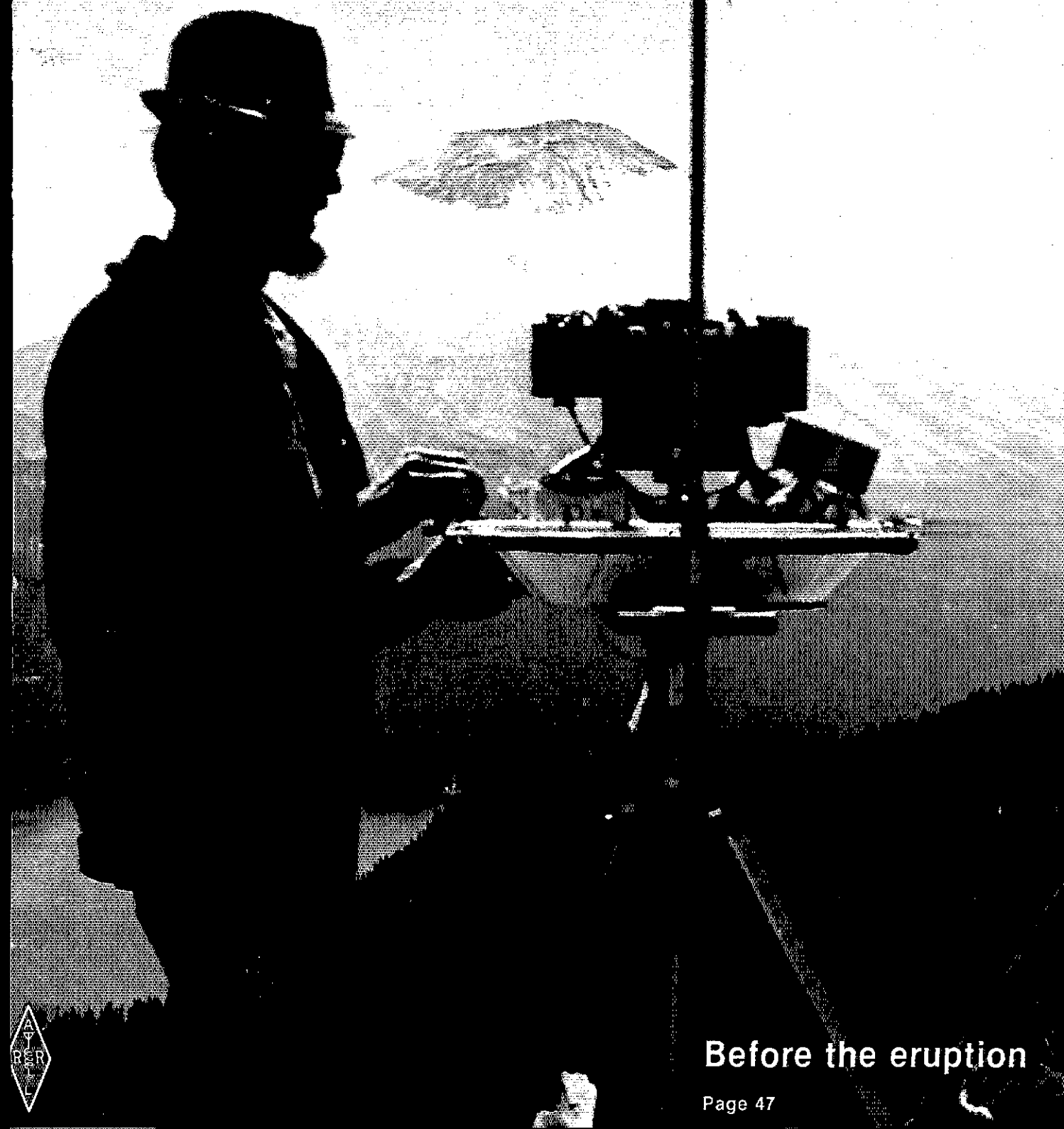


QST

August 1980 \$2.50

devoted entirely to Amateur Radio



Before the eruption

Page 47



Henry

...STILL THE TOP FAMILY IN LINEAR AMPLIFIERS

IT'S A FACT... HENRY RADIO STILL PRODUCES THE BROADEST LINE OF SUPERIOR QUALITY AMPLIFIERS IN THE WORLD. WHETHER FOR AMATEUR RADIO, COMMERCIAL OR MILITARY USE, WE OFFER A CHOICE OF FIELD PROVEN STATE-OF-THE-ART UNITS TO FIT THE REQUIREMENTS AND BUDGETS OF THE MOST DISCRIMINATING USER.



The **1KD-5**...the newest member of the famous Henry Radio family of fine amplifiers. And we're still convinced that it's the world's finest linear in its class. The 1KD-5 was designed for the amateur who wants the quality and dependability of the 2KD-5 and 2K-4A, who may prefer the smaller size, lighter weight and lower price and who will settle for a little less power. But make no

mistake, the 1KD-5 is no slouch. Its 1200 watt PEP input (700 watt PEP nominal output) along with its superb operating characteristics will still punch out clean powerful signals...signals you'll be proud of. Compare its specifications, its features and its fine components and we're sure you will agree that the 1KD-5 is a superb value at only \$695.

The **2KD-5** We have been suggesting that you look inside any amplifier before you buy it. We hope that you will. If you "lift the lid" on a 2KD-5 you will see only the highest quality, heavy duty components and careful workmanship...attributes that promise a long life of continuous operation in any mode at full

legal power. The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands. It operates with two Elmac 3-500Z glass envelope triodes and a Pi-L plate circuit with a rotary silver plated tank coil. Price \$945.

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And don't forget the rest of the Henry family of amateur amplifiers...The 2K-4A, the Tempo 2002 high power VHF amplifier and the broad line of top quality solid state amplifiers. Henry Radio also

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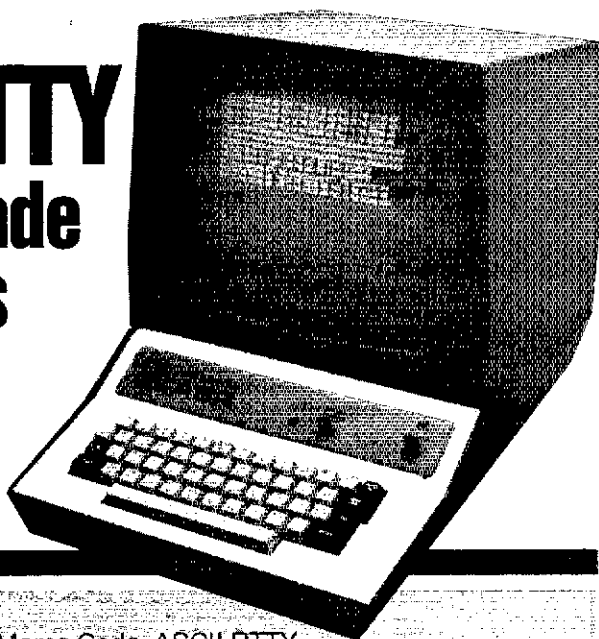
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Henry Radio

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UNSURPASSED RTTY

No other RTTY terminal made gives you ALL the features of our new DS3100 ASR:



- TX/RX operation with 3 codes: Baudot RTTY, Morse Code, ASCII RTTY
- Storage buffers for 150 lines of RX storage and 50 lines of TX storage
- The HAL "original" split screen shows both RX and TX buffers or whole screen for RX
- Ten programmable "Here Is" messages can be chained from one to next
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- Programmable WRU answer-back and selective-call features
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- Internal real time clock keeps 24 hour time plus date
- Newly developed CW receive circuitry and programs give superior CW reception
- New green, P31 phosphor display screen gives clear, eye-easing viewing
- On-screen status indicators give continuous display of terminal operating conditions
- Word-Wrap-Around prevents splitting of words at end of display line
- Continuous, line, and word modes offer flexibility in editing transmit text
- Attractive streamlined metal cabinet gives effective RFI shielding from transmitters

Here Are More DS3100 ASR Specifications that Give You State-of-the-Art RTTY Operation:

QBF and RY test messages ■ Loop and RS 232 RTTY I/O ■ Plus or minus CW key output ■ 25 pin EIA modem connector ■ Half or full duplex ■ Upper-lower case ASCII ■ All ASCII control codes ■ Optional line printer for all codes ■ Selectable ASCII parity ■ 110 to 9600 baud ASCII ■ 45 to 100 baud Baudot ■ 1 to 175 WPM Morse receive and transmit ■ UnShift on space for Baudot ■ SYNC idle for RTTY and Morse ■ Break key for RTTY ■ Tune key for Morse ■ Automatic CR-LF ■ 120/240 v, 50/60 Hz power ■ Custom labeled key tops show control operation ■ Copy receive text into transmit buffer ■ TX flags allow segmenting of TX buffer ■ One year warranty

PRICE: \$1995.00



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*Write or give us a call.
We'll be glad to send you our
new RTTY catalog.*

IC-720

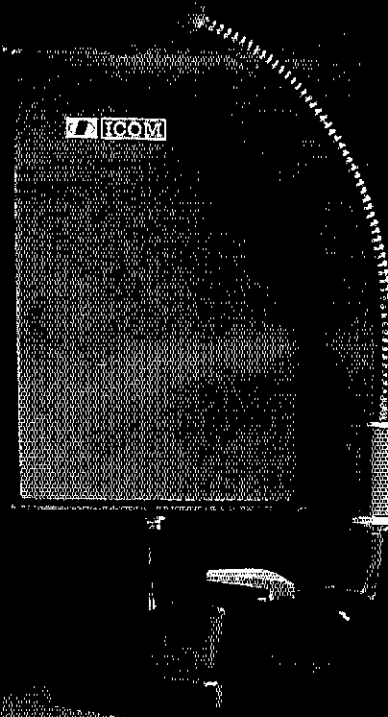
The New Standard in Ham Radio

You're looking at the next generation in ham radio design. The ICOM IC-720 has standard features offered elsewhere as options... or not offered at all:

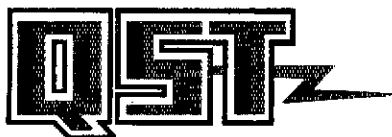
Transmit on all 9 HF bands...
Receive from .1 to 30 MHz...
with just a push of a button.
Dual built-in VFO's.

Automatic sideband selection (reversible). All solid state. Fully synthesized. Etc., etc., etc., etc.

There isn't enough room to list all of the specifications and features of this exceptional radio. So, please visit an authorized ICOM dealer or write to the address below for additional information.



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August 1980 Volume LXIV Number 8

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Editor

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Contributing Editors
Michele M. Maynard
Layout Artist

Sue Fagan
Technical Illustrations

Lee Aurick, W1SE
Advertising Manager

John H. Nelson, W1GNC
Circulation Manager

Marion E. Bayrer
Assistant Circulation Manager

Offices

225 Main Street
Newington, Connecticut 06111
Tel: 203-666-1541

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THE COVER

Roger McCoy, W7ADV, was just one of the amateurs active before, during and after the Mt. St.

Helens eruptions. The remote-camera site and the lake are now buried under volcanic ash and mud. See p. 47. (photo courtesy K7UUH)



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Rack Attack from DenTron

Components are the latest in communication systems adapting to your stations' needs. The DTR-3KA and DTR-1200L are equipped with heavy-duty handles for easy rack mounting and rack brackets that can be easily removed. The DTR-1200L linear amplifier provides 1200 watts SSB and 1000 watts CW input continuous duty. It features large 3½" shadow box, back lit meters for easy reading, and tuned input for compatibility with solid state or tube transceivers. The DTR-3KA antenna tuner handles a full 3KW PEP. It features a built in 2KW dry dummy load with thermostatically controlled forced air cooling, a remote sensor box to insure meter accuracy and 50 OHM impedance. Component racks available at your DenTron Dealer.

DTR-1200L Linear Amplifier

Frequency Ranges:

80 Meter Band	3.45 - 4.6 MHz
40 Meter Band	6.00 - 9.0 MHz
20 Meter Band	10.00 - 16.00 MHz
15 Meter Band	20.95 - 23.50 MHz
10 Meter Band	Export Model

Modes:

USB, LSB, CW, RTTY, SSTV

Power Input:

1200W - SSB, 1000W - CW

Power Requirements:

234/117 VAC 50/60 Hz

RF Drive Power:

150 Watts maximum and 65 watts

minimum for 1 KW DC input.

DC Plate voltage:

Idle + 2300V approximate

Duty Cycle:

100% SSB, CW, RTTY, SSTV

Input Impedance:

50 Ohms nominal

Input VSWR:

1.5 to 1 average

Output Impedance:

50 Ohms nominal

Antenna load VSWR:

2 to 1 maximum

ALC:

negative going, adjustable from front panel

Spurious Emissions:

IMD - greater than 30 db down

FCC Type Accepted

Size: 5¼" H x 17" W x 13" D (19" W with

Weight:

46 pounds

Switchable 12VDC accessory output voltage

Multimeter:

Plate Voltage 0 - 3000VDC

Plate Current 0 - 500ma

Relative Output Adjustable

Front Panel Plate Voltage Switching

DTR-3KA Antenna Tuner

Frequency Coverage: 1.8 - 30 MHz continuous

Built in 2 KW PEP Dummy Load - Forced Air Cooled

Input Impedance: 50 ohms (Resistive) to transmitter

Antenna Inputs

Coax 1, 2 & 3 - unbalanced—may range from a few

ohms to a high impedance

Long wire - low to high impedance

Balanced line - 75-660 ohms

Power Capability: 3000 watts P.E.P.

Wattmeter: 200 watts forward

2000 watts forward

200 watts reflected

Accuracy: ± 5%

Remote sensor box

3½" backlit meters

Dummy Load: with manual or automatic forced air

cooling.

Integral 3KW Balun

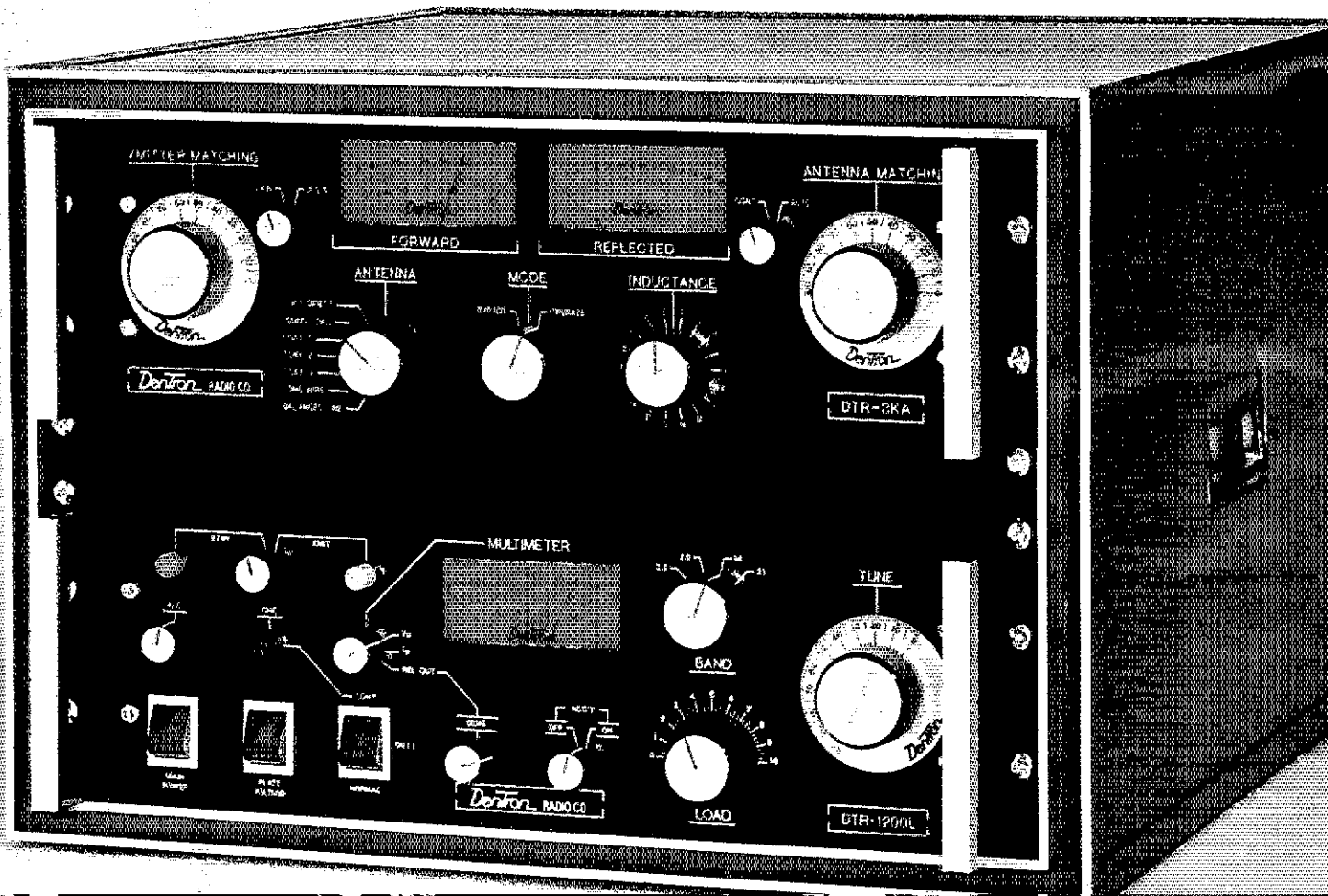
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A3

\$219⁹⁵

**The full power,
full performance
20-15-10 meter beam.**

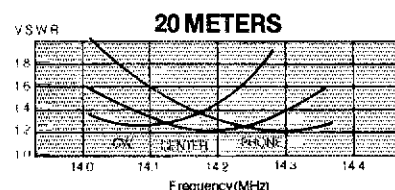
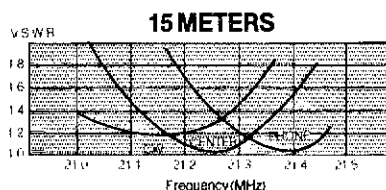
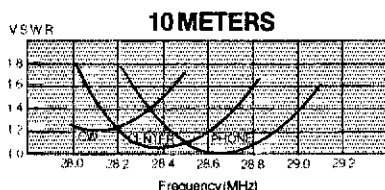
Enjoy the thrill of working rare DX with excellent A3 forward gain. Increase the pleasure of your daily contacts with A3 interference reducing front to back ratio. Use your linear amplifier with confidence in our new A3 high power traps.

Make friends of your neighbors with A3 compact dimensions, low profile, and small turn radius. Satisfy your budget with A3 economy pricing.

The Cushcraft engineering team has again created that unique combination of quality materials, easy assembly and high performance with A3, the three band beam for the eighties.

V.S.W.R.	1.2-1 Typical
Average Bandwidth	500 KHz
Power Rating	2000 w PEP
Feed Point Impedance	50 Ω
Connector	Twin terminal stainless steel takes all coax.
Boom	1 $\frac{1}{8}$ "-1 $\frac{1}{2}$ " x 14'
Elements/Longest	1 $\frac{1}{8}$ "-1 $\frac{1}{2}$ " x 27'9"
Wind Stc. area	5.6 Feet ²
Weight	35 Pounds
Turn Radius	15'6"
Mast Diameter	1 $\frac{1}{4}$ " min. 2" max.
Material	6063-T832 Seamless aluminum
Fasteners	Zinc Plated Steel
Telescope Method	Taper tubing with full circle clamps

UPS Shippable
No balun required



A LEADER FOR OVER 30 YEARS

 **cushcraft**
CORPORATION

The Antenna Company
48 Perimeter Road, P.O. Box 4680
Manchester, NH 03108

Top-Notch.



VBT, notch, IF shift, wide dynamic range

TS-830S

Now most Amateurs can afford a high-performance SSB/CW transceiver with every conceivable operating feature built in for 160 through 10 meters (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455-kHz second IF. Its optional VFO-230 remote digital VFO provides five memories.

TS-830S FEATURES:

• 160-10 meters, including three new bands

Covers all Amateur bands from 1.8 to 29.7 MHz (LSB, USB, and CW), including the new 10, 18, and 24-MHz bands. Receives WWV on 10 MHz.

• Wide receiver dynamic range

Junction FETs (with optimum IMD characteristics and low noise figure) in the balanced mixer, a MOSFET RF amplifier operating at low level for improved dynamic range (high amplification level not needed because of low noise in mixer), dual resonator for each band, and advanced overall receiver design result in excellent dynamic range.

• Variable bandwidth tuning (VBT)

Continuously varies the IF filter passband width to reduce interference. VBT and IF shift can be controlled independently for optimum interference rejection in any condition.

• IF notch filter

Tunable high-Q active circuit in 455-kHz second IF, for sharp, deep notch characteristics.

• IF shift

Shifts IF passband toward higher or lower frequencies (away from interfering signals) while tuned receiver frequency remains unchanged.

• Various IF filter options

Either a 500-Hz (YK-88C) or 270-Hz (YK-88CN) CW filter may be installed in the 8.83-MHz first IF, and a very sharp 500-Hz (YG-455C) or 250-Hz (YG-455CN) CW filter is available for the 455-kHz second IF.

• Built-in digital display

Six-digit large fluorescent tube display, backed up by an analog dial. Reads actual receive and transmit frequency on all modes and all bands. Display Hold (DH) switch.

• Adjustable noise-blanker level

Built-in noise blanker eliminates pulse-type (such as ignition) noise. Front-panel threshold level control.

• 6146B final with RF NFB

Two 6146B's in the final amplifier provide 220 W PEP (SSB)/180 W DC (CW) input on all bands. RF negative feedback provides optimum IMD characteristics for high-quality transmission.

• More flexibility with optional digital VFO

VFO-230 operates in 20-Hz steps and includes five memories. Also allows split-frequency operation. Built-in digital display. Covers about 100 kHz above and below each 500-kHz band.

• Built-in RF speech processor

For added audio punch and increased talk power in DX pileups.

• RIT/XIT

Receiver incremental tuning (RIT) shifts only the receiver frequency, to tune in stations slightly off frequency. Transmitter incremental tuning (XIT) shifts only the transmitter frequency.

• SSB monitor circuit

Monitors IF stage while transmitting, to determine audio quality and effect of speech processor.

Ask your Authorized Kenwood Dealer about the many operating features offered by the TS-830S...at a very reasonable price!

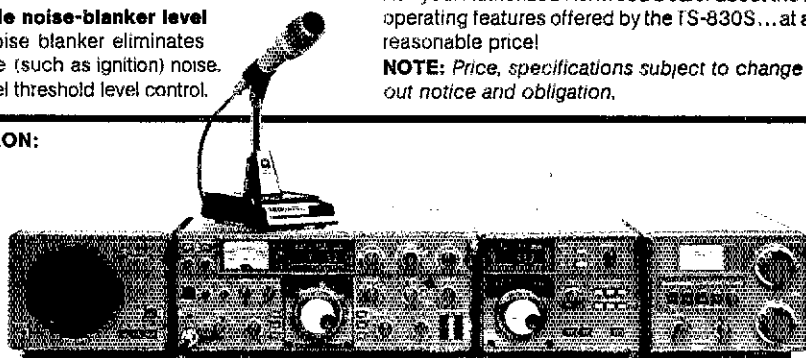
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MATCHING ACCESSORIES FOR FIXED-STATION OPERATION:

- SP-230 external speaker with selectable audio filters
- VFO-230 external digital VFO with 20-Hz steps, five memories, digital display
- AT-230 antenna tuner/SWR and power meter
- MC-50 desk microphone
- YG-455C (500-Hz) and YG-455CN (250-Hz) CW filters for 455-kHz IF
- YK-88C (500-Hz) and YK-88CN (270-Hz) CW filters for 8.83-MHz IF
- HC-10 digital world clock
- HS-5 and HS-4 headphones

Other accessories not shown:

- TL-922A linear amplifier
- SM-220 Station Monitor
- PC-1 phone patch
- MC-30S and MC-35S noise-cancelling hand microphones



New 2-meter direction.



A compact transceiver with FM/SSB/CW plus... **TR-9000**

Kenwood's done it again! Now, it's the exciting TR-9000 2-meter all-mode transceiver...complete with a host of new features. Combining the convenience of FM with long-distance SSB and CW in a very compact, very affordable package, the TR-9000 is the answer for any serious Amateur Operator! Versatile? You bet! Because of its compactness, the TR-9000 is ideal for mobile installation. Add on its fixed-station accessories and it becomes the obvious choice for your ham shack!

TR-9000 FEATURES:

- FM, USB, LSB, and CW...all popular modes
- Compact size...only 6 11/16 inches wide X 2 21/32 inches high X 9 7/32 inches deep
- Digital dual VFOs...with selectable tuning steps of 100 Hz, 5 kHz, and 10 kHz, convenient for each mode of operation
- Digital frequency display...five, four or three digits, depending on selected tuning step

- Extended frequency coverage...143.9000 - 148.9999 MHz
- Five memories:
 - M1 - M4...for simplex or ± 600 kHz repeater offset
 - M5...for nonstandard offset (memorizes transmit and receive frequency independently)
- Scan of entire band...automatic busy stop and free scan
- SSB/CW search...sweeps over selectable 9.9-kHz bandwidth segments, for easy monitoring
- UP/DOWN microphone (standard)... "beep" sounds with each frequency step
- Noise blanker...eliminates pulse-type noise on SSB and CW
- Low-noise, dual-gate MOSFET and two-stage monolithic crystal filter for improved receiver front-end characteristics
- RIT (receiver incremental tuning) for SSB and CW...effective even on memory channels
- RF gain control

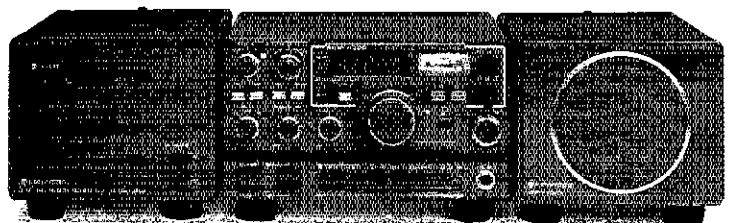
- CW sidetone
- Automatic selection of AGC time constant with MODE switch (slow for SSB and fast for CW)
- Improved power module for reliable and stable linear RF output
- Selectable power outputs...10 W (HI)/1 W (LOW)
- Mobile mounting bracket...easy to mount, with quick-release levers
- LED indicators...ON AIR, BUSY, and VFO
- Accessory terminals on rear panel...KEY, BACKUP DC, STBY, EXT SP, DC, TONE INPUT, and ANT

See your Authorized Kenwood Dealer now for details on the TR-9000...the new direction in 2-meter all-mode transceivers!

NOTE: Price, specifications subject to change without notice and obligation.

MATCHING ACCESSORIES FOR FIXED-STATION OPERATION:

- PS-20 power supply
- SP-120 external speaker
- BO-9 System Base...with power switch, SEND/RECEIVE switch for CW operation, backup power supply for memory retention (BC-1 backup power adaptor may also be used for this application), and headphone jack



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"It Seems to Us . . ."

Deregulation: Are We Ready?

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," if 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.

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

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If you're not a 6-meter operator, chances are that a recent FCC action went by unnoticed: As of July 14, "conventional" fm emission is allowed between 50.1 and 52.5 MHz. Before, there was a bandwidth limitation on fm emissions in this segment which precluded the use of normal fm techniques. "Happenings" this month has more details.

One benefit of this change is that finally, almost eight years after the adoption in FCC Docket 18803 of 52.0 to 54.0 MHz as a repeater subband, fm repeaters can occupy the lower 500 kHz of this subband. The League, and others, have been working for years toward that objective. There was no real opposition to that change, from any quarter; it was simply a matter of overcoming inertia. The fact that it was a rather minor change didn't make it easier to accomplish; if anything, it was more difficult because it did not command the attention or the priority that a major matter would have enjoyed. So, nothing happened.

Had the Commission simply modified the subband limit to accommodate fm repeaters, this would have remained a minor matter. However, the Commission took no action until a more radical proposal, to eliminate the bandwidth restriction altogether in the band 50.1 to 52.5 MHz, was filed by a Southern California group ("Happenings," December 1979, page 79). Then, the Commission was moved to propose adoption of the new, "more flexible" proposal.

A clear majority of the comments filed in response, including those of the League, opposed deletion of the restriction. Seeking compromise, the League counterproposed changing the limit to 51.0 MHz, to permit greater flexibility while protecting the narrow-bandwidth modes which are generally used at the low end of the band. But the Commission was not to be swayed from its goal of "deregulation." The comments notwithstanding, the "more flexible" proposal was adopted. In its Report and Order in PR Docket 79-285, the Commission said it this way:

"Opponents of the proposal were concerned that fm users would take over the entire 6-meter band and preclude its use by single sideband users. Proponents of the proposal, on the other hand, believed that amateur radio operators could and would successfully resolve any problems by voluntarily developing sharing arrangements and band-plans which would accommodate most, if not all, of the various operating interests. . . . We believe that the inherent flexibility in this approach outweighs any difficulty which amateur radio operators might have in reaching sharing agreements."

Let us hasten to say that in this particular case we do not strongly disagree

with the Commission's reasoning. We don't envision hordes of fm'ers riding roughshod over the weak-signal DX operators at the low end, and it's nice that the Commission has expressed such faith in the ability of the amateur community to resolve its own problems. In general, that faith is well placed. Oh, there will be an occasional local problem where someone puts a new rig on the air without knowing the score, or where a couple of hams a block or two apart carelessly dial up a low-end frequency on their synthesized fm rigs to talk to one another, in the process clobbering a DX contact. This happens on 2 meters, and is solved through education, not regulation.

What concerns us is not this specific rules change, involving the 50-MHz band. The band is 4 MHz wide, and there ought to be room for everyone. It is that the Commission, in its zeal to deregulate, may try to extend this reasoning to the crowded high-frequency bands where, frankly, there is *not* room for everyone. Phone-band expansion has been a recurring topic for the past decade. Back in 1971 the League and the FCC *both* proposed substantial expansion of the hf phone bands, but the following year the Commission drew in its horns and adopted a much more modest plan. Now that we are in the post-WARC era, the pressures are stronger and the arguments more compelling than ever for some adjustments to the phone subbands. But what if, in response to these pressures, the Commission were to eliminate *all* mode restrictions in the hf bands? Are we ready for that?

Unfortunately, we think not. There is no national mechanism, not even ARRL, for "voluntarily developing sharing arrangements and band plans" which has such universal acceptance that it could replace the FCC Rules in the hf bands. It's not that we need FCC Monitoring Stations policing the bands to keep us in our place; it's simply that more amateurs will abide by an FCC regulation than will follow a voluntary "band plan." And, in the case of the hf bands, it would only take a handful of troublemakers to cause nationwide and worldwide problems.

Someday, we hope it *will* be possible for amateurs to accept full responsibility for managing the use of our bands. It's a worthy objective, but right now is beyond our grasp. We hope in the months to come, as the Commission grapples with the phone-expansion issue, that it recognizes that fact. — David Sumner, K1ZZ

League Lines...

FCC has proposed a rule change which, if adopted, would permit amateur television and facsimile on all amateur frequencies above 3775 kHz where voice transmissions are currently allowed. Certain bandwidth limitations would apply below 225 MHz. Details about Docket 80-252 appear in "Happenings," page 57.

In a change from the already published tentative date, the ARRL Simulated Emergency Test will be held annually on the third weekend of October, this year October 18 and 19. This adjustment, in response to recommendations from SCMs and NTS Officials, is being made to avoid several conflicts on the first weekend of October and at the same time avoid interference with the Canadian Thanksgiving celebration in the future. However, as per the standard procedure, groups are permitted to hold their activities on any two-day period between September 1 and October 31. Most of the National Traffic System activity will occur on October 18 and 19.

Effective July 14, 1980, it became legal for U.S. amateurs to use standard bandwidth fm voice emission in the 6-meter band segment 50.1 to 52.5 MHz. Until then, such operation in the 6-meter band was restricted to frequencies above 52.5 MHz. Repeater inputs and outputs still are not permitted in the band below 52 MHz. This FCC deregulation action was taken in the belief that the amateur community can and should make its own decisions with respect to vhf band planning. For this reason, and in a spirit of cooperation with the users of narrow-band modes, fm operators are strongly urged to avoid using frequencies between 50.1 and 51 MHz, and also to avoid operating just above the frequencies 51.0 and 52.0 when propagation is possible to New Zealand and Australia, where amateurs cannot operate in the normal DX segment near 50.1 MHz. Details about FCC's action deregulating 6 meters appears in this month's "Happenings," page 56, and "It Seems to Us," page 9.

Petitions to expand the 27-MHz CB band and to legalize the widespread unlicensed single-sideband operations between the CB band and the amateur 10-meter band were considered by the FCC July 1. The ARRL had filed comments opposing the petitions. Last December, as described in March 1980 QST, page 73, the FCC had instructed its Private Radio Bureau to prepare a draft Notice of Proposed Rulemaking on the subject. At the FCC meeting July 1, the draft was vigorously opposed by the Field Operations Bureau because of enforcement and interference problems. After extended discussion the Commissioners voted to have prepared a Notice of Inquiry seeking answers to the many troubling questions before proceeding further with this matter. ARRL will file appropriate comments when this Notice of Inquiry is released. In the meantime, the CB rules and the status of the illegal operators remain unchanged. Further developments will be reported in QST.

Amateur Radio study guides for the new exams are available from the FCC. Each study guide contains outlines of the subjects covered for the Novice, Technician, General, Advanced and Amateur Extra class tests. Single copies can be obtained from any of the FCC field offices where the tests are given or from the Licensing Division (Room 5202), Private Radio Bureau, Federal Communications Commission, Washington, DC 20554. Only one copy per request, please. (Note: These outlines were printed in March 1980 QST, pages 55 to 58, and in the third printing of the 77th edition of the License Manual.

S. 2827 is the new U.S. Senate bill for overhauling the Communications Act. Some of its provisions of interest to hams include giving FCC authority to establish minimum performance standards for TV receivers to reduce their susceptibility to rf interference, to delegate the preparation and administration of Amateur Radio examinations to qualified persons or organizations, and to establish a 10-year license term.

The Talking Books Publishing Company is looking for experienced persons to describe QST schematics onto tape. Interested? Contact Tom Torda at the Talking Books Publishing Co., 1055 West Arizona Ave., Denver, CO 80223. Tel. 303-778-1692.

New Jersey Assembly Bill A-441 has passed the Assembly by a 44 to 16 vote. At press time it was being considered by the NJ Senate Transportation and Communications Committee. The bill, if signed into law, will exempt Technician, General, Advanced and Amateur Extra class radio amateurs from N.J.S. 2A:127-4, which presently prohibits, in automobiles, receivers capable of picking up signals of police, fire, municipal or other government agencies unless one has a permit from the police.

Solar Powering a Ham Station

Double your hamming pleasure by reducing your electric bill! W5PIZ reveals how a small investment and a few hours of time have produced rewards far in excess of his expectations.

By John R. Halliday,* W5PIZ

Several months ago, I was in contact with Ted Handel, WB5REA, in Los Alamos, New Mexico, through the Redondo solar powered repeater. Ted is one of the engineers who installed the repeater on Redondo Peak, nearly 11,000 feet above sea level; it has delivered 20 watts of trouble-free power for several years. He suggested I build a solar-powered ham station and show how reasonable the cost can be. That made me think about the possibility of using solar power. Perhaps it would cut the power bill each month.

Well, with about \$150 from the ham-radio savings kitty and the junk-box material on hand, I made the dream come true. I asked Ted to buy me three used panels (solar batteries) with his next order. They arrived in first-class condition.

These solar panels are very sensitive; even on a very cloudy day, they have good voltage output. On a clear night with a full moon I can get 6 to 7 volts from the

system. One evening very low clouds passing over brightly lit Albuquerque produced 2 to 4 volts peak depending on the density and reflection characteristics of the clouds. Certainly, solar panels could be effective for almost any location.

Inexpensive Accessories

The panels are mounted on a wooden rack made of surplus wood. I built the rack so the panels would be at a 45-degree

angle to the roof, which is a flat surface. (Our home is a pueblo-style structure typical of the Southwest.) The panels face due south to catch the greatest amount of sunlight. Also, the panels are mounted about 12 inches above the bottom of the rack, so if it snows or rains, they will have some protection from any accumulation. The wooden rack has been treated with weatherproofing paint to stand the seasonal weathering. If I'd had metal



This modest installation atop W5PIZ's home provides the electricity for his entire amateur station.

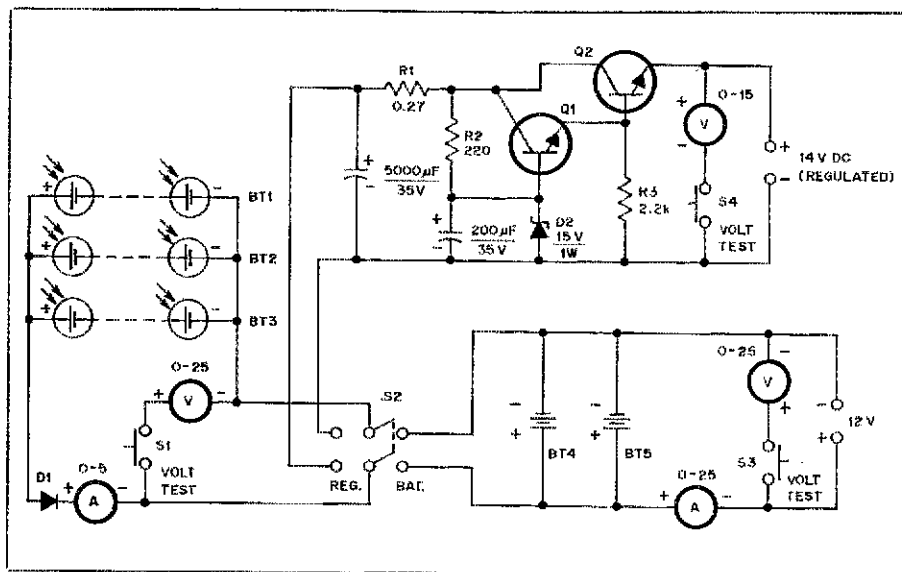


Fig. 1 — Schematic diagram of solar power supply. Note that battery charging circuit does not employ a regulator or switch to shut off charging current once the storage battery reaches full charge state. Because the output of the solar panels is, at most, 1-1/2 amperes and the storage batteries are full-size automobile batteries, the danger of damage from overcharging is not great. Anyone contemplating higher current solar batteries or smaller storage batteries should give serious consideration to a regulator and/or an automatic cutoff switch for the charging circuit. (See page 12 of this issue.)

BT1, BT2, BT3 — 20-V, 1/2-ampere solar panels by Spectrolab.

BT4, BT5 — 12-V, lead-acid automobile batteries.

D1 — Motorola MR 752/7414 or any diode with at least 2-ampere capacity and with at least 50 PIV.

Q1 — Npn silicon 90-W transistor, power switching, TIP31, Radio Shack 276-2020 or

equiv.

Q2 — Npn silicon 115-W transistor, power switching, 2N3055, Radio Shack 276-2041 or equiv.

S1, S2, S3 — Spst, momentary contact switch.

S2 — Dpdt knife switch.

R1 — 0.27 Ω , 1 watt.

R2 — 220 Ω , 1 watt, carbon composition.

R3 — 2.2 k- Ω , 1 watt, carbon composition.

(such as aluminum) available, I would have used that instead of wood. Toward the rear of the wooden rack I mounted a terminal strip with the blocking diode (D1 of Fig. 1) and the connections from the solar panels.

I used large, stranded hook-up wire on the panels. From the terminal strip I used no. 10 wire (color coded; red is positive and black is negative). It is a 15-foot run from the terminal strip to the battery bank at the operating position.

I like to keep track of both the voltage and the amperage with meters. The ammeters are left in circuit at all times; however, to minimize current drain from all sources, I have put switches in series with the voltmeters. Every little bit helps! S2 switches the solar panels directly to the equipment through a regulator circuit or to the battery-storage system. Make sure the solar panels have sufficient current output to supply the equipment you are using when connected directly through the regulator.

