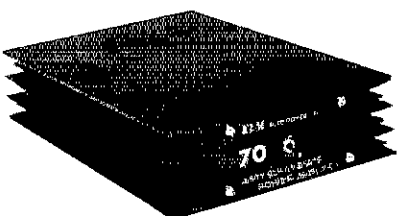
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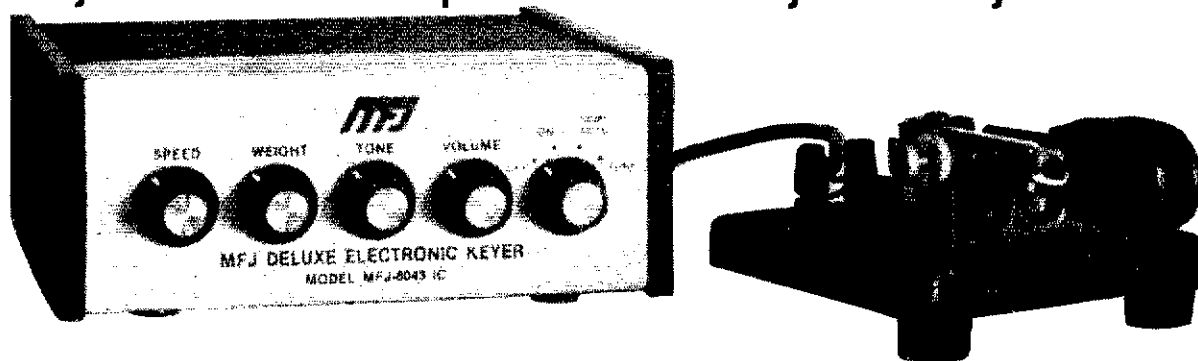
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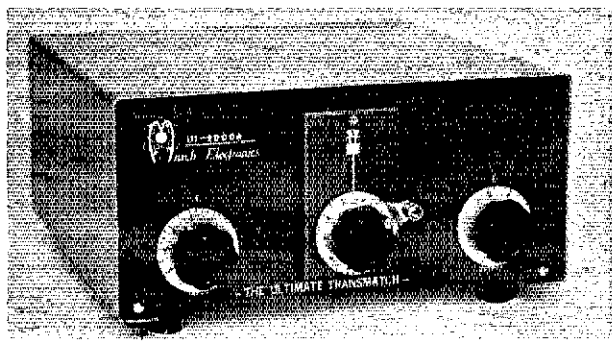
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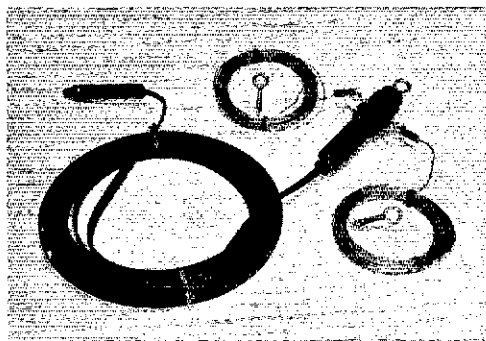
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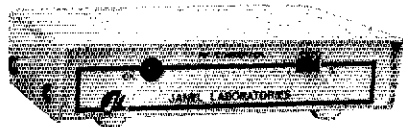
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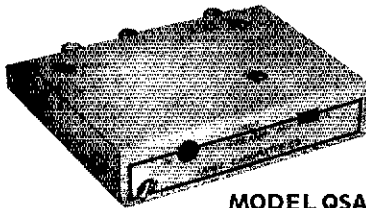
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ONLY \$39⁹⁵

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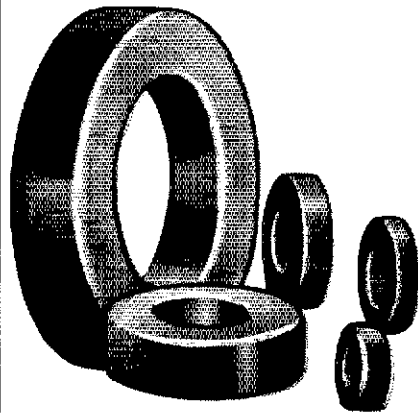
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T-80	55	45		.80	.80
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F-125	960	300	1.25	3.00
F-87	600	190	.87	2.05
F-50	500	190	.50	1.25
F-37	400	140	.37	1.25
F-23	190	60	.23	1.10

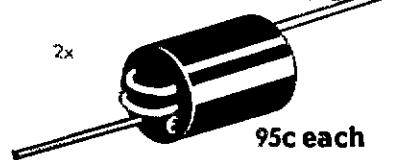
Chart shows uH per 100 turns.