My Argonaut 509 requires 12 to 14 V dc

Table 1

Some Solar Battery Manufacturers and Distributors

Solar Power Corporation
c/o Lindberg Company
4163 Montgomery, N.E.
Albuquerque, NM 87109
Tel. 505-881-1006

Solarex Corporation
1335 Piccard Dr.
Rockville, MD 20850
Tel. 301-948-0202

Applied Solar Energy
15251 E. Don Julian Rd.
City of Industry, CA 91746
Tel. 213-968-6581

Solec International
12533 Chadron Ave.
Hawthorne, CA 90250
Tel. 910-325-6215

at 1 ampere. I have three solar panels with a total of 1-1/2 amperes output. This can supply the needed current when the equip-

ment is connected to the solar panels through the regulator. Each panel produces 20 volts dc under a no-load condition. Under load the panels provide enough voltage to yield 13 to 14 volts dc from the regulator.

The equipment I am using with my solar-powered station is an Argonaut 509 (2 watts PEP), Atlas 210X (180 watts PEP), ICOM-245 (10 watts PEP) and FT-901-D (180 watts PEP). The FT-901-D draws between 18 and 21 amperes; short transmissions are very desirable. I have ordered more solar panels so I can increase the capacity of the charger. W6PQZ designed the transistor regulator circuit that is connected directly to my solar panels when using the Argonaut 509. The circuit is shown in Fig. 1. My plans are to keep up to date on solar energy for powering electronic equipment and to find out who else is using solar power. How about you? Wouldn't you like to have fun on the air without straining the family budget? I'll look for you on the bands.

QST

An Electronic Switch for a Solar Panel

Do you waste time constantly checking the condition of your batteries as you recharge them with solar cells? Here is a set-it-and-forget-it switch that will protect your batteries, eliminate worry and make solar-powered hamming more fun.

By Douglas A. Blakeslee,* N1RM

Because I live in an area where power failures are common, DeMaw's article about using solar power was of interest.¹ Here is a way to power both an hf transceiver and a 2-meter fm rig during those lights-out periods. In fact, I can run my radios via solar power all the time!

A "lifetime" 12-volt automobile battery and solar panels were acquired. The missing element was a method of turning

off power from the solar panel when the battery was fully charged.

Circuit Description

The circuit which evolved for the electronic switch is based on an idea published by Millard.² The unit described was too complex for my application and called for components which I didn't have. After some work with a pencil, I settled on the circuit shown in Fig. 1.

The electronic switch consists of a voltage reference (U1), a comparator (U2) and a pass-transistor switch (Q2). The

reference is a 3-terminal regulator, the 7805. This unit normally puts out 5 volts, which is raised to 6.2 volts by including two silicon diodes in its ground lead. This reference voltage is compared to the voltage across the battery divided approximately by two. An op amp — the ever popular 741 — is employed as the comparator. R7 is included to allow adjustment of the point at which power from the solar panel is turned off.

A lead-acid storage battery is fully charged at 13.5 V. Whenever the battery is less than fully charged, Q1 will be on,

*4 Maple Lane, Brookfield, CT 06804

¹Notes appear on page 13.

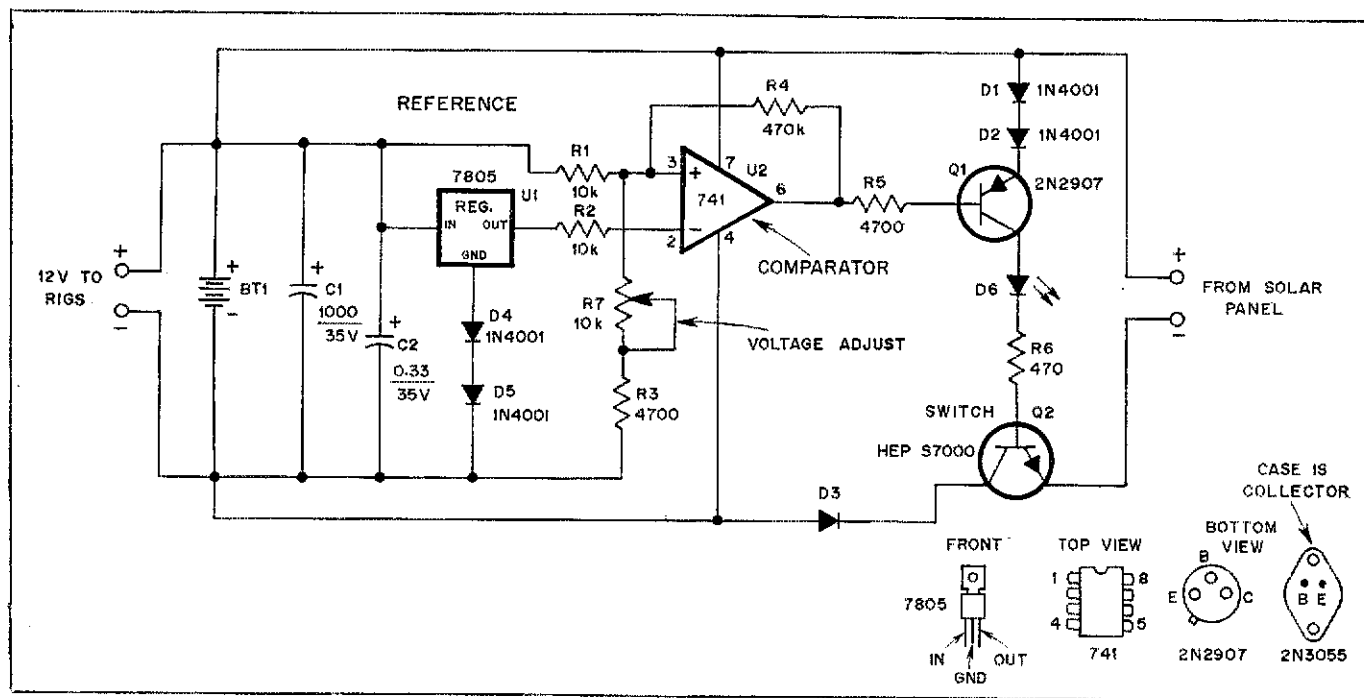


Fig. 1 — Schematic diagram of the electronic switch. Resistances are in ohms; k = 1000; capacitance values are in microfarads (μF).

BT1 — Automotive storage battery, lead-acid type.

C1 — 1000- μF , 35-V electrolytic.

C2 — 0.33- μF , 35-V, Solid-tantalum type

D3 — Silicon diode, PIV of 50 or more, cur-

rent rating sufficient to pass full output of the solar panel.

D6 — Light-emitting diode, any type.

Q2 — Low-frequency power transistor; 2N3055, HEP S7000, or equivalent. Use heat sink of

9 square in. (52,258 square mm) or more.

R7 — 10 k Ω , 1/2 watt, carbon control, linear taper, pc mount.

U1 — 3-terminal, 5-volt regulator.

U2 — Op amp, any of the 741 family usable.

which will inject sufficient base current into Q2 so that it also will be on, allowing current from the solar panel to be passed to the battery. D3 isolates the panel from the battery. A light-emitting diode is used in the base lead of Q2 to indicate when the battery is being charged.

Q2 can be any member of the 2N3055 power-transistor family. It requires a heat sink, which can be fabricated from a 1- by 3-in. (25- by 75-mm) piece of aluminum, or, the Radio Shack 276-1364 heat sink is suitable. For solar panels with current output above 2 amperes, a larger heat sink or a second, parallel-connected pass transistor will be needed.

Suitable components for the electronic switch are available from Radio Shack outlets. My unit is assembled on a Radio Shack no. 276-151 experimenter's pc board. The small components are mounted via holes drilled in the block pattern using a no. 60 bit. The op amp is mounted in the holes provided in the circuit board for an IC. Holes for the pc-mount control and the pins of the power transistor are made with a 1/16-in. (1.6-mm) diameter drill bit.

Once the unit is assembled, it can be checked by using a 100-ohm resistor in place of the battery. With a voltmeter connected across the 100-ohm resistor, adjust R7 until the trip point which turns the LED on and off is between 13.2 and 13.5 volts. Then the unit is ready for installation. In my station the electronic switch is mounted atop the battery. No enclosure or rf decoupling was used. Run-

ning a kilowatt amplifier within a few feet of the unit produced no adverse effect.

When my solar-power system was first installed, I was left to wonder what was happening. The LED came on, indicating that the battery was being charged. Somehow, it wasn't enough, so an ammeter was added, temporarily. It was fun to "see" what was coming out of the solar panel under varying amounts of sunlight.

I found that the solar-power system produced more than enough stored energy to run my hf and 2-meter rigs. Even spates of contest operation haven't run down the battery sufficiently to require using an ac-line-operated power supply. After several years of turning out lights and adjusting thermostats to save energy, I've become cavalier about the ham shack. I leave the rig on for hours while wandering in and out to check a band. After all, except for

the original investment, this energy is free.

Let's hope the government forecast of a 20-fold decrease in the cost of solar energy by 1986 comes true. If so, my roof will be solid silicon!

Notes

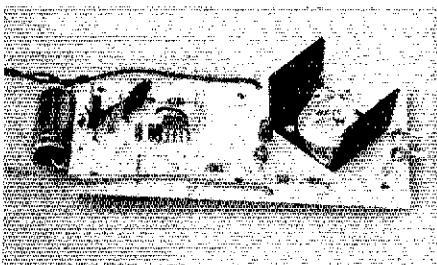
DeMaw, "Solar-Electric Power and the Amateur," QST, August 1977, p. 24.

Millard, "Solar-Powered Regulator Charges Batteries Efficiently," Electronics, September 13, 1979.

Strays



Jim Decker, WB9UQT (left), and Jim Romelfanger, K9ZZ, operated K9DOK, Yellow Thunder ARC's club call, at the Winter Special Olympics. Held February 20 to 22 at Devils Head Lodge, near Merrimac, Wisconsin, the event was staged for retarded athletes of Wisconsin. The event featured two-and-a-half days of instruction and competition in skiing and ice skating. (photo by Carl Dvorak, KA9EYJ)



Author's compact, neatly laid-out version of the solar switch. All components including the breadboard-style pc board should be available locally.

An Optimized QRP Transceiver

A rig doesn't need to be complex to work well. This 40-meter cw transceiver, designed for performance, ease of operation and low power consumption, is a case in point.

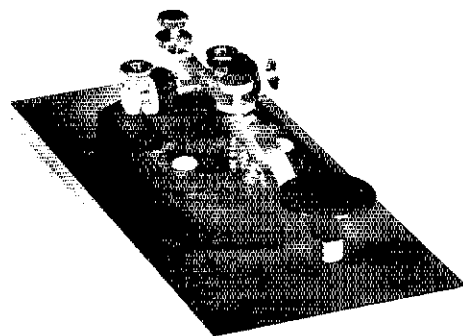
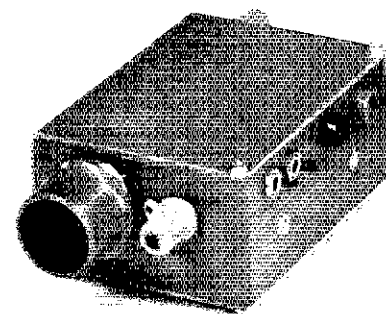
By Roy W. Lewallen,* W7EL

Many QRP rigs have been described in Amateur Radio publications over the years. The distinguishing characteristic of *this* transceiver is that it was designed and then optimized for high performance. It's relatively easy to build something that works, but it usually requires a great deal more effort to produce something that works really well. That effort has gone into this rig, and the result is a 40-meter cw transceiver with the following characteristics: full electronic break-in; clean keying and smooth, quiet transceive operation; *stable* VFO coverage from 7.0 to 7.15 MHz; receiver incremental tuning (RIT); single 12-volt supply operation; two-watt power input, 1.5-watt output into a 50-ohm load; receive current drain less than 20 mA; reasonable transmitter efficiency; high-performance direct-conversion receiver; and small size (1-1/2 × 2-1/2 × 3-1/2 in. [40 × 70 × 90 mm]).

This is *not* a step-by-step construction article. Rather, the purpose of this article is to share some of the many things I learned from designing, building and perfecting the transceiver. Very little of the article is devoted to mechanical packaging and, since there are no printed circuit boards in my rig, none are available from the author. I hope that this article will help potential designers of such gear to avoid some of the pitfalls I've encountered, in addition to provoking thoughts about how to make *good-quality*, simple rigs.

Some Underlying Philosophy

"High-performance direct-conversion receiver" may seem to be self-contradictory. After all, direct-conversion (DC) receivers are so simple they can't possibly compete with a good superhet, right? Wrong! DC receivers have only *one* significant disadvantage when compared to superhets: the presence of an audio im-



This diminutive QRP transceiver is a joy to operate. It features a high-dynamic-range receiver, smooth break-in operation, RIT and a host of other high-performance features.

age which doubles the amount of noise and interference heard.

The only other inherent disadvantage is the inability to generate other than audio-derived agc. The same careful attention to detail and potential problems is required in designing the DC receiver as is required for a top-quality superhet, if comparable performance is to be realized. This last point is frequently overlooked, and that may be one reason why the DC receiver is often looked upon as a mediocre performer.

All other problems can be overcome with careful design, and even the two inherent disadvantages can be overcome to some extent. On cw, narrow af filters may be used, reducing the image bandwidth along with the desired signal bandwidth. RIT helps also: When an image signal produces the same beat note as the desired signal, adjusting the RIT will move one up in pitch and the other down, thus separating them.

As for agc, this rig does without, and I've hardly missed it. This receiver is on a par with all but the best superhets for any type of operation, except perhaps during contests in conjunction with a high-power transmitter, but at a fraction of the com-

plexity. Note also that to use a superhet in a transceiver, an additional oscillator and mixer must be added to the *transmitter* to convert the VFO to the transmit frequency. In a transceiver using a DC receiver, the required shift is only a few hundred hertz, and can easily be accomplished by pulling the VFO.

Since the rig was designed for portable use, current drain was a major consideration. My experience indicates that many solid contacts may be had using simple antennas and operating during the night with 2 watts on 40 meters. This power level is also more than adequate for short-range daytime operation. Power drain is low enough that the rig will run for about a week of evening operation from one charge on ten NiCad "A" cells (660 mA-h).

The small size precludes wide-range antenna impedance matching — a necessity for field use — so a Transmatch was built in a separate box. The circuit for the Transmatch was taken directly from the reference (page 167).¹

While crystal oscillators have

*5470 SW 152 Ave., Beaverton, OR 97007

¹Hayward and DeMaw, *Solid State Design for the Radio Amateur*, ARRL, 1977.

advantages for certain types of operation, a VFO is preferred in a rig which is intended primarily for ragchewing (and, I can't resist, a miniscule amount of DX-ing) and Field Day. Full electronic break-in was taken on as a challenge, and the convenience it offers is well worth the effort. RIT was originally left out of the design for the sake of simplicity. I later decided that RIT is a necessity in a transceiver, no matter how simple it may be, so an RIT circuit was added.

Many of the circuits and concepts used here were taken directly, or with some modification, from the reference. The following discussion concentrates on the unique features of the circuits used, rather than on basic principles or those well covered in the reference.

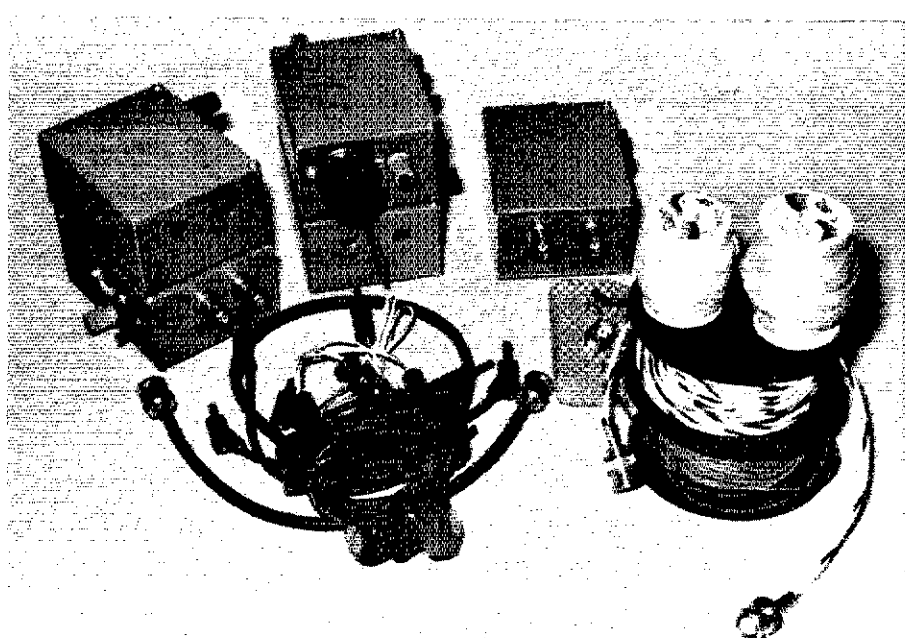
The VFO

The oscillator, Fig. 1, is a good example of the principle that a circuit doesn't necessarily need to be complex to work well, if properly designed. This simple Hartley circuit exhibits less than 200-Hz warm-up drift, with about half of that occurring within one minute after turn-on. This drift performance is completely repeatable, as the building of many such oscillators has shown. The circuit used here is the result of a considerable amount of experimentation directed toward identifying the sources of drift in such VFOs. Without giving the details of the experiments, I'll summarize the results.

1) No part of the VFO circuit except the FET drain should be connected to a pc-board pad that is over a ground plane or near other pads. It's best to avoid pc construction (including ARRL "universal breadboard") of the VFO altogether, because the capacitances formed with the board material as a dielectric have extremely poor temperature and humidity characteristics. I prefer building VFOs using point-to-point wiring on standoffs above a ground plane of copper-clad board (copper side up).

2) Use NP0 ceramic capacitors. Commonly used polystyrene units are predictable, but have too strong a temperature coefficient to compensate a decent inductor. If a rather poor inductor is built, one might get lucky and have the considerable drifts cancel, as they are in opposite directions. But I don't consider that to be a good approach. I prefer to first reduce the temperature dependence as much as possible, then if necessary, compensate what's left. The NP0 ceramic capacitors have a much lower temperature coefficient than polystyrene or silver-mica types. "Dogbone" NP0 units have a black-painted end, and some NP0 disc capacitors are marked "NP0."

3) The gate diode is essential to minimize drift, for reasons put forth in the reference. A 1-megohm gate resistor provides better drift performance than the sometimes recommended 100-kilohm



Here's the complete W7EL QRP station, ready to pack for portable use. At the left, the box on top contains 10 "A" NiCad cells. Below it is a Transmatch. Below the transceiver itself in the center is a keyer and, at the right, for when the going gets rough and batteries are plentiful, is a 10-watt amplifier "brick."

value, possibly because of reduced tank loading.

4) The temperature of the FET itself has a negligible effect on this circuit. Therefore, circuits which more loosely couple the active device don't have any significant advantage over this one.

5) After the above recommendations have been followed, the only remaining significant source of drift is the inductor. Of the inductors I've tried, the best are those wound tightly on type-6 powdered-iron toroidal cores, with core size being relatively unimportant. A technique suggested by W7ZOI is to anneal the coil after winding, which I do by boiling it in water a short while, then letting it cool in air. This noticeably reduces drift, and this method was used to obtain the quoted drift.

If extreme environments with rapid temperature changes are to be encountered, you may want to compensate the VFO. This can be done by replacing part of the fixed capacitance with negative temperature coefficient (TC) capacitors, such as polystyrene or negative TC ceramic units.

It should be possible to make other oscillator types perform as well as, or better than, this one, as long as the above guidelines are followed. The secret, however, lies in the choice, rather than the number, of parts.

The rig had been used for a year without voltage regulation for the oscillator, and with no difficulty with chirp or hum. Supplies used have been a NiCad battery, an ac supply using a 3-terminal regulator, and fresh lantern batteries. This was possible because the sensitivity of the unregulated oscillator is

only 50 to 80 Hz/volt from 9 to 15 volts. A regulator was added when experiments showed noticeable modulation of received audio (and, presumably, transmitted rf) when a small amount of ac was purposefully introduced to the supply. It can now be used with poorer ac supplies or an automobile power system with the engine running.

The buffer, although designed for low current drain, is the major power consumer in the receiver, requiring 10 mA. The key to efficiency in this sort of buffer is to choose the transformer turns ratio to sustain as large a voltage swing at the output stage collector (or drain) as possible. Another potentially efficient approach is to use a complementary-symmetry stage. One was used for some time, but its temperature-stable, low-distortion design consumed as much power as the present buffer, and was more complex. Buffer voltage gain is approximately one half, providing about 2.5 volts pk-pk output.

The RIT circuit uses a Zener diode as a voltage-variable capacitor. While Zener diodes are inexpensive and readily available, their nominal capacitances may vary a great deal with different manufacturers. An empirical procedure to adapt the circuit to an individual diode is to select a series capacitor (here 15 pF) to obtain a tuning range of about 1300 Hz with a diode reverse bias variation of about 9 to 4 volts. When the control is adjusted to the center of its range, the frequency shift should equal the center frequency of the receiver audio filter (about 650 Hz). During transmit, or when the ZERO button is depressed, the shift is removed, causing the transmit frequency to be the same as that of a received signal peaked at the

audio-filter center and tuned to the correct side of zero beat.

The Transmitter

The transmitter is a fairly efficient (75%) Class C design. The Zener diode was added after twice blowing the output transistor by inadvertently transmitting with the antenna disconnected. The diode protects the output transistor from this hazard. Some caution is necessary when using a Zener diode at the output-stage collector, as many Zener diodes have a large amount of shunt capacitance. When adding the diode, the collector capacitance must be reduced by an amount approximately equal to the capacitance of the diode when it is reverse biased by the collector supply voltage. In this transmitter, the total capacitance at the collector should equal approximately 450 pF, including the fixed capacitor, the 51-pF receiver-pickoff capacitor, the Zener diode and the transistor (about 10 pF for this type). If the capacitance of the diode can't be measured, the 385-pF fixed capacitor should be made variable and adjusted for best transmitter efficiency.

The value of L2 is not critical, as long as it's not much smaller than the 10 μ H shown. Conventional solenoidal rf chokes will work fine also, but toroids are required in a tightly packed rig such as mine to keep mutual coupling acceptably low.

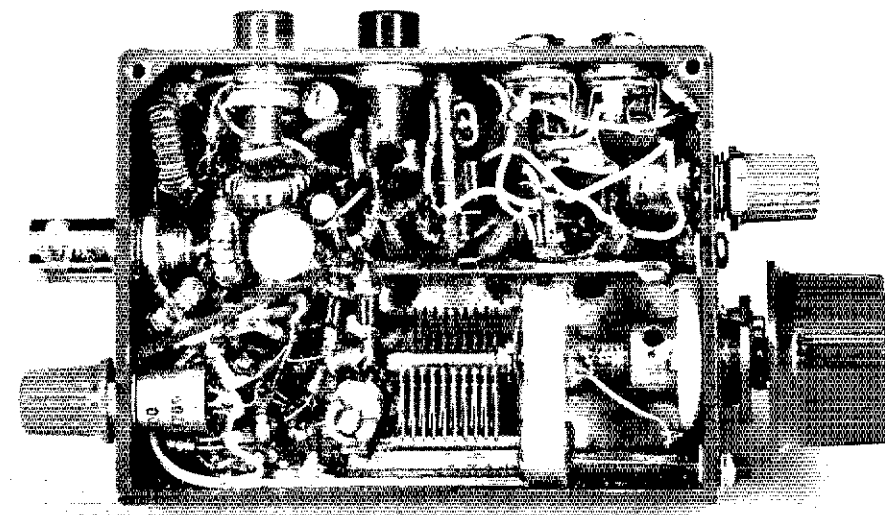
The Receiver

More time has been spent improving the receiver than any other part of the rig. The end result is no more complex than the first version, but the improvement has been great, again showing that complexity and performance don't equate. In the following discussion I'll relate why some types of circuits were chosen and others rejected.

Receiver signal pickoff is through the 51-pF capacitor from the transmitter output filter. When transmitting, the diodes protect the receiver and cause the 51-pF capacitor to become part of the transmitter output network. When receiving, the capacitor and L5 make up a fairly low-Q series resonant network to reduce signal attenuation by maintaining an approximately 50-ohm source impedance to the mixer. The additional filtering it provides is helpful also.

The mixer is a conventional doubly balanced type. Unfortunately, I didn't choose this by accident — it was selected after a good deal of frustration trying to use other kinds!

I'll digress here a moment to explain about a-m demodulation, a problem which is common in "simple" direct-conversion receivers (but not because they're simple!). Direct-conversion receivers have most or all of their gain at audio frequencies. Thus, if any device near the receiver input is nonlinear — such as forward- or reverse-biased diode



High component density is necessary to allow the author to squeeze all the circuitry of the transceiver into such a small package. Point-to-point wiring is also used. The transmitter circuitry is at the upper left in the photo above. The output transistor, which is bolted to the case, is hidden below the top layer of components.

junctions — audio from strong shortwave broadcast and a-m broadcast stations or ssb stations is detected. If passed through the mixer, this audio is amplified and appears as an annoying "din" in the background — or foreground, if severe enough! Leakage of the local-oscillator signal into the circuitry preceding the mixer definitely aggravates the problem, but I haven't attempted to isolate the (apparently) several phenomena involved. An often-overlooked point is that the audio amplifier itself will usually happily rectify any rf which reaches its input, amplifying the resulting detected audio.

A common solution is to use very selective tuned circuits at the receiver input, a solution not practical in this case. Another is simply to avoid using nonlinear elements ahead of the mixer — and following the mixer, if rf can get through it. This is difficult when using electronic T-R switching — this rig has the T-R diodes, Zener diode and PA transistor as potential culprits. Yet another solution is to use a balanced mixer which will, in theory, prevent detected audio from getting through the mixer. I took this last approach, first trying an MC1496 IC mixer. Try as I did, I was never able to obtain good rejection of a-m signals originating over a wide frequency band. The balance seemed to depend on the source impedance which, of course, changes with frequency when an antenna is the source — to say nothing of the transmitter output network and series-resonant network in the path. My attempts included different biasing and signal levels, and driving the inputs through baluns.

I next tried a singly balanced diode mixer, with and without two extra diodes for improved balance. I used this for quite a while, and it was quite satisfactory after I replaced the T-R diodes with a MOS transistor switch. The noise figure was

marginal, however, and there was still some background a-m interference when propagation was good. While trying to improve that situation, I performed quite a few experiments using the mixer with and without the extra diodes, with the input ports exchanged, with Schottky and

Fig. 1 — The circuit of the W7EL 40-meter QRP transceiver. Resistors are 1/4 or 1/8 watt, 5%. All ferrite cores are available from Amidon Associates. When winding the inductors that use BLN-43-2402 cores, the wire should be passed once through both holes of the core for each "turn" specified. See the illustration at far right.

- C1 — 1- μ F, 3-V non polarized ceramic.
- D2, D3, D5-D13, incl. — Silicon general-purpose/switching diode; 1N914, 1N4152 or equiv.
- D4 — Zener, 33-V, 400-mW; 1N973 or equiv.
- D14 — Zener, 10-V, 400-mW; 1N961 or equiv.
- L1 — Approx. 3 μ H; 26 turns on a T-44-6 core. Tap at seven turns from ground end.
- L2 — Approx. 10 μ H. 43 turns on a T-50-2 core.
- L3, L4 — 1 μ H; 19 turns on a T-37-6 core.
- L5 — 9.4 μ H; 58 turns on a T-37-6 core.
- Q1, Q11 — Silicon n-channel JFET, 300 mW, 2N4416.
- Q2, Q3, Q10 — General purpose, silicon npn, 310 mW, 2N3904.
- Q4 — General purpose, silicon npn, 1.8 W, 2N2222.
- Q5 — Rf power, silicon npn, 7 W, 2N3553 or 2N5859.
- Q6, Q7 — General purpose, silicon pnp, 310 mW, 2N3906.
- Q8 — General purpose, silicon npn, 310 mW, 2N4124 or 2N3565.
- Q9 — General purpose, silicon npn, 310 mW, 2N3565.
- RFC1 — 100- μ H subminiature choke, wound on a 1/4-watt-resistor-sized ferrite form. Dc resistance is approx. 8 Ω .
- T1 — Primary 15 turns, secondary 3 turns. Wound on a BLN-43-2402 core.
- T2 — Primary 39 turns (approx. 6.7 μ H), secondary 5 turns. Wound on a T-44-6 core.
- T3, T4 — Five trifilar turns on a BLN-43-2402 core.
- U1 — Op amp, LM301.
- U2, U3 — Dual op amp, LM358N (one section of U3 unused).

conventional diodes, and with various VFO source impedances. None were satisfactory with respect to both a-m demodulation and noise figure.

These problems virtually disappeared when I replaced the mixer with a doubly balanced type. Additional improvements were significant when I designed the present preamplifier and input diplexer. Now, a huge am-signal is required to cause interference, and none has been heard since it was implemented. The noise figure is very good, with a minimum-discernable signal level of less than 0.1 μ V. Other balanced mixers, such as CA3028 IC or discrete balanced JFET mixer, might match the a-m demodulation characteristics of this receiver, but they probably won't match its signal-handling capability. A signal 50 kHz away must be greater than 100 mV in amplitude (120 dB above the minimum discernable signal) to have any noticeable effect on a medium-amplitude (30- μ V) received signal. Try that test with *your* station receiver!

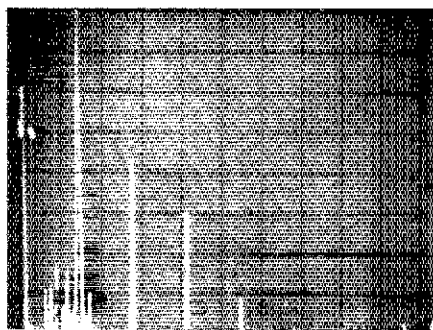
Following the mixer is a diplexer. Its purpose is to provide a wide-band 50-ohm termination for both rf and af, while preventing rf energy from getting into the af amplifier and preventing af energy from being wasted in the rf termination. The rf termination consists of the 0.1- μ F capacitor and 51-ohm resistor; RFC1 and the 0.47- μ F capacitor form a low-pass filter which prevents any residual rf from reaching Q10, thus greatly enhancing immunity to a-m. Q10 presents an input impedance of approximately 50 ohms for maximum power transfer.

Receiver Audio

Because the receiver audio gain exceeds 100 dB, great care must be taken to prevent feedback or amplification of power supply hum. This receiver uses an active decoupling circuit consisting of Q9 and associated parts to avoid these problems in the input stage, where the sensitivity is greatest.

Following the preamp is the active audio filter. This one is a peaked low-pass type with a Q of five — low enough to keep ringing unnoticeable. It is simple, noncritical and adequate for general operating. The peak frequency is about 650 Hz, which corresponds to the transmit-receive frequency difference with the RIT control centered. An LM301 is used because of its low noise and relatively low current drain. A TL071 or TL072 should give comparable performance, and one section of an LM358 may be used with a 2-dB increase in noise figure, an amount I feel is quite acceptable.

The last two stages are conventional amplifier stages, with frequency response rolled off outside the range of about 150 to 1500 Hz. The gain distribution (31 dB in the first stage, 52 dB in the second) is unusual, but not for any special reason — it just evolved that way.



The output spectrum of the Optimized QRP Transceiver. Vertical divisions are each 10 dB; horizontal divisions are each 5 MHz. For a transmitter of this power level, FCC rules require that spurious outputs be suppressed at least 30 dB. The 14-MHz second harmonic can be seen at about -37 dB. The pip at the extreme left is the zero-frequency reference, generated within the spectrum analyzer.

U3 is a sidetone oscillator. The reference suggests keying just the bias resistor, but this doesn't work with the LM358, as the negative supply voltage (ground) is an acceptable input. It will still oscillate (at a very low frequency) with both 10-k Ω resistors grounded! Therefore the IC supply line is keyed also. Sidetone injection level is set by the 100-k Ω resistor at pin 6 of U2B; this may be varied to suit individual taste.

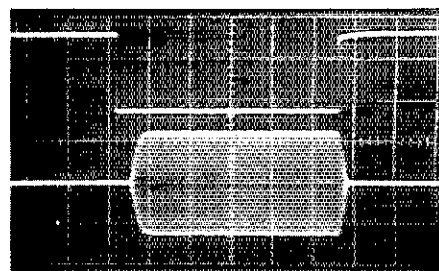
Keying and T-R

Three events must occur when this type of transceiver is keyed, and they must occur in the proper sequence if operation is to be clean. They are, in order: (a) receiver mutes, (b) VFO shifts frequency, and (c) transmitter keys. These events must occur in reverse sequence when switching back from transmit to receive. The sidetone oscillator must also be keyed, but its timing isn't as critical.

Attention to this sequence and proper transmitter waveform shaping makes the difference between a poor-sounding rig and a really clean one. Many people have been surprised to learn my power input — because "it doesn't *sound* like a QRP rig." Only a few parts are required to accomplish this. In addition, it's easier to copy a clean weak signal than a poor one, so good keying and freedom from chirp, clicks and roughness are particularly important for QRP transmitters.

The receiver is muted by Q11 which acts as a series gate. Q10, U1 and U2A are all driven to saturation for a while when the transmitter is keyed, and again when the key is released. This is caused by the relatively large rf signal appearing across the T-R diodes, as well as stray rf pickup by the receiver. Such a disturbance is impractical to eliminate, as it would require a T-R switch with very high attenuation, and extensive shielding. I solved the problem by other means: Q11 is turned off immediately when the transmitter is keyed, then turned back on after the disturbance

is over, about 60 ms after the key is released. The diodes around U2A prevent the output of U2A from swinging to ground during the disturbance, a condition which turns Q11 on when it should be off. I find the 60-ms delay to be ideal, as it removes distractions between dits and dahs at medium speeds while being short enough to provide essentially instantaneous break-in. The disturbance (hence, required delay) could possibly be reduced further by limiting the swing of either or both Q10 and U1, or biasing U1 and U2A outputs closer to the positive supply voltage.



The keyed CW waveform of the Optimized QRP Transceiver. The horizontal divisions are each 5 ms. The upper waveform indicates the actual key-down time. The rise and fall times of approximately 2 ms result in a crisp sounding but clickless signal.

Oscillator frequency shift is obtained by changing the bias on the Zener diode (used as a voltage-variable capacitor) in the VFO circuit when going from transmit to receive or vice versa. The timing is provided by Q8, which comes on fast when the key is closed, but goes off some five milliseconds after the transmitter output drops to zero following the release of the key. Shaped transmitter keying is provided by Q7 and associated components. I found that simultaneous keying of the base and collector circuits of the driver stage was required to give the desired rise and fall times of a few ms at the transmitter output. The sidetone oscillator is keyed from the same line.

Construction

I discourage others from attempting to duplicate the construction of my unit. To do so requires access to subminiature parts and several no-longer-available items, a good understanding of potential crosstalk, shielding and ground problems, and a large amount of patience. There are, however, a few points which may be of interest to those wishing to build similar gear.

A great deal of information is available regarding bypassing, decoupling and layout techniques. If the potential builder isn't familiar with these basics, construction of a similar unit may cause a great deal of frustration indeed. I would suggest, as a minimum, that construction be over a ground plane, as shown in many

QST articles and in publications such as the reference, or *The Radio Amateur's Handbook*.

I am certainly no expert on miniaturization, and this rig doesn't by any means approach the ultimate in that regard. My only general advice is to begin with the box and build the rig into it, rather than the other way around, and get a good idea of the placement of controls, connectors and large components before you begin. Since it's difficult to troubleshoot or modify such a rig once built, ideally a larger breadboard version should first be constructed, perfected and operated. When I got really pressed for space, I found that building the circuitry on small pieces of perfboard and mounting the boards vertically allowed very dense packing. It helps a great deal to mount components on both sides of the board, and to ignore the usual conventions of placing parts in neat rows. The use of 1/8-watt resistors saves a surprising amount of space compared to 1/4-watt units. Another great space-saver is the use of tantalum, rather than aluminum, electrolytic capacitors. Small parts are nearly always more expensive and less available than their larger counterparts, so each builder must decide if the trade-off is a good one.

Adjustment and Operation

The only adjustments required are the

VFO trimmer, used to set the VFO frequency at the lower band edge; the drive level pot, used to set power input at 2 watts (although no major problem will arise if driven at higher or lower levels, efficiency may drop slightly); and the transmitter rf-amplifier tank circuit, which is peaked at the center of the frequency range. None should require readjustment once set.

Operation is, by design, simple. The only point worth noting is that, as with any direct-conversion receiver, signals must be tuned on the correct side of zero beat so that the transmitter will be on the same frequency as the received signals. Guest operators have picked this up in a few minutes, so the SPOT button is seldom used. When the rig is new, however, it's nice to have the assurance of knowing just where the transmitter will be when the key is pressed.

I do want to emphasize that this isn't just a "paper design," but a rig which has undergone a good deal of operation at W7EL and, on many occasions, from portable locations, including Field Day operation. The first version was built about two years ago. Nearly all states, as well as a few DX stations, have been contacted using simple antennas. I enjoy ragchewing, and countless enjoyable QSOs have been had with this rig. It's a pleasant experience anytime to operate a stable, clean, full-QSK, essentially crush-

proof rig. And, to my taste, to do this from a backpacking tent or cabin at the beach enhances the pleasure even more. The very best part, however, was best stated in the closing paragraph of the reference: *That* is "where it's at."

Closing Remarks

I hope that this article has illustrated a few important points: that simplicity and performance aren't mutually exclusive, that a well-designed direct-conversion receiver is a good receiver indeed, and that really good designs don't generally just happen. I also hope that some readers are moved to question the statements I've made, and those which have been made elsewhere, so that more of the subtleties of simple solid-state gear can be widely understood. Most of all, I hope that this will be of help to people who were puzzled, as I have been, by some of these phenomena.

To the extent that time permits, I will be glad to answer questions. An s.a.s.e. would be appreciated for inquiries. No circuit boards, board layouts, parts kits or parts availability information are available from the author. I'm too busy working on my *next* rig! I wish to thank Wes Hayward, W7ZOI, for his comments, criticism and encouragement during the design and testing of this rig, and the writing of this article. QST

Strays



OPERATION HELL AND PARADISE

□ Few amateurs can say they have worked either hell or paradise. On August 23 and 24 the Adrian (Michigan) ARC will be operating from both Hell and Paradise, Michigan. They offer a QSO and a colorful QSL certificate to prove your QSO with two of the rarest spots (on earth?). QSL W8TQE/Hell and W8TQE/Paradise via P. O. Box 26, Adrian MI 49221, with a legal size s.a.s.e. Frequencies to be used are: cw — 3710, 7110 and 21,110 kHz; ssb — 3900, 7235, 14,285, 21,360 and 28,625 kHz from Hell; and cw — 3720, 7120 and 21,120 kHz; ssb — 3910, 7245, 14,295, 21,370 and 28,635 kHz from Paradise. Two-meter fm operation will be on 146.52 MHz from both locations.

QST congratulates . . .

□ Charles Dorian, W3JPT, of Washington, DC, 1980 recipient of the National Marine Electronics Association (NMEA) Reginald A. Fessenden Award for his career devoted to the improvement

of marine communications. Chuck is a Life Member, ARRL, and a member of the ARRL Long Range Planning Committee.

LOW-FREQUENCY EXPERIMENTERS' NET

□ Ken Cornell, W2IMB, reports the formation of a 160-meter ssb net for persons interested in operation in the so-called "experimenters' band," which is from 160 to 190 kHz. The conclave, called the "Soldering Iron Net," meets every Monday evening at 0100 UTC on 1818 kHz. Ken says that the participants are LOWFERS (low-frequency experimenters) and that the discussions are semi-technical in nature.

The low-frequency band is one set aside by the FCC for signalling and control purposes at a power level of 1-watt maximum dc input to the last stage of the transmitter. The antenna cannot exceed 50 feet (15.24 m) in length, including the feed line, for transmitting. A number of amateurs and nonamateurs in the USA have been operating beacon transmitters

in the 160- to 190-kHz range, and cw contacts are claimed for distances in excess of 100 miles. No operator's license is required for activities in that part of the spectrum, provided the FCC regulations are complied with. The primary difficulty the experimenters report is impaired reception after dark, at which time neighborhood SCR light dimmers pollute the airways with severe hash. — Doug DeMaw, W1FB

ENERGY CONSERVATION QSL EXCHANGE

□ Armond, K6EA, and Gladys, W0MFW, Brattland of Long Beach, California and Bemidji, Minnesota, observed an insulated wire descending past their fourth floor Las Vegas hotel room at the January 80 SAROC. They used a rubber band to tie their QSL card to the wire. They've just received a return QSL from Ken Grabenauer, WA6BJW, of Napa, California, marked "SAROC 1980 carrier pigeon Atlas 210X with long wire vertical from 14th floor of Dunes Hotel."

A Radio Parts Eldorado!

Buy 'em by the blister pack and save your "bucks" for bigger things! How about 100 new coils, chokes and capacitors for only \$1.98?

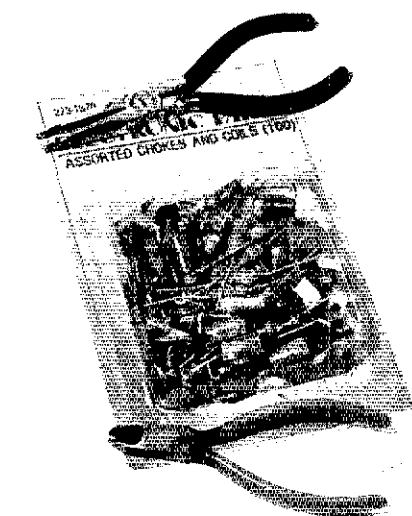
By Doug DeMaw,* W1FB

How long has it been since you browsed the small-parts rack at your nearby Radio Shack store? If you're anything like me, you probably drop in every now and then, just to see what's new and tempting — within the constrictions of your ham-radio budget, that is. This article deals with a bargain package on which the tag reads "Coil Assortment." I spotted this cornucopia of small parts during a recent visit to a local Radio Shack outlet. The cost of the blister pack of goods was \$1.98 at the time of this writing. The only catch — although it's not a bad one — is that there are capacitors included in the assortment of parts. But, they're choice capacitors for amateur work (more on that later).

The intent of this article is not to encourage you to focus your attention entirely on the Radio Shack no. 273-1570 coil kit. Rather, I'd like to stimulate your thinking about all facets of bargain hunting for small parts.

How to Find Parts

A popular outcry today among those who build equipment or like to experiment is, "Parts are impossible to get!" This is anything *but* a fundamental truth. Components are difficult to find only if the hunter is unfamiliar with typical amateur "scrounging" techniques, or if he or she is suffering from a terminal case of chronic lassitude! Admittedly, there are a few electronic devices that elude even the most experienced "hunter." But that is only because he or she lacks the



An unopened coil pack that contains the same part number as the one discussed in this article, but contains a different group of components.

purchasing power to buy 1000 or more pieces of a given component at one time. This restriction is imposed (unfortunately) by a number of major manufacturers — notably the ones who produce semiconductors. If they do have appointed distributors who will sell you a single part "over the counter," chances are that the distributor won't have the item you need. He may even tell you that he's never heard of it! If the parts vendor does acknowledge that the item of interest actually exists, you might find yourself facing a frustrating back-order situation —

for weeks or even months! It's a sad matter of fact and none of us knows the answer to this problem.

Parts Sources

There are a number of useful methods we amateurs can apply in obtaining small parts for our home-built gear. Here are six basic rules:

- 1) Read the surplus ads in the various amateur magazines.
- 2) Order catalogs from as many new parts and surplus outlets as possible. Keep this file current by updating it every 12 months.
- 3) Take money and your shopping bag to as many hamfest flea markets as you can.
- 4) Check the parts-supplier listing (extensive) in the construction-practices chapter of *The Radio Amateur's Handbook*. It shows who sells parts, what kinds of parts are sold, if a catalog is available and if a minimum order is imposed.
- 5) Tell your friends what you're searching for — in person or while on the air. If they have the part, they may be happy to let you swap something for it. In other words, "make lots of noise!"
- 6) Check the Ham Ads in *QST* for the material you need. Don't overlook the classified ads in other amateur magazines.

Bargain Assortments

Do you avoid buying bargain packs of small parts because you're afraid you won't be able to identify the components or their values? If such things prevent you from making an investment, then you're not a high-spirited typical ham

*Senior Technical Editor, ARRL

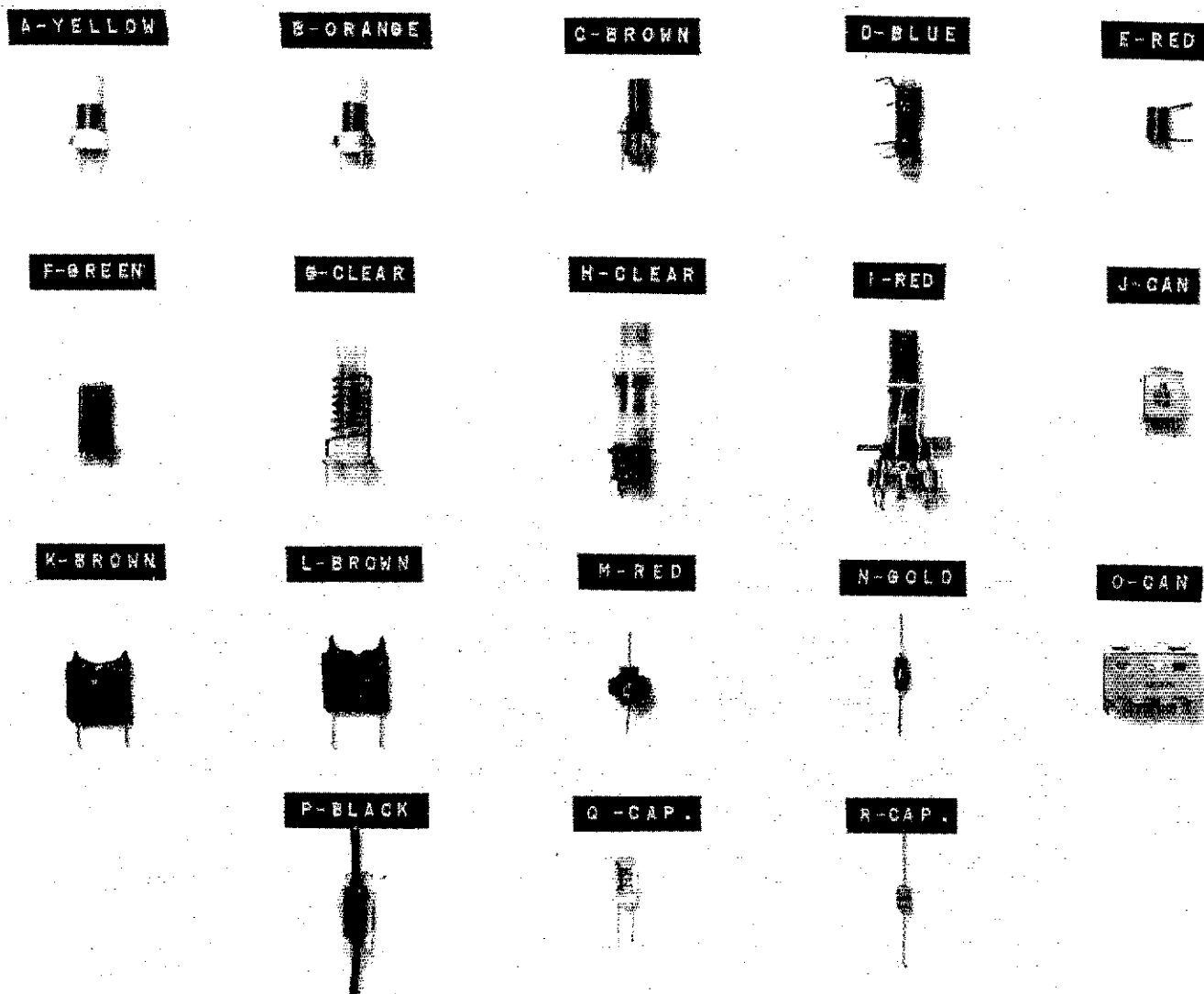


Fig. 1 — A layout photograph showing each type of component found in one coil kit. Other assortments bearing the same kit number may contain completely different components. The label above each part gives it a designator that is keyed to Table 1. The color code of most items is included in the label above it.

experimenter, and the key word here is *experimenter*. You must be willing to dabble with unknown components as well as with the circuit you plan to build! Otherwise, your veins don't contain the blue blood of your amateur forefathers!

It's unlikely that everything we find in a bargain assortment can be identified properly. Furthermore, some of the parts will be of no immediate use to us. But the initial investment is so small that a 100% return should not be a criterion when garnering a new bag of goodies.

The RS 273-1570 Coil Pack

I was unable to resist buying the Radio Shack no. 273-1570 kit. It was filled with beautiful printed-circuit types of miniature and larger slug-tuned coils. A small number of rf chokes were also visible through the plastic window of the pack. Since the coils had very few turns of wire on them, it was reasonable to conclude that they were made for use at hf and vhf. Similarly, the rf chokes had small

Table 1

Part	Value	Type	Q (unloaded)	Quantity	Remarks
A	0.4-0.8 μ H	slug tuned	90 @ 9 MHz	5	single winding
B	2.7-6.0 μ H	slug tuned	70 @ 9 MHz	5	single winding
C	0.5 μ H min.	slug tuned	100 @ 9 MHz	4	slug stuck
D	0.18-0.26 μ H	slug tuned	100 @ 9 MHz	3	two coils, two slugs
E	0.36-0.56 μ H	slug tuned	80 @ 9 MHz	5	no core
F	0.45 μ H	air	100 @ 9 MHz	2	sealed winding
G	0.1-0.5 μ H	slug tuned	20 @ 9 MHz	1	low Q
H	0.3-0.6 μ H	slug tuned	---	2	three windings
I	not tested	slug tuned	---	1	single layer
J	not tested	slug tuned	---	3	shield can, built-in capacitor
K	0.8-1.8 mH	slug tuned	90 @ 250 kHz	28	vio/grn/brn
L	750 μ H	rf choke	35 @ 800 kHz	5	brn/blk/brn
M	100 μ H	rf choke	30 @ 800 kHz	5	single-pl choke
N	1 mH	rf choke	45 @ 800 kHz	9	single layer
O	3.5 μ H	rf choke	70 @ 9 MHz	1	ratio detector or discriminator
P	not tested	transformer	---	1	ferrite sleeve type
Q	470 pF	capacitor	---	10	temperature-stable capacitor
R	2 pF	capacitor	---	14	5% tolerance

Refer to Fig. 1 for the above part designators. Parts K and L are encapsulated. The actual parts count was 104. The slugs in item C appear to be cemented in position at the minimum-inductance position. All slug-tuned coils are pc-mount types.

windings, suggesting their usefulness in amateur work. The entire collection appeared to be taken from some TV-set manufacturer's inventory overrun. All of the parts looked brand new.

I found some polystyrene capacitors (great for use in stable circuits such as VFOs and RC active audio filters) and a collection of 2-pF, 5% ceramic capacitors. How often have you searched for or tried to buy a low-value capacitor like a 2-pF unit? If your luck is similar to mine, the answer is "many times." There were also some shielded inductors (in metal cans) and what appeared to be an fm receiver ratio-detector or discriminator transformer.

Fig. 1 shows one each of the parts that were in the packet. The labels provide a key for use with Table 1, which gives the approximate component values and additional data about each of the parts shown.

Certainly there is no guarantee that every 273-1570 blister pack will contain exactly the same type and number of parts that were found in mine. But you can be sure that there will be plenty of components you can use in your projects. In fact, the packet shown in the photograph on the first page of this article contains many parts that aren't shown in Fig. 1. It was bought at a Radio Shack store some five miles from the branch store where the pack in Fig. 1 was obtained. The irony here is that I paid \$1.98 for 100 parts, whereas I would have paid \$1.92 for a single brand-new slug-tuned coil of similar characteristics, as listed in the current catalog of a leading U.S. coil manufacturer! So in general terms, we might extrapolate this to an equivalent cost of \$192 for the bargain pack if we were to pay the single-lot price for each of the 100 units!

I realize that few amateurs have access to laboratory test equipment. Therefore, it may not be easy for you to determine the inductance values of unknown coils and chokes. But if you have access to a dip meter (most hams do) you can come pretty close to learning what the unknown values are. Component evaluation involves placing a capacitor of known value in parallel with the inductor to be checked. A dip meter is used to find the resonant frequency of the coil or choke. Once you know the value of capacitance and the resonant frequency, you can determine what the inductance is from

$$L_{\mu H} = \frac{X_c}{2\pi f}$$

where f is the frequency in MHz at the dip and X_c is the reactance in ohms of the capacitor used in the test. Therefore, if we had a 50-pF capacitor in parallel with an unknown inductor, and the dip meter indicated resonance at 12 MHz we would find the inductance from

$$L = \frac{265}{6.28 \times 12} = 3.51 \mu H$$

The value of X_c is obtained from

$$X_c = \frac{1}{2\pi fC}$$

where X is in ohms, f is in MHz and C is in μF . Since X_c and X_L are equal at resonance, either term can be used to find the coil inductance. The *ARRL L/C/F Calculator*, type A, can be used to find the unknown inductance if you'd rather not massage the keys of your pocket calculator.

It should be said also that you can find the capacitance of an unknown low-value capacitor by means of a dip meter when you connect the capacitor in parallel with an inductor of known value. If this were done, you would determine the capacitance from

$$C_{\mu F} = \frac{1}{2\pi \times f \times X_L}$$

where f is in MHz and X_L is in ohms. X_L can be determined from $X_L = 2\pi \times f \times \mu H$. The mathematics is all of grade-school level, so none of us should be afraid to use the equations.

The relative Q (figure of merit) for an inductor can be gauged by the depth of the dip-meter indication when checking a resonant circuit. The deeper the "null," the higher the tuned-circuit Q . Also, the higher the Q , the farther from the tuned circuit we can place the dip-meter coil and still obtain a dip. An accurate home-workshop technique for finding the Q of a tuned circuit is shown in Fig. 1 on page 54 of the *ARRL Electronics Data Book*. If a coil shows very low Q at the test frequency, don't use it for circuits near that frequency. However, the core properties might be ideal for some lower frequency. Checks with a dip meter and a higher-value capacitor should prove this. Pi-wound rf chokes seldom exhibit high Q s. Typically, they yield Q values between 30 and 60. In most applications we don't want an rf choke with high Q . The lower Q s provide a wider frequency response, and that is desirable for rf chokes.

Closing Comments

The rectangular encapsulated rf chokes (probably video peaking coils) in the 273-1570 kit are color coded to indicate their values, so no need to check them for other than open circuits. The 1980 Radio Shack catalog (no. 315, page 108) lists this kit as a standard item, so I presume an ample supply exists. Some other tempting assortments are shown in the same catalog.

This article cites only one example of how you can save money while building up your parts stock for experimenting. Lots of good parts can be found! All we need do is look for them! QST-1

Experimenters may want to check the Poly Paks no. 92CUB283 coil/transformer assortment which contains 200 pieces and sells for \$2.99. See QST ads for the address.

Strays

HOW YOUNG IS THAT AMATEUR EXTRA CLASS LICENSEE?

□ Bernard Weinstock, K2MU, of Queens, New York, earned his Amateur Extra Class license when he was 13 years, 5 months and 17 days of age; Greg McIntosh, AFØE, of Springfield, Missouri, became an Extra when he was 13 years, 4 months and 16 days old; and Timothy Wettach, of Hencoye, New York, was a youngster of 13 years, 3 months and 10 days when he reached Extra Class. The young people of today are really amazing. There are probably other young amateurs with equally amazing accomplishments to their credit. Do you know any young hams whose feats match those of Bernard, Greg and Timothy? If so, we'd like to hear about them. Send details to KA2BNV at ARRL hq. [Editor's Note: Thanks to AF2K for providing information on these fine young hams.]

PROJECT MOCH: MORSE COMMUNICATION FOR THE HANDICAPPED

□ Sharon Williams, KA6BJB, is involved with a very special program with a group of students in Fremont, California's Glanker School. The students, ranging in age from 12 to 20, cannot speak or "sign," owing to physical handicaps. The new instructional program, the brainchild of Stu Langs, AA6SL, provides for classroom instruction in sending and receiving Morse code by the handicapped students, their parents and teachers.

For the first time the students will be able to "speak" in group conversations or tell their parents about the events of the day. The wheelchair-bound child will be able to use a keyer to activate an alphanumeric converter to communicate with the outside world. If the project works as well as expected, a massive effort will be made to locate qualified instructors. — Jane Bell, WD6GKN, South Bay ARA, Fremont, California



Sharon Williams, KA6BJB (left), instructs Paul Boyce in sending and receiving Morse code. (photo by Jeff Pinto)

Modulation Systems and Their Noise Performance

When can ssb have a better signal-to-noise ratio than fm? When can fm have an even better signal-to-noise ratio than a baseband system? This article answers these questions and unravels some of the mysteries of modulation.

By Wayne Greaves,* WØZW

At first glance, the concept of modulation seems simple enough. Modulation is the process of varying a parameter of a carrier wave — either its amplitude, frequency or phase — in proportion to an information-bearing signal. The wide variety of modulation types which are in use yield an almost equally wide variety of performance characteristics. Let's begin our exploration into modulation systems and discover what makes some methods superior to others for a given application.

Why Modulate?

Now that we have defined modulation, of what use is it? By translating a message to a different frequency band via modulation, we can take advantage of the shorter wavelengths of that band to build a smaller antenna. An antenna system assembled for the audio frequency range, for instance, would be enormous, although such systems have been constructed.^{1,2} For the radio amateur with an average-sized lot, this is reason enough for using modulation! Another use is that one can take advantage of propagation characteristics by translating the message to a particular frequency. As an example, conventional, long-haul communication is typically done in the hf bands rather than uhf. In this respect we gain some control over the propagation of our message. Last, by moving message signals to unique spectral locations, or channels, interference from other messages may be avoided.

At this point it is hoped that the use of modulation is well justified. Indeed, it is fundamental to radio communications. As will be shown, there can be significant

performance differences between modulation types. Even the casual observer can recognize the noise performance advantage of fm over a-m. In an effort to quantify such observations, the remainder of this article is devoted to introducing the

relations which mathematically describe the noise performance of various modulation systems. The relations given are simple and understandable, yet provide considerable insight into modulation characteristics. The section that follows

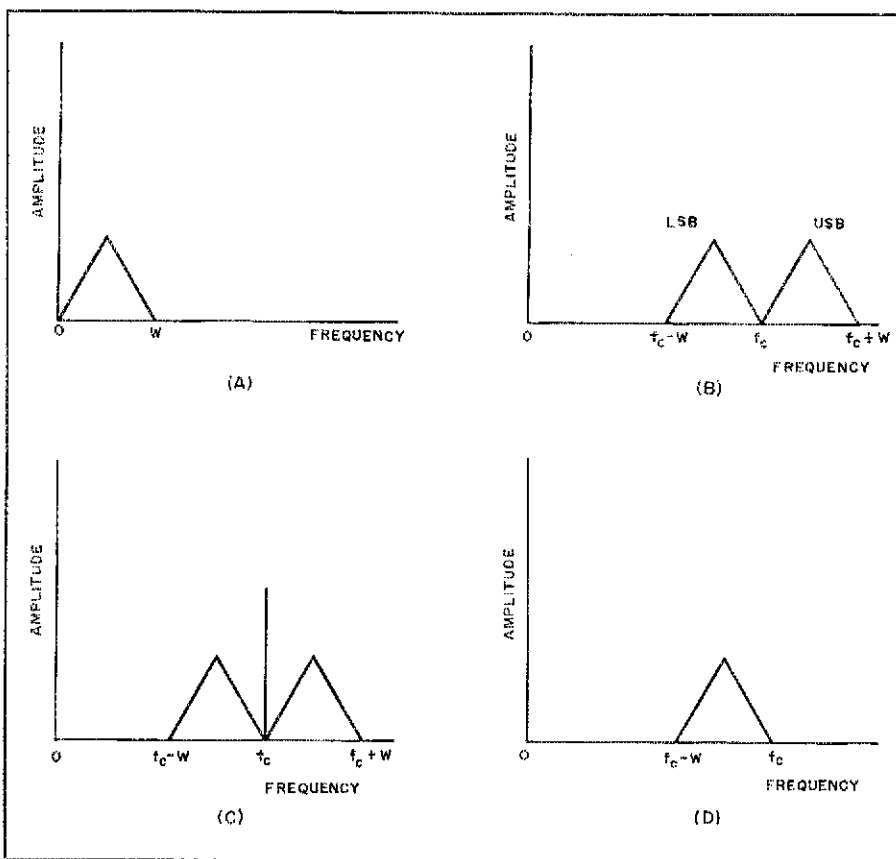


Fig. 1 — At A, the spectrum of the modulating, or message, signal is shown. A double-sideband spectrum is shown at B. At C is the spectrum of an a-m signal, while the spectrum of a single-sideband signal is shown at D.

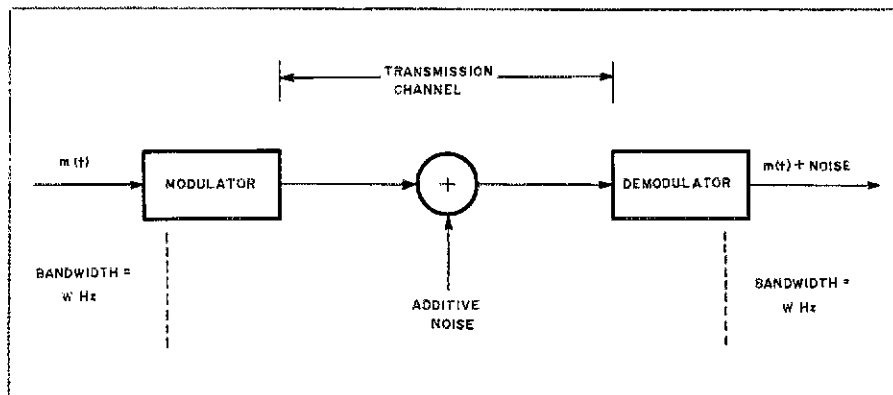


Fig. 2 — Block diagram of a basic communication system.

reviews some modulation basics and introduces notation which will be used in the discussion on noise.

Basics of Analog Modulation

The output of an analog modulation system is a continuously variable signal which is proportional to the message signal in some manner. Double-sideband (dsb) modulation is the result of a simple multiplication of a carrier by the message signal, $m(t)$. The output of a dsb modulator is

$$x(t) = m(t) \cos 2\pi f_c t \quad (\text{Eq. 1})$$

where f_c is the carrier frequency. The frequency domain representation of a dsb signal is shown in Fig. 1B. Note that the message-signal spectrum appears on either side of the carrier frequency, resulting in an upper sideband and a lower sideband. A message-signal bandwidth of W Hz yields a dsb signal bandwidth of $2W$ Hz. An inherent disadvantage in the use of dsb modulation is that a cw signal of the same frequency as f_c is needed for demodulation. This increases the complexity of the receiver. A demodulator using a cw signal of the same frequency and phase synchronism as the carrier, called a coherent demodulator, is desirable. In general, it is the most complex type to implement but yields the best linearity and noise performance.

When a dc bias (K) is added to the message signal prior to the modulation process described above, amplitude modulation (a-m) results. This is described by

$$x(t) = [K + m(t)] \cos 2\pi f_c t \\ = K[1 + i m_n(t)] \cos 2\pi f_c t \quad (\text{Eq. 2})$$

where $m_n(t)$ is constrained between 1 and -1, and $i = |\max \text{ amplitude of } m(t)|/K$. The parameter i , known as the modulation index, is an indication of the degree to which the a-m carrier is modulated. As shown in Fig. 1C, the spectrum of an a-m signal is identical to dsb except that a car-

rier component is present in a-m. Although this carrier component transmits no information and thus is wasted power, it does allow for a simpler receiver than that used for dsb. The bandwidth of a-m is identical to dsb for the same message signal.

Transmission of both an upper sideband and a lower sideband is not really necessary because each by itself contains all the information needed for reconstructing the message signal. Eliminating one of the sidebands of a dsb signal yields a single-sideband (ssb) signal. The resulting bandwidth is W , the same as the message signal bandwidth. Single-sideband transmission requires a relatively complex transmitter and receiver.

Dsb, a-m and ssb are all examples of amplitude modulation. Phase modulation (pm) and frequency modulation (fm) are examples of angle modulation. A pm signal is described as

$$x(t) = \cos [2\pi f_c t + k_p m(t)] \quad (\text{Eq. 3})$$

where k_p is the phase deviation constant.

A description of the spectrum of an fm or pm signal is a complex task and in fact would reveal a signal of infinite bandwidth. Fortunately, the power is negligible in sidebands far from the carrier frequency. This fact permits an expression for the bandwidth (B) of an angle-modulated signal which is known as Carson's Rule:

$$B = 2(D + 1)W \quad (\text{Eq. 4})$$

where D (deviation ratio) is the ratio of the peak carrier-frequency deviation to the corresponding maximum-frequency component of the message. For D much less than one, the resulting signal is a narrowband angle-modulated signal. D much greater than one yields a wideband angle-modulated signal.

Noise

We are now at a point where the effects of noise in modulation systems can be considered. Noise is present everywhere.

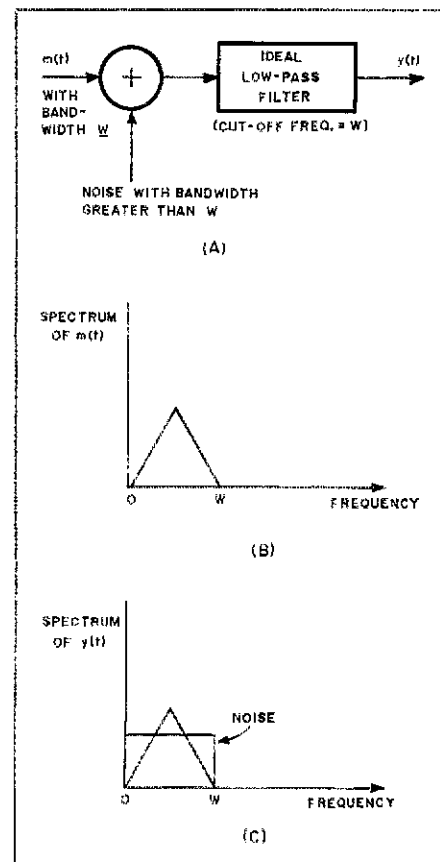


Fig. 3 — A baseband communication system. At A is the block diagram. At B is the spectrum of the message signal, and C shows the message signal after the addition of system noise and low-pass filtering.

In communication systems, it causes random degradation of signals in their journey from transmitter to receiver. The effects of noise in communication systems depend on the type of modulation being used. In fact, modulation can actually reduce noise, but not without a trade-off, as will be shown.

There are many ways of comparing the relative merits of communication systems. In this discussion, the signal-to-noise ratio (SNR) following detection shall be the basis for comparing the noise performance of modulation systems. Fig. 2 illustrates the basic system under study in block diagram form.

Although this article concerns noise in modulation systems, the first noise analysis will be of a system which involves no modulation or demodulation. Such a configuration, called a baseband system, is shown in Fig. 3. Assume the message signal, $m(t)$, has bandwidth W Hz and a power of P watts. The noise has a spectral power density of N watts/Hz. Low-pass filtering improves the SNR by not passing noise above W Hz. The amount of noise present in the system output is

$$(N \text{ watts/Hz}) (W \text{ Hz}) = NW \text{ watts (Eq. 5)}$$

and the baseband system SNR at the filter output is therefore

$$\text{SNR} = \frac{P}{NW} \quad (\text{Eq. 6})$$

(the ratio of signal power P to noise power NW).

The SNR of the baseband system is presented as a reference for comparison to the SNR of other systems. Except for this purpose, the baseband communication system is of limited use to the radio amateur. For the remaining, more complex communication systems, the SNR will simply be given without derivation. Analysis of these systems is beyond the intent of this article, but excellent texts are available for those interested.^{3,4}

We will now consider the noise performance of several practical amplitude modulation systems. Interestingly, the SNR of both dsb and ssb following coherent detection is P/NW , which is identical to the baseband system. Therefore, if signal-to-noise ratio is the sole basis of system performance comparison, dsb and ssb would be equal candidates. Trade-offs enter the picture when the wider bandwidth of dsb versus the added complexity of ssb is considered.

The discussion of the basics of analog modulation mentioned that the carrier component of an a-m signal is wasted power. Once can therefore surmise that the noise performance of a-m is inferior to dsb or ssb. The SNR for a-m after coherent detection is

$$\text{SNR} = \frac{i^2 \overline{m_n^2}}{1 + i^2 \overline{m_n^2}} \left(\frac{P}{NW} \right) \quad (\text{Eq. 7})$$

where $\overline{m_n^2}$ is the mean squared value of the

normalized message signal and i is the modulation index. As an example, for $\overline{m_n^2} = 1$, as is the case for a square wave message signal, and a modulation index of one, a-m SNR is $P/2NW$, which indeed is 3 dB worse than dsb and ssb. Substituting a sine-wave message ($\overline{m_n^2} = 0.5$), $\text{SNR} = P/3NW$. The fact that typically $\overline{m_n^2}$ is about 0.1 and i is less than one reveals further the poorer noise performance of a-m over dsb and ssb. As if that isn't bad enough, we have only considered coherent demodulation of an a-m signal. An advantage of a-m is that simpler, non-coherent demodulation techniques such as envelope detection can be used. Such techniques trade simple implementation for noise performance inferior to the coherent system described above. Therefore, the a-m SNR given earlier is the best that one can hope to achieve with ideal conditions. In spite of the relatively poor performance of a-m, it is popular in broadcast applications because of the simple detectors which can be used.

Thus far, this investigation has not revealed a modulation system with better noise characteristics than the baseband system. As we turn now to angle modulation systems, just such an improvement is evident. Exactly how much better is angle modulation over amplitude modulation? The expression for the signal-to-noise ratio of a pm system is

$$\text{SNR} = K_p^2 \overline{m_n^2} \left(\frac{P}{NW} \right) \quad (\text{Eq. 8})$$

In that $K_p \overline{m_n^2}$ is constrained to a maximum value of π to allow unique demodulation, $K_p^2 \overline{m_n^2}$ cannot exceed π^2 . Therefore, the noise performance of a pm system is at best about 10 dB better than the baseband

system. Of even greater significance, in an fm system

$$\text{SNR} = 3 D^2 \overline{m_n^2} \left(\frac{P}{NW} \right) \quad (\text{Eq. 9})$$

This relation reveals a noteworthy property of fm. By increasing the deviation ratio, D , one can realize ever-increasing signal-to-noise ratios! Unlike pm, there is no theoretical upper SNR boundary. As long as the received fm signal is above the operating threshold of the demodulator, one can achieve any SNR at the expense of increased transmission bandwidth. Significant noise improvement begins when the carrier-frequency deviation is large compared to the message-signal bandwidth. Note that for a narrowband fm signal, where D is much less than one, the SNR falls below that of baseband. In the early days of radio, fm experiments proved disappointing for this reason because the fm signals were limited to a relatively narrow bandwidth, mimicking that of an a-m signal. Not until 1933, when Edwin Armstrong used an fm signal which swung over a very wide bandwidth, was the advantage of fm realized. One can see this benefit in the following example: For the case of a wideband fm signal, assume $D = 10$ and a sine-wave message ($\overline{m_n^2} = 0.5$). This yields an SNR which is a factor of 150 or 21.8 dB better than baseband. Examining the bandwidth penalty by applying Carson's Rule (Eq. 4), one finds that such a signal has a bandwidth of 22W Hz as opposed to W Hz for baseband.

Summary

Having established the purpose and need for modulation and having developed the basics of analog modulation, we have explored the noise performance of some systems in common use by radio amateurs. With the equations provided, the performance of these modulation systems in the presence of noise can be quantitatively compared. Indeed, we have discovered that the various signals which carry our communications are not all equal performers. Angle modulation techniques can yield much-improved performance over amplitude modulation, but the superior performance of pm and fm systems is gained at the expense of wide transmission bandwidths. Table I condenses modulation-system trade-offs. Given the often demanding communications environment amateurs experience, it is hoped that the preceding brief treatise sheds some light on the effects of noise in radio communication.

Notes

- ¹Ruhe, "ELF In Warfare," *Signal*, January 1979.
- ²Black & Lindstrom, "TACAMO," *Signal*, September 1978.
- ³Ziemer and Tranter, *Principles of Communications*, Houghton Mifflin Co., Boston, 1976.
- ⁴Schwartz, Bennett and Stein, *Communication Systems and Techniques*, McGraw-Hill, New York, 1966.

Table 1
Modulation-System Trade-offs

Modulation System	Postdetection SNR	Required Bandwidth	System Complexity
Baseband	$\frac{P}{NW}$	W	minor
Dsb with coherent demodulation	$\frac{P}{NW}$	2W	moderate
Ssb with coherent demodulation	$\frac{P}{NW}$	W	major
A-m with coherent demodulation	$\left(\frac{i^2 \overline{m_n^2}}{1 + i^2 \overline{m_n^2}} \right) \left(\frac{P}{NW} \right)$	2W	moderate
Pm above threshold	$K_p^2 \overline{m_n^2} \left(\frac{P}{NW} \right)$	$2(D + 1)W$	moderate
Fm above threshold	$3 D^2 \overline{m_n^2} \left(\frac{P}{NW} \right)$	$2(D + 1)W$	moderate

Verti-Beam III — A Multidirection 20-Meter Antenna

Radiation patterns of this array, covering 360 degrees, are selected with a simple relay circuit. No "tricks of the trade" are needed for matching or tuning. It's a fun antenna!

By James A. Turner,* W9LI

Trees are gifts of nature offering aesthetic appeal to nearly everyone. To the radio amateur they have a special value, for almost intuitively the amateur sees trees as a practical means of supporting wire antennas. Where trees are well spaced, installation of horizontal antennas generally is a task accomplished without tribulation. But when there is an abundance of arboreal growth, putting up such an antenna may often be nearly impossible. That is the way it is here at W9LI.

Being blessed with such a situation, one could say my choice was either to demolish much of my "forest" or seek a simpler solution. Nature seemed to dictate the simpler approach. The W9LI antennas would be vertical.

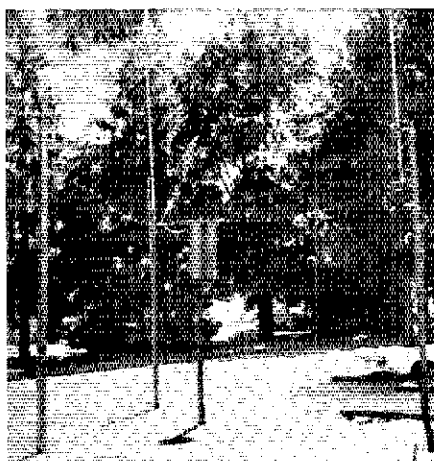
A Practical Antenna That Seems Best

Although the advantages of vertical antennas were known to radio engineers in the earliest days of radio, relatively few amateurs took advantage of the low-angle radiation and DX capabilities of this type of antenna until after World War II. Today the vertical is favored not only by DXers, but also by those amateurs who are not fortunate enough to have sufficient land available for stretching out a large horizontal antenna.

Over the years, I have tried numerous vertical antennas in a variety of configurations. My latest, which I am about to describe, seems to be the most practical and, in my opinion, the best of the lot.

A Three-Element Vertical Array

The W9LI antenna is designed to provide not only additional gain, but also to



The W9LI 20-meter array. Vertical elements are mounted on self-supporting posts. The relay control box containing the matching network is mounted on the center post. Open-wire line feeds the individual radiators.



The author mounted the vertical elements as illustrated by this photograph. One wire of the transmission line can be seen terminated at the bottom of the radiator. The other wire is supported by an insulator.

provide a choice of directional patterns. As you can see by examining Fig. 1, two relays serve to switch the elements from one pattern to another with the result that there is 360-degree coverage. The system consists of three half-wave, self-supporting 20-meter elements set in an equilateral triangle. Each side of the triangle is 17 feet or approximately $1/4$ wavelength.

Open wire (Zepp) feeders voltage feed the bottom of each vertical radiator. Two elements are fed in phase and the other out of phase. The signal is beamed through the two in-phase elements and in the direction of the out-of-phase element. Relays switch the elements so that 360-degree coverage is obtained. Curves in *The ARRL Antenna Book* show 1-dB gain for the in-phase elements at the indicated spacing and 4-dB gain for out-of-phase elements. We could estimate the gain, therefore, to be about 5 dB.

How the Array is Made

Each vertical element is mounted on an 18-foot (5.5-m), 4×4 in. (100 \times 100-mm) redwood post set four feet (1.2 m) in the ground. This places the bottom of the elements 11-1/2 feet (3.5 m) above ground. There is nothing sacred about this height except that it puts the fairly high rf voltage points out of the reach of neighborhood youngsters.

I chose 61ST aluminum tubing with 0.058-inch (1.47-mm) wall thickness for the elements. This choice allows the elements to telescope with a 0.009-inch (0.23-mm) clearance. The first segment of each element has a 1-1/2-inch (38.1-mm) OD with a 1-3/8-inch (34.9-mm) OD piece inserted in the full 12-foot (3.7-m) length. There is a very practical reason for this, namely to stiffen the first segment and allow it to bend in a long arc during high

*Editor's Note: After accepting Mr. Turner's article for publication, we were saddened to learn of his passing.]

winds. Previous experience has shown that a sharp bend results in permanent damage to aluminum tubing. So far, the antenna has weathered 80 mi/h winds with no resulting harm to the array.

The next section is formed with 1-1/4-inch (31.8-mm) OD tubing, 12 feet (3.7 m) long. Then follow three 4-foot (1.2-m) sections, 1-1/8-inch (28.6 mm) OD, 1 inch (25.4 mm) OD and finally 7/8 inch (22.2 mm) OD. Each section is telescoped 9 inches (229 mm) into the next larger section. A self-tapping screw is placed in each larger section before assembly to act as a stop. Each joint is secured with three self-tapping screws. It would have been better to slot the sections, use some anticorrosion compound and a hose clamp. As it is, the thing will probably never come apart. The overall length of each element is 33 feet (10.1 m). All three elements are mounted on the poles with some old power-line insulators. Stainless-steel strapping provides the electrical connection at the bottom of each element.

The Feed System

As indicated in Fig. 1, 450-ohm ladder line connects the elements to the central tuning box containing the relays and matching network. Each of these feed-line segments is 10 feet (3.0 m) long. All must be exactly the same length. As with the familiar Zepp antenna, the transmission line is connected to one end of the radiating element in the manner shown in Fig. 1. One wire of the 450-ohm line is attached to the radiator, and the other wire is dead-ended at an insulator on the pole.

The directivity switching relays inside the tuning box must be fairly rugged if they are to withstand normal use under medium or higher power conditions. Those at W9LI are Advance products. A few years back, when 500-ohm transmission lines were popular, Advance relays were commonly used in antenna-changeover units. At the present time, they are rather expensive. Mine were acquired through the generosity of W9NEX and by the fortune of purchasing one at low cost at a hamfest.

As the Zepp feeders are less than 1/4-wavelength long, a simple series tuner is sufficient for matching purposes. L1 is wound with no. 12 tinned copper wire placed on a grooved 2-1/2-in. (64-mm) diameter ceramic form. Spacing between turns is equal to the diameter of the wire. There are four turns on either side of the three-turn center link, L2, as indicated by Fig. 1.

C1 and C2 are also "scroungees" from a hamfest. High-voltage, wide-spaced capacitors are not necessary because the voltage is low at this point. The tuner is fed by buried RG-8/U cable extended from the shack. Regular rotator control cable, also buried, carries the relay control voltage.