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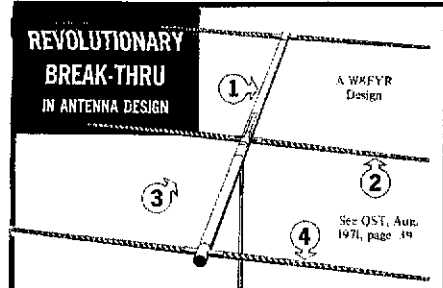
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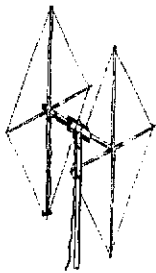
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RELIEF POT page 163, Oct. 1977, K6BOA.

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SPECIAL antenna accessories including stainless and galvanized steel guy wire. Wilcox Electronics, Box 1331, S.L.C., UT 84110.

WANTED: Signal One GS-7 not in working condx. Will pay reasonable price and shipping, depending on defects. Write giving full description of malfunctions, serial, model, history, etc. (include a description of modifications, if any) to Fred Wegmer, KL7HFM, P. O. Box 345, Bethel, Alaska, 99559.

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WANTED: Repairable ssb transceiver or receiver or transmitter. State price and condition in first letter. Miller, Box 869, Marion, Indiana, 46952.

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WANTED: Radio News July 1926, All About Television 1927, Modern Electronics, Electronic Experimenter & Science & Invention Magazines. Have some spares. Jacks, K7NER, 172 Freihage Dr., NE, Sierra Vista AZ 85635.

MICROWAVE Specialists — We buy and sell microwave test instruments and components. Send inquiries. Lectronic Research, 1423 Ferry, Camden, NJ 08104.

WANT: Megacycle knob with locking pin for R391 receiver. Also surplus meteorological gear and parts. Thompson, W1DXR/VE8, Box 186, Gorham, NH 03581.

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QST and CQ 1950-1975 issues for sale. Send s.a.s.e. if ordering 73, Ham Radio, or other QST and CQ issues. One dollar minimum order and all issues cost 25c each, including USA shipping. Send chronological list and full payment to W6LS, 2814 Empire, Burbank, CA 91504. Available issues and refund sent within one month.

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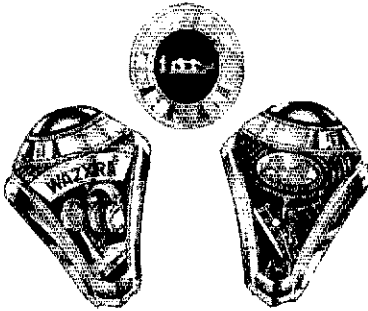
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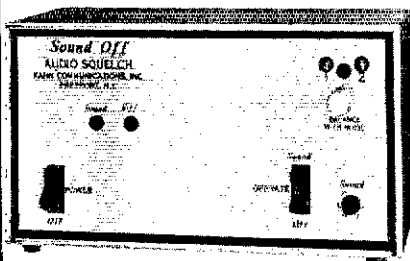
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WANTED: Telex ants. State model, condition, price, etc. W5WMMU, 305 Silverbelle, Lafayette Louisiana. 70501.

HELP! Need to contact anyone that was part of the group that set up a ham station on Isla del Coco, off the coast of Costa Rica. Need maps and photos of the island. Info on comm. problems and sea transport to the island. J. F. Welch, TUSLOG Det-8, Box G, A.P.O. NY 09294

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HEATH o-8, 2mc, 5" scope, operable, IB \$40, Waterman S-14B, 3" scope, operable IB \$30, Thordarson T-16P01, 3120/2500ct 0.3A \$40, T-19669 2360/1800ct 0.3A \$35, T-19C38 0.3A SWG/G choke \$15, RCA: 208/230V pri. tapped, 1020/510 0.24A SEC. \$30, 208/230V tap, pri. 2700/2200 @ 0.2A sec. \$30. W2LKT, 1700 Lake Ave., Seaside Pk., NJ 08752

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WANTED: Late model Collins 75A4 in unmodified, excellent condition. A. L. Coil, 2228 Elm Street, Kieler, WI 53813.