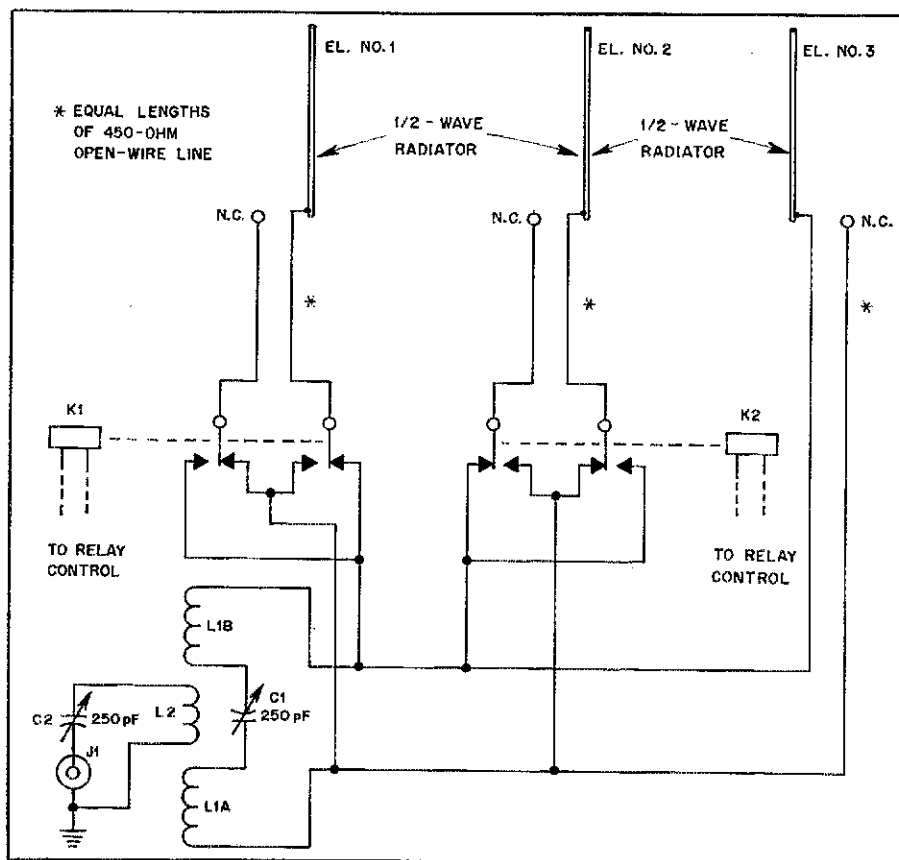


Fig. 1 — Circuit diagram for the W9LI vertical antenna array. Relays enable the operator to switch radiation patterns covering a full 360 degrees. Lengths of the 450-ohm ladder line must be equal (see text). A simple network provides proper matching between the coaxial line from the transmitter and the antenna-system load. Relay contacts should be rugged enough to handle the anticipated rf current flow to the open-wire lines. A variable link (not essential), placed between the two sections of L1, will permit adjustment for maximum coupling. Pattern directivity switching is obtained by energizing K1 only, or K1 and K2 together.

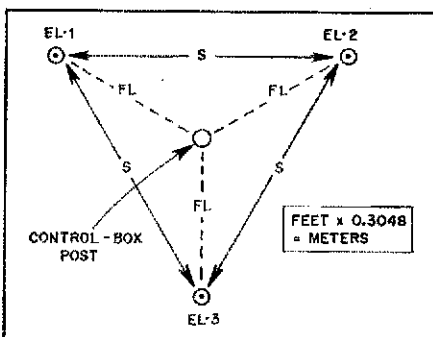


Fig. 2 — A top view of the W9LI antenna array. Spacing (S) between each pair of elements is 17 feet. Feed-line length (FL) from the control box to each element is 10 feet.

Two knife switches control the relays during tune-up. A third switch keys the transmitter. All control wires are bypassed to ground with 0.001- μ F mica capacitors.

Ground radials, either buried or otherwise, are not needed for the sake of good radiation. This is helpful where space is at a premium. Nevertheless, a ground for lightning protection is desirable. Also, in the case here at W9LI, a ground connected to the braid of the coaxial cable at the antenna end of the line cleared up a

case of fundamental-overload TVI.

Tuning the array is simple. Insert an SWR meter in the coaxial line at the antenna tuner and adjust C1 for minimum SWR. C2 primarily compensates for reactance of the link. Touch-up of C2 may be required but once that is accomplished, the job is done.

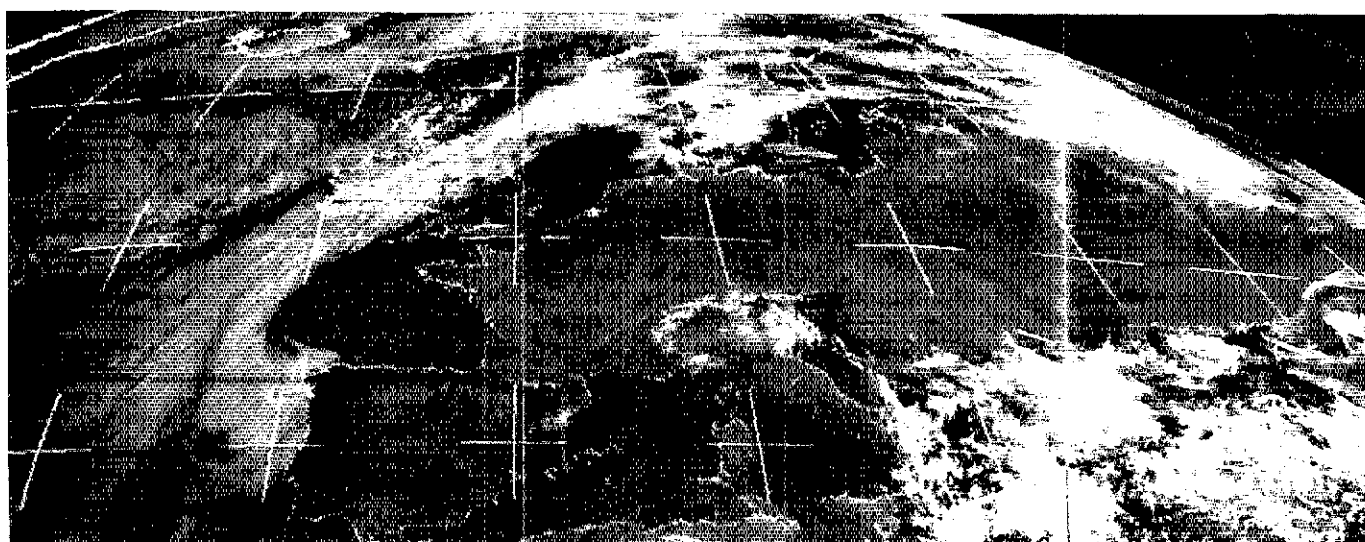
No vertical is an ideal receiving antenna under most circumstances. This one, however, does show good directivity and gain on low-angle DX signals as compared with a 5/8-wave antenna. Side discrimination is good. On short skip such as high-angle stateside signals, the discrimination leaves something to be desired.

Transmitting performance, on the other hand, is good both from the standpoint of directivity and gain. Of course, it has caused no frustration among those amateurs who have high Yagis and four-element quads, but I am pleased by the results. The first morning I tried the antenna, I contacted two VUs with little effort. Since that time, the array has held its own in pileups during DXpeditions, special prefix races and the like. I think it would be fair to say, though, that some of those 599 push-button reports should be discounted a bit!

An S-band Receiving System for Weather Satellites[†]

How's the weather? Be ahead of any backyard weather forecasters in your neighborhood by building this satellite receiving system. With it and some surplus facsimile equipment you can receive weather pictures from space!

By Guido Emilani,* I4GU, and Marciano Righini,** I4MY



Europe as seen by Meteostat. This is a composite of three images received by I4GU/I4MY on May 15, 1979.

Have a look at Fig. 1. In all probability your location lies within one or even two of the areas enclosed in the dotted lines (telecom coverage). This means that you are in a position to receive the signals from one or two of the five geostationary weather satellites which are positioned over the equator at intervals of about 70 degrees of longitude. Before deciding that the reception of a geostationary weather satellite is a feasible project, let's examine the pros and cons of the matter.

Advantages:

- 1) A geostationary satellite is at a "fixed" position in the sky and need not be tracked. The antenna is aligned only once.
- 2) The antenna need not be tower-mounted. Installation at ground level is fine, as long as the "view" of the satellite

*Via Fratelli Bandiera 18, I-48018 Faenza, Italy

**Via Colombo Lolli 8, I-48100 Ravenna, Italy

[†]Adapted from a similar article which appeared in *Radio Rivista* (ARI), July 1979.

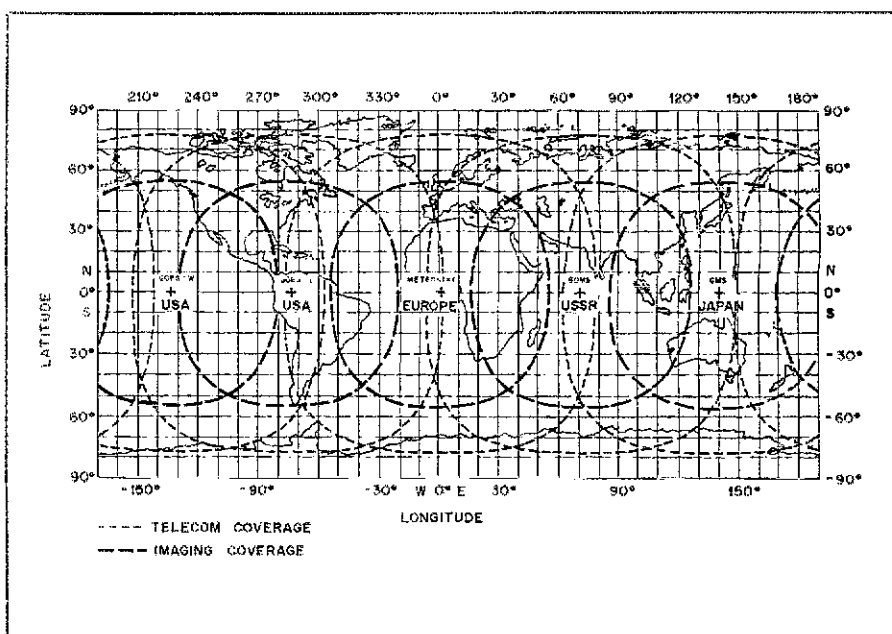


Fig. 1 — Coverage areas of the five geostationary weather satellites.

is not blocked by trees or buildings.

3) The frequency used by the weather satellites is free from man-made electrical noise and not subject to Faraday rotation.¹

4) The satellites operate 24 hours a day.

5) They have a common downlink frequency. In a suitable location, two satellites can be received with the same equipment simply by re-aiming the antenna.

¹Notes appear on page 33.

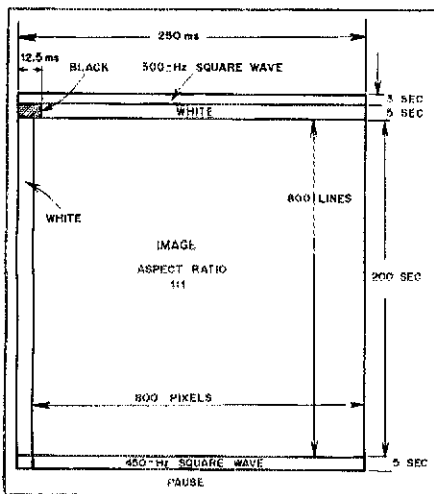


Fig. 2 — The WEFAX image format.

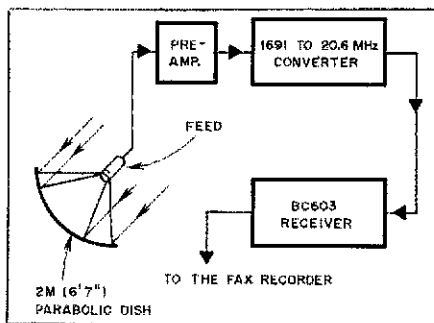


Fig. 3 — Block diagram of the 1691-MHz receiving system.

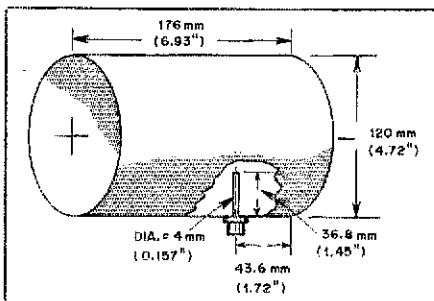


Fig. 4 — The tubular radiator for 1691 MHz consists of a metal cylinder with one end open. This end faces the dish. The rod element should be soldered directly to the type-N connector. The connector should have a provision to slide 5 mm (0.197 in.) forward and backward to find the best position.

6) The format of their APT-WEFAX images is the same all over the world and no changes in the format are planned.

Disadvantage:

The satellites transmit at 1691 MHz. Construction of receiving equipment for this frequency can be difficult even for the experienced amateur.

Reproducibility of the Receiving System

We have been receiving weather pictures from all the USA and USSR polar-orbit satellites for 10 years. Last year, after Meteosat, the first European geostationary weather satellite, was launched, we decided the advantages far exceeded the disadvantage! We

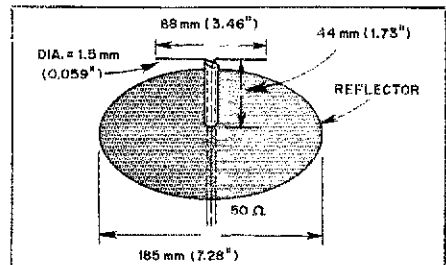


Fig. 5 — Dipole and reflector for 1691 MHz. The two branches of the dipole are soldered to the inner and outer conductors of a 50-ohm coaxial cable. The cable is held in position by a metal tube.

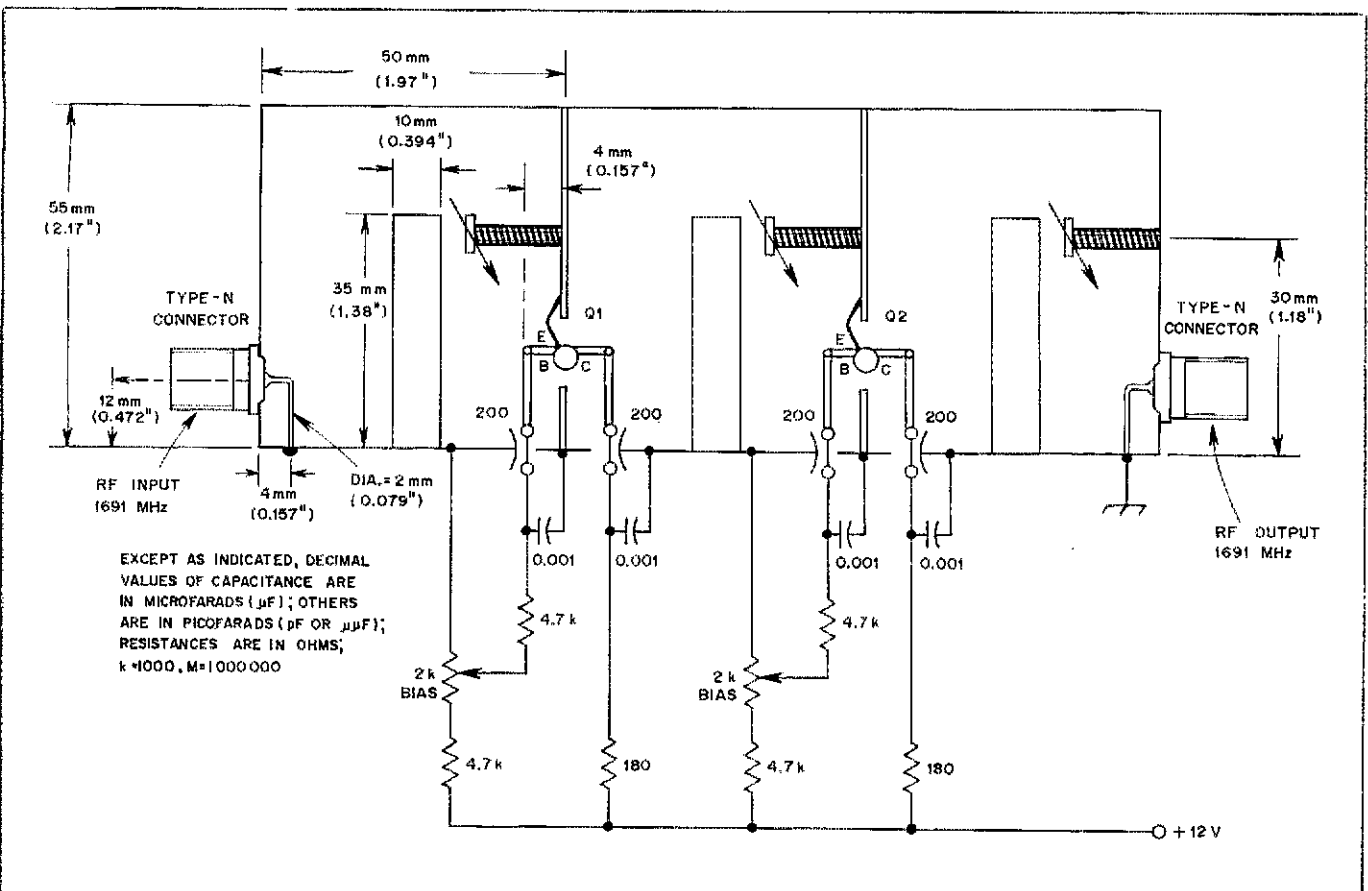


Fig. 6 — The 1691-MHz preamplifier. Q1 and Q2 are BFR-91 transistors. All three cavities are identical; dimensions shown for the left-most cavity also apply to the two cavities on its right.

experimented for several months and succeeded in developing a receiving system that can be duplicated without too much difficulty. Indeed, it has been constructed tens of times by amateurs here, always with good results.

The International Global System

The system of satellites is designed to contribute to the Global Atmospheric Research Program (GARP) and to the World Weather Watch (WWV) of the World Meteorological Organization.² An international group for Coordination of

Table 1
Status of the International Satellite System

Operator	Satellite Name	Location	Status
ESA (Europe)	Meteosat	0° E	in operation
Japan	GMS	140° E	in operation
USA	GOES-E	75° W	in operation
USA	GOES-W	135° W	in operation
USSR	GOMS	70° E	not yet launched

Geostationary Meteorological Satellites (CGMS) has been able to relate many aspects of the system, so that in many cases the modes of operation are quite similar even though the satellites themselves were constructed in different countries.

The status of the system is shown in Table 1. The GOMS spacecraft has not been launched as of this writing; it is expected to have similar functions to the other four. As a special effort on the part of the USA and the European Space Agency (ESA), a third GOES spacecraft

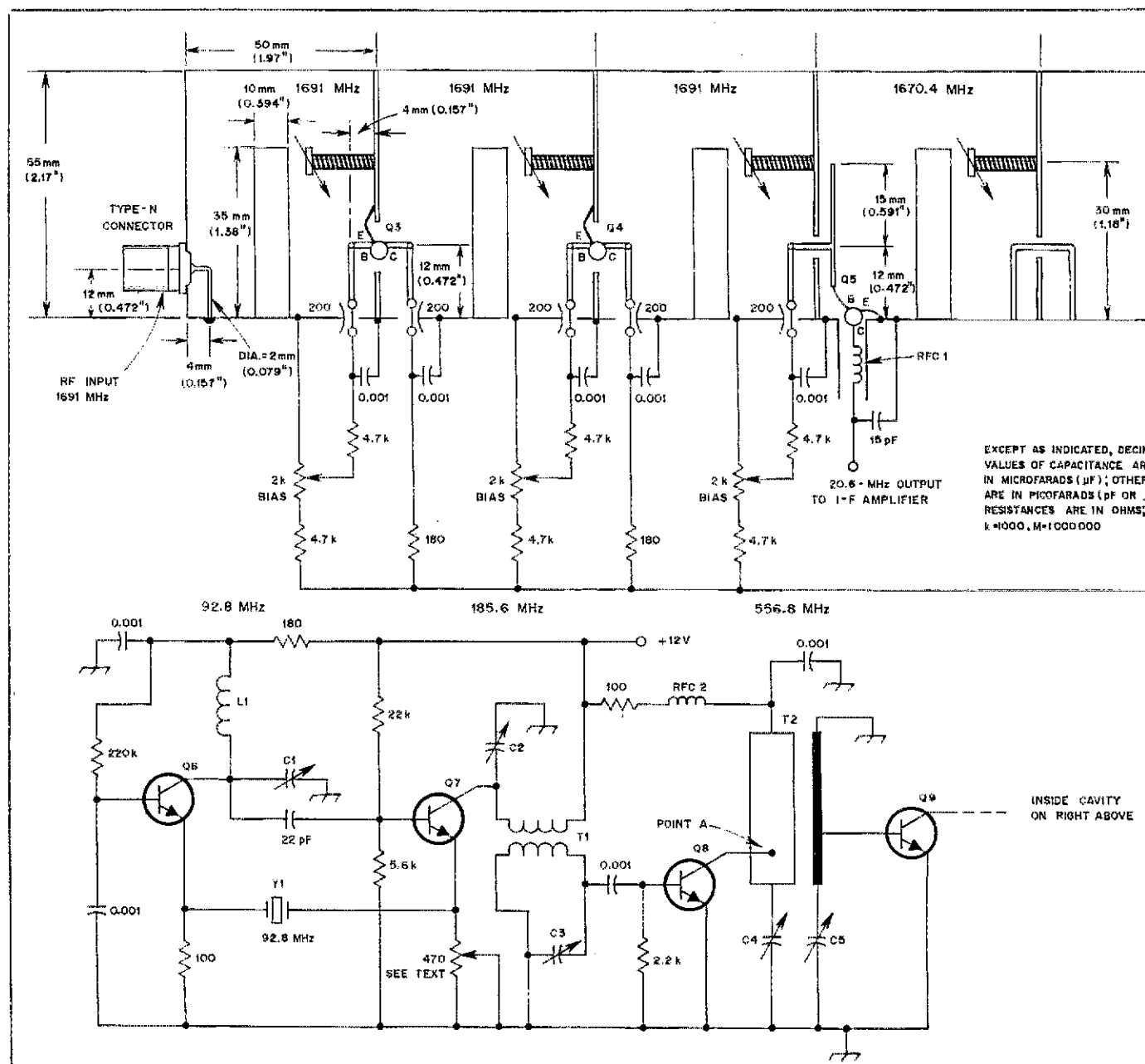


Fig. 7 — The rf amplifier, mixer and LO chain. The triplers, Q7 and Q8, are shown twice; once in schematic form (above) and once in mechanical layout form (upper right). All five cavities are identical; dimensions shown for the left-most cavity also apply to those on its right.

C1 — Miniature ceramic trimmer, 6-30 pF.

C2, C3 — Piston trimmer, 2-10 pF.

C4, C5 — Piston trimmer, 1-5 pF.

L1 — Seven turns of no. 18 AWG copper wire, air core, 6-mm (0.236 in.) diameter.

Q3, Q4, Q5, Q9 — Vhf/uhf amplifier, silicon npn, BFR-91.

Q6, Q7 — Video amplifier, silicon npn, BF-155.

Q8 — Uhf amplifier, silicon npn, BFY-80.

RFC1 — 50-mm (1.97 in.) length of copper wire air wound with a 3-mm (0.118 in.) diameter.

The coil is inserted in a small copper or brass tube in the bottom of the cavity.

RFC2 — 100-mm (3.937 in.) length of copper

was operated over the Indian Ocean during the year of the First GARP Global Experiment (FGGE) from December 1, 1978 until November 30, 1979. It has now been moved west to another location to form part of the GOES-E/W system. This spacecraft is functionally identical to GOES-E and GOES-W but is being operated by ESA.

The Spacecraft and their Sensors

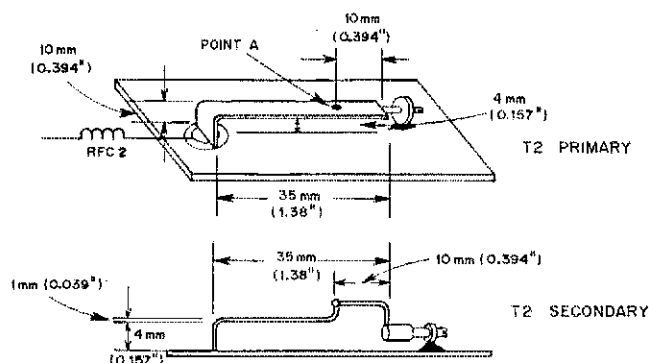
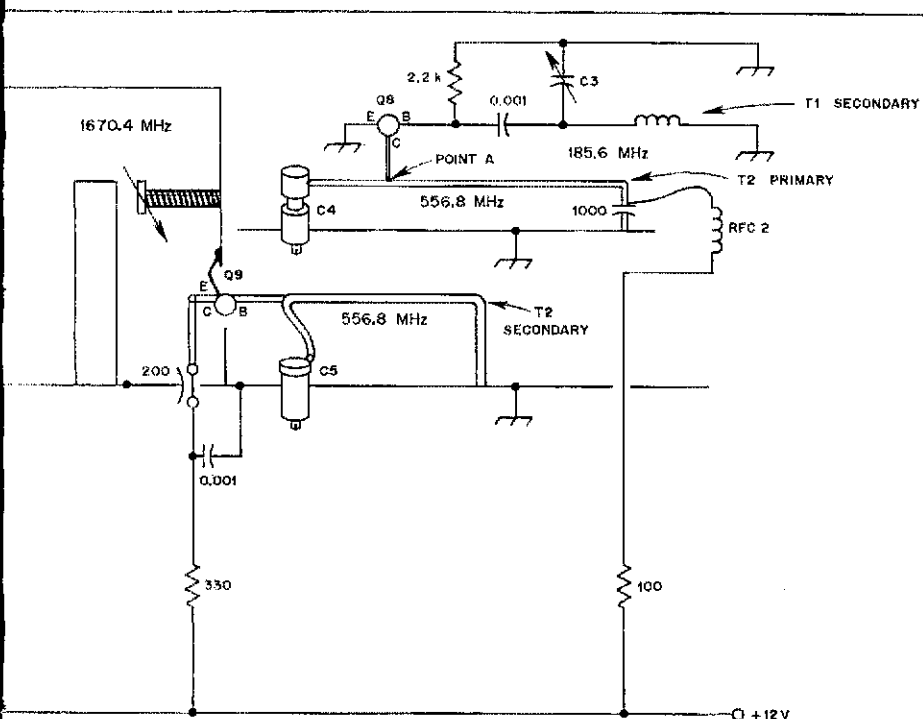
Some characteristics of the satellites are given in Table 2. All three spacecraft are

spin-stabilized and rotate at 100 rpm with the spin axis nearly parallel to the N-S axis of the earth. They each carry a radiometer as the main meteorological payload. In each case the radiometer is used for imaging, using the same principle as that used for earth scanning. A line of data is collected by the spinning of the satellite about an axis parallel to the N-S axis of the earth, and successive lines are obtained by the stepping of the telescope to a new line of latitude after each spin of the spacecraft.

Table 2

Main Characteristics of Geostationary Weather Satellites and APT-WEFAX Transmission

<i>Rf</i>	
Transmit antenna polarization	Linear hor.
Carrier modulation	Fm analog
Carrier deviation	± 9 kHz
Rf bandwidth	26 kHz
<i>Video</i>	
Sub-carrier frequency	2400 Hz
Sub-carrier modulation	A-m
Black level	Minimum — 5%
White level	Maximum — 80%
Base band video	1600 Hz
Line rate	4 Hz (240 lines/min.)
Index of cooperation	267.36
Direction of horizontal scan	Left to right
Direction of vertical scan	Top to bottom



wire air wound with a 3-mm (0.118 in.) diameter.

T1 — Primary and secondary are each 3-1/2 turns of no. 18 AWG copper wire, air core, 6-mm (0.236 in.) diameter; the two windings are interleaved.

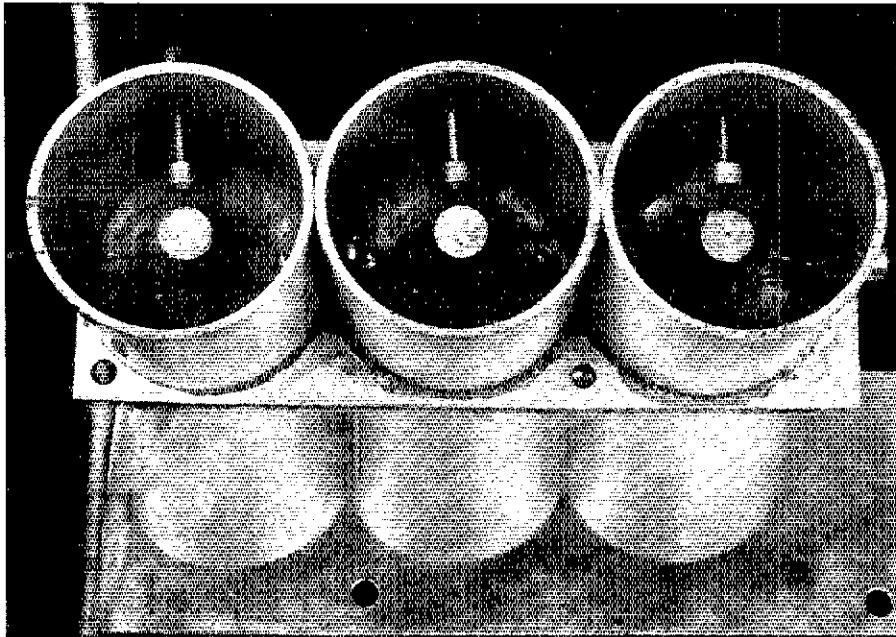
T2 — The primary is made from a 35 x 10-mm (1.38 x 0.394 in.) copper strap; the secondary is 35 mm (1.38 in.) of no. 18 AWG copper wire. See drawing above and photo for details.

The differences among the three radiometer types incorporated in the satellites are relatively minor, except that *Meteostat* is the only spacecraft of the five to have a water-vapor channel, and scans from east to west and from south to north — the opposite of both *GOES* and *GMS*.

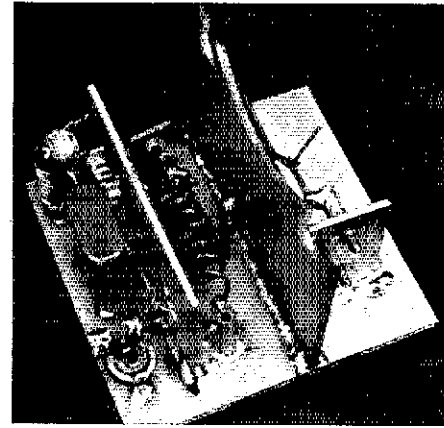
For information dissemination, all use the common frequency of 1691.0 MHz. As regards data formats, only the *WEFAX* transmissions have been standardized by the *CGMS*: This format is identical for all satellites, and standard recording equipment can be used worldwide. Two differences should be noted, however. *Meteostat* has an additional independent dissemination channel at 1694.5 MHz. Also, *GMS* transmissions have a 260-kHz bandwidth as opposed to the 26-kHz bandwidth of *GOES* and *Meteostat*. This would necessitate a change of filter in the receiver to ensure reception of both types of *WEFAX* transmissions. For further information on individual aspects of the satellites (dissemination schedule for instance), apply at the space agency liable for the spacecraft you wish to receive.

The APT-WEFAX Format

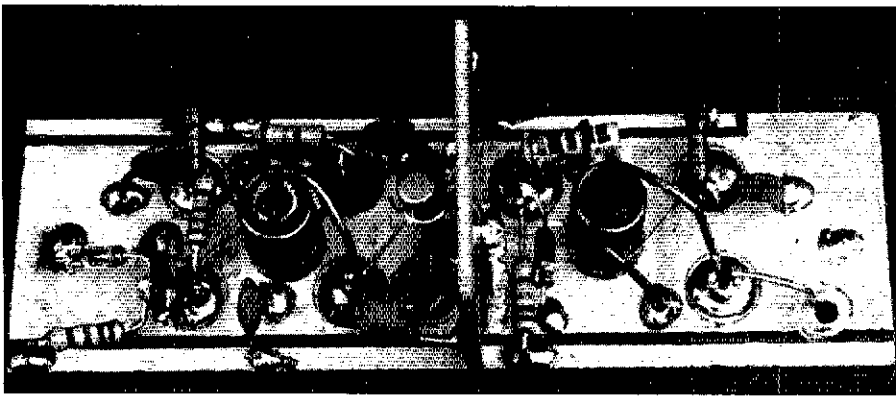
APT (automatic picture transmission) is a slow-scan image-transmission system. Its data is analog. *WEFAX* stands for Weather Facsimile.³ The *WEFAX* format of the images from all geostationary satellites is shown in Fig. 2. The image is preceded by the transmission, for three seconds, of a square-wave signal at 300 Hz for the supply of current to the facsimile equipment. The line synchronization code which follows consists of 20 lines (five seconds). The black level transmitted at the beginning of these lines lasts 5% of the duration of the line (12.5 ms). The rest of



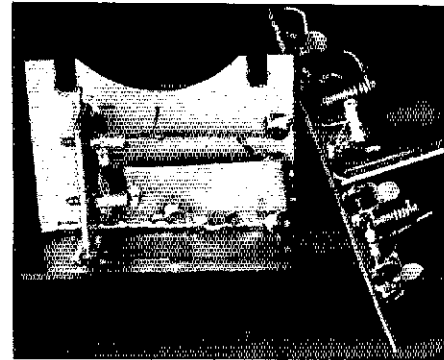
The preamplifier cavities from above, shown without lid.



The local oscillator and multiplying stages. Note the construction technique, using double-sided pc board as chassis, ground plane and shield.



The i-f amplifier. Note the pc-board shield separating input and output circuitry.



A side view of the local oscillator chain showing T2 at 556.8 MHz. The wire attached to the secondary connects to the base of Q9 when the LO assembly is mounted on the converter. On the right is another view of the i-f amplifier.

the line (237.5 ms) is at white level. After this synchronization code, the 800 lines of the image are transmitted. Each of these lines begins with a white level (in which there are seven phasing bars) of a duration of $1/21$ of a line (11.9 ms). The rest of the line, bearing the image, lasts 238.1 ms. The image is followed by the transmission, for five seconds, of a 450-Hz square-wave signal to switch off the facsimile equipment.

Receiving the Satellites

The 1691-MHz receiving system at 14MY is shown in Fig. 3. It uses a 2-meter (6 ft, 7 in.) diameter homemade parabolic dish. Using a surplus dish would undoubtedly make the project much easier. If higher quality transistors were used in the preamplifier than those called for here, a smaller dish could perhaps be used, but 2 meters is a desirable diameter for a consistently usable signal.

Two types of antenna feed were tried: a tubular radiator (Fig. 4), and a dipole with reflector (Fig. 5). Dipole feed is used here,

although good results were obtained with both types. Since the signal from the satellite is horizontally polarized, the feed must be placed horizontally in the dish.

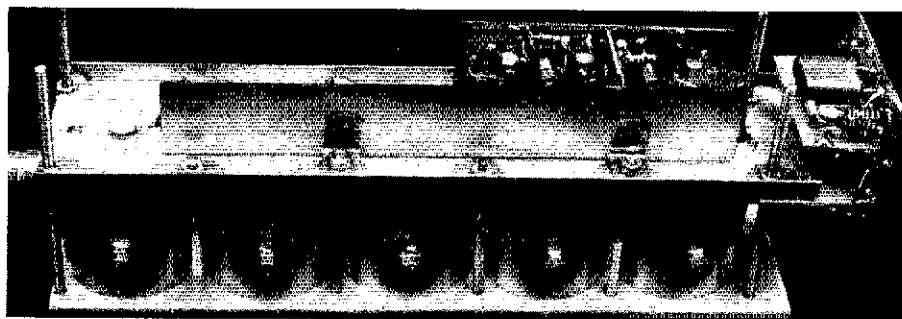
The 1691-MHz preamplifier, shown in Fig. 6, consists of two cascaded identical stages, each using a BFR-91 transistor. The three silver-plated resonant cavities are cut from a 50-mm copper or brass tube. In the center, each contains a coaxial line which is tuned with an air capacitor. These are made with fine-thread screws supported by nuts soldered to the sides of the cavities. The two emitters are soldered to the inner cavity sides. Adjust the bias potentiometers for 9 volts at the collectors of the two BFR-91 transistors.

The Down-converter and Tunable I-F

After preamplification, the satellite signal is converted to 20.6 MHz. A surplus BC-603 receiver is used as a tunable i-f. This receiver can easily be found in the surplus market¹ and can tune the 3.5-MHz bandwidth required to receive both



The authors and the 2-m (6 ft, 7 in.) parabolic dish. The feed is a dipole with reflector. The preamplifier is mounted at the antenna for minimum cable losses and is wrapped in a nylon bag.



The entire converter: the five cavities with their lid, and the LO and I-F amplifier assemblies.

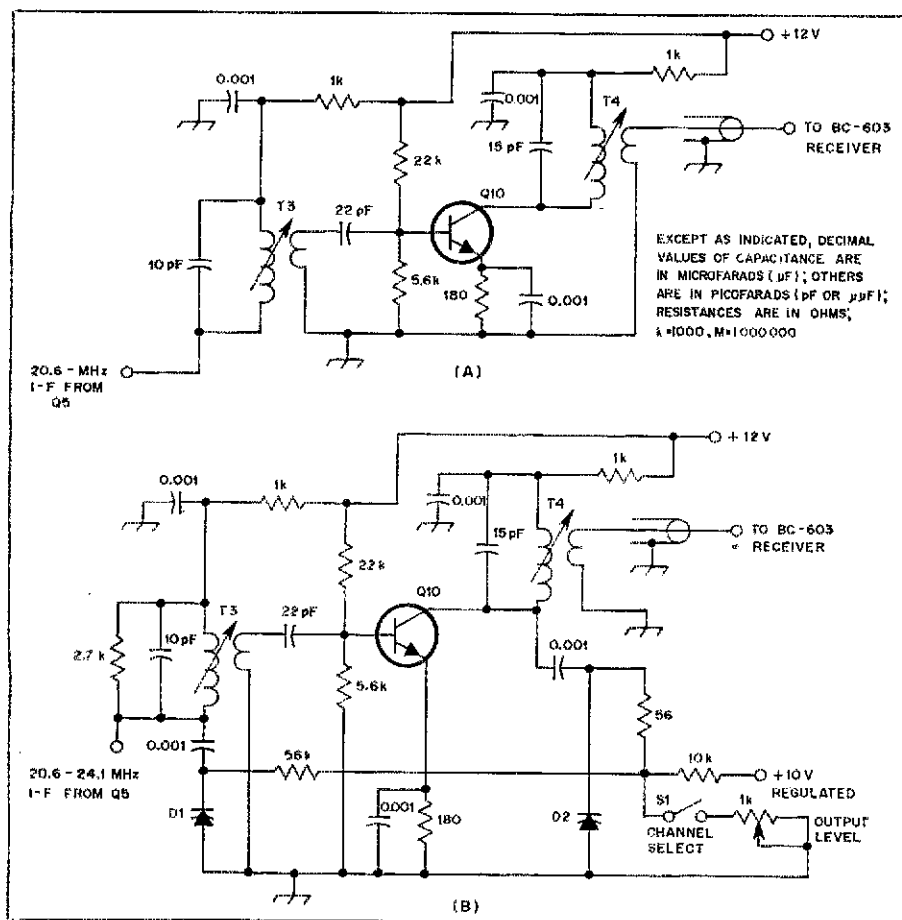


Fig. 8 — I-F amplifier circuit. At A is the fixed-tuned version; at B, the dual-channel version for reception of the Meteostat satellite.

D1, D2 — Varactor, BB-103.
Q10 — Video amplifier, silicon npn, BF-155.

T3, T4 — Primary: 16 turns of no. 24 AWG copper wire wound on a slug-tuned form

6-mm (0.236 in.) in diameter; secondary: a four-turn link of no. 18 AWG wire wound over the cold end (side nearest rf ground) of the primary winding.

Meteostat channels (1691 and 1694.5 MHz).

The down-converter consists of an rf amplifier, a local oscillator chain and an i-f amplifier, each built as separate assemblies. The 1691-MHz signal from the preamplifier is amplified by Q3 and Q4 of the rf amplifier/mixer/LO assembly (Fig. 7). It is then mixed with the 1670.4-MHz local oscillator signal in Q5. The five resonant cavities are exactly the same as those of the preamplifier already described. The two bias potentiometers

for Q3 and Q4 are adjusted for 9 volts at each collector. The potentiometer for Q5 should be set for 10 volts at the collector and 0.2 volts at the base. Q6 is a 92.8-MHz overtone oscillator. The 470-Ω potentiometer should be adjusted for stable oscillation of the crystal. Q7 doubles this signal to 185.6 MHz. Q8 and Q9 are each triplers, resulting in an LO output frequency of 1670.4 MHz.