WANTED X4550200 200Hz crystal filter for 75S3B. Jim George N3BB 2635 Springhill Circle, Furlong, PA 18925. 215-794-5417.

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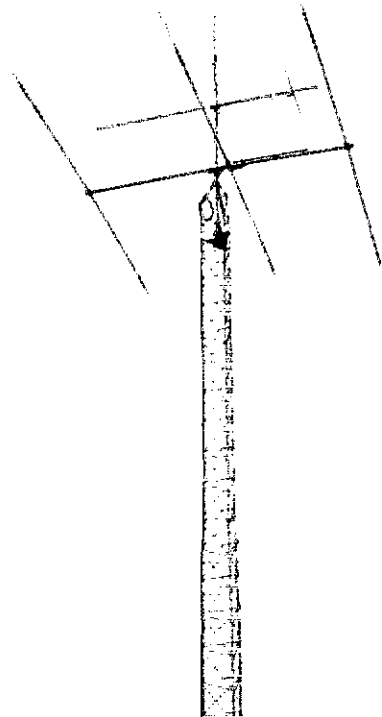
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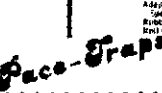
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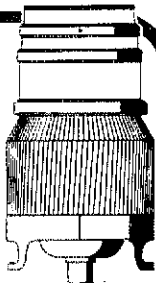
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SELL: to highest bidder "The Story Of Wireless Telegraphy." Written by A. T. Storey in 1904, Excellent condition, 211 pages — W5UX, Rte. 2, Box 223, Burnet, TX 78611.

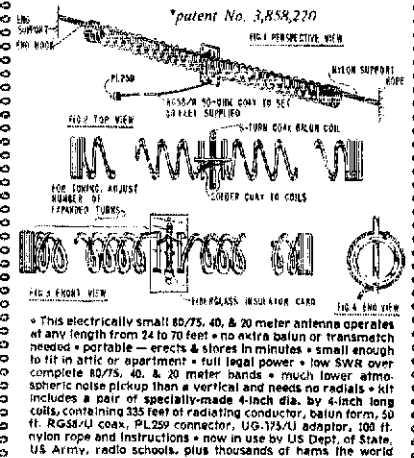
WANTED: Audio filters and 455kc crystal filters. Collins or what have you. K9UKX, 51625 Chestnut Road, Granger, IN 46530.