Two i-f amplifier circuits are shown in Fig. 8. Those planning to receive the Meteostat satellite should build the circuit

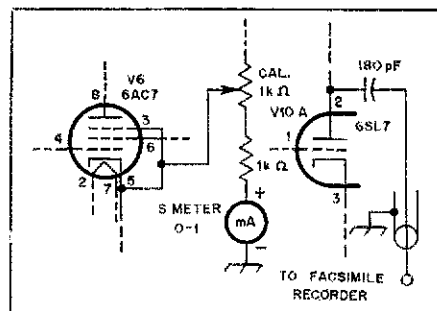


Fig. 9 — The modification to the BC-603 receiver is the addition of an S meter and an audio output for the "fax" recorder.

at B. It can be tuned to either Meteostat channel with the two varicap diodes, D1 and D2. With S1 open, L6 and L8 should be tuned for maximum gain at 24.1 MHz. With S1 closed, set the potentiometer for maximum gain at 20.6 MHz. Switching between channels must be done very rapidly as sometimes there are only 17 seconds between two successive images transmitted on two different channels. This span of time is more than enough to switch S1 and push a tuning button on the BC-603. Those with no interest in Meteostat may build the simpler fixed-tuned circuit at A.

The BC-603 needs few modifications, and an accurate alignment is recommended. The addition of an S meter may be helpful to optimize the entire receiving system. Fig. 9 shows the addition of an S meter and an audio output connection for the facsimile recorder.

Final Remarks

A considerable number of rf amplifiers and cavities are used in our receiving system. More expensive, higher gain transistors could have allowed the cavity count to be reduced, in addition to allowing the use of a smaller receiving dish. The total cost of the system in this configuration is quite low, however, and the received image quality is excellent.

Notes

¹Glassmeyer, "Circular Polarization and OSCAR Communications," *QST*, May 1980.

²Meteostat Programme, April 1977, and *Introduction to the Meteostat System*, November 1978, published by the European Space Agency.

³A Facsimile/Weather Satellite Reference Compendium;

Berman, "GOES Weather Satellite Picture Reception," Technical Correspondence, *QST*, March 1979.

Winkler, "Producing Weather Satellite Pictures at Lower Cost," *QST*, June 1978.

Johnston, "Locating Geosynchronous Satellites," *QST*, March 1978.

Righini and Emiliani, "Sync the Deskfax," *QST*, October 1976.

Winkler, "Facsimile Transceiver for Weather-Satellite Pictures," Technical Correspondence, *QST*, May 1974, and Feedback, *QST*, July 1974.

McKnight, "Evolution of an Amateur Weather-Satellite Picture Station," *QST*, April 1968, and Feedback, July 1968.

Anderson, "Amateur Reception of Weather Satellite Picture Transmissions," *QST*, November 1965.

⁴The BC-603 receiver is available as surplus from Fair Radio Sales, P. O. Box 1105 — 1016 E. Eureka St., Lima, OH 45802.

144-MHz Stop-Band TVI Filters†

Got TVI from your vhf transmitter? A high-pass filter won't help. Use a stop-band filter to notch out the beast!

The use of hand-reject filters at the TV receiver is an attractive solution in the case of interference from 70-, 144- and 432-MHz transmissions, where TV reception may be on frequencies higher or lower than that of the amateur transmitter.

Even a simple series-tuned resonant circuit across the TV feed line can help and may sometimes attenuate strong local signals by 30 to 45 dB. A rather more elegant stop-band design for reducing strong signals is the "bridged-T" filter, which when correctly adjusted can provide a tunable, sharp, symmetrical null, even within the frequency band used for TV reception. Band-

rejection filters of high Q can also be made using single or double stubs fashioned from coaxial cable.

Jan Martin Noedling, LA8AK, points out, however, that the technique of using stop-band filters to cure TVI caused by 144-MHz transmissions still receives relatively little coverage in most of the handbooks. Recently he encountered a problem of severe TVI when working "aurora" with 100 watts of output power on cw. For such transmissions his beam antenna needed to be directed virtually straight at a house some 33 feet (10 meters) distant, where his signals blanketed the TV receiver and blocked reception.

The Norwegian radio and TV interference investigation team found his equipment to be reasonably good; an article in the Dutch *Electron* (no. 11, 1978) encouraged him to

try the use of stop-band filters tuned to 144 MHz and installed in the neighbor's TV feed line. See Fig. 1. The filter is capable of providing 50 to 60 dB of attenuation over all or part of the 144-MHz band. The parallel resonant circuit (L2-C2) is tuned to the center of the required rejection band by squeezing, pulling or bending turns. The series-resonant circuits (L1-C1 and L3-C3) are trimmed for maximum attenuation at the upper and lower frequency limits. The filter was aligned using a test circuit incorporating a 3-dB pad (see Fig. 2), tuning the resonant circuits to the frequencies shown in Table 1. A stable generator should be used for alignment. The pad is needed to prevent "short-circuiting" the signal generator output, as this can cause false indications. This simple arrangement cured LA8AK's TVI problems completely. □

†Adapted from an item of the same title in the column by Pat Hawker, G3VA, "Technical Topics," *Radio Communication* (RSGB), March 1979, p. 232.

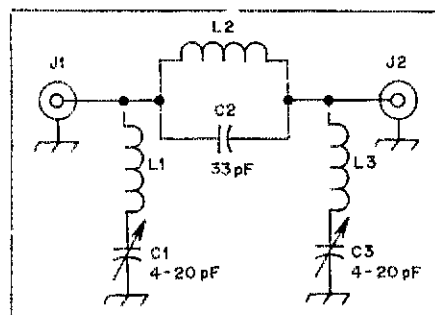
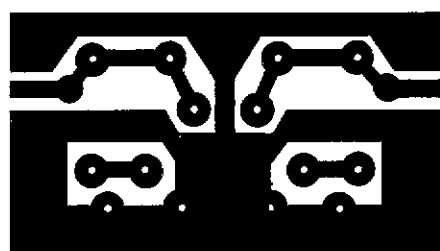


Fig. 1 — The 144-MHz stop-band filter. L1 and L3 are 10 turns of no. 16 AWG wire with a 3/16-inch inside diameter. L2 is two turns of no. 16 AWG wire with a 5/16-inch inside diameter. See text regarding length adjustment of inductors. C1 and C3 are trimmer capacitors. J1 and J2 are BNC jacks, soldered to the pc-board foil.



Circuit-board etching pattern for the 144-MHz stop-band filter. Black represents copper. The pattern is shown at actual size from the foil side of the circuit board.

Table 1

Resonant Circuit Frequencies

These are frequencies to which the resonant circuits of the filter should be tuned, for maximum attenuation in different segments of the 2-meter band.

Circuit	144 to 144.5 MHz	144 to 146 MHz	146 to 148 MHz
L1-C1	144 MHz	144 MHz	146 MHz
L2-C2	144.25 MHz	145 MHz	147 MHz
L3-C3	144.5 MHz	146 MHz	148 MHz

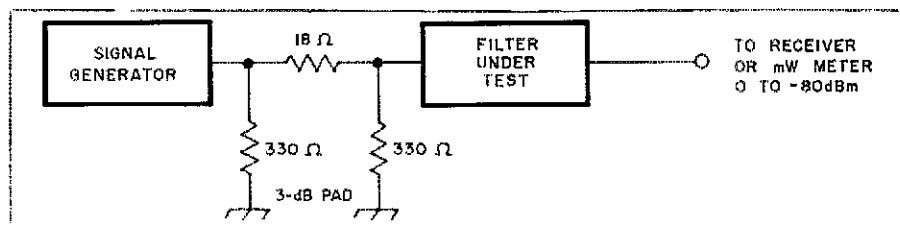


Fig. 2 — The recommended filter test circuit. See text.

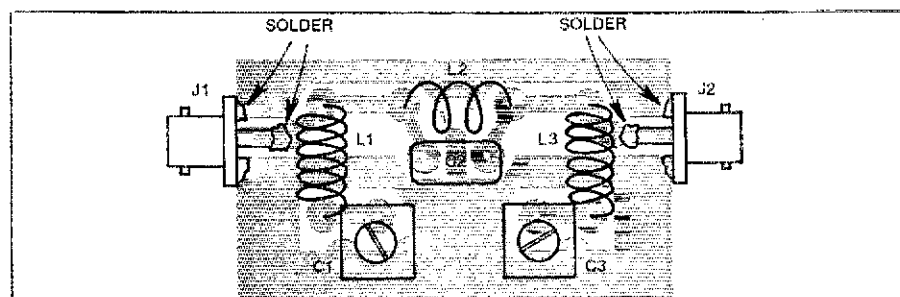


Fig. 3 — Parts-placement guide for the filter. The shaded area represents an X-ray view of the copper pattern. The two BNC connectors are each soldered to the board in three places as shown.

A Newcomer's Guide to FM Terminology

Confused by "quieting," "gain," "spread-spectrum" and other FM terms? Here is an easy-to-understand guide to these terms.

By Pete O'Dell,* AE8Q

When I got my first 2-meter rig I sat for hours, in awe, listening to the local "big guns" talk about how many dB of quieting so-and-so's signal had. They made fun of people with quarter-wave antennas, because "everybody" knew that gain antennas were always superior — the more gain the better! They tossed around other words that were incomprehensible to me at the time. Being reasonably gullible, I was impressed. Sound familiar? Let's see if we can demystify some of the terminology that you hear daily on your local repeater.

The chief advantage of fm communications is the "noise-free," painless sounds that come out of the speaker. If you think that "painless" is a poor adjective, just listen to your local 2-meter repeater for an hour or so, then try to listen to CB channel 19 for an equal amount of time. The howls, whistles and distortions coming from channel 19 are a function of the a-m mode of operation in conjunction with the overcrowding on that channel. In some areas, many of the 2-meter frequencies are crowded (probably not to the extent of channel 19), but you are not confronted with the noise because of the fm mode of operation. Fm receivers exhibit what is referred to as the *capture effect*.

The mathematics and physics of the capture effect are somewhat beyond the scope of this article; therefore, we will merely describe its effects. In an a-m system a signal voltage only 1/100 of the desired signal will still produce noticeable interference. In an fm system the desired signal need only be twice as strong as the other to completely mask its existence. That, in a nutshell, is the capture effect. If two stations happen to transmit at the same time (double) and if their signal levels at the repeater are approximately equal, then you will hear a garbled noise;

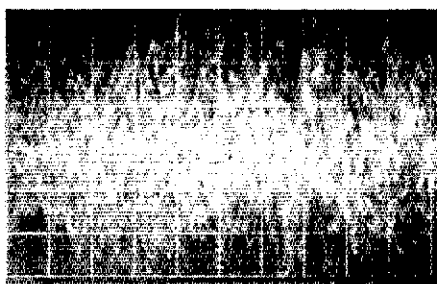


Fig. 1 — This is an oscilloscope display of the audio output of an unsquelched fm receiver with no signal present at the receiver input. In short, this is what noise looks like.

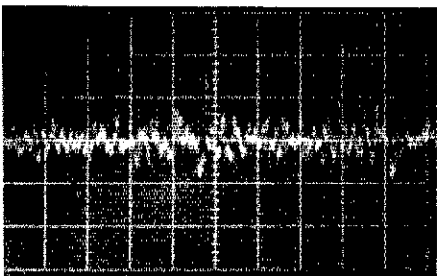


Fig. 2 — This display shows what happens to the audio output of an fm receiver when there is some signal present. The carrier has masked all but the strongest noise peaks. The receiver is "quieting."

fortunately, that does not seem to happen too often. The important difference comes when there is a marginal band opening and a very weak signal is coming through. A strong, local station will "capture" the receiver of the repeater and the listeners will not know that the weak signal is there.

One of the terms that the newcomer hears on fm that he does not hear on the other modes is "20 dB of quieting." Some hams talk about "full quieting" while others throw around initials such as "DFQ" (dead full quieting). Why the concern with quieting? The fm detector acts in a way to mask interference —

regardless of whether that interference is man-made or natural. Typically, about 140 dB of gain will be required from the front end of a receiver through to the audio output. At the antenna input, there is a constantly varying voltage produced by the random movement of electrons on the antenna system; this is referred to as thermal-agitation noise. There are any number of other sources of minute "signals," all of which are amplified through the stages of the radio. The result is the rushing, white-noise sound that you hear from an unsquelched fm receiver (or any other high-gain receiver). An example is given in Fig. 1. The presence of an unmodulated carrier will begin to quiet the receiver, as depicted in Fig. 2.

You can observe this by connecting a signal generator to the input of an fm receiver. Attach an oscilloscope across the speaker terminals or any other convenient position in the audio chain. Unsquelch the receiver and you should see a pattern that looks roughly like a field of grass — growing both upward and downward. Adjust the output of the signal generator to a level below 0.1 microvolt. Then slowly increase the signal strength. You should see the average level of the noise begin to drop. When the average level drops to 1/10 the level with no signal applied, read the rf output from the signal generator. This figure, which will be on the order of 0.2 to 0.5 microvolt for a typical well-tuned amateur fm receiver, is the 20 dB sensitivity figure for the receiver. An ac-voltmeter is more accurate, but less graphic for educational purposes. If your reading is substantially off from the figure given by the manufacturer (assuming that you are using a reliable signal generator of known accuracy), you might want to retune the rf and i-f sections of the receiver. Tuning procedures will vary from one rig to another, but in general you will be safe tweaking the coils (or

capacitors) for minimum noise on any crystal set; for a synthesized receiver, it would be wise to consult with the manufacturer or at least the service manual for the receiver. Generally, anyone who tunes receivers frequently will develop some skill at "tuning by ear." If you do not have an oscilloscope or an ac-voltmeter available, the "ear" method can be used. Once full quieting (Fig. 3) is reached, the "ear method" is useless. Keep the signal generator output low enough to produce a noisy signal for tuning purposes.

Squelch Tales

A standard squelch circuit cuts off the receiver audio output when there is no signal present. Typically, a transistor switch is employed to short-circuit the audio to ground, to block the audio from one of the final amplifying stages or to shut off one of the audio stages. Any of these systems will work fine when properly designed. How does the transistor switch know when a signal is present? Again, there are several ways of detecting the presence of a signal. In some units, audio is taken from the detector and routed to a high-pass filter which has its cutoff frequency well above normal voice frequencies. The high-frequency noise is then amplified and fed to a detector which rectifies the voltage and uses it as bias. When a carrier appears on frequency, the receiver "quiets" and the high-frequency noise disappears; therefore, the bias disappears, the switch switches and audio flows forth from the speaker. Other systems operate on the basis of detecting the presence of the carrier.

There are technically superior systems for squelching a receiver. The most practical system for repeater and fm use in general is what is referred to as *PL*. *PL* stands for *Private Line*; both terms are trademarks of Motorola. GE uses the term Channel Guard for this system, while other manufacturers have similar trademark names. The generic name for it is *continuous tone-coded squelch system*, which even in its acronymic form of CTCSS is quite unwieldy. Since *PL* is used as the generic in general amateur parlance, we will use it here.

In a *PL*-equipped transmitter, an encoder generates a precise tone from the second that the microphone button is pushed. This tone is used to modulate the transmitter signal at a very low level — on the order of 500-Hz deviation in a 5-kHz system. In this system there are 32 standard tones that range in frequency from 67.0 to 203.5 Hz. Whenever the transmitter is activated, this signal is there.

The standard squelch detector in the *PL*-equipped receiver is replaced with a *PL* decoder. Usually a high-pass filter passes the audio above 300-Hz to the audio stage, while a low-pass filter routes the *PL* tones to the decoder. The com-

bination of the high-pass filter in the receiver and the low level of deviation of the *PL* signal from the transmitter means that, typically, the user does not hear the tone; hence, it is often referred to as a sub-audible system. If the tone is present (within ± 1.5 Hz or so), the decoder provides the proper bias to switch the audio output on. In commercial applications, the user is generally able to choose between *PL* or standard squelch simply by throwing a switch. There is nothing to stop one from wiring the squelch circuit so that either a *PL* or a non-*PL* signal will operate the switch. For instance, the standard squelch can be set to require a very strong signal to open while the *PL* is set to open on the weakest signal that the receiver can detect.

If *PL* is technically superior to standard squelch, then why is it not used widely to minimize interference? There are basically three reasons: prejudice, the desire not to limit access to those with *PL* and cost factors. The widespread prejudice against *PL* stems from the early days of the fm boom. A few snobbish gentlemen decided that they wanted to keep the masses out of their exclusive circle. They installed *PL*-only systems that kept the peasants away. Of course, if one of the peasants managed to come up with a *PL* rig, he was still not welcome unless he met their preconceived idea of perfection. These lids soon received the contempt that they deserved. Unfortunately, *PL* had become equated with these operators of closed repeaters; today, years later, *PL* is still pronounced guilty by association, without so much as a second thought.

If a receiver (in a repeater, for instance) is wired similar to one found in commercial service, it will either be on *PL* or on standard squelch, but not both. In that situation, to derive the benefits of *PL* operation, it would be necessary to exclude all signals that arrived at the receiver that do not have *PL*. That, of course, would exclude any transients who were not equipped for *PL* (or for the tight *PL* tone). On the other hand, if wired as suggested above, the only signals that would be blocked would be the *weak ones without the proper PL tone*. Thus, the

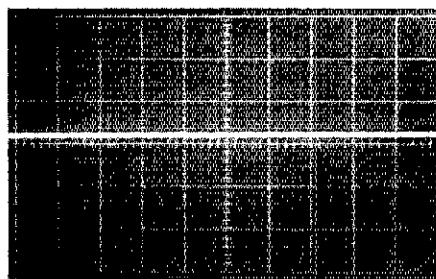


Fig. 3 — This display shows the output of a fully quieted fm receiver. There are no noise spikes present — all that can be seen is the base line indicating the presence of the unmodulated carrier.

local base stations and any local mobile in the prime coverage area would not need *PL*. Mobiles expecting to operate from the fringes and portable (hand-held) stations would be likely to install a *PL* encoder. Under a dual-squelch system, *PL* would not "keep out the transients" and therefore, would not be "un-ham-like."

At one time, cost factors were also significant. Besides the associated electronic circuitry, an encoder or decoder required an expensive reed or mechanical device (most of which operated on a tuning-fork principle). To go from one *PL* tone to another was expensive and time consuming. Digital electronics has changed all that. Several inexpensive, lightweight and field programmable encoders and decoders are on the market now. They draw little current and require no expensive reeds or devices for changing tones. If the manufacturers adopt *PL* as an additional "bell and whistle," it is doubtful that the cost increase per unit would be over \$5 (some manufacturers have made a token effort in this direction).

Of these three reasons for not using *PL*, probably the most significant is the first — old prejudices die hard. In most areas of the United States, the 2-meter fm frequencies are full. The slightest bit of a hand opening brings in weak signals that serve no useful function. A repeater that is constantly keying up only to spit out a couple of bursts of static and then shut off again is no fun to listen to. A dual-squelch system will keep out those unwanted weak signals, while allowing weak signals with the proper tone to come through. Strong signals would be unaffected. The cost is down and would go lower if manufacturers incorporated *PL* during the manufacturing stage. There isn't that much demand, yet. It's just that old prejudices die hard.

Gain, Gaining, Gone

One of the more confusing aspects of fm operation for the newcomer is likely to be the subject of antennas. Because no measurement standards have been agreed upon in the manufacturing industry, *QST* advertising policy prohibits advertisers from giving antenna gain figures in advertisements carried in *QST*. Most other electronics magazines do not have this type of policy; you've probably noticed their figures and wondered just what they mean. (So have a lot of other people, including a few electrical engineers who I know.)

Antenna gain is usually expressed in decibels (dB), and may be referenced to a dipole antenna (dBd). Sometimes reference is made to an isotropic radiator (dBi), which is a theoretical antenna that cannot exist in practice. An isotropic radiator is a point source that radiates an equal amount of energy in all directions. Its radiation pattern would be a sphere,

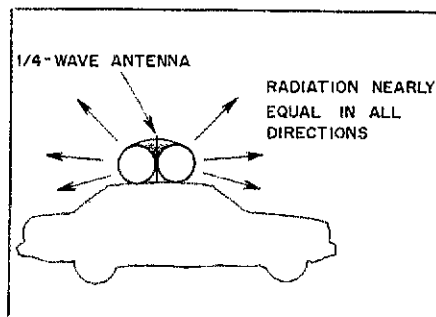


Fig. 4 — A quarter-wave antenna radiates "equally poor" in all directions.

but more about radiation patterns in a moment. For your information, a dipole has 2.14 dB gain over isotropic. Any time an antenna has gain, it is always at the expense of a loss in some direction. A dipole has no radiation off its ends, so its 2.14 dB gain over isotropic is in a broadside direction, at the expense of a loss off the ends.

It is important to know the reference when you compare gain figures, or the numbers can be misleading. If a particular antenna has 4 dB gain over a dipole, it will have 6.1 dB gain over an isotropic radiator. Ads can indicate this gain as either 4 dB or 6.1 dB; both numbers are correct, but the advertiser, for clarity, should indicate his reference antenna, either 4 dBd, or 6.1 dBi.

Because there are no standards for measuring gain, each manufacturer establishes his own procedures. Different procedures may produce different gain figures for the same antenna. Ad men will want to use the largest figure, to make the advertised antenna performance look good. It is fair to say that most of the advertisements appearing in *Amateur Radio* magazines are much more realistic than those appearing in some of the magazines oriented toward other personal radio services.

Some of you have noticed that most antennas are designed to be mounted with their radiators horizontal or vertical to the earth (quads are another story). The reason for this is a phenomenon called *polarization*. Every electromagnetic wave is made of two component parts — an electrical wave and a magnetic wave. The plane that the electrical wave lies in determines the polarization of the antenna. A rule of thumb is that the horizontal radiators produce horizontally polarized signals and vertical radiators produce vertically polarized signals. In "line-of-sight" communications, the only really critical thing is that both the transmitting and the receiving antenna be polarized in the same direction. When one is vertically polarized and the other is horizontal, there is an isolation of something on the order of 30 dB. Any gain patterns will also be distorted under these conditions. If the signal passes through an atmospheric duct, bounces off the ionosphere or

bounces off a rock, the polarization may be "twisted" somewhat; then the polarization of the antennas is not as critical. Because most fm communication is conducted over a "line-of-sight" path, polarization is important.

Just about all the fm operation in North America is done with vertically polarized antennas. The simplest of these is the quarter wave. When mounted in the center of the roof of an automobile, a quarter wave presents a reasonable termination for 50-Ω coax. The radiation pattern of a quarter-wave vertical is omnidirectional; i.e., if it is mounted in the center of the roof and if there are no other objects on the roof, equal amounts of radiation will be going out toward the horizon in all compass directions. As the radiation angle above the horizon increases, the radiated energy drops off slowly. (Of course there is nothing radiated in a straight-up direction.) Suppose you take an ordinary doughnut and drop it over a vertical radiator. The doughnut will represent the strength of radiation going out from the antenna along an imaginary arc extending from the surface of the car roof up to the antenna itself (see Fig. 4). Some operators say quarter-wave antennas radiate "equally poor" in all directions, because no single direction or angle of radiation is highly favored over others.

Gain antennas come in two general varieties. Omnidirectional gain antennas are quite similar to the vertical quarter-wave antenna; beam antennas introduce a new dimension. Omnidirectional gain antennas generally look somewhat like their quarter-wave cousins, except they are always longer (for any given frequency). The most common of this variety is the 5/8-wave vertical. Unlike the quarter-wave, which is resonant and presents a fair match to 50-Ω coax, a 5/8-wave radiator is nonresonant, having a high capacitive reactance at its feed point. At the base of a 5/8-wave radiator you will find a housing that contains a matching network of one type or another.

The omnidirectional gain antennas change the radiation pattern of the antenna by compressing the vertical distribution of energy down from the high angles toward the horizon. Remember the doughnut that we slid down over the quarter-wave radiator? Just imagine now that a vandal comes along with a brick and very carefully mashes the doughnut flat. Ignore the mess on the roof of your car for the moment. The diameter of the doughnut increases because all the material that gave it height has been shoved down and compressed into a much smaller height, as depicted in Fig. 5. This is what happens with the gain antenna; more energy is radiated out toward the horizon. There is no magic here, though, because less energy is going out at high angles above the horizon.

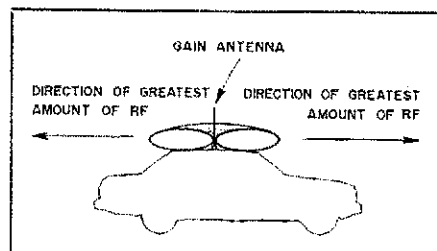


Fig. 5 — The radiation pattern for a gain antenna is somewhat flatter than that for a quarter-wave. This means that more of the signal goes out toward the horizon — as long as the roof of the car is parallel with the average terrain.

This discussion, so far, assumes that the ground plane (roof of the car) and the general terrain are parallel to each other. What happens if the ground plane is tilted at a 30° angle to the general terrain? Do we still have the strong lobes going out to the horizon? No, except along the two directions that are the axis of the tilt; this is illustrated in Fig. 6. The strong lobes go out in a direction that is parallel to the ground plane. Only if the ground plane is parallel to the general terrain do the lobes go toward the horizon.

In practical terms this means that the best antenna for mobile operation may be dictated by your geographical area. For instance, while living in West Virginia, I initially had a gain antenna mounted on my car. I noticed that as I neared the fringe area of the repeater, I would completely drop out when starting down a hill. When I would get to the bottom of the hill, the car would level out, and then the repeater would come back up (not as strong as at the top of the hill, of course). I replaced the gain antenna with a quarter-wave (at about a third the cost of the gain antenna). Bingo! I no longer dropped out when the car was tilted from being parallel with the general terrain (going up and down hills). On the other hand, I was recently in Baton Rouge, Louisiana, where it is pretty flat. I don't recall seeing a single quarter-wave 2-meter antenna in the parking lot. Depending on where you live and drive, a gain antenna may or may not be better than a quarter wave.

Omnidirectional gain antennas can be used at a fixed station by replacing the roof of the car with radials. This is fortunate — it would take a *large* tower to hold even a VW up in the air. Unless your tower is tilted quite a bit, it would seem reasonable to assume that a gain antenna mounted on the top of the tower will outperform a quarter-wave antenna every time.

Once a radiator becomes longer than 5/8-wave, the radiation pattern changes rather dramatically. Instead of extending out toward the horizon, the major lobes of radiation are at very high angles. Increased gain over a 5/8-wave antenna for the low-angle lobes can be achieved, though. One process called stacking,

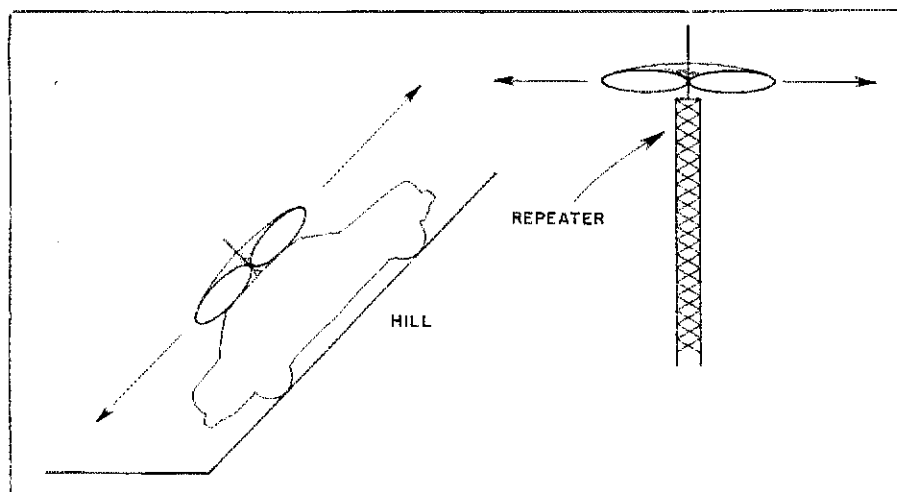


Fig. 6 — In extremely hilly country, a gain antenna may not perform as well as a quarter-wave antenna because the roof of the car is not always parallel to the average terrain: therefore, the main lobe is not always "aimed" at the horizon.

consists of connecting 1/2-wavelength radiators to each other through 1/2-wavelength delay lines. But that is getting a little too complicated for this article. Those interested in pursuing this should read the "Mobile and Portable" chapter in *FM & Repeaters for the Radio Amateur*.

The other general type of gain antenna is the beam; any of the standard-format antenna such as the Yagi, quad or Quagi will perform quite well, as long as the antenna is mounted in such a way as to provide vertical polarization. Beam antennas pull the energy from the other horizontal directions and concentrate it in one direction. Fig. 7 depicts an example radiation pattern as viewed from above the antenna. With most beams there may be several lobes, but only one of them should be extremely strong. Depending on design, the minor lobes will vary in strength and the major lobe may be short and fat.

Normally, the beam-type antenna will be mounted at a fixed location on a tower or at least on a mast above nearby objects that could degrade its performance. However, I did meet one ham recently who had a three-element quad mounted permanently on his car. He mounted a small TV-antenna rotator to a set of luggage racks that were attached to the car. The quad was bolted to a short mast installed in the rotator. Power for the rotator came from a small inverter. If you have need to get into a repeater from the deep fringe area and if you don't mind the curious glances from other motorists, you might consider a similar setup.

Coming Attractions

What is the future of fm operation? It seems likely at this point that the amateur service will continue to grow over the next decade — the rate of growth in the U.S. being largely in the hands of the FCC. There is no reason to think that new

operators will not be attracted to fm operation on one or more bands. The 2-meter band is reaching a saturation point in all but sparsely populated areas of the U.S. With the advent of inexpensive "store-bought" rigs and converted CB sets (all synthesized), 10-meter fm seems to be where 2-meter fm was about a decade ago — growing fast! The other vhf and uhf bands are nowhere near being saturated.

New technology is bringing new possibilities, too. *Spread-spectrum techniques* have been around for years in one form or another. These techniques hold some promise for better utilization of available frequencies — perhaps more so for some of the other services than for the amateur service. One spread-spectrum concept calls for a microprocessor to change the frequency of the transmitter several times per second in a very specific pattern. Of course, for reception it is necessary for the receiver to be controlled by a microprocessor and to hop in the same pattern as the transmitter.

Another suggestion we have heard about is modeled very closely after the mobile telephone systems. Here a microprocessor is used to cause the transmitter and receiver to look for an unused frequency (channel, repeater, etc.). VOX circuitry would keep signals off the air except when something is being said. Transmitter-receiver coordination would be maintained by a Digital PL signal (another highly descriptive Motorola trademark; computer buffs call it a data stream) which the receiver would search for and lock into.

None of this is terribly new or earth shaking. The military was using frequency-hopping techniques with radar back in the 1950s. The Improved Mobile Telephone System and the newer Advanced Mobile Telephone System have been using "intelligent" transceivers to search for vacant frequencies to use for

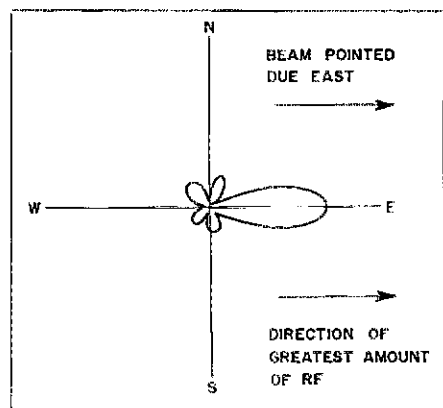


Fig. 7 — This is an overhead view of the radiation pattern of a beam antenna which is pointed due east. As with the other illustrations of antenna patterns in this article, the radiation pattern was drawn for illustration purposes only and should not be construed to be the actual pattern of any particular antenna.

years. Motorola introduced Digital PL nearly five years ago. The uses of inexpensive microprocessors are growing by leaps and bounds each day. It is not surprising that hams are beginning to talk of using spread spectrum now that microprocessors are making it inexpensive.

The technology for spread-spectrum techniques is available and waiting. The question is whether anyone will be able to make these techniques compatible with the traditions and values of Amateur Radio. On the surface it would appear that these techniques are far more exclusionary than PL. Anyone care to make a prediction? Before you answer that, think back a decade ago and ask yourself if you would have expected synthesized hand-helds.

Gain, quieting, PL and spread spectrum are all terms that are tossed about daily on repeaters. But there is another term that has fascinated me from the time that I first turned on a 2-meter rig. This term was thrown around with such authority that only an irreverent iconoclast would dare question its meaning. The first time that I heard an fm'er say "I'm *destinated*," I was struck by the vivid imagery that the strange word conjured up. Visualize a movie screen. There is a tight shot of Joe Ham talking into a microphone. Joe says, "I'm *destinated*." The camera begins to pull back and we see that Joe is sitting in a casket. He drops the microphone over the side of the casket, lies back and pulls the lid down on the casket. Slowly, the casket slides into the crematorium. "Destinated" sounds awfully final to me.

OSF

Notes

- For information on how to interpret this kind of pattern, see Hall, "The New Look for QST's Antenna Patterns," *QST*, July 1980, p. 26.
- Knickerbocker, Weiss and Stelau, "CB-to-10 FM — Best Conversion Yet?", *73*, January 1980, p. 117.

Technical Correspondence

Conducted By
John C. Pelham,* W1JA

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

THE NEW BAUD GAME

□ I am dismayed to find *QST* perpetuating the common myth that baud rate and bit rate are equivalent. The "FM/RPT" column, April 1980 *QST*, under the heading of "The Old Baud Game," mistakenly states that "Baud is the number of bits transferred in 1 second." A similar error was made in the "Washington Mailbox" column in June 1980 *QST*.

Actually, a baud is a unit of signaling rate, and is derived from the shortest signaling interval. For example, a signaling rate of 20 baud implies a signaling interval, that is, the time between changes of state, of 0.05 second. A bit is a unit of information. A bit/second (bps) is a unit of information transfer rate. The relation between signaling rate (baud rate) and information transfer rate (bit rate) on a channel is $\text{bits/second} = \text{bauds} \times \text{no. of bits in one signaling interval}$.

The Baudot code used in the Teletype model 15 is an example in which the bit rate and baud rate have different values. The information rate is 42 bps and the signaling rate is 45.5 baud.

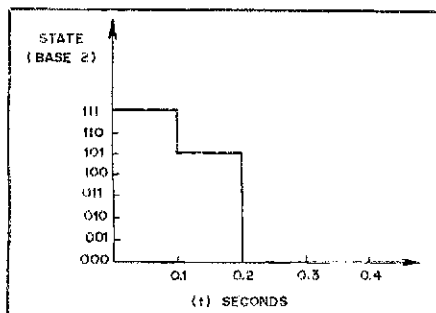


Fig. 1 — An eight-state coding scheme. In two signaling intervals, six bits (111101) have been sent.

Another example in which these rates differ is in schemes that employ multilevel coding. Most radio amateurs and computer hobbyists limit their thinking to the familiar two-state (mark/space) communication channel. The terms mark and space are relevant only in terms of bistate channels. One need not restrict oneself to two states (in fact, many commercial data communications services do not). Consider a channel which may have eight states. That is, if we were to examine the channel at any instant, we could find it in any one of eight conditions. For a baseband channel, these could be various voltage levels. For an audio-frequency channel, we could designate eight different audio frequencies.

Let's say that the shortest time between changes in state is 0.1 second. Thus the signaling rate is 10 baud. In this example, depicted in Fig. 1, three bits are used to distinguish among these eight states. Thus, the bit rate on this channel is 30 bits/second, while the signaling

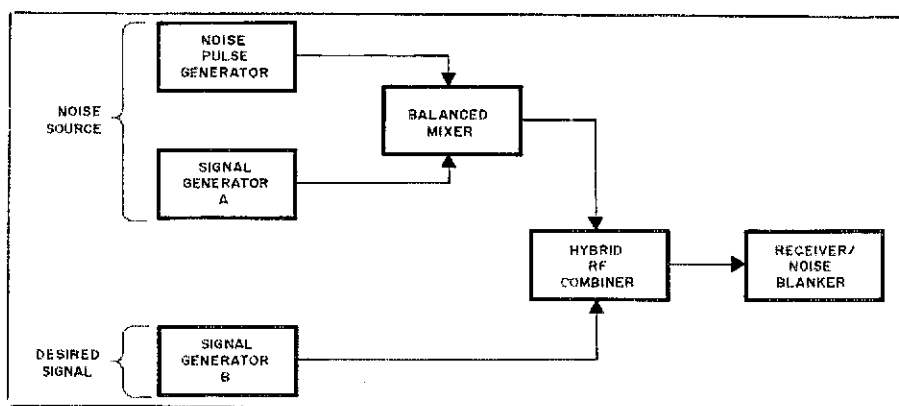


Fig. 2 — A test setup for quantitative noise-blanker measurements.

rate is only 10 baud. — Robert S. Parnass, AJ9S, 8046 Knox Ave., Skokie, IL 60076.

QUANTITATIVE NOISE-BLANKER TESTS

□ While reading the ARRL book, *Weekend Projects for the Radio Amateur*, I noted with interest the construction article on the solid-state noise blanker.¹ One difficulty that is encountered with such a construction project is the lack of a good method to evaluate the finished product. There are two basic approaches to take toward evaluating a noise blanker. For a particular noise source being encountered under a specific set of receiving conditions, a qualitative approach like the one described in the construction article provides reasonably good indications that the blanker is working properly. Since qualitative evaluations are difficult to duplicate, a more precise method of evaluation must be used to obtain repeatable results and sets of data that can be easily compared.

Fig. 2 illustrates a proper setup for noise blanker tests. Signal generator A and a pulse generator are connected together with a balanced mixer, such as the Mini-Circuits ZAD series. The balanced mixer has a direct-coupled port; this allows the mixer to serve as an rf switch that is controlled by the pulse generator. This arrangement produces a pulsed rf output. Adjust the pulse generator to a pulse rate and duration typical of received impulse noise. This output is fed into an rf combiner, along with a second signal generator (B) which is used to provide the desired signal.² Signal generator A is typically set 1 kHz from the desired signal frequency. The rf-combiner output is then fed into the receiver/noise blanker under test. Using this method, various signal-level comparisons can be made. Since both the noise source and the desired signal are true rf signals within the receiver passband, a 50-μV noise vs.

a 3-μV signal begins to mean something for quantitative comparison. I have found that a good blanker will be able to perform well with a strong noise level and weak desired signal, a weak noise level and strong desired signal, and equal noise/signal levels.

One further note of caution may be in order: Some noise blankers have rather high gain in the blanking signal path. This high gain can make proper alignment difficult because of the strong noise level present in the blanking path. If this becomes a problem, some method of gain reduction may have to be used to execute the alignment. Full gain can be restored before putting the noise blanker into the receiver. — Richard L. Webster, K9ULW, ARRL T.A., 1775 Henderson Dr., Marion, IA 52302.

STABLE TRANSMISSION-LINE OSCILLATOR

□ I needed an extremely stable oscillator that required a minimum of stabilization time, and that would operate at room temperature without an oven. By stability, I am speaking of a few parts in 10⁷ per hour, or a few hertz per day. I could tolerate only approximately plus or minus 0.3-Hz-per-hour drift or noise error. The output of the oscillator had to drive a frequency counter directly. It also needed to be easily variable to cover frequencies on the 75- and 80-meter bands, to utilize solid-state components and to be relatively easy to construct. While the Hartley, Colpitts or Clapp circuits could accomplish the requirements, it was evident that considerable attention had to be given to details of mechanical construction and selection of components.

The circuit which I devised, shown in Fig. 4, utilizes the best features of the Clapp oscillator. However, it does not use a variable inductor. Instead, it incorporates an open-circuited transmission line as the major frequency-determining device. Being purely passive, the transmission line is extremely stable both mechanically and thermally. In addition, one usual source of instability, the capacitor between the base of the transistor and the tuned circuit, is eliminated.

The oscillator is operated at 10 times the

¹Van Zant, "A Solid-State Noise Blanker," *Weekend Projects for the Radio Amateur*, ARRL; and *QST*, July 1971.

²"A Hybrid Combiner for Signal Generators," *The Radio Amateur's Handbook*, ARRL, 1980, p. 16-30.