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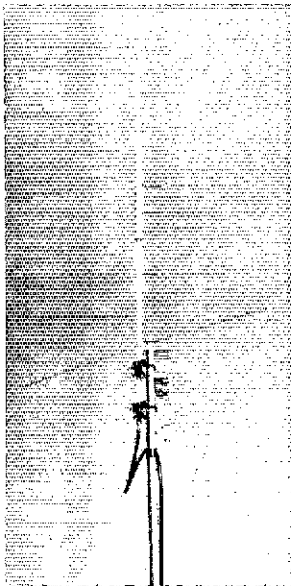
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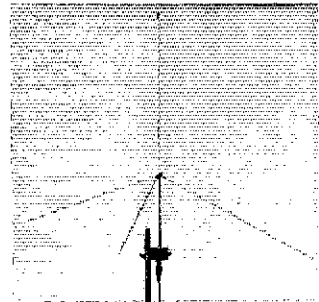
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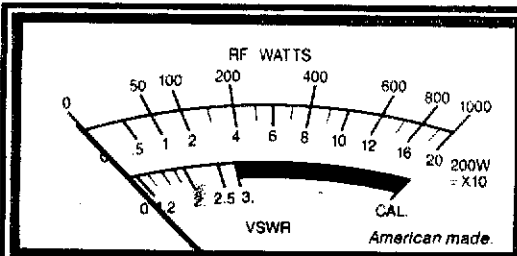
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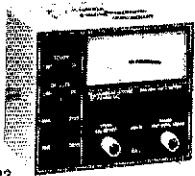
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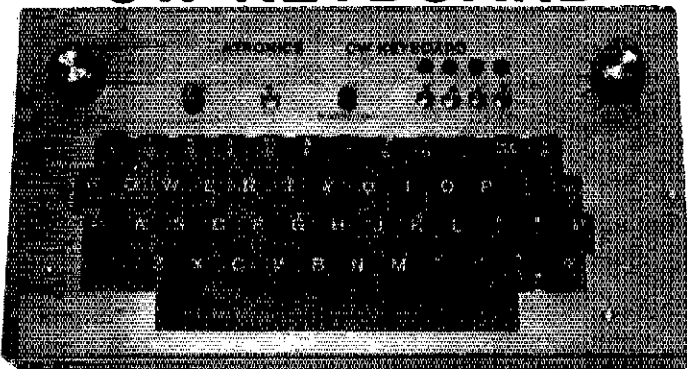
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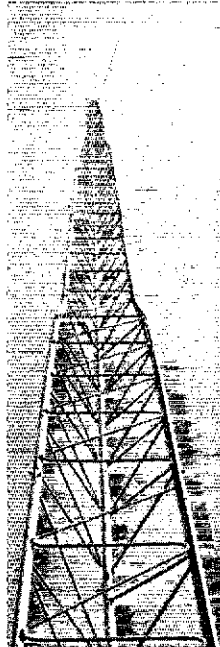
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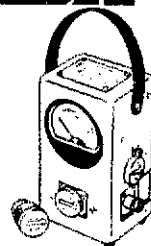
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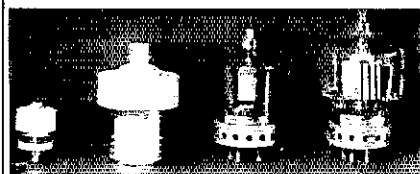
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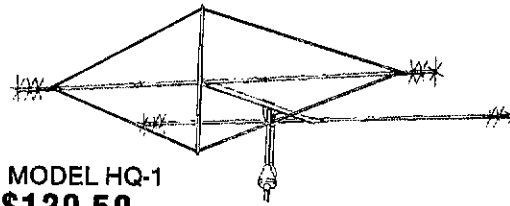
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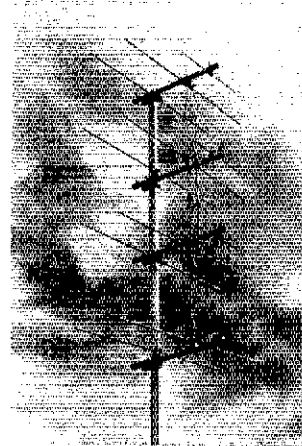
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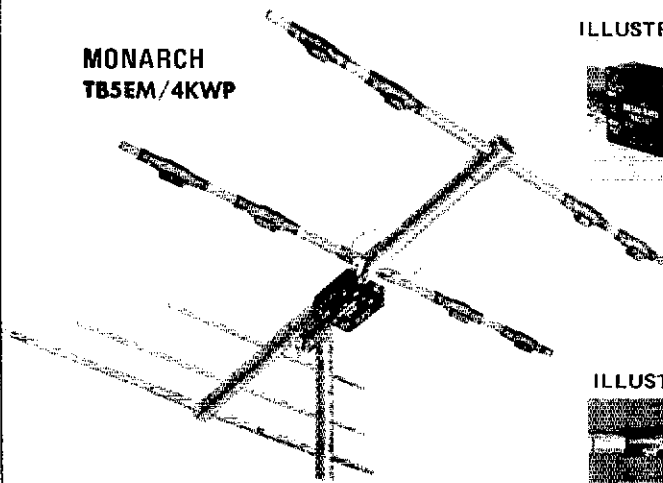


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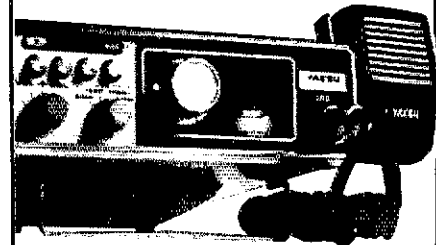


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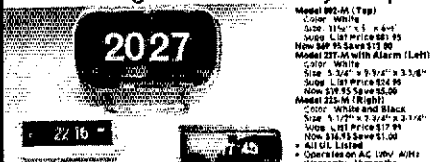


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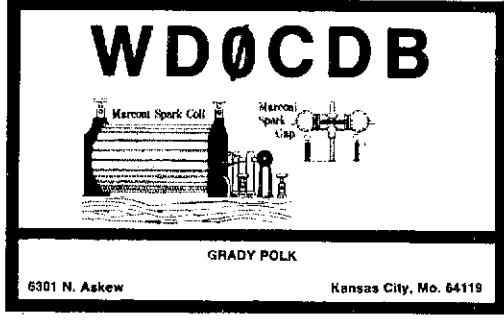
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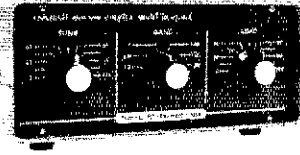


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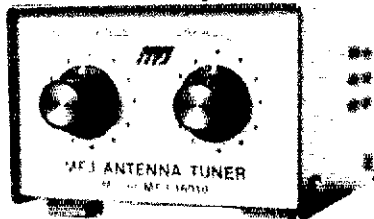
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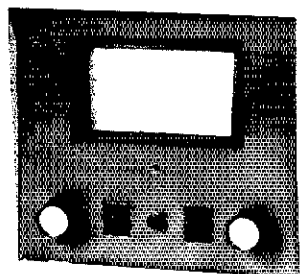
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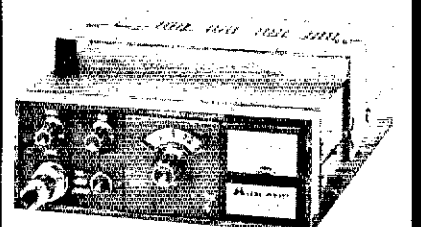
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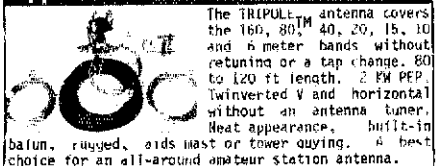
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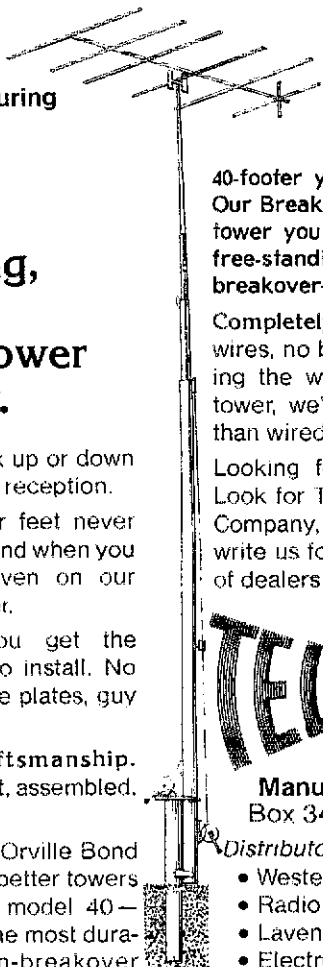
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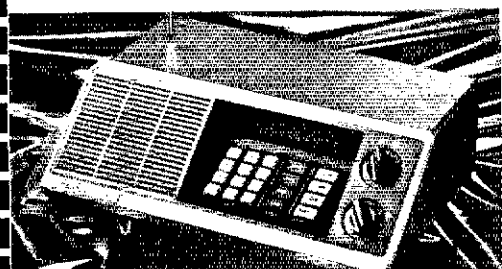
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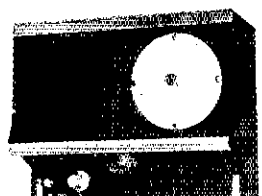


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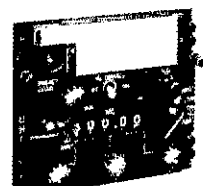
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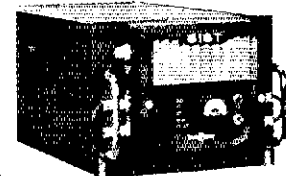
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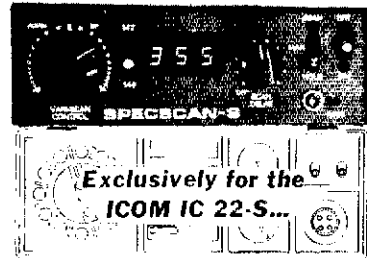
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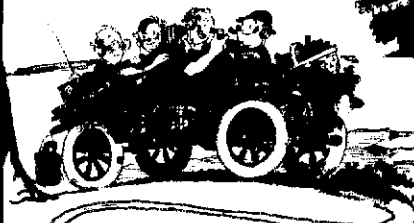