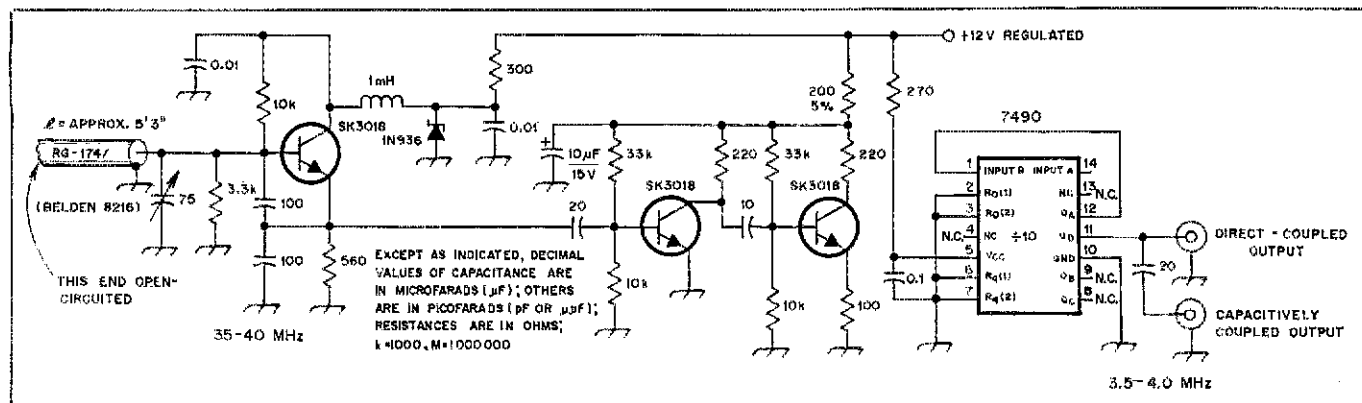


Fig. 3 — The stable oscillator devised by Baker consists of a 35- to 40-MHz oscillator using a length of coaxial cable as the main frequency-determining device. This frequency is divided by 10, resulting in an output frequency of 3.5 to 4.0 MHz.

output frequency. Two advantages are gained by this procedure. The length of transmission line required is well within workable limits (a little over 5 feet, occupying approximately 1 cubic inch). Any error or drift in the oscillator is divided by a factor of 10, i.e., a 1-Hz shift at 35 MHz is a shift of only 0.1 Hz at 3.5 MHz. The use of the 74LS90 IC makes the division simple and practical. The output of the unit is sufficient to drive counter circuits directly, and the frequency is not adversely affected by external coupling or loading.

Concerning construction, the following should be noted: C2 should be a stable variable capacitor. If necessary, C2 could be temperature compensated by padding with negative-temperature-coefficient capacitors. (I did not find this necessary.) The oscillator should be built in a mechanically solid manner in a heavy-gauge box. I used a printed circuit board to achieve maximum stability.

While the RG-174/U transmission line may be installed in any configuration, it is best to assure that the turns do not shift mechanically with respect to one another. Attention should be given to isolating the transmission line from severe changes in temperature. I used the shield case of a 2-inch (51-mm) panel meter for this

purpose, and wrapped the coil of transmission line in fiberglass wool. I then packed everything in the meter case, and grounded it as a shield and temperature guard. — *John H. Baker, K3NZS, 6605 McCallum St., Philadelphia, PA 19119*

IMPROVING THE DELUXE NICAD CHARGER

□ The May 1980 *QST* article entitled "A Deluxe NiCad Charger for Hand-Held Transceivers" raised high hopes on first glance, but fell short after closer inspection. Selecting the so-called constant-current mode of the charger does nothing more than effectively place the battery across the output of the bridge rectifier. The "constant" current is completely a function of the transformer losses and the battery condition. Also, the current is not adjustable.

The circuit shown in Fig. 4 uses the same bridge, switch and regulator, but offers selectable, adjustable constant-voltage or constant-current charging. Constant output voltage can be varied between at least 8 and 13 volts, with loads to 150 mA or more. Constant output cur-

rent can be reliably set from 10 to 150 mA for battery voltages to at least 13 volts. — *Robin David Becker, WA2NYE, 2912 N. Calvert St., Baltimore, MD 21218.*

Feedback

□ The QTH of Richard K. Thompson, KA5GYI, listed in "Correspondence," June *QST*, page 61, should be Harlingen, Texas.

□ An omission occurred in "The WARC Warriors" (March *QST*, page 60). Mr. Raymond E. Stone, W5RBO, is a contributor of \$200 to the ARRL Foundation WARC Fund.

□ W3EP/9, shown with his antenna array in "The World Above 50 MHz," July *QST*, page 65, has worked 31 states on 2 meters.

□ Dr. Tom Linde, KA0W ("Stray," July *QST*, page 35), is a psychologist at the Veterans Medical Center in Knoxville, Iowa.

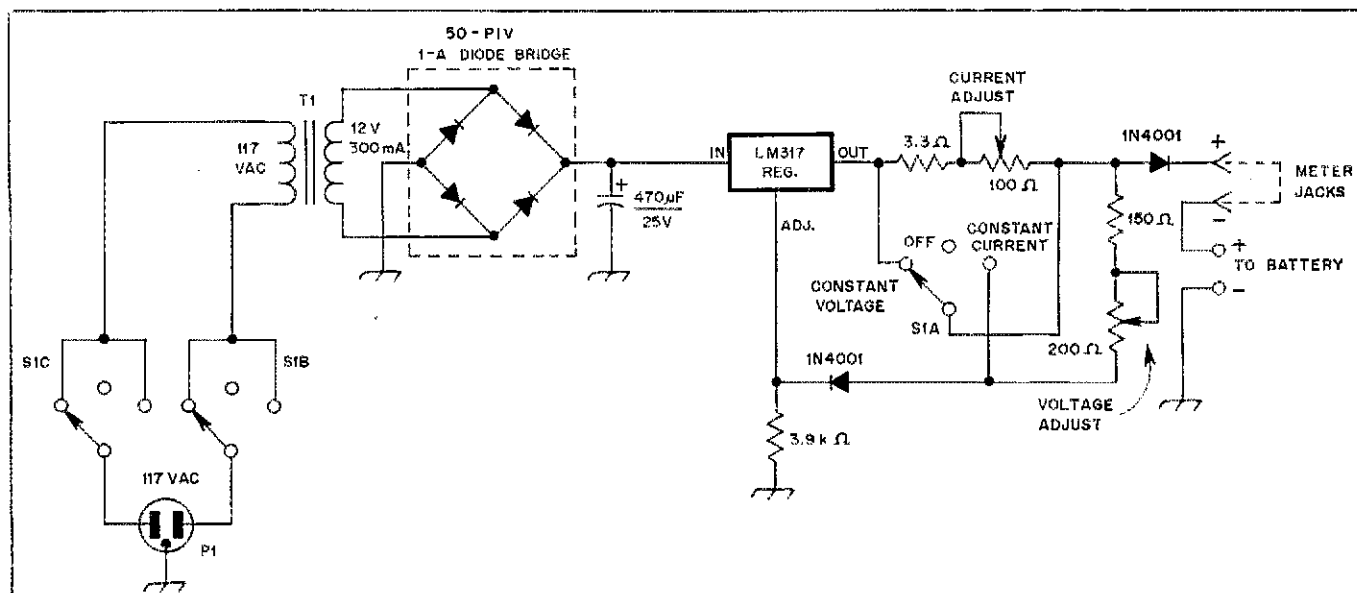


Fig. 4 — The NiCad charger from May 1980 *QST* can be improved as shown above, according to WA2NYE. T1 can be a Radio Shack no. 273-1385.

Hints and Kinks

Conducted By Stuart Leland,* W1JEC

POWER-CONNECTOR STANDARDIZATION IMPROVES EMERGENCY COMMUNICATION

Amateur Radio emergency operations can be enhanced by compatibility of equipment. Frequently, during extended field operations, the need arises to lend a "lighter-plug" power cord or to power a transceiver from a borrowed power supply. The variety of power connectors supplied as original equipment on popular amateur gear make such interchange difficult, if not impractical.

The Central Ohio ARES has solved this problem, within its own group, by adopting an "ARES Standard Connector." On the basis of cost, availability and ease of installation, the Cinch-Jones 300 series, 2-pin connectors have been adopted for 12-V service with currents ranging up to 10 amperes, under continuous operation, or 15 amperes where demand is intermittent. This series has both male and female connectors for cable installation or chassis mounting. The connectors are also available with a locking device. A compatible nonlocking connector series is available from Radio Shack (male no. 274-201; female no. 274-202; chassis mount no. 274-203). The "standard" connectors are either permanently installed in the equipment or a short patch cord is made up to interface between the equipment and the "standard" connector. Following the industry standard, the larger pin is negative and the smaller pin is positive. The female connector is, of course, used on the power side with the male connector on the equipment side. For current requirements in excess of 15 amperes, the 400-series connectors are used with the even-numbered pins positive and the odd-numbered pins negative.

To facilitate interaction between groups in Ohio in any widespread emergency, the Ohio Council of Amateur Radio Clubs has recommended adoption of this procedure by all members. Emergency groups elsewhere might consider the same action, for amateurs often travel considerable distances to assist in major disasters. — *Robert R. Adams, W8BKO, EC, COARES, Columbus, Ohio*

ADJUSTMENT OF SPEED KEYS

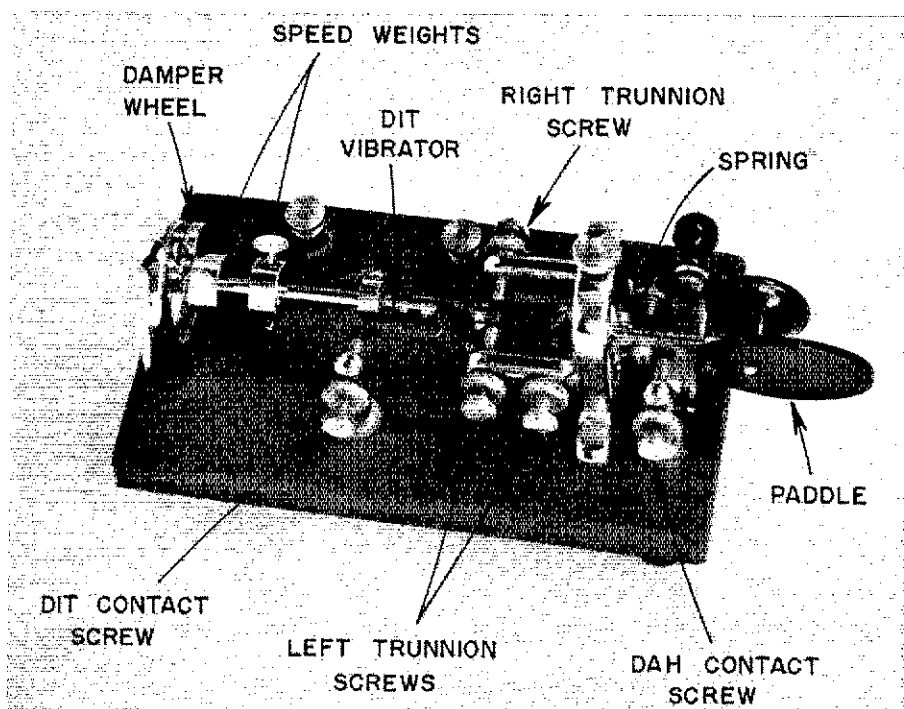
The adjustment of a speed key is not difficult, but it must be done carefully to get good and lasting results. The most important concern is to adjust the dit vibrator correctly. After the dits are correctly set, other adjustments come easily.

To adjust the speed key, proceed as follows (see the drawing):

1) Loosen both the right and left trunnion screws and the dit-contact screw. Carefully adjust the position of each screw so that the vibrator arm looks straight and is lightly butting up against the damper wheel. Tighten the right and left trunnion screws.

2) Slide the one or two weights on the vibrator arm to the end, or to the slowest dit position. Tighten the weights in place, making certain that the outermost weight is not touching the damper wheel.

3) Holding the thumb paddle to the right or



Proper adjustment of a speed key, such as above, is provided in "Hints and Kinks" by W2PRO. His information on the nearly lost art is based on some early Western Union reference material in addition to some 33 years of pounding brass.

dit position, readjust the left trunnion screws so that the vibrator dit arm can move to the left about 1/64 inch (0.40 mm). Tighten the left trunnion screws.

4) Hold the paddle in the steady series of dits position and allow the vibrator arm to come to rest.

5) Readjust the dit contact screw so that the contact makes a light contact with the contact of the vibrator arm. Tighten the dit screw. Release the paddle.

6) Test the Bug for proper dit adjustment by holding the paddle in the dit position and noting that the Bug can produce at least 40 well-formed dits in a series. Count the dits in bunches of 10 dits each by tapping your foot once for every 10 dits.

7) When the vibrator arm stops vibrating, note that the vibrator arm comes to rest lightly on the dit contact. Readjust the dit contact screw if necessary. Release the paddle and recheck step 6. This completes the dit adjustment.

8) To adjust the dah contacts, adjust the dah contact screw so that the distance between the paddle contact and the dah contact is about 1/64 inch (0.40 mm). Clearance is a matter of personal preference.

9) Adjust the degree of spring tension of the paddle to the almost completely unwound position. Although this adjustment is also a matter of personal preference, a light tension is favored.

10) For varying the dit speed, move the dit speed weight closer to the paddle for higher speeds. When two weights are part of the vibrator arm, always keep the outermost weight at the end of the arm, varying the speed of the dits by moving the innermost weight

closer to the paddle. In general, leave the outermost weight positioned at the end of the arm.

11) Clean any dirt from the contacts by sandwiching a piece of bond paper between any closed contacts and whipping the paper through. Do this several times.

12) Check that all contacts open and close squarely. Recheck all screws, being sure they are all tight. — *Al D'Onofrio, W2PRO, Yonkers, New York*

FT-301 HINTS

Here are some modifications which I made to my Yaesu FT-301. Other '301 owners may be interested.

1) My FT-301 had poor cw waveshaping, resulting in extremely hard keying and minor key clicks. I eliminated the key clicks by changing C127 from 10 μ F to 2.2 μ F, and adding a 5- μ F capacitor in parallel with C134. Both changes were done on PB-1433, the rf board.

2) Solid-state rigs seem to be sensitive to feed-line SWR, and my '301 was extremely so. I reduced this sensitivity by adding a 4.3-k Ω resistor in series with the anode end of D1304 on PB-1445, the LPF board. Now the output power remains nearly constant with an SWR of up to 2:1. Since this modification was performed, I gave my rig the ultimate test by accidentally transmitting with no antenna connected; the finals survived!

3) When the 250-Hz super-sharp cw filter I ordered from the F-T Corporation¹ arrived, I didn't want to give up the use of the 500-Hz Yaesu cw filter already installed. So I devised a method of installing both filters and switching between them. To perform this modification,

*Assistant Technical Editor, QST

cut the wires connected to the MOX-PTT switch and tape them aside (to be reconnected when the rig is sold). Remove the wire connected to pin 15 on the pc-card edge connector of PB-1435, filter board. In my unit, this wire was white with a black tracer. This wire comes from the MODE switch. Pull this wire back through the harness until it breaks out near the MODE switch. Connect it to the center terminal (common) of the spdt MOX-PTT switch. Remove the two white/violet wires connected to pin 14 of PB-1435 and, preserving their connection to each other, tape them aside. Connect a wire from the left MOX-PTT switch terminal to pin 15 of PB-1435. Connect a wire from the right MOX-PTT switch terminal to pin 14 of PB-1435. Install the new 250-Hz cw filter in the space allotted for the a-m filter on PB-1435, filter board. Now 250/500-Hz cw bandwidth switching is done with the front panel MOX-PTT switch! PTT with the microphone switch still functions in the normal manner. The cw carrier oscillator must be tuned precisely to the peak of this sharp filter since the transmitted cw signal passes through it. In cw transmit, apply a slight amount of drive and adjust TC-401 on PB-1436, i-f board, for maximum rf output.

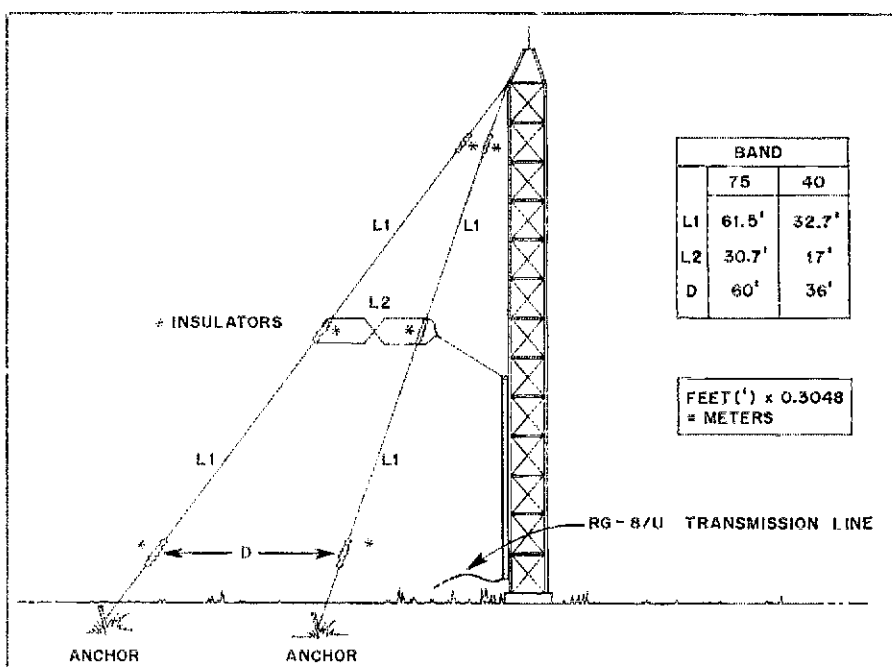
4) My FT-301 had a sluggish VOX relay on cw, which resulted in a missing first dit when using moderate or high keying speeds. I performed an N6JF modification,² which speeds up the VOX attack time considerably on cw. A sluggish relay was only part of the problem; a slow-starting 9-MHz oscillator was the real culprit. Before starting, set the DRIVE control for a specific output level, which will be used as a reference for realignment after the modification. On PB-1433, rf board, change C126 to a 10- μ F electrolytic capacitor. On PB-1436, i-f board, change C422 to 120 pF and C414 to 47 pF. On the VOX board, change R608 to 10 k Ω if your '301 has PB-1438; if you have PB-1685 change R622 to 10 k Ω . For realignment, peak the rf output through the 250-Hz cw filter with TC401 as in step 3 above. This gets the carrier oscillator back on frequency. If the 250-Hz cw filter is not installed, the correct frequency will have to be determined by other means, such as a frequency counter. Then adjust TC402 for the same output level that was set with the drive control at the start of the modification.

5) While the dynamic range of the receiver in the '301 is acceptable, I noted some overloading and IMD generation with a strong signal present in the receiver passband. The following modification, inspired by *The Radio Amateur's Handbook*,³ doesn't give the '301 an uncrushable front end, but is extremely easy to implement. Before starting the modification, tune in a signal from the crystal calibrator, peak it with the PRESELECTOR control, and note its S-meter reading. On PB-1433, rf board, install a 10-k Ω resistor from the drain of the mixer, Q103, to ground. A mounting location for this resistor has already been provided by Yaesu! The empty holes are labeled R123, just next to Q103 on the board. The addition of this resistor has decreased the gain of the mixer slightly, so now adjust the i-f gain potentiometer, VR301 on PB-1435, filter board, to return the calibrator signal to its original level on the S meter. — John C. Pelham, W1JA

²Fox-Tango Corp., P. O. Box 15944, W. Palm Beach, FL 33406.

³The International Fox-Tango Club Newsletter, June 1979.

⁴ARRL, *The Radio Amateur's Handbook*, 1979 or 1980 ed., p. 4-32.



When Carl Bissonnette, WA1AKR, chases DX he uses a sloper like the one illustrated. Carl's arrangement is fashioned after the famous 8JK beam. The feed system resembles that of the ZL Special.

THE WA1AKR 40- AND 75-METER SLOPERS

Several amateurs have suggested that I submit a description of my sloper antenna system for publication in "Hints and Kinks." Other amateurs may be interested in this adaptation of the 8JK beam. Construction information is shown for both the 75- and 40-meter bands.

As shown in the accompanying diagram, the array has two half-wave sloping elements joined by a 1/8-wave, 300-ohm phasing line. Transposing the phasing line should bring the element currents into phase. I find the antenna is broadbanded. There appears to be no need for a Transmatch.

If one desires to suspend an additional sloper from the tower for a directional change, installation of remote switching at the top of the tower will permit the use of a single transmission line. Otherwise, separate transmission lines will be required.

Ends of the antenna are suspended by ropes with the tops placed roughly 1 foot away from the tower. An angle of 45 degrees between the antenna and ground should be maintained. Do not use an angle greater than 50 degrees. Resonance with the dimensions shown should occur near 3.8 MHz for the 75-meter sloper and 7.150 for the 40-meter antenna.

How well do my antennas work? I have contacted stations "across the pond" while competing with the big boys who sport three and four-element beams. I have also experienced little difficulty in working VKs and ZLs. — Carl Bissonnette, WA1AKR, Fairhaven, Massachusetts

CAVITY DUPLEXER CONSTRUCTION NOTES

A few construction notes may help those who might wish to build the duplexer cavities as noted on page 266 of the ARRL *VHF Manual*. When soldering the 0.020-inch stock to the center 1-1/4-inch pipe, I found the best ap-

proach is to insert the stock into the pipe without cutting the slits first. A Sears chrome-plated 15/16 socket fits snugly inside the shim stock after being inserted in the 1-1/4-inch pipe. The solder will not adhere to the chrome. This method makes cleaning up the excess solder easier. Slits may be cut after the cleanup by using a pair of aircraft shears which are used upside down. This will curl the finger stock inward and give firm contact to the tuning slug.

For those who are not adept at soldering large joints, the following may be of some help when soldering 4-inch copper pipe to the brass or copper base. This mass of metal makes quite a heatsink and therefore should be heated for at least three or four minutes before attempting to solder. With a brush, wipe Nokorode pre-tinning paste flux on the area, and then apply a heavy rosin-filled solder for the filler.

Don't be concerned if you find that lumps, bumps or depressions develop as you work around the pipe. Once you have a reasonable amount of solder applied, you can then wipe the joint with a clean dry rag that's been dipped in paste flux. Heat a small section at a time, and when the solder is shiny use the wiping cloth. I suggest that the wiping be done immediately after the initial soldering has taken place, since the assembly should be evenly heated by this time. After wiping the joint, any excess solder that has run over the base can be scraped from the base with a sharp wood chisel. However, leave a 1/4-inch width of solder on the base. A round metal or wood file will take off any excess. The entire joint can then be sanded with an 80-grit paper.

Another note about solder: There are times you may want to insert one pipe into another but do not want the solder to travel too far up the assembly. Take a graphite pencil and draw a wide line around the assembly at the point you want the solder to stop. If the assembly is soldered with the graphite line at the high point, the solder will not flow beyond it. — Herb Patterson, WA1ZMV, Madison, Connecticut

Product Review

Conducted By Paul K. Pagel,* N1FB

Azden PCS-2000 2-Meter FM Transceiver

What comes in a small package that can be made even smaller, has 12 push-button controls and a full 25 watts of output power? The Azden PCS-2000, a versatile and well-made 2-meter rig that's designed to satisfy the most demanding fm operator.

You say your subcompact car doesn't have enough knee room for a small bird, much less an underdash radio? The Azden's remote cable option cuts the size down to a miniscule 2-1/2 x 8 x 3-1/2 inches (64 x 203 x 89 mm). Want to call up a favorite repeater (or simplex) frequency without fiddling with the 12 buttons on the control panel? Just hit MI CALL on the microphone. Want to find a vacant frequency? Turn the scan knob to V.

*Assistant Technical Editor, ARRL

The PCS-2000 can do all this, and more. It may take you a week or so to become familiar with its formidable list of features — as well as a few quirks. But once you've mastered them, you'll have a rig that will do just about everything except clear a busy repeater.

What doesn't it do? The list is short. It doesn't stay on frequency in the scan mode, for one thing. That problem is shared by all scanners, of course, but it's a bit annoying to find yourself 30 kHz up from where you thought you were — just as you're about to jump into a QSO. Perhaps someone will design a 3-second delay circuit to keep the rig on frequency until you really wish to move on. Once you've located a "busy" frequency by means of the scan function, you'll have to make it "permanent" by hitting the UP 10K (or DOWN 10K)

button — twice. Then you punch the other button (DOWN or UP) to return to the repeater frequency. It's all accomplished in a matter of seconds, but takes some getting used to.

Another difficulty that can be overcome with some practice is the lack of backlighting for the push buttons. Trying to read them while driving at night is no easy task. For the sake of the rest of us on the highways, you may want to memorize the function of each button before attempting to operate at night.

Once you have the hang of it, operating the '2000 is a pleasure. Every control, both on the microphone and the control panel, is designed for ease of access. LEDs indicate frequency [the readout numbers are a full half inch (13 mm) high], signal strength, power output, which of the six memory frequencies is in use, and whether the memory mode is in use. The controls on the standard microphone are well placed — you're not likely to punch the wrong button while driving.

The standard microphone boasts six functions — PTT, call up memory 1, up 10 kHz, down 10 kHz, volume and squelch. It provides enough versatility to keep the user from having to deal with the multitude of switches and keyboard buttons on the control unit while operating mobile. About the only thing you can't do from the microphone is scan.

A brief summary of the steps needed to get the rig going provides an idea of what it can do. (1) Turn on power. (2) Set squelch and select high or low power. (3) Write in a memory frequency (let's say it's to be 146.88) by: pushing the M ADRS (memory address) button until the LED is on the first position; push the combination of MHz UP, 100K UP (or DOWN), and 10K UP (or DOWN) buttons to display 6.880 on the frequency readout; and push M WRITE. The



The Azden PCS-2000 2-meter fm transceiver. While a multitude of functions may be initiated from the front panel, the unit presents a neat and uncluttered appearance.

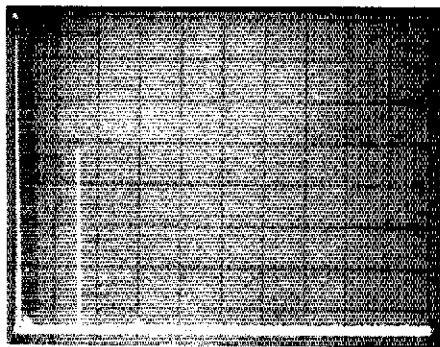
Azden PCS-2000 2-Meter FM Transceiver

Manufacturer's claimed specifications (except where indicated)

Frequency coverage: 144.000 to 148.995 MHz in 5-kHz steps.
Power requirements: 13.8 V dc \pm 15% at 5.0 A transmit, 0.7 A receive.
Output power: 25 W (high), 5 W (low).
Spurious emission: -60 dB or better.
Microphone input impedance: 500 ohms, nominal.
Antenna output impedance: 50 ohms, nominal.
Sensitivity: 0.28 μ V for 20 dB of quieting.
Selectivity: ± 6 kHz (-6 dB), ± 15 kHz (-60 dB).
Price class: \$300 (without optional accessories).
Manufacturer: Japan Piezo Company, Ltd., Tokyo, Japan.
Importer: Amateur-Wholesale Electronics, 8817 S.W. 129th Terr., Miami, FL 33176.
Dimensions (HWD): 2-1/2 x 8 x 11-1/4 in. (65 x 200 x 285 mm) including cabinet projections.
Weight: 5.5 lbs (2.5 kg).

Measured in ARRL lab

27 W (high); 7 W (low).
 -72 dB.

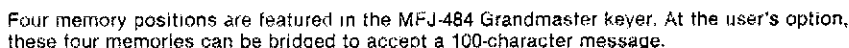


ARRL lab spectral photograph of the output of the Azden PCS-2000 transceiver. Vertical divisions are 10 dB each; horizontal divisions, 100 MHz. The fundamental frequency at 144 MHz has been attenuated approximately 32 dB by means of a two-cavity notch filter in order to prevent overload distortion in the spectrum analyzer. The second harmonic is down approximately 72 dB. This photograph represents a worst-case test. The PCS-2000 complies with current FCC specifications regarding spectral purity.

"Convenient" is the most appropriate word for the PCS-2000. In describing the usefulness of the remote cable kit, for example, the manual suggests: "When using this transceiver [sic] as a fixed station, you can perform QSO in bed while setting the main unit on a desk." What more could you ask from your 2-meter fm rig! — *Joel P. Kleinman, WA3UY*

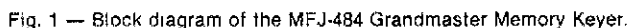
When I opened the keyer cabinet I fully expected to see the Curtis Electro Devices 8044 and 8047 keyer and memory ICs reposing on the circuit board, because the 8044 is used by MFJ and others in various models of keyers. But the interior view disclosed 19 ICs and seven bipolar transistors instead! Indeed, this appeared to be a "busy" circuit board! The packaging and circuit-board layout had that "sanitary" look that many of us appreciate.

The memory features of the keyer permit the operator to place 25 characters into any of the four memory positions, A, B, C and D. Memories can be combined to provide up to three 50-character messages, or all four memories can be bridged to accommodate a



A memory-delay control is provided so that

The RESET switch is used to stop the message. The same effect will be brought about



MFJ-484 Keyer

Claimed Specifications

Size (HWD): 2 x 8 x 6 inches (51 x 203 x 152 mm).

Power requirements: External 12-15 volts dc or 117-volt ac adaptor.

Keying characteristics: Dot and dash memories, adjustable weight control, sidetone and sidetone monitor.

Memory feature: Up to 12 each 25-character messages. Bridge the memories for up to three 50-character messages or combine memories A, B, C and D for 100-character message. Message delay and message-repeat features included. Memory-saver battery provision included also.

Keying modes: Up to -300 volts at 10 mA max., or up to +300 volts at 100 mA max.

Color: Eggshell and brown.

Price class: \$140.

Manufacturer: MFJ Enterprises, Inc., Box 494, Mississippi State, MS 39762. Toll free no. is 800-647-1800.

If the paddle is tapped during a transmitted-message period, LED indicators show the state of the memories. They illuminate when the memories are addressed and become extinguished when the memories are full or have been fully utilized during a message period. The LEDs also enable the operator to know which memory is in service. A fifth LED will light during activation of the time-delay feature.

There is provision in the '484 keyer for a memory-saver battery (9 V). If the 117-volt ac service is interrupted, the battery is switched in to the circuit automatically. If the keyer sidetone is not used during the power-outage period, the battery will provide approximately three hours of service before it is depleted. Longer periods of operation can be had by connecting an external battery of higher capacity to the battery jack on the rear of the keyer.

The keyer comes with a 117-volt ac adaptor. This unit plugs into the rear of the keyer. It can be connected to the '484 at all times, and can be attached while an external dc supply is connected to the keyer. With this arrangement, the dc supply will take over when the operating voltage from the ac adaptor vanishes. A 12- to 15-volt dc supply is recommended by the manufacturer.

Other Features

A squeeze key or conventional paddle can be used with the MFJ-484, since the circuit permits iambic keying. Grid-block or positive-voltage keying can be accommodated by this keyer. Damage to the keyer will not result if the wrong keying mode is chosen by the operator. The two outputs are protected from this kind of potential damage. A maximum voltage of -300 at 10 mA is the limit for grid-block keying. Direct keying of positive voltage can be done at levels up to +300 volts at 100 mA maximum.

Practical Considerations

I have used the '484 keyer for several weeks on a daily basis at WIFB. Operation took place on 80 through 10 meters at the 1-kW dc input level. End-fed and coaxial-fed antennas were used without rf energy affecting the keyer, the memory circuit or the sidetone operation. It appears to be rf-tight, provided shielded cables are used between the paddle and the keyer, and

between the keyer and the transmitter.

The only difficulty experienced with the product occurred when it was first tried: The paddle jack was wired in reverse (dots and dashes reversed). The two appropriate wires on the jack were reversed and all was as it should be! — *Doug DeMaw, WIFB*

HEATH COMPANY MODEL SA-7010 TRI-BAND YAGI

Pictures can, at times, tell more than words. This may be true when describing a hardware item like the Heath SA-7010 4-element tri-band Yagi for 20, 15 and 10 meters. The purchaser is usually interested in two things when buying a beam antenna — performance, and the structural properties of the system. This review contains photographs of the key structural points to be discussed. It should be easy for the reader to form his or her own conclusions after inspecting the close-up views of Heath's new antenna. Performance data are included for those who want to compare our published results with the specifications of other brands and models of similar antennas.

The SA-7010 is advertised as a 4-element antenna. This does not mean that four elements are used during operation on any one band. Rather, there are three elements in service at a given time. The fourth element is a separate reflector for the 10-meter band. The designer included the extra element in order to obtain optimum spacing of the elements during 10-meter operation. A trap type of reflector is used during operation on 15 and 20 meters; the 10-meter reflector is full size, and has no traps.

Structural Details

A view of the assembled and operational SA-7010 is shown at the beginning of this review. It is installed at WIFB on a 50-foot (15-m) Rohn 25 tower. The director is in the foreground. Four traps are used in director, as is the case with the driven element. The rear element has only two traps. It is the 15- and 20-meter reflector.

Figs. 2 and 3 illustrate the ruggedness of the mounting hardware for the boom-to-element

unions (Fig. 2) and the boom-to-mast junction (Fig. 3). The latter consists of rugged aluminum castings which contain groove-type teeth for secure clamping of the boom to the mast.

Dimensions for the assembled antenna are 16 x 34 feet (4.9 x 10.4 meters). The boom is formed by joining two sections of 2-inch (51-mm) OD aluminum tubing. Each of the elements with traps contain graduated-size aluminum tubing [1-1/4, 1-1/8 and 7/16 inch (32, 29 and 11 mm) OD sections] to permit tapering of the elements. This ensures structural soundness while reducing the overall weight of the system. The 10-meter reflector contains sections of 7/8, 5/8 and 7/16 inch (22, 16 and 11 mm) tubing.

A check of the balance point of the assembled beam showed it to be exactly at the mast-to-boom clamping site. This is important in the interest of reduced stress on the mounting hardware. Conductive grease is provided with the kit for use where the tubing sections are joined. This prevents corrosion and subsequent resistive electrical joints.

I was not highly impressed with the element-clamp bolts which are used to lock the

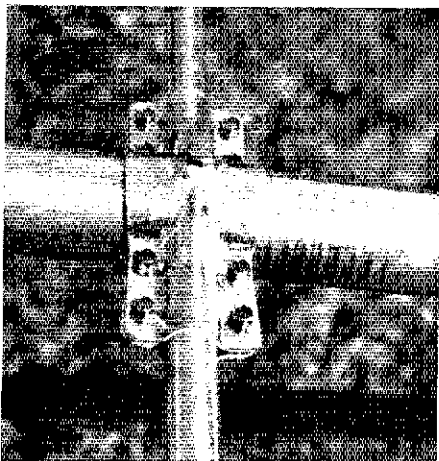
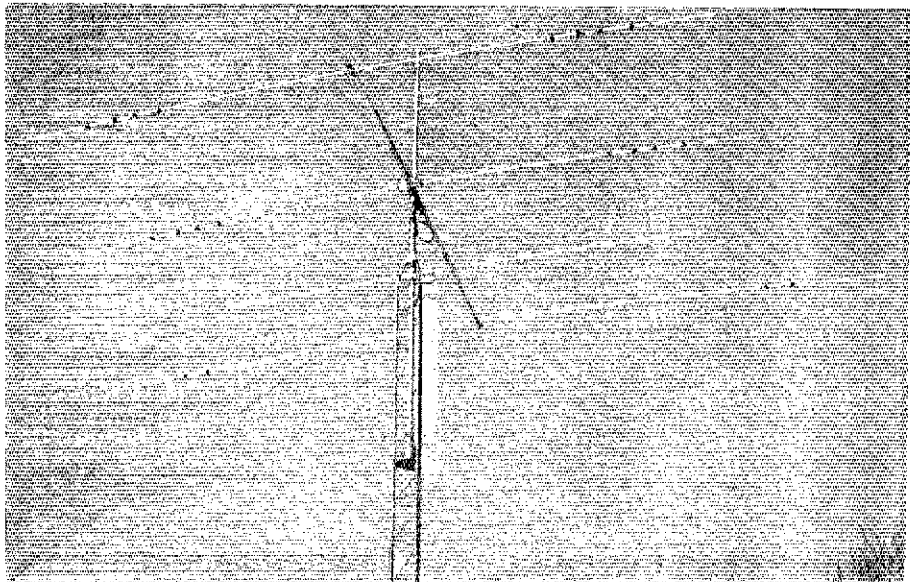


Fig. 2 — Closeup view of the element-to-boom clamps of the tri-band Yagi.



The Heath SA-7010 tri-band Yagi assembled and operational.

Heath SA-7010 Claimed Specifications

Weight: 40 pounds (18 kg).
 Impedance: 50 ohms.
 Maximum rf power input: 1 kW.
 VSWR (at resonance): Less than 1.5:1.
 (See Fig. 4 for ARRL lab measurement.)
 Turning radius: 17.4 feet (5.3 meters).
 Surface area: 5.4 square feet (0.5 square meters).
 Maximum wind survival: 80 mi/hr (128.7 km/hr).
 Price class: \$200.
 Manufacturer: Heath Company, Benton Harbor, MI 49022.

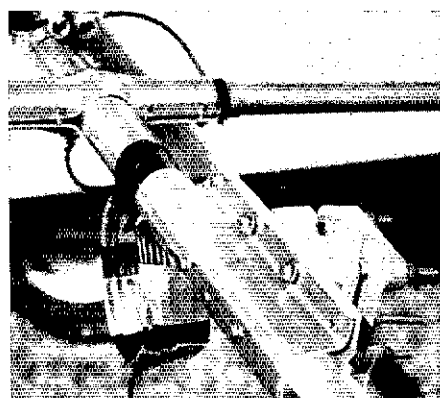


Fig. 3 — A cast-aluminum clamp offers a strong union between the 2-inch OD boom and the mast.

telescoping sections of tubing. They might be considered one of the two weak points in the system; during assembly, two of the clamp bolts broke before the tension was sufficient to lock the tubing sections together. Most of the clamp bolts are bowed somewhat when the torque on them is ample to hold the element sections together. This is complicated by the application of the conductive grease, which allows the tubing sections to slip inside one another unless high torque is applied to the bolts. In fact, a few days after the beam was erected, a bolt snapped on the reflector and down came the end of the element, plus one trap! The practical cure is to replace the kit clamps with stainless-steel hose clamps. Perhaps the manufacturer will consider this as a production change in the future!

Electrical Aspects

This antenna can be tuned for the phone or cw portions of the three bands. The bandwidth will not allow full coverage of each band without substantial SWR at one extreme of the frequency spread. The review model was tuned for the cw segments. The resultant SWR curves were obtained with the antenna in place on the tower (Fig. 4). On 15 and 20 meters, the lowest SWR occurs quite high in the cw parts of the bands. In my opinion, it would be much better to provide adjustment dimensions which would allow the SWR to "bottom out" at 14.050 and 21.050 MHz. This is especially important because the highest cw activity is found in the bottom 50 kHz of each band. It can be seen from the curves that the SWR is fairly high in the lower portions of the bands, except on 10

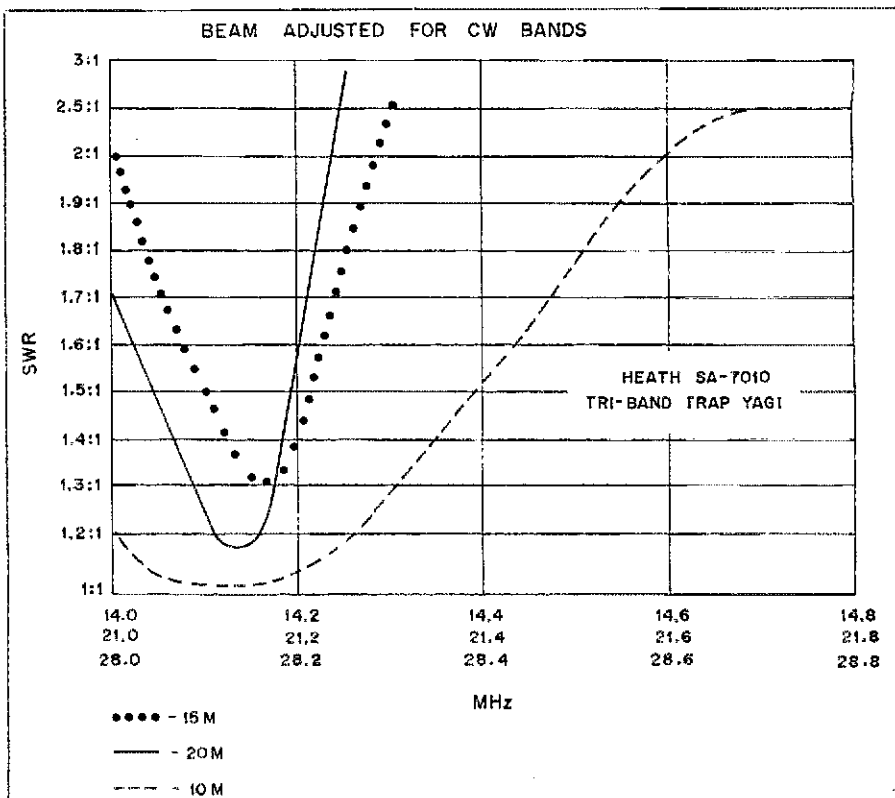


Fig. 4 — SWR curves for the 20-, 15- and 10-meter bands with the elements adjusted for cw operation. Dimensions are those specified in the instruction manual. Tests were performed with the beam at 50 feet on an unguyed tower.

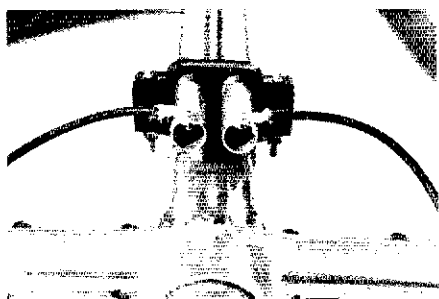


Fig. 5 — This view of the beta-match tubing shows 8-32 nuts and screws holding the driven-element connection wires in place on the matching section (see text).

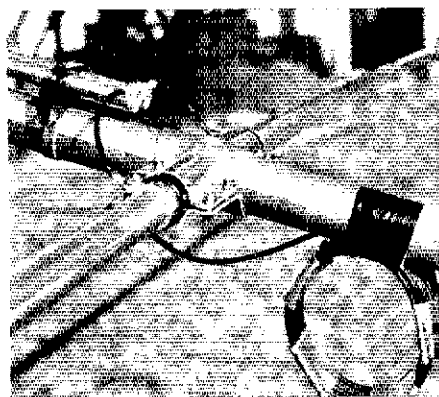


Fig. 6 — Details of the beta match, driven element and coaxial rf decoupling choke after assembly of the beam was completed. Plastic inserts insulate the halves of the driven element from the boom. The beta match provides a dc return for lightning protection.

meters. These curves were obtained after tuning the beam in accordance with the instruction book.

Impedance matching (50 ohms) is accomplished with a beta match. The beta match tubes are mounted "piggy back" style on the boom, as shown in Fig. 5. This is where the second weak spot was observed. The manufacturer supplies two sheet-metal screws for use in attaching the driven element jumpers to the matching section. In order to obtain good tension at this important electrical junction, I replaced the screws with no. 8-32 bolts and nuts. The screw holes in the beta match tubes stripped before there was sufficient tension to hold the jumper wires in place. Noncorrosive weatherproof sealant was added after the bolts were in place.

Fig. 6 shows details of the decoupling choke which is fashioned from RG-58A/U coaxial cable. It contains 11 turns of coax. The ID is 6 inches (150 mm).

Performance

It took eight hours to sort, assemble and adjust the antenna. Installation on the tower required some 30 minutes (courtesy of W1VD). The reviewer is entirely satisfied with the antenna, structurally and electrically, now that the two mechanical weak points have been resolved. It received its first significant test during the ARRL DX Contest early in 1980. Of the first 30 "pileups" encountered, W1FB was acknowledged on the initial try in all but three instances. It took two attempts to break two of the pileups and four tries to nail down the third. (dc input to the transmitter was 1 kW.) Overall performance is markedly better than with the previous low-cost triband trap Yagi that was on the tower. — Doug DeMaw, W1FB

*The Heath Company has informed the ARRL lab that new clamps are being tested and will be available in the future.

Amateurs in the Thick of Volcano Action

By John H. Brown,* W7CKZ and David Lievsay,** K7UUH

What do you do when that nice snowcapped mountain in your backyard suddenly becomes a fire-spouting volcano? Amateurs in the states of Oregon and Washington found out when Mount St. Helens began erupting in March. Hundreds of amateurs began helping the Washington State Department of Emergency Services (DES) keep an eye on the mountain. Other groups, such as the Tektronix Employees Radio Amateur Club (TERAC), began helping the scientific teams studying the mountain.

Scientists had been concerned about Mount St. Helens for a number of months prior to the first big bang, at 8:32 A.M. on the third Sunday in May. The mountain had been venting steam since early March. Then earth tremors were detected, followed by more venting of steam. Ash began spewing from the mountain on March 27, turning the mountain into a dirty snow-covered cone. Geologists and scientists were not certain what would happen, if anything, or when.

Amateur Radio emergency communications circuits were put into 24-hour operation beginning with the March 27 activity. ARES and RACES nets were activated on vhf and hf, with amateurs acting as scientific observers as well as communications operators, feeding information to DES headquarters in Olympia. The mountain eased its activity after a few days and the Amateur Radio nets went on a less strenuous schedule.

A Major Eruption

Everything was relatively uncomplicated until, without warning, Mount St. Helens blew her top at 8:32 A.M. on Sunday, May 18. The first warning to the world was from Amateur Radio operator Jerry Martin, W6TQF, who was at his observation post, "Coldwater 2," for the Amateur Radio Emergency Communication Network. His warning activated the state DES office and, in turn, the populace learned of the disaster. It was thought that W6TQF was in a safe position some 10 or 12 miles from the peak, but contact was lost a few minutes after his warning and his location was



Jim Kauppila, WA7JOH, of Beaverton, Oregon, is shown on the west rim of the Mount St. Helens crater, prior to the May 18 eruption. Snowcapped Mt. Adams can be seen in the background. (photo courtesy WA7JOH)

destroyed by the volcano's blast, ash and mudflows. Jerry is listed as "missing and presumed dead." [Editor's Note: July QST, page 28, carried the sad news that another amateur, Reid Blackburn, KA7AMF, had lost his life in the initial Mount St. Helens eruption.]

The amateur nets on 147.66/06 and 3.987 MHz were buzzing with activity, relaying wind-direction and ash-fall information to towns in the cloud's path as it drifted over the mountains and headed east, raining ash from a lightning-ripped cloud that rose to nearly 60,000 feet. Information was fed to DES headquarters, where a concerned staff began to rely more and more on Amateur Radio as the minutes ticked off and it became apparent that this disaster had been triggered by an explosion inside Mount St. Helens that was estimated to have had the force of a 10-megaton atomic bomb.

Amateur Radio became the key communications link for the handling of necessary traffic during the next few days, as the mountain continued to spew ash that eventually drifted to the East Coast. The ash that penetrated the outer regions of the atmosphere will probably drift for many years before dispersal.

A Second Eruption

Things quieted down a bit and everyone began to sort their lives into a semblance of order when, a week after the first blast, the mountain erupted again at 2:49 A.M. on Sunday, May 25. With the top 1300 feet of the mountain already gone, the biggest concern was centered around the ash drifting northwest and toward the ocean beaches, where throngs of Memorial Day weekenders were in retreat

to escape the ash fallout in eastern Washington. Amateur Radio kept the Washington State DES headquarters informed of the mountain's actions.

County emergency services offices in the path of the ash-cloud travel used information from the Amateur Radio network to plan necessary activities. Mount St. Helens soon ceased its second eruption and everyone settled back into a routine of ash cleanup learned after the first eruption. Amateur Radio emergency communications networks continued to pass mountain observations and information to officials, educators and other agencies involved in monitoring Mount St. Helens.

Dr. Leonard Palmer, N7AQA, a geologist on the staff of Portland State University, was instrumental in letting the scientists studying the mountain know how well Amateur Radio worked in the vicinity of the volcano. Having carried a 2-meter handheld on overflights of the volcano, Dr. Palmer knew what Amateur Radio would do.

The mountain settled into a familiar routine of steam venting and light ash emissions. For the next couple of weeks everyone wondered if a weekly Sunday eruption would occur, but nothing big happened.

A Third Eruption

After two and a half weeks of waiting and watching, Mount St. Helens erupted again on Thursday, June 12, at 9:11 P.M. Just hours before, many had predicted a Friday-the-13th eruption. Ash drifted southwest over Portland, Oregon, and resulted in airport closures plus general discomfort for those in the path.

As of this writing, Amateur Radio networks are still present on 147.66/06, 3.940 MHz and other secondary frequencies, keeping nearly 300 Pacific Northwest hams active passing reports, mountain observations and data to emergency services offices around the state. It is estimated that 2000 to 3000 messages have been handled by Amateur Radio. Scientists are watching a possible lava dome form in the mountain crater and predicting more possible eruptions. No matter what Mount St. Helens does, hundreds of eyes are observing and reporting via Amateur Radio to emergency officials and the rest of the world. As long as there is a need, Amateur Radio will be there. □

*ARRL Northwest Division PRA, 725 88th Ave. S.W., Olympia, WA 98502

**1258 S.W. Taylors Ferry Rd., Portland, OR 97219

New League Film Promotes Amateur Radio

W6AQ's masterpiece — "The World of Amateur Radio." How was it made? How can you use it?

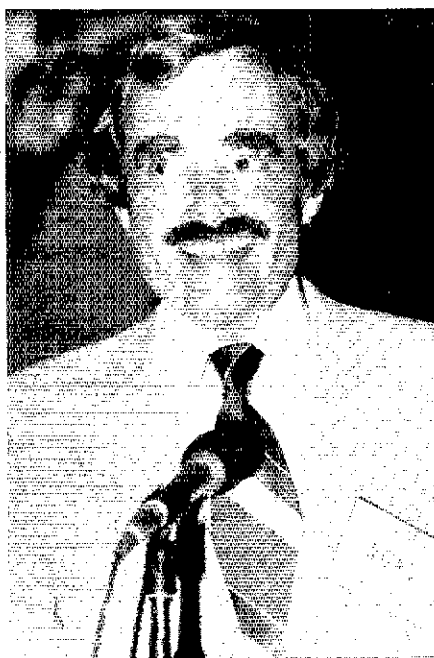
By Bill Pasternak,* WA6ITF

It's a typical southern California spring morning — overcast. It's 8 A.M. and the film crew is busy setting up. Both Dave Bell, W6AQ; and Larry White, WB3EJG, will be directing today. The cameraman is busy setting up the Eclair. Others are setting up lights and checking other equipment. What will appear on the screen for but a few moments will take hours to photograph. Nobody minds this. For some it's just another day's work; for others it's a labor of love. Why else would anyone spend a Saturday making a movie?

On this particular Saturday in the spring of 1979 a film crew is on board the *Queen Mary*, in Long Beach harbor, to film the on-scene narration segments of the new ARRL-sponsored film, "The World of Amateur Radio." Thanks to Nate Brightman, K6OSC, and the Associated Radio Amateurs of Long Beach, the filmmakers will be able to show a bit of true history: that of the majestic *Queen* herself, along with the *Queen Mary's* wireless room, recently restored and given the addition of a shiny new Amateur Radio station.

What Does an Associate Producer Do?

You might wonder how a videotape service technician winds up as the associate producer of an Amateur Radio film for the ARRL. In my case it came in the form of a telephone call from the true genius behind the project, Dave Bell. Dave explained that he needed a right-hand man to help oversee things — that was all the prodding it took. Having an opportunity to work for the man who has been dubbed "The Cecil B. De Mille of the Airwaves" by both the League and his peers was an



Emmy award winner Dave Bell, W6AQ, the man behind "The World of Amateur Radio," at the premier of the film. (photo by Norm Chaffin, K6PGX)

honor that I could not consider passing up. As it turned out, this was not only a film project, but a true learning experience as well. The following will tell you a bit of what my responsibilities were. I was, of course, just one member of a team, and it was this team, guided by Dave Bell, W6AQ, that made "The World of Amateur Radio" the success it has become.

I soon found out that an associate producer does everything that a producer has little time to handle himself. My first job was to write a scenario; a very basic story

line that we would work an initial script against. Simultaneously, I was also handed the responsibility of scouting shooting locations to see if an idea that seemed good on paper would lend itself to "the silver screen." To look at the original scenario in relation to the finished production, it's easy to see the way things evolve and change.

Changes, Changes and More Changes

After I was sure that NBC-TV network news correspondent Roy Neal, K6DUE, would be our narrator, I envisioned an opening where he would be seen "covering a news story" — in a long shot, over the shoulders of a TV news crew. That idea then became Roy interviewing Personal Communications Foundation founder Jon Gallo, WA6PTM, at Jon's Encino home. The next idea was Roy simply using the setting of Jon's home station, and our final decision was to move the entire narration sequence to the *Queen Mary*. Each time a change was made, it meant rewriting a good portion of the script. Enter Larry White, WB3EJG.

The final script was written by Dave Bell and Larry White. But even the final script was subject to last-minute changes. In Roy's closing soliloquy, where he speaks about the future, of amateurs going into space and inhabiting colonies on the moon and beyond, the idea came from the script but the words were Roy's. In the end, what you see and hear in "The World of Amateur Radio" are the true feelings of those who made the movie.

"The World of Amateur Radio" was not meant to be an entirely new film. The original thrust of the project was to update an earlier Dave Bell/ARRL film, "Ham's Wide World," which had been made back in the late '60s. An awful lot of

*24854 New Hall Ave., New Hall CA 91321

technology had changed since that time, of course. For instance, fm repeater operation, now a day-to-day part of virtually every amateur lifestyle, was just getting started in 1968. Neglected in "HWW," fm repeaters would obviously have to be included in the new version, and old style a-m vhf operation deleted.

Similarly, the AMSAT/OSCAR program had come a long way in the 10 years since "HWW" was made. Nor could we overlook the modernized methods of amateur instruction. One prime example of such advanced learning techniques found its roots here in Los Angeles under the name "Murphy's Code and Theory Class." These were not the only stories to be told. What about the value of Amateur Radio to the handicapped; its use as a therapeutic tool in the rehabilitation of those requiring prolonged confinement in a hospital? Perhaps you have read about April Moell, WA6OPS, and her "rehab radio" program (September 1979 *QST*, page 60). In "The World of Amateur Radio" you will see exactly what April does and why she has been so successful.

On an international level, how can the value of Amateur Radio be better depicted than by telling the story of its emergence in Jordan and showing the profound effect that Amateur Radio has had on the development of this Middle Eastern nation? We were fortunate to have been granted permission to film in Jordan and to have the entire sequence narrated by His Majesty King Hussein, JY1. Almost on the spur of a moment, Dave Bell and Cameraman Wayne Threm found themselves aboard an Alia (Royal Jordanian Airlines) jet headed some 10,000 miles away to capture this story on film. His Majesty's message about Amateur Radio being a tool of understanding between all peoples of the world is well worth listening to. One thing is certain: What started as a remake became a really new film!

In the span of 28 minutes, "The World of Amateur Radio" touches on just about every aspect of today's Amateur Radio society, and then pauses to glimpse into what the future may hold. This fast-paced trip around the nation and the world, as seen from the standpoint of the radio amateur, has something for everyone, amateur and nonamateur alike.

How to Promote Amateur Radio

"The World of Amateur Radio" does little good sitting in my videocassette collection or in the ARRL library. We freely admit it to be a promotional film — one designed to educate and inform the world as to who amateurs are and the type of services they can render. The film has already taken a special-category prize at the International Telecommunication Union film festival in Geneva, and it is entered in other competitions. What is even more important, however, is show-



Scene 3, take 2 of Dick Van Dyke's opening sequence. (WA6ITF/Dave Bell Associates photos)



In the closing scenes, Roy Neal turns to the mic and asks, "Is this frequency in use? This is K6DUE operating W6RO..."



Actor/comedian Stu Gilliam, WD6FBU (right), teaching a class at Murphy's Code and Theory Class in Culver City, California, as Cinematographer Wayne Threm catches the student reaction.



Actual filming of a scene onboard the *Queen Mary* in Long Beach harbor. Left to right: Cinematographer Wayne Threm; Production Assistant Terry Modnick; Narrator Roy Neal, K6DUE and Producer/Soundman Dave Bell, W6AQ.

ing it to the general public. How, you ask?

Do you belong to a church or civic group? These organizations are always looking for weekly or monthly presentations. Take the initiative — tell the organization's program chairperson that you want to provide a program about Amateur Radio. The same holds true for service groups such as the Red Cross or other charities that you may be affiliated with.

What about getting it on TV? The film seems to fare well on the "tube," as shown by the response following its presentation on KNBC-TV in Los Angeles. The time slot was a good one, Sunday afternoon after a football game. I know that people did see it because many nonamateur friends who were not aware of the scheduled presentation have since remarked that they saw my name in the credits of a film about ham radio. In getting a film such as this on your local TV station, follow the advice of your local ARRL public relations assistant (PRA). These people are usually adept at such matters. Work with them and through them.

Another important outlet for this film is public and private schools. The film is timely and lends itself to both science and social studies classroom work. The possibilities are only limited by your imagination.

"The World of Amateur Radio" is available on 16-mm film and various videocassette formats, including 3/4-inch U-matic (see April *QST*, page 10). This 3/4-inch U-matic cartridge is today's standard in electronic journalism; virtually every television station in the nation uses this format of videotape in addition to the normal 2-inch Highband Quad that most programs are produced on. If you are dealing with a station that has no 16-mm film capabilities, ask if they can play a 3/4-inch U-Matic videocassette. If they say yes — you're in.

So there you have a bit about the making of the new film; the places we went and the people and scenes that we photographed. You may have heard that such notables as actor/comedian Stu Gilliam, WD6FBU; U.S. Senator Barry Goldwater, K7UGA; actor/comedian Dick Van Dyke; and entertainer Arthur Godfrey, K4LIB, appear in the film, either on screen or as narrative voices. Many, like Alan Kaul, W6RCL; Lenore, W6NAZ, and Bob, W6VGQ, Jensen; Byron Paul, WA6RNG, and hundreds of other Amateur Radio volunteers, far too many to list here, also donated their time and talents to make a dream called "The World of Amateur Radio" become a visual reality. Special thanks to Dr. Norm Chalfin, K6PGX, for processing color slides to black-and-white photographs. Also, thanks to Norm and Bill Orenstein for providing additional photographs for this article.

Arctic DXpedition Falls Just Short of Pole

By Andrew Tripp*

When Dave Porter, K2BPP, set foot on the North Pole one year ago he became the first man to have walked at both poles, a feat which earned him a place in the 1981 edition of *The Guinness Book of World Records*. The Hope, New Jersey, resident had been at the South Pole in 1970 and 1973 as a guest of the U.S. Navy.

But success for Porter was bittersweet. In 1979, he had planned to be the first to complete an Amateur Radio operation from the North Pole, but fell short of that goal when the -39°F temperature froze his transmitter. He vowed to return.

This year's attempt to be the first to communicate worldwide from the top of the world had an added dimension: Porter and his 16-man expedition had planned to sustain a four-day encampment at the pole, besting a previous stay of 28 hours set by a Soviet ski team in 1979.

Accompanying Porter were Dr. Jack Wheeler, organizer of last year's expedition; a corporate executive; a banker; a writer; five parachutists who set a record when they performed the northern-most sky-dive; a four-man ABC film crew which recorded the historic jump; and two



At their base camp at Hazen Lake, K2BPP, N4ZG and K0BJ practiced putting together their 20-meter, 3-element, Hy-Gain antenna. The group was able to install the antenna at the Arctic site in about 15 minutes, a feat made possible in spite of the sub-zero temperatures, because the antenna sections were color-coded. (photo by Dave Porter, K2BPP)

other Amateur Radio operators, Lee Skipper, N4ZG, of South Carolina and Bruce Frahm, K0BJ, of Kansas.

This time, Porter and company were prepared. In addition to a 10-day supply of food and water, they brought two radios, two masts, six antennas, two generators, two 800-watt heaters, three portable stoves — and an insulated box, specially designed by Porter to house the radio equipment.

Members of the expedition set out from various points in the world and met in Edmonton, Alberta, on the evening of April 25. The next morning the group headed north to Resolute Bay to rendezvous with their charter service. Repairs to one of the planes delayed departure until April 29, when the troupe flew to the Eskimo village of Grise Fiord, Canada, and then onto Hazen Lake, the world's northern most lake, where they established their base camp.

On May 1 the expedition set out for the North Pole and a place in history. But the Arctic has a way of discouraging strangers to the region. About 180 miles from their destination they encountered cloud cover caused by the unusually warm temperatures (only -5°F) for that time of year. At 92 miles from the pole, it was evident any attempt to land could be fatal without the benefit of shadows to give depth and definition to the pressure

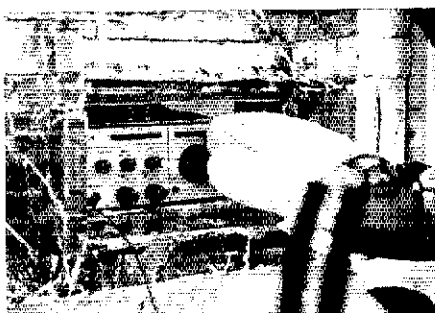
ridges, not fully visible from the air. The decision to turn back was made by the pilot, who has many years of Arctic flight experience.

The temporarily disheartened adventurers retraced their trail to clear skies and set down on the frozen Arctic Ocean at 84.5°N , 70.0°W , about 200 miles from the North Pole. There they set up their equipment and operated for about four hours, making 31 contacts with hams in Puerto Rico, Greenland, Alaska, and the Midwest and East Coast of the U.S. Dick Duane, WB2VAT, and his wife, Jeannine, WB2MBW, who operated the group's base station from atop Schooley's Mountain in New Jersey, handled most of the messages and phone patches to family members. On May 4 the Arctic expedition returned home, disappointed but not defeated.

Already, Porter is making plans for his third attempt at being the first to complete an Amateur Radio operation from the North Pole. But rising costs, especially of fuel, is one of the many obstacles Porter must overcome before he can again challenge the icy jaws of the Arctic. And while Porter ponders the past and confidently looks to the future, the Arctic has already erased any traces of the 17 strangers who dared venture there. QST



Some things never change. K2BPP stands beside a trail igloo at Grise Fiord, similar to one he stayed in for two days during a blizzard on last year's polar expedition. Although Eskimos now live in more modern housing, the 8000-year-old tradition is still passed on from father to son. (photo by Bruce Frahm, K0BJ)



Brrrr!! K2BPP wears insulated mittens while operating a Rockwell-Collins KWM-380 from the doorway of a DC-3 at the Arctic Ocean site. The compartment housing the radio is lined with six inches of polyurethane foam insulation and three heating pads. Specially designed by Porter for the expedition, the box maintained an internal temperature of about 80°F , allowing Dave to operate the rig with the compartment door open. (photo by Lee Skipper, N4ZG)

Canadian NewsFronts



Conducted By Harry MacLean,* VE3GRO

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Moved and Seconded . . .

INTERIM MINUTES OF CRRL BOARD MEETING NO. 2, May 9, 1980

Under the provisions of Article X of the Letters Patent of the Corporation, the Board of Directors of the Canadian Radio Relay League, Inc., met at 1300 FDT on Friday, May 9, 1980, at the Skyline Hotel, Toronto, Ontario. Present were Vice President Mitch Powell, VE3OT, who assumed the Chair in the absence of President Ron Hesler, VE1SH; Directors Thomas Atkins, VE3CDM, and George Spencer, VE6XN; and Counsel Robert Benson, Q.C., VE2VW. Also present as observers were Assistant Directors George Davis, VE3BBW; William Loucks, VE3AR; Harry MacLean, VE3GRO; Noreen Nimmons, VE3GOL; Martin Rosenthal, VE3MR; and Gordon Steane, VE3BMG.

In the absence of Secretary Fred Towner, VE6XX, who was ill, Harry MacLean, VE3GRO, was appointed to record the minutes.

After discussion of events leading to the receipt of a letter of resignation from President Hesler, moved by Mr. Spencer and seconded by Mr. Atkins, that the Board accept with regret Mr. Hesler's resignation, and express the hope that Mr. Hesler's counsel and advice would continue to be available to CRRL, VOTED unanimously.

After discussion of the responsibilities of the CRRL president and vice-president; the desirability at this time of giving CRRL a more simplified structure; and the feasibility of the vice-president assuming responsibility for the former president's duties, while in fact, delegating those duties to others, moved by Mr. Spencer and seconded by Mr. Atkins, that Vice President Mitch Powell, VE3OT, be appointed interim president of CRRL. VOTED unanimously.

The Board recessed from 1440 to 1502.

In the remainder of the meeting, the Board

discussed items on an agenda prepared by Mr. Powell, and APPROVED the following:

1) Renewal of the call, VE2BE. This call belonged to Alex Reid who was ARRL Canadian director for many years.

2) Reservation of calls with an RRL suffix in all Canadian call areas for future use by an Official Bulletin Station system.

3) Appointment of Harry MacLean, VE3GRO as editor for the QST "Canadian NewsFronts" column. President Hesler had indicated in March that he no longer wished to be responsible for this column.

4) Preparation and publication of a new Canadian Amateur Radio licensing manual.

5) At the discretion of the CRRL president, appointment of a person to act as liaison between CRRL and League Communications Department personnel in Canada. William Loucks, VE3AR, who chaired the ad-hoc committee dealing with this matter, was commended for his excellent work.

6) Preparation of a mailing to all amateurs in Canada, explaining the work of the League in Canada, and inviting them to become members.

7) Travel to League Headquarters in Newington, by Larry Kayser, VE3QB, and others, to demonstrate and publicize the packet radio system that they developed in Canada.

8) Underwriting travel expenses for Assistant Director Randy Smith, VE1SAT, to allow him to attend the Canadian Amateur Radio Federation Regional Symposium, to be held Saturday May 17, 1980 in Hamilton, Ontario.

9) Continued opposition, through legal channels, to attempts by the Canadian Amateur Radio Federation to register in their name, the trademark CARL, which stands for Canadian Amateur Radio League. It was felt that this trademark was too similar to CRRL, and would become a source of unnecessary confusion to Canadian amateurs.

10) Participation by CRRL-ARRL officials in as many hamfests as possible during the coming months. Specifically mentioned were those known to be upcoming in Cape Breton, Ontario, Saskatchewan and Alberta.

11) Sending of a letter of congratulations to the Ontario Trilliums, on the occasion of their 15th anniversary, and commending them for their excellent work on the QSL bureau.

During the course of the meeting, the following were also discussed, with no formal action being taken at the time:

1) Payment of articles for QST.

2) Program arrangements for the 1980 Radio Society of Ontario Convention.

3) Appointment of additional assistant directors, particularly in western Canada.

4) CRRL budgets.

5) The ARRL Executive Committee meeting held on March 9, 1980 in Gaithersburg, Maryland, at which some CRRL concerns were discussed.

6) Findings of the ad-hoc committee on proposed expansion of the American phone sub-band on 20 meters. Opposition to this proposed expansion has become more difficult as a result of the new Canadian phone sub-band on 40 meters.

7) Attempts to establish alternative traffic systems in Canada.

8) Excellent comments by Peter Guenther, VE4PG, regarding League affairs in Canada.

9) Reestablishment of an intruder watch system. This seems particularly desirable with the continued illegal hobby radio activities between 27 and 28 MHz, and the new WARC bands at 10, 18 and 24 MHz.

10) Nominations for CRRL Amateur of the Year.

There being no further business, the meeting was adjourned at 1845.

Respectfully submitted,
Harry MacLean, VE3GRO

CHARLES POWERS, VE3APK

Amateurs across Canada will be saddened to learn of the death of Charles "Chuck" Powers, VE3APK. Chuck was the Ontario SEC. During 1979, his work received national attention. Under his direction, amateurs assisted the Canadian Red Cross by providing a vital communications link between Canada and hurricane-torn Dominica, and later, by organizing the communications network that ensured the safe evacuation of the Mississauga disaster area.

Chuck left quite a legacy. There is now a new interest among Canadian amateurs in forming



Charles "Chuck" Powers, VE3APK, and his wife, Doreen, handling messages after Hurricane David had caused a complete communications breakdown in Dominica last year. Chuck passed away on Saturday, June 7.

League-sponsored ARES groups. The Ontario Division of the Canadian Red Cross will soon be entering into formal agreement with the Ontario Section of the League, to have amateurs provide communications during emergencies. Similar agreements are expected in other provinces. Still, Chuck will be missed by all of us who knew him.

CRRL NEWSLETTER AVAILABLE

Does your club secretary or bulletin editor receive the CRRL Newsletter? This monthly publication is free to League officials, affiliated clubs and other amateur organizations across Canada. If your club is not on the mailing list, contact Dick Reiber, VE3IBV, 417 Regal Dr., London, ON N5Y 4J8.

Coming Conventions

**August 1-3,
Florida State, Jacksonville**

**August 2-3
Louisiana State, Shreveport**

**August 29-31
Pacific Division, Santa Clara, CA**

**August 31
Illinois State, Rockford**

**September 5-7
Southwestern Division, Los Angeles, CA**

**September 26-28,
Dakota Division, Fargo-Moorhead, ND**

**September 27-28
Kentucky State, Louisville**

**October 3-5
New England Division, Boxborough, MA**

**October 3-5
Virginia State, Virginia Beach**

**October 10-12
Midwest Division, Lincoln, NE**

**November 1-2
South Florida Section, St. Petersburg**

**November 7-9
Hudson Division, South Fallsburg, NY**

ARRL NATIONAL CONVENTIONS

**July 25-27, 1980
Seattle, Washington**

**March 13-15, 1981
Orlando, Florida**

**July 23-25, 1982
Cedar Rapids, Iowa**

PACIFIC DIVISION CONVENTION

August 29-31, 1980, Santa Clara, California

The Santa Clara County Amateur Radio Association, with the cooperation of the Santa Clara Valley Repeater Society and the West Valley Amateur Radio Association, presents the 1980 Pacific Division Convention at the Marriott Hotel in Santa Clara, California on Labor Day weekend. This Great America convention will feature something for everyone.

The program will present the latest in radio technology including computer and microwave techniques, live OSCAR demonstrations, DX and contest forums, and a multitude of related subjects. There will be thrill rides for the youngsters, entertainment for the teenagers, and fine shows for the adults and every member of the family at Marriott's Great America Theme Park, which adjoins the Marriott Hotel complex. And, of course, in keeping with the fine tradition of past Pacific Division Conventions held in the Greater San Jose area, there will be an outstanding ladies program.

The latest in ham equipment will be on display throughout the convention. An extensive flea market will entice those who are looking for a special item or a good bargain. The

ladies program will include an interesting tour, a buffet luncheon and an entertaining "Gay 90s" show on Saturday, August 30, with the tour bus departing at 10:30 A.M. For those who want to get in a little last-minute summer fun and exercise, lighted tennis courts and a fabulous indoor-outdoor swimming pool await you at the hotel.

Tickets for the full range of convention activities, including the Sunday evening banquet with extras, are \$20 per person prior to August 1 and \$22 per person thereafter. For those who wish to participate in the exhibits and technical program only, the price is \$5 per person. Flea market spaces are \$4 per space. Reservations may be made by writing to SCCARA, P. O. Box 6, San Jose, CA 95103.

Special rates for convention guests have been arranged with the hotel. Reservations should be made directly by writing the Marriott Hotel, Great America Parkway, Santa Clara, CA 95054. Be sure to mention the ARRL Pacific Division Convention in your request to ensure getting the reduced rate.

A talk-in repeater, WB6OQS, will be available on 146.16/76 to assist those arriving from out of town. RV spaces will also be available on the hotel grounds (no hookups, sorry).

ILLINOIS STATE CONVENTION

August 31, 1980, Rockford, Illinois

We are pleased to announce the third annual ARRL Illinois State Convention and Rockford Hamfest. Once again, the event will be held at the spacious (one acre under roof) grand exhibition hall at the Winnebago County Fairgrounds at Pecatonica, just west of Rockford on U.S. Route 20.

There will be interesting demonstrations and discussions with some of the most knowledgeable hams in the Midwest. The flea market will have 300 tables available at a nominal charge.

We will again be proud to offer our fine hamfest menu, including hot dogs, barbeque and soft drinks, all at reasonable prices.

Our convention site has approximately 200 acres within the gates. Plenty of free parking is available, along with drive-in access to the exhibition hall for loading and unloading equipment. Talk-in is on the 146.01/.61 Rockford repeater or 146.52.

Tickets are available from any Rockford Amateur Radio Association (RARA) member, or by writing RARA, P. O. Box 1744, Rockford, IL 61110. Tickets are \$2 in advance or \$2.50 at the gate. Please include a business-size s.a.s.c. for tickets-by-mail.

SOUTHWESTERN DIVISION CONVENTION

September 5-7, 1980, Los Angeles, California

"Something interesting for everyone" is the aim of the 1980 ARRL Southwestern Division Convention to be held in Los Angeles on September 5, 6 and 7. The setting is the beautiful Marriott Hotel near Los Angeles International Airport. Ample space for exhibits will allow comfortable browsing. Technical and informational sessions, held in luxurious meeting halls, will commence Saturday at 9 A.M. Attendees will have hourly choices between three well-planned seminars. Exhibit halls will open Friday 5 to 9 P.M. Saturday 9

A.M. to 5:30 P.M. and Sunday 9 A.M. to noon.

Prizes galore? You bet! The elegant banquet hall has room for 1000 to enjoy an especially entertaining evening at 7:30 P.M. Saturday. Prior to the banquet there will be a no-host cocktail party. The traditional Wouff Hong ceremony will be staged at midnight. For the ladies there will be a nostalgic fashion show following luncheon on Saturday. Other entertainment is also planned for spouses. Tickets for Sunday breakfast will be sold on Saturday. To help the planners, please advise if you are interested in ARES, RACES, MARS, ladies activities, DX, 10-10, QCWA/OOTC, RTTY or other groups.

Every effort will be made to expedite the convention registration process, starting Friday from 3 P.M. to 9 P.M., and on Saturday and Sunday from 8 A.M. Talk-in frequencies will be 146.52 simplex, 222.98/224.58 and 7.250 MHz. The large free parking lot should be ample, although hotel valet parking at \$2.50 a day is also available. Campers and mobile homes can be accommodated at \$15 per night.

For preregistration or additional information write HAMCON, Inc., P. O. Box 1083, Sun Valley, CA 91352. Preregistration deadline is August 18. Preregistration prices: complete program-banquet, exhibits and technical sessions is \$20; banquet only \$17; registration only \$5. Prices at the door: complete program \$22; banquet only \$18; registration only \$6. The ladies luncheon and program is \$9.50.

A special event, free to the public, "An Introduction to Amateur Radio," will be held Friday, September 5, at 7:30 P.M. (inquire in lobby). In addition to the film, "World of Amateur Radio," prominent amateurs will present special demonstrations of their favorite facet of our hobby. Invite your nonham friends!

For hotel accommodations write directly to the Los Angeles Marriott Hotel, 5855 West Century Blvd., Los Angeles, CA 90045, or Tel. 213-641-5700, mentioning the ARRL convention.

Hamfest Calendar

***Alabama:** The North Alabama Hamfest will be held on Sunday, August 17, at the Von Braun Civic Center in Huntsville. Free admission. Prizes, exhibits, forums, air-conditioned indoor flea market and ladies activities. Tours of the Alabama Space and Rocket Center available. Hamfest supper Saturday night. A limited number of campsites, with hookups, are available at the Von Braun Civic Center on a first-come, first-served basis. Flea-market tables \$3. Talk-in on 3.965 and 34.94. For more info write NAHA, P. O. Box 423, Huntsville, AL 35804.

Arkansas: The Queen Wilhelmina Hamfest Committee is sponsoring its 11th annual hamfest September 6-7 at Queen Wilhelmina State Park Inn, atop Rich Mountain, near Mena. Registration \$2.50 at the door. Campsites, flea market and banquet. Talk-in on 19.79 and 52. Details from General Chairman Albert C. Petrasek, AD5J, Rte. 4 — Box 612, Mena AR 71953.

California: The Tri-County ARA will hold their hamfest/picnic on August 9, from 9 to 2, at Westmont Park, 9th and Goldenrod, Pomona. Prizes. Donation \$1 per ticket. Info from Bob Goad, Hamfest Chairman, P. O. Box 142, Pomona, CA 91769.

Delaware: The 5th annual New Delmarva Hamfest will be held on August 17 at Gloriland Park in Bear.

Admission is \$2 in advance, \$2.50 at the gate. Tailgating \$2.50. Tables under pavilion \$4. Prizes, food, drinks, talk-in on 52 and 13/73. For more information send s.a.s.c. to Stephen Momot, K3HBP, 14 Balsam Rd., Wilmington, DE 19804. Make checks payable to the Delmarva Hamfest, Inc.

***Florida:** The Platinum Coast ARS will hold their 15th annual hamfest on September 6-7 at the Melbourne Civic Center, Melbourne. Admission is \$3 in advance, \$4 at the door. Swap tables \$5 per day. Meetings, forums and awards. For tables, reservations or info write to PCARS, P. O. Box 1004, Melbourne, FL 32901.

***Florida:** The Five Flags ARS, Inc., will hold its 1980 Ham-A-Rama on August 31 from 8 A.M. to 4 P.M. at the Pensacola Municipal Auditorium, Pensacola. Admission \$1. Swap tables available for \$5 each. Additional information from FFARA, P. O. Box 17343, Pensacola, FL 32522.

***Illinois:** The Shawnee ARA will hold their annual hamfest on August 17 at the North Marum Access Area on Rend Lake in Southern Illinois. Full recreation facilities including boating, beaches and camping. Flea market, auction and computer displays. Talk-in on 25/85, 52 and 3/925. For more information and reservations contact Mike Warkins, KA9ALR, 401 Cedar View, Carbondale, IL 62901.

***Illinois:** The Hamfesters ARC will hold its 46th annual hamfest on August 10 at the Santa Fe Park, 91st and Willow Springs Road, Willow Springs. Gates open at 6 A.M. Tickets at the gate are \$3 each (\$2 in advance). Free coffee for earlybirds, games for kids, prizes for YLs, world famous "shoppers row." Children under 15 free. For more information and advance tickets, send s.a.s.c. and checks to Hamfesters ARC, P. O. Box 42792, Chicago, IL 60642.

***Illinois:** The Illiana Repeater System, Inc., ARC will host the 11th Annual Danville Hamfest on August 30-31 at the Georgetown Fairgrounds in Georgetown. Tickets are \$1.50 per adult in advance, and \$2 at the gate. Children under 14 admitted free. Two days of flea markets, commercial exhibitors, RTTY setups, Antique Wireless Association displays, homebrew builders contest, USAF/MARS station and other interests. Meals and refreshments served both days. Overnight camping facilities available. For more information or advance tickets send s.a.s.c. to Illiana Repeater Systems, Inc., P. O. Box G, Catlin, IL 61817.

***Illinois:** Radio EXPO '80, sponsored by the Chicago F.M. Club, will be held September 6-7 at Rtes. 45 and 120 in Gray Lake. Large flea market area free of charge. Bring your own tables and chairs. Huge manufacturers display building, with the latest in amateur and computer software. Doors open at 6 A.M. both Saturday and Sunday with free parking and camping. Special programs for the ladies with prizes and talks. Technical talks and seminars. Tickets are \$2 in advance and \$3 at the gate. For advance tickets send s.a.s.c. to Radio EXPO, P. O. Box 1532, Evanston, IL 60204. Tel. 312-278-3976.

***Illinois:** The Fox River Radio League will hold its annual hamfest on August 24 from 8 to 4 at the Kane County Fairgrounds in St. Charles. Free outside flea market, large exhibition hall. Talk-in on 146.94. Refreshments, hot lunch. Advance tickets \$1.50, \$2 at the gate. For more info contact Gary Senesac, KA9ADP, 926 Britta Ln., Batavia, IL 60510. Tel. 312-879-7724.

***Indiana:** The 10th annual Lafayette Hamfest, sponsored by the Tippecanoe ARA, will be held on August 17 at Tippecanoe County Fairgrounds located at 18th Street at Teal Road (Indiana Highway 25) in Lafayette. Activities include flea market and forums. Flea market setups can be made after 6 P.M. Camping on the grounds Saturday night only. Preregistration, tickets available at \$2.50 each by mail or at the gate. Send s.a.s.c. with check or money order to J. B. Van Sickle, K9KRF, RR1 — Box 63, West Point, IN 47992. Mail orders must be in by August 10. Food available on the grounds. No extra charge for flea market setups. Rain or shine. Talk-ins on 13/73 and 94.

***Indiana:** The annual LaPorte County Hamfest will be held rain or shine August 24 at the County Fairgrounds on Highway 2, west of LaPorte, paved outdoor flea market area. Indoor tables \$1 each. Overnight trailer hook-ups available on site for earlybirds. Advance tickets \$2 with s.a.s.c. to P. O. Box 30, LaPorte, IN 46350.