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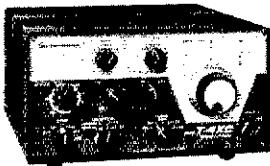
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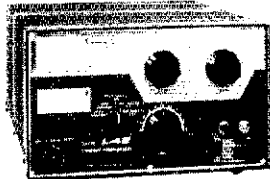
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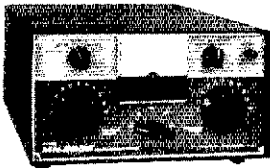
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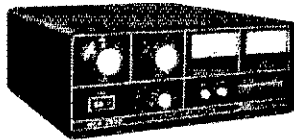
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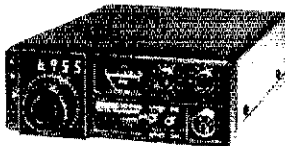


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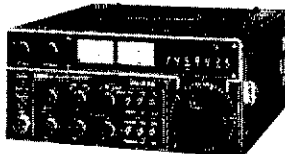
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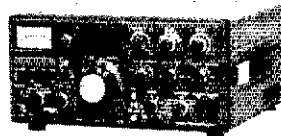


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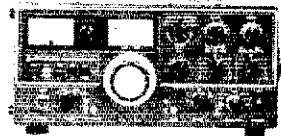


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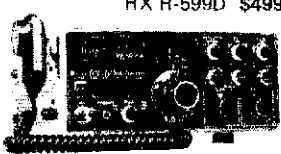
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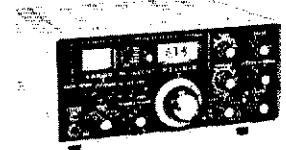


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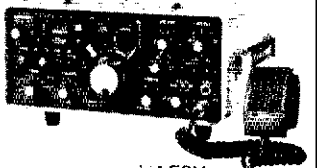


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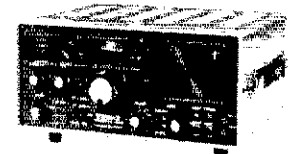
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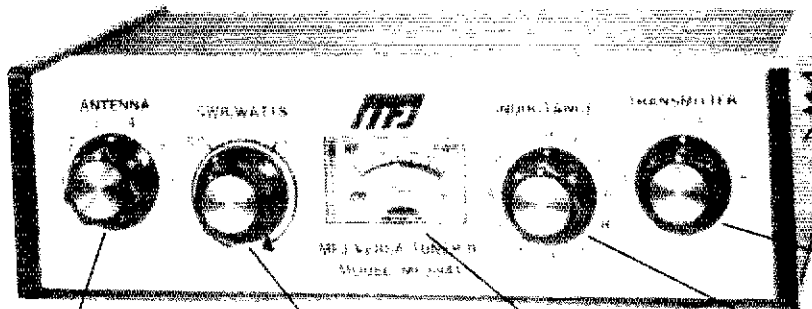
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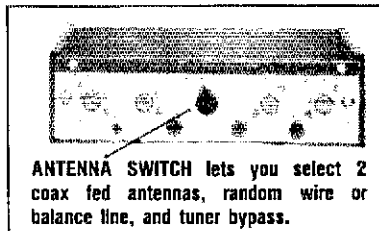
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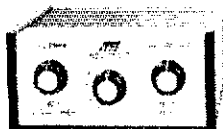
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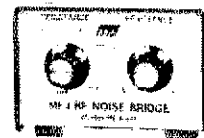
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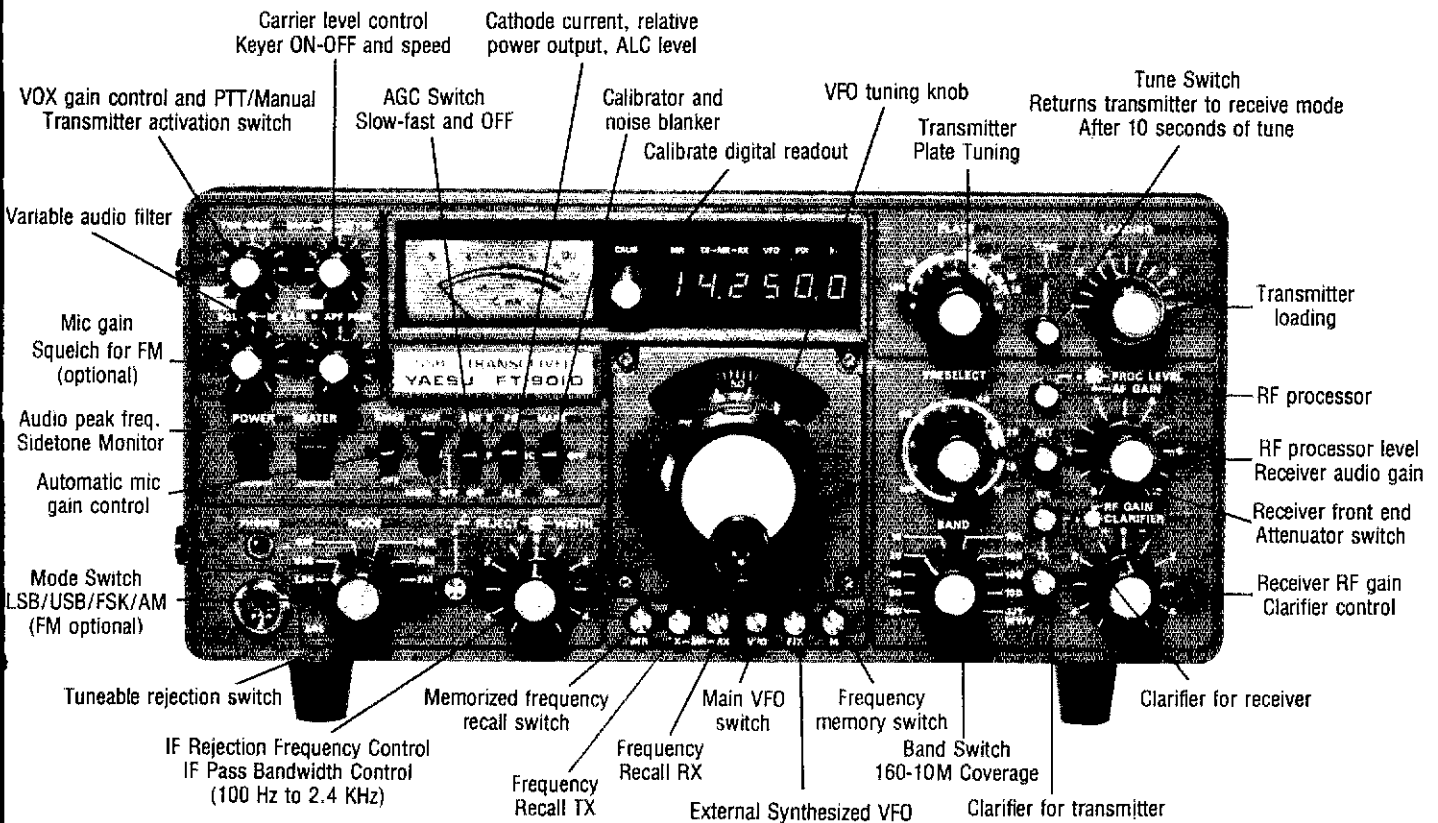
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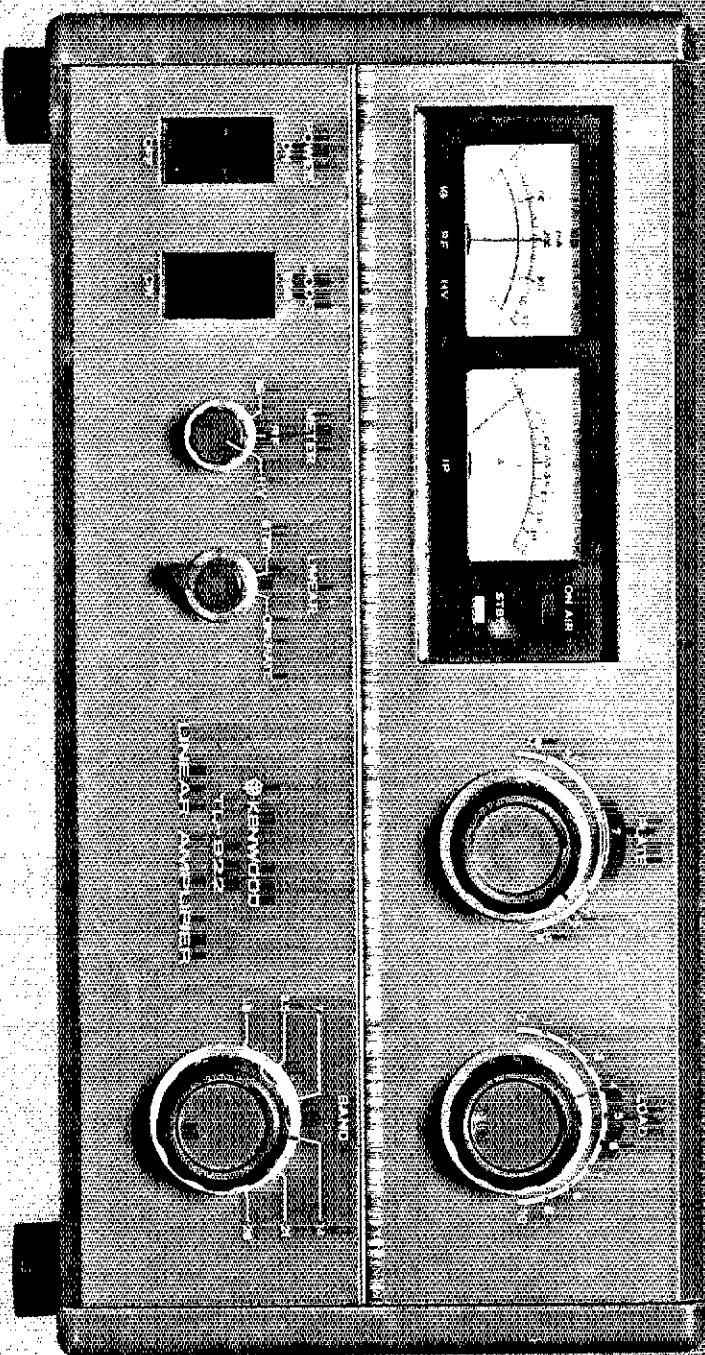
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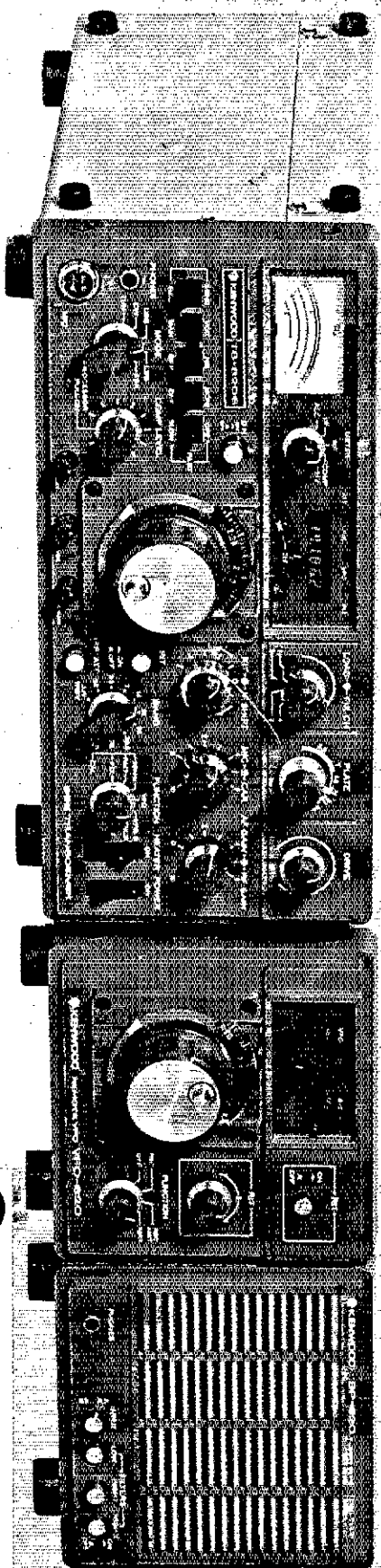
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