***Iowa:** The Des Moines Radio Amateur Association will hold the Hawkeye Ham and Computerfest on August 17 from 9 A.M. to 5 P.M. at the Veterans Auditorium, Des Moines. Admission \$2.50 in advance, \$3 at the door. Activities include: QCWA, AWA, ARRL, AMSAT (operational station) and QLF contest. Also available for the entire family are the Iowa State Fair, Living History Farms, Des Moines Science Center, Art Center. Adventurelands

and Botanical Center. Consignment tables for flea market items. Many exhibitors. Talk-in on 34/94 and 22/82. Prizes. For additional info contact Nancy Young, KA0AYK, Tel. 515-282-0457 or Gary Liljegren, W0SH, Box 88, Des Moines, IA 50301, Tel. 515-758-2545.

***Iowa:** The Iowa 75 Meter Net will hold its annual swap meet and picnic on August 24 at the Hickory Hills Park, south of Waterloo. Potluck meal will start at noon and a program with prizes follows. Talk-in on 34/94. For further information contact Lovelle Pedersen, WB0JFF, 2327 West Reinbeck Rd., Hudson, IA 50643.

***Kansas:** The Dodge City Boothill ARC will hold their hamfest on August 31 at the Ford County 4-H Building. For additional information contact Joe Barragree, 805 Minneola Rd., Dodge City, Kansas 67801, Tel. 316-227-3410.

***Kansas:** The Kansas-Nebraska Radio Club will host their 29th annual hamfest on August 9-10 at the Cloud County Community Junior College in Concordia. The following programs will be held on both days: MARS, antennas, computers, OSCAR, EC, ARRL forum and a DX forum. George Collins, AD0W, of ARRL hq. will speak both days. On August 9 there will be a QCWA luncheon at noon. The annual banquet (\$6.50) will be held at the Senior Citizens Center at 7 P.M. Reservations by August 5 to Wilbur Naylor, Box 157, Concordia, KS 66901. Following the banquet the Kansas Amateur of the Year will be named. Registration for both days is just \$3. At noon Sunday there will be a pork 'n' bean western-style barbeque at a moderate price. Children under 12 half price. Programs for the ladies, flea market and distribution displays both days. Talk-in on 34/94 and 3920. For further info contact Allen Fowler, hamfest chairman, Box 404, Beloit, KS 67420. For motel reservations contact: Wendell Wilson, Box 462, Concordia, KS 66901, or Vince Bombardier, 600 East 11th, Concordia, KS 66901.

***Kentucky:** The Bluegrass ARS will host its annual ARRL Central Kentucky Bluegrass Hamfest August 10 starting 8 A.M. at the Fasig-Tipton Sales Paddock, Newton Pike, Lexington. Prizes, forums, indoor exhibits and distributors, paved outside flea market. Admission \$3 in advance, \$3.50 at the gate (includes parking). Food service available. Talk-in on 16/76. For details contact Ed Bono, WA4ONE, 2077 Dogwood Dr., Lexington, KY 40504.

***Maine:** The Sandy River ARC will hold a Hamfest/Flea Market on August 16-17 at the Farmington Fairgrounds. Admission \$1. No charge for tailgating, commercial dealers welcome. Prizes both days. Talk-in on 37/97 and 52. Free camping available Friday at 5 P.M. until Sunday afternoon. Refreshments and snacks during the day, lobster or chicken dinner late Saturday afternoon. For information and map, send s.a.s.c. to Charles Stenger, W1HTG, Box 111, East Dixfield, ME 04227.

***Massachusetts:** The Southeastern Mass ARA will hold its annual Picnic and Flea Market on September 7 from 9 to 4. Rain date September 14. Picnic to be held at the Stackhouse Fairgrounds, Faith Street, South Dartmouth. Talk-in on 60/00. Parking is free; food, beverages for sale. Entertainment. To reserve space and/or tables, write to: SEMARA, P. O. Box P-105, South Dartmouth, MA 02748.

***Michigan:** The Straits Area Radio Club, Petoskey will hold its Swap and Shop August 9 from 9 to 4 at the 4H Building at the Emmett County Fairgrounds, Charlevoix Avenue, 1/4 mile west of U.S. 131 and 31. Talk-in on 52 and 07/67. Free parking (Friday night for self-contained vehicles). Refreshments available. Ladies bus tour to Cross Village. Prizes. Table space \$2. For additional information write to Joseph F. Werden, Straits Area Radio Club, Box 444, Conway, MI 49722.

***Michigan:** Historic Marshall's 72/12 E. S. Team Trunk-Trailer Bash will be held on August 31 from 8 A.M. until 5 P.M. Admission is \$2 and table space is \$5. Inside 50 cents/ft. in advance, less 25%. Free parking. For more info contact Earl Goodrich, K8UCQ, 110 Perrett Rd., Marshall, MI 49068.

***Minnesota:** The St. Cloud Radio Club will hold its annual hamfest on August 10 at the Whitney Park Senior Center from 9 A.M. to 5 P.M. Free overnight camping available 1 mile from the site at the Sauk Rapids Lions Park. Food available, swapfest and prizes. Talk-in on 34/94 and 3925. Contact William R. Zins, WA0UTO, RR 4, St. Cloud, MN 56301, or Tel. 612-253-3428.

***Mississippi:** The Delta ARA will hold its Mid-Delta Hamfest on August 9 and 10. Open 9 to 12 on August 9, begins at 8 A.M. August 10. The hamfest will be held at the Greenville Mall Civic Center, Greenville. ARRL forums, MARS meeting, talk-in on 22/82 and 3987.5. For more info contact the Delta ARA, Box 5127, Greenville, MS or Tel. 601-378-9557. The Ramada Inn, Highway 82, Greenville, will be the

Hamfest headquarters.

***Missouri:** The Saint Charles ARC presents Hamfest '80! to be held at the Wentzville Missouri Community Center on August 24. Bring the entire family. Refreshments, flea market, prizes, grab bags, cake walk, equipment displays, free info, talk-in on 07/67, 34/94, 222.74/224.34. For information about motels, tickets, displays, camping, etc., contact Jim Short, AG0U, Rte. 1 — Box 40, O'Fallon, MO 63366.

***Missouri:** The Southwest Missouri ARC will be holding its annual Hamfest/Picnic on August 24 in Springfield. Prizes, talk-in on 31/91. For more information contact J. E. King, WB0WAD, 2053 S. Wedgewood, Springfield, MO 65807.

***Nevada:** The Nevada RA will hold the 1980 Sierra Hamfest on August 16 in Reno. Gates open at 8 A.M. Preregistration: Adult tickets \$12 each (\$13 after August 6). Tickets for ages 7-16 \$5 each, children under the age of 6 free. Swap tables at \$2 each. Bar-b-Q, refreshments, prizes, talk-in on 63/03, 01/61. Make checks payable to: Nevada Amateur Association, Inc. and mail to P. O. Box 2534, Reno, Nevada 89505.

***New Jersey:** The South Jersey RA will hold its 32nd annual Hamfest on September 7 at Hylton Road, 1-1/2 miles s.e. of Tacony Palmyra Bridge on Rte. 73, Pennsauken. Doors are open from 9 A.M. to 5 P.M. Admission \$3. Activities include flea market and prizes. Talk-in on 52 and 22/82. Tailgate/booth space in Market \$5. For additional info and reservations contact Edwin T. Kephart, W2SPV, 4309 Willis Ave., Pennsauken, NJ 08109, or Tel. 609-663-6710.

***New Jersey:** The Gloucester County ARC will hold its second annual Hamfest on August 24 from 8 to 3 at the Gloucester County College, Tanyard Road, Sewell. Tailgaters set up at 7 A.M. Indoor and outdoor spaces available. Food and prizes also will be available. Dealers and tailgaters, \$5. Talk-in on 52 and 78/18. Tickets \$2 in advance, \$2.50 at the door. For additional info and tickets, contact Bob Grimmmer, KN2QWO, 229 Williams Ave., Barrington, NJ 08007.

***New Jersey:** The Sussex County ARC is holding its second annual Hamfest at the Sussex County Farm and Horse show grounds on September 6. The Sussex Farm is located on Plains Road off Rte. 206 in Augusta. Acres of outside flea market. Sellers \$5 at the door, \$4 preregistered. Enormous building for indoor sellers: \$6 at door, \$5 preregistered. Free admission. For info and preregistration contact the Sussex Co. ARC, P. O. Box 11, Newton, NJ 07860, or Ed Wozniak, AC2A, 201-852-3268. Talk-in on 90/30 and 52 simplex.

***New Jersey:** The Ramapo Mountain ARC will hold its annual flea market on August 16 at the American Legion Hall, Oak Street, Oakland. Indoor tables are \$5, tailgating \$3. No admission fee for buyers. Refreshments available on premises. Talk-in on 147.49/146.49 and 52. Call Bud Hauser at 201-797-8471 or -791-0589 for advance reservations and information.

***New York:** The Rip Van Winkle ARS will hold its annual Auction and Flea Market September 6 at Hudson High School. Talk-in on 147.81, 147.21 and 52. Flea market from noon to 8 P.M., with the auction starting at 3 P.M. No admission price; \$1 charge for all flea market sellers. 10% club commission on auctioned items up to a maximum of \$100 of sale price. Items sold over \$100 pay only \$10 maximum. Ample space available outdoors; limited number of tables inside. Plenty of parking space for all. For more information call or write Shelly Evans, AA2Y, Star Route, Claverack, NY 12513, or Tel. 518-851-9435. S.a.s.c. please.

***New York:** The Seaway Valley Hamfest will be held on September 7 at the Louisville Municipal Arena, in Louisville. Activities include: flea market, commercial displays, sales, military radio display and prizes. Demonstrations include: computer display, North Franklin ARC, slow-scan TV, Oswegatchie Valley ARC plus others to be announced. Registration is \$2.50. \$2 in advance, children under 12 free. Snack bar, food and beverages available all day. For more information contact Lois Iordan, WA2RXO, 725 Proctor Ave., Ogdensburg, NY 13669.

***New York:** The Suffolk County RC will present the third annual electronic flea market on September 7 (rain date September 14) at the Odd Fellows Hall, Jane Boulevard, Port Jefferson. Walk-ins \$1.50, sellers \$3. Gates open at 7 A.M. Bargains, prizes, food and friendship. Talk-in 52 and 94, also 223.50 MHz. For further information contact Floyd Davis, WA2SDI, at 516-234-9376.

***New York:** The Radio Central Amateur Club will hold its hamfest on August 10 (rain date August 17) at the Mount Sinai Elementary School, Mount Sinai. For additional information contact Austin Gaskill, KA2BPE, 2917 Connecticut Ave., Medford, NY 11763.

***North Carolina:** The Cabarrus ARS will hold the second annual CARS Hamfest on August 10 at the Cabarrus County Boys Club in Concord. Flea market, dealers set up at 7 A.M. For additional information contact Tom Blanchard, WA4UPO P. O. Box 1290, Concord, NC 28025, or tel. 704-786-5900 or 704-786-9616.

***North Carolina:** The Shelby Radio Club will hold its Shelby Hamfest on August 30 and 31 at the Cleveland County Fairgrounds, 1/2 mile east of Shelby on business route 74. Enclosed dealer area, paved flea market area, camping available on site with full hookups. Motels available. Food served on grounds, plus famous Shelby barbeque. Talk-in on 28/88, 147.943-345, 146.52 and 3.923. Admission \$3.50. For additional info contact Robby Hamrick, Jr., WA4QFV, P. O. Box 158, Mooresboro, NC 28114, or tel. 704-434-6354.

***North Carolina:** The Cape Fear ARS will hold its fourth annual Hamfest August 16 to 17 at the Main Officer's Club, Fort Bragg. Large air-conditioned space. Many prizes. Saturday night social and QCWA luncheon meeting Sunday. Talk-in 31/91, 93/33 and 52. Tickets \$1 advance, \$2 at the door. Send s.a.s.c. to Marie Presler, WA4YMM, P. O. Box 35171, Fayetteville, NC 28303.

***Ohio:** The Warren Radio Association will hold its 23rd annual Hamfest on August 17 at the Trumbull Branch, Kent State University. Large flea market, tech forums, DX programs, dealer displays inside, XYL activities. QSL to WARA, P. O. Box 809, Warren, OH 44482, for further info.

***Ohio:** The 38th Annual Findlay Hamfest greets you on September 7 with a fine new indoor/outdoor location. The Hancock Recreational Center, located east of I-75 exit 161, on north edge of Findlay, 40 miles south of Toledo. Prizes, forums. Tickets \$2 in advance and \$2.50 at the door. Reserve your table early. Forums 5 P.M. to 10 P.M. Saturday, set-up Sunday begins at 5 A.M. For tickets and info and reservations send s.a.s.c. to P. O. Box 587, Findlay, OH 45840.

***Ohio:** The Union County ARC will hold its hamfest on August 24 at the Union County Fairgrounds and Buildings in Marysville. For more information contact Chuck Simpson, KA8HDA, 19726 Del-Co Line Rd., Marysville, OH 43040, Tel. 614-666-2721.

Pennsylvania: The 25th annual York County Hamfest will be held on August 31, rain or shine, 8 A.M. to 4:30 P.M. Registration \$3. Children and

XYLs admitted free. Tailgaters \$2 with tables under roof with power \$5 in advance by August 23. Fly-ins right on site at York Airport at Thomasville. Hamfest held at U.S. 30. Talk-in on 37/97 and 52. Saturday night campers welcome (no facilities). Full service cafeteria, clean rest rooms. For more info contact Leroy Frey, K3POR, 170 S. Albemarle St., York, PA 17403, Tel. 717-854-1203.

Pennsylvania: The Mid-Atlantic ARC will hold its annual JBM Hamfest on August 17 from 9 A.M. to 4 P.M., rain or shine. Tailgate set-up begins at 8 A.M. Location: Rte. 309 Drive-in theater, 1/4 mile north of Rte. 63 in Montgomeryville (6 miles north of the Fort Washington Interchange of the Pennsylvania Turnpike.) Admission is \$2.50 (\$1 additional for the first tailgate space and 75 cents for each additional tailgate space). Refreshments, prizes and a sanctioned transmitter hunt by the Freedom Foxhunters Association. Talk-in on WB3JOE, 66/06 or 52. For further information call Don Schuenemann, WB3AYT, 215-822-9076, or write the Mid Atlantic Radio Club, Box 14429, Philadelphia, PA 19115.

Pennsylvania: The Tioga ARC will hold its fourth annual hamfest on Saturday, August 23, at the Tioga County Fairgrounds, Rte. 660, 1/2 mile off Rte. 6. Flea market, dealers, traders, TV demonstration, ARRL news, FCC info, QSL contest, transmitter hunt, family activities, craft show, radio control models and prizes. Registration \$3 at the gate, families free. Talk-in on 19/79, 52 and CB channel 5. Info from Carl Borden, WA3HGD, RD 2 - Box 202, Wellsboro PA 16901, Tel. 717-724-1637.

Pennsylvania: The Butler County ARA hamfest will be held Sunday, September 7, from 9 to 4, at the Butler Farm Show Grounds, adjacent to Roe Airport on Rte. 68. \$1 donation for admission (children under 12 free). Free outdoor flea market. Indoor flea market, vendors space \$3 per 8-foot table. Food and refreshments. Prizes. Mobile check-in on (W3DUX) 96/36 and 52. Talk-in on 84/24 and 90/30. Fly-in to Butler Farm Show Roe Airport. Parking for 2500 cars, overnight campers welcome, handicapped parking available. Info from Dan Metrick, WA3GDS, 130 Rieger Rd., Butler, PA 16001, Tel. 412-283-1719.

Pennsylvania: The Uniontown ARC will hold its annual Gabfest on Saturday, September 6, at the club grounds on the old Pittsburgh road, just off Rte. 51 and the Rte. 119 bypass. Pre-registration fee \$2 each or three for \$5. Free swap and shop; bring your own tables. Prizes and refreshments. Free parking. Talk-in on 147.045/645 and 146.070/670. Info from UARC Gabfest Committee, c/o John Cermak, WB3DOD,

P. O. Box 433, Republic, PA 15475.

***Tennessee:** The 22nd Cedars of Lebanon hamfest, sponsored by the Short Mountain Repeater Club, will be held August 31 at Cedars of Lebanon State Park, 10 miles south of Lebanon on Rte. 231. Tickets six for \$5.

***Texas:** The 1980 Golden Spread hamfest and convention, sponsored by the Panhandle ARC, will be held August 1 to 3 (beginning Friday evening) at the Student Activities Center of West Texas State University in Canyon. Activities include free bowling, billiards, basketball, handball, racquetball, swimming and games. Amateur events include commercial displays, swapfest, ARRL station operating demonstration, Navy and Army MARS meetings, ARRL Forum and technical sessions. Prizes, tours and games. Pre-registration \$5 per person, \$6 per person at the door. Talk-in on 146.07/67, 147.99/39 and 52.

***Vermont:** The Burlington ARC International Hamfest will be held at the Old Lantern Inn Campground on August 9 to 10. Flea market, commercial exhibitors, games and prizes. Admission \$4. Info from Hap Preston, W1VSA, Box 312, Burlington, VT 05402.

***Washington:** The Radio Club of Tacoma (W7DK) HAMFAIR will be held August 23 to 24 on the campus of Pacific Lutheran University, 122 Street and Park Avenue, Tacoma. Prizes, flea market, banquet, loggers breakfast, commercial exhibits and much more. Talk-in on 88/28. Info from Joe Winter, WA7RWK, 819 No. Mullen, Tacoma, WA 98406, Tel. 206-759-9857.

***West Virginia:** Bluefield Hamfest '80, sponsored by the East River Radio Club, will be held Sunday, August 24, at the Bluefield Armory, a new location. Admission \$2 in advance, \$3 at the gate. Children under 12 free. Dealers, indoor flea market, special tailgate area. Tables \$5 each. Prizes. Talk-in on W8MOP on 89/49 and 3.947. For info send an s.a.s.c. to East River Radio Club, 2113 Hemlock Hill, Bluefield, WV 24701.

***West Virginia:** The Jackson County ARC Inc., will hold the Cedar Lakes Hamfest on Sunday, August 10, at the Cedar Lakes FFA-FFA Conference Center, Ripley. Admission \$2 (3 for \$5) in advance, \$2.50 at the door. Flea market, forums, demonstrations, prizes, ladies and childrens activities. Talk-in on 146.07/67 and 52. Info and registration from Robert D. Morris, WA8CTO, 308 Edgewood Circle, Ripley, WV 25271, Tel. 304-372-9953.

50 Years Ago 25 Years Ago

August 1930

□ "The Story of PMZ" by Harry Wells, W3ZD, tells of an American scientific expedition to Borneo, to study the natives and observe short-wave conditions in that part of the world. This fascinating account of truly primitive people and environs and of amateur radio's important contributions to the success of the venture makes most of the current "DXpeditions" look like Sunday-school picnics.

□ Speaking of DX, the 1930 February contest was called "The Third International Relay Competition," and the top U.S. score was turned in by Opie Taylor, W6BAX, followed closely by W2CXL, W1ASF and W8GIZ. Windom, of single-wire-feed antenna fame. It was pointed out that no contestant succeeded in working all six continents during the week-long event.

□ In the six-page, first of two articles covering "The Operating Characteristics of Vacuum Tube Detectors", H. A. Robinson, W3LW, compares triode plate, grid and power detection. All of the information is presented in graphs and probably looked "too technical" to many readers, but it must have been very useful to others.

□ G. C. Omer Jr., W9EFB, describes a dummy antenna of variable capacitor and iron-wire inductance, which are adjusted to have the same characteristics as his antenna at the test frequency.

□ Leeds Radio advertises an interesting item. It consists of two 18-henry 250-ma. chokes that "... when connected in series (is) 36 henries at 250 ma. and, when connected in parallel, 18 henries at 500 ma." (Obviously two could give 18 henries at an amp., and so on. A real bargain!)

August 1955

□ Much misunderstanding exists about the relationship between power input/output and amplifier plate current readings. In "Power and Meter Facts in S.S.B. Operation," Howard Wright Jr., W1PNB, tries his hand at explaining it in simple terms, complete with photographs, oscillograms and cartoons. Good basic material.

□ National Emergency Coordinator George Hart, WINIM, reports on "A.R.R.L. at Operation Cue." "Cue" was the scheduled explosion of a "nuclear device" at a test site in Nevada, observed by invited representatives of the news media and Civil Defense organizations, among others. George reports his personal reactions and those of many of the radio amateurs who were present.

□ "An Improved Antenna Bridge" is a description of an r.f. resistance bridge useful and accurate to at least 50 Mc. The design is based on a circuit suggested by Stu Seelye, W2ZE, and requires no more power than that available from a grid-dip meter. The author is Wade Caywood, W1KRD, chief engineer of Millen Mfg. and a well-known sports-car driver. Balanced-line measurements can be made by using a 4:1 wound balun that is also described.

□ Don Mix, W1TS, writes about "The Automobile Storage Battery and Its Charging System," a timely topic what with mobile interest running high. Consideration is given to the d.c. generator comprising the car's charging system. (Alternators were not yet used in passenger cars.)

□ Lew McCoy, W1CPC, describes "One Tube — 80 and 40 Meters — 75 Watts," a 6146 single-tube Novice crystal rig that is easy to build and gentle on the pocketbook.

□ Technical Assistant Laird Campbell, W1CUT, modernizes an old favorite in "The Transistorized 'Little Gem.'" The original wavemeter and field-strength-meter combination has its usefulness and sensitivity extended by the addition of a PNP junction-transistor d.c. amplifier, a Hydro-Aire CO-1. (A what?) — Byron Goodman, W1DX

Strays



This handsome station represents the lifelong dreams and efforts of R. E. "Rube" Hadfield, VE3RH, of Guelph, Ontario, Rube, who is 71 years young, says that it all began at the breadboard stage, with all its haywire, continued through homemade transmitters and receivers, finally arriving at what we see in the picture. Tidying up the shack can be a pleasant chore when one sets his mind to it.

Correspondence

Conducted By Bruce R. Kampe,* WA1POI

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

460-800 PROOF

I find it hard to believe that the FCC doesn't already have authority to impose proof-of-license at point-of-sale regulations on Amateur Radio suppliers. The director of engineering at my employer said that he had to present a valid license to Motorola before they would sell him our 460-MHz business-band radio or our new equipment in the 800-MHz region. If the FCC has the authority for one service, surely it has the authority for another service.

Personally, I would gladly pay an examination and/or renewal/modification fee if the moneys so collected were used exclusively and specifically by the Commission to help good amateurs rid the bands of janmeters and other creeps. — *Rob Wandere, WB2MCB, Pompton Lakes, New Jersey*

ADS, ADS, ADS . . .

I just opened my May 1980 QST, and I am fed up. There are 196 pages in the issue, and 109 of those pages are advertisements. I know that advertisements are a need in any magazine, but this is getting out of hand. I do not pay my dues to look at ads. If you must take so many ads, then why don't you send out an issue with nothing but ads, and leave the regular issue for projects and news.

It pains me to say this because I feel the League serves a very good and urgent need for Amateur Radio. — *John T. Chevront, WB7SAU, Astoria, Oregon*

LAW OF AVERAGES

Truly, the cart is now before the horse. Five-Banders were initiated to offer those who had "done everything" a goal to strive toward. They were not intended as a substitute for the "mainstream" awards of DXCC and WAS.

Have we lost sight of "Mr. Average Ham" — with modest equipment and modest goals. His ambition may be 80-meter WAS; and when he achieves that last state and subsequent confirmation he'll surely want certification; caring not a whit for that "ultimate" 5-Bander.

The administrative angle may well be insupportable (and I can certainly sympathize with that). However, if the resources cannot justify the complexities of administration perhaps it is time to importune the Board to relax the "starting date" requirement for 5BWAS; a root cause of this particular problem. — *Ellen White, W1YL/4, Homestead, Florida*

[Editor's Note: The above was in response to "Operating News" for June.]

*Membership Services Assistant, ARRL

FIVE-YEAR PLAN?

After having passed my theory and code for my General, I felt a tremendous feeling of accomplishment. But having monitored three separate illegal QSOs during the past two weeks by CBers in the cw portion of 10 meters, I've decided to stop upgrading to Advanced until the FCC cleans up its act. Why should I break my back studying? Ham tickets won't be worth the paper they're printed on in about five years. — *Ron Previty, KA4EET, Cape Coral, Florida*

NOVICE NEWS

Re: "Lifetime Novice," June 1980 QST, page 41.

Of course there are other Novices who operate mobile! It's a great way to go. The OM (not a Novice) and I take turns at the key and wheel on vacation trips. I'm a three-year Novice who, like WD5CJH, really enjoys cw and helping other Novices. — *Elizabeth H. Swanson, WB7RSE, Tucson, Arizona*

Lately many "big guns" have appeared on the Novice bands going 100 miles per hour and pumping signals so loud one must grab for earplugs lest they become deaf. If one is lucky to grab the call sign in the fast speed it travels, it is found it usually belongs to a high-class amateur license holder. As a Novice I enjoy cw, I am limited to a very small space, and I run a 100% homebrew QRP station. Since I am easy to step on, I move around in order to find a quiet spot. Can anyone tell me what all the speed, power and pushing is for? — *James Baxter Howell, KA4EBW, Salisbury, North Carolina*

The good old days of courteous behavior still exist in the Novice bands. During the past months I have noticed that offensive behavior had been less noticeable in the General class subbands than in the Advanced or Extra subbands. I decided to extend these observations into the Novice bands and in doing so my operating habits have changed. Many pleasant QSOs have resulted. I tip my hat to those patient and courteous newcomers. If they can maintain their attributes through successive upgrading they will help Amateur Radio once again become a gentleman's hobby. — *Hunt Turner, K0HT/W4ONA, Berthoud, Colorado*

RADIO-CONTROL INTERFERENCE

This is a response to a letter in June QST by KA6IUY concerning R/C model flying on 6 meters.

I am in sympathy with KA6IUY's dismay over the destruction of a fine model and I share his apprehension over the possibility of injury to bystanders. However, I believe his attempt

to extend liability to another amateur transmitting on or near the model aircraft's control frequency to be blatantly incorrect.

The FCC has made it perfectly clear in numerous rulings, comments on proposed rule making and general policy statements that no amateur has the right to a given frequency on an interference-free or exclusive-use basis. Multiple signals on a given frequency is the status quo for today's operator. Knowing this, a reasonable and prudent person will not launch a potentially dangerous machine that he cannot positively control. Nor will any amount of shouting "Look what you made me do!" reduce the basic liability of the imprudent person who knowingly launches under adverse conditions and then has an accident.

I do not suggest that R/C flyers abandon 6 meters. Instead I urge that these amateurs use their talents to improve R/C gear so that getting "shot down" becomes unlikely.

OM Spears needs to abandon his tunnel-vision approach to ham radio and gain a broad spectrum knowledge of ham radio's history and evolution. Convoluted legal reasoning has no place in Amateur Radio, especially when based on improper assumptions. I invite him and his fellow flyers to join the rest of us in finding solutions to the problems rather than in assigning blame. — *Dennis C. O'Connor, K8DO, President, Saginaw Valley Amateur Radio Association, Freeland, Michigan*

RADIO-FROG INTERFERENCE

An Israeli friend of mine, whose name is Razi, was performing an experiment here at Cornell University. He and another student, a girl, attached electrodes to a frog in order to observe its nervous impulses. The electrodes were also attached to a scope and an audio speaker.

While they were monitoring the "blips," they had the shock of their lives. Voices started coming through the speaker from the frog! Razi exclaimed, "It sounds like Hebrew!" However, the girl was not amused. She was upset because the frog's propensity to talk was interfering with her experiment. Razi was upset because he wanted to hear what the frog had to say, but could not, due to the blips. Finally, after numerous futile attempts to keep the frog quiet, the experiment had to be cancelled.

While all this was going on, I was in a QSO with Dror, 4X4ZE. And of course, I was speaking (struggling?) in Hebrew. And the next day, when Razi told a group of friends about his "amphibious" conversation, all of us thought that something had snapped inside his head. Except for me. I had to confess to being the "voice" behind the frog.

And so ends the saga of the Hebrew-speaking frog. Except for one small detail. I've heard of dipole antennas, but has anyone ever heard of "Tadpole" antennas? — *Richard Gussow, WA2GCQ, Ithaca, New York*

FCC Relaxes Emission Limitations in 6-Meter Band

In a Report and Order (Docket 79-285) released June 10, 1980, the Commission amended §97.65(c) to read: *On frequencies below 29.0 MHz, the bandwidth of an F3 emission (frequency or phase modulation) shall not exceed that of an A3 emission having the same audio characteristics.*

Previously, §97.65(c) limited the maximum bandwidth of an fm voice emission (F3), transmitted between 50.1 and 52.5 MHz, to that of an amplitude modulated (a-m) voice emission having the same audio characteristics.

The Commission stated that "at the present time, most Amateur Radio operators who use fm use the fm emission which is standard in the commercial land-mobile radio services" (often referred to as standard bandwidth or 16F3 emission). Standard-bandwidth fm emission inherently has a wider bandwidth than an a-m emission having the same audio characteristics. By removing the restriction between 50.1 and 52.5 MHz, the Commission allows the use of this conventional land-mobile fm voice emis-

sion in this part of the 6-meter band.

The Commission received 49 comments and reply comments. Fourteen staunchly supported the proposal, 11 favored it with certain reservations and counter-proposals and 24 flatly disagreed.

The primary issue was the protection of cw and ssb operation in the lower portion of the band and whether or not standard-bandwidth fm voice operation could coexist with these other modes of operation. Opponents of the proposal felt that standard-bandwidth fm operation would preclude the use of ssb, while proponents believed that amateurs would solve any problems by voluntarily developing sharing arrangements and bandplans.

The Commission agreed any problems could be solved voluntarily. By removing the restriction, the FCC has acted in a manner consistent with one of the basic philosophies of the Amateur Service — that the Service is a self-guiding entity. The Commission is convinced that the inherent flexibility in this approach outweighs any difficulty which Amateur Radio

operators might have in reaching sharing agreements.

During the course of the proceedings in 79-285, the League (at the recommendation of the ARRL vhf Repeater Advisory Committee and vhf/uhf Advisory Committee) filed a counterproposal that standard bandwidth fm (16F3) emissions be permitted only down to 51.0 MHz to protect cw and ssb operation between 50.1 and 51.0 MHz (See "Happenings," March 1980 QST).

With the Report and Order (which terminates the proceeding and closes 79-285), the Commission is also deleting the phrase in Section 97.65(c) which refers to Section 97.73. This latter section, which deals with the purity and stability of emissions, applies to all Amateur Radio transmitters, regardless of the type of emission used. Thus, the reference to it in Section 97.65(c) is unnecessary.

For further information on this rule change, contact Maurice Depont or Jay Jackson at FCC, Tel. 202-254-6884. — Rick Palm, K1CE

LICENSING AND CALL SIGN ASSIGNMENT SIMPLIFIED

In its Third Report and Order in Docket 21135, the Commission decided that no new call signs for club, military recreation or RACES stations would be assigned, and no new club, military recreation or RACES station licenses will be issued. It felt, however, that the public interest would be served by accommodating present licensees of these stations by granting modification and renewal of existing licenses. In this connection, it said, a change in a club trustee, person in charge of a military recreation station or a responsible civil defense official would constitute a modification, as would a change in station name or location.

1) The present text of Section 97.37 is designated as paragraph (a) and a new paragraph (b) is added to read as follows:

§97.37(b) Only modification and/or renewal station licenses will be issued for club and military recreation stations. No new licenses will be issued for these types of stations.

2) The present text of Section 97.171 is designated as paragraph (a) and a new paragraph (b) is added to read as follows:

§97.171(b) Only modification and/or renewal station licenses will be issued for RACES stations. No new licenses will be issued for RACES stations.

In amending its rules, the Commission noted "the tradition for self-regulation by Amateur Radio licensees assures us that full responsibility for a station's operation will be borne by the primary station licensee." With this Third Report and Order, the Commission terminated the proceeding, and closed the docket. — Rick Palm, K1CE

*Deputy Manager, Membership Services, ARRL

PRESIDENT DANNALS, WASHINGTON AREA COORDINATOR WILLIAMS MEET WITH FCC CHAIRMAN FERRIS

In an attempt to improve relations between the Amateur Radio Service and FCC, ARRL President Harry J. Dannals, W2HD, and Washington Area Coordinator Perry F. Williams, W1UED, met in June with Commission Chairman Charles Ferris and other FCC officials.

Recent public statements by Chairman Ferris have aroused concern in the amateur community that Ferris and other FCC officials may not be sufficiently aware of the bases, purposes and traditions of the Amateur Radio Service.

In the one-hour meeting on June 19 at FCC headquarters in Washington, DC, Dannals and Williams praised the FCC's support at WARC '79 in Geneva and its advocacy of an Amateur Radio Service within the People's Republic of China, but hastened to add that important domestic issues also needed addressing. Issues discussed included the accessibility of amateur license exams to the public, the possibility of digital licensing, and the encouragement of a closer alliance between FCC and amateurs in exploring new technologies such as companioned ssb and spread-spectrum techniques.

Dannals and Williams also expressed support for the new Communications Act Rewrite bill, S-2827, which includes a provision for 10-year license terms and authorizes FCC to require TVI rejection standards for TV receivers. The Rewrite would make clear FCC's authority to delegate supervision of license exams and would preserve, for instance, the present Novice volunteer examiner system. The ARRL's representatives reiterated the public service role Amateur Radio has played, and continues to play. They cited the active par-

ticipation of amateurs during the recent Mt. St. Helens volcanic eruption which resulted in the loss of two hams, W6TQF and KA7AMF, who died while serving in the public interest.

Also attending the meeting were Jim McKinney, chief of the Field Operations Bureau; Carlos Roberts, chief of the Private Radio Bureau; Dr. Stephen Lukasik, chief scientist; and Greg Ballard, legal assistant to the chairman. — Andrew Tripp, Public Information Officer

RECENT PETITIONS FOR RULEMAKING AFFECTING THE AMATEUR SERVICE

Three petitions have been filed recently with FCC:

RM-3656: The petitioner, Ray F. Hartley, AC4B, requests amendment of §97.51 of the rules (assignment of call signs). Hartley proposes that the Commission make available specific K- and W-prefixed "1 x 1" calls to Amateur Extra Class hams upon request. Hartley cites the "preferred" status of these call signs over the "2 x 1" calls presently being issued. At one time, Extra Class amateurs had the privilege of requesting specific "1 x 2" calls.

RM-3665: Robert W. Stankus, N1AAR, proposes that the Commission amend its rules to eliminate the use of amplitude modulation as an authorized emission in the amateur bands. Stankus, in his remarks to the Commission, states that "a-m continues to decline in popularity, in turn resulting in a more positive use of ssb and its corresponding narrow spectrum use." He continues by saying that the best use of the radio spectrum can be achieved by "outlawing the use of a-m." Presently, the use of a-m is permitted as an A3 emission in the

amateur bands (\$97.61).

RM-3664: Filed by Henry B. Ruh, KB9FO, the petition proposes to restrict the use of the three new amateur bands (10, 18 and 24 MHz) to ASCII, RTTY and SSTV modes only, to the exclusion of cw and ssb modes. Ruh, in his remarks, states that the use of ASCII, RTTY and SSTV would be promoted and efficient use of the new bands would be achieved. Ruh points out that "there is no overwhelming need for an additional DX, contest or traffic band, and the reduction of special-mode operations in the current five bands would provide more room and opportunity for such commonplace operations as cw, ragchewing, ssb, contesting, DX and other mundane operations."

All interested parties are invited to send their formal comments to the Secretary, Federal Communications Commission, Washington, DC 20554 (don't forget to send a copy of your comments to the petitioner). — *Rick Palm, KICE*

ARRL COMMENTS ON RM-3618: RESPONSIBILITY FOR REPEATER VIOLATIONS

A petition filed by two California hams with the FCC asks that repeater users — not licensees — be held responsible for the content of user stations' transmissions. Robert Thornburg, WB6JPI, and David A. Faraone, WA6KOS, requested that the amateur rules be changed to make the content of a signal being retransmitted by a repeater solely the responsibility of the originating station, and not the repeater licensee. (See "Happenings," June 1980 *QST*.) The League, in comments filed April 30, 1980, requested the Commission either to withhold consideration of the petition until June 6, 1980, to afford the ARRL an opportunity to prepare more comprehensive and constructive comments, or promptly issue a Notice of Inquiry or Notice of Proposed Rule Making inviting appropriate comments.

In its further comments of June 5, 1980, "the ARRL again repeats its often expressed opinion that the users of a repeater must be held accountable for the content of their transmissions. To hold the repeater owner or control operator accountable for content would be impractical and unrealistic in the extreme because one or two individual users (operators) could bring about the shutdown of a repeater, thereby making the repeater unavailable for normal or emergency use." The League feels the answer to the problem of malicious interference and profane and obscene language retransmitted by repeaters lies in the enforcement of existing rules, coupled with a comprehensive education program, not in the adoption of more rules. — *Rick Palm, KICE*

TV AND FACSIMILE PROPOSED FOR GENERAL CLASS HF

The Commission has released a Notice of Proposed Rulemaking in Docket 80-252 to permit the transmission of television or facsimile signals, amplitude or frequency modulated, on all Amateur Radio frequencies above 3.775 MHz where voice transmissions are currently allowed. Additionally, the Commission proposes to include facsimile transmission within the bandwidth limitations which currently apply to television transmissions. Excluded from the proposal is the 160-meter band.

The NPRM is in response to two petitions

Second Notice — ARRL Elections

Attention all ARRL members! Nominations are now open for candidates for ARRL director and vice director in each of the following divisions: Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf.

What do ARRL directors and vice directors do?

The ARRL Board of Directors is the governing body of the nonprofit, educational and scientific corporation chartered under the laws of Connecticut as the *American Radio Relay League, Incorporated*. The Board of Directors is ultimately responsible for all League matters, including deciding ARRL priorities and services that will be made available to the membership. There are 16 directors, who are elected by the membership on a geographical basis. Half of the directors stand for election in the even-numbered years, half in the odd. At the same time directors are elected, vice directors are also chosen, who can fill in when directors are unable to serve. For this reason, candidates for vice director must meet the same requirements as the candidates for director.

Who is eligible to run for director or vice director?

In order for a candidate to be eligible for the office of director or vice director, he or she must submit a nominating petition bearing the signatures of 10 (or more) full members of a division naming him or her as a candidate for director or vice director. This petition must be received by League headquarters no later than noon on September 10, 1980.

The nominee must reside in the ARRL division he or she seeks to represent. He or she must also be the holder of at least a General class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a full member of the League for a continuous term of at least four years at the time of the election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communication. Neither is a person eligible who is commercially or governmentally engaged in frequency allocation planning or implementation. Finally, no one can run who is commercially engaged in the publication of radio literature intended in whole or in part for radio amateurs. The idea behind these rules is to ensure that candidates have a true interest in Amateur Radio and the League, legal capacity to make decisions for ARRL, and freedom from conflicts of interest.

Nominating Form

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

*Executive Committee
The American Radio Relay League
Newington, CT 06111*

We, the undersigned Full Members of the ARRL residing in the . . . Division, hereby nominate . . . of . . . as a candidate for director; and we also nominate . . . of . . . as a candidate for vice director from this division for the 1981-1982 term.

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

Who is eligible to vote?

Whenever there is more than one candidate for either office, ballots will be sent to all full members of the League in that division who were in good standing on September 10. The ballots will be mailed no later than October 1 and, to be valid, must be returned to Headquarters by noon, November 20. A group of nominators can name a candidate for director, for vice director, or for both, but there are no

"slates" as such. Each candidate appears on the ballot in alphabetical order.

Absentee Ballots

All ARRL members who are licensed by FCC or DOC but temporarily residing outside the U.S. or Canada are now eligible for full membership. These members overseas who arrange to be listed as full members in an appropriate division prior to September 10 will be able to vote this year where elections are being held.

Even within the U.S., full members temporarily residing outside the ARRL division they consider home may now notify the Secretary of the League prior to September 10, giving the current QST address and the reason why another division is considered home (as for instance, holding an amateur call appropriate to the division). So if your home division is the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf Division, but your QST goes elsewhere, please let the ARRL Secretary know, as soon as possible but no later than September 10, so you will receive a ballot for your home division.

What if one person is nominated for both director and vice director?

If a person is nominated for both director and vice director, the nomination for director will stand and that for vice director will be void. A person nominated for both offices does have the option, however, of declining the higher nomination and running for vice director if he or she wishes.

Since all the powers of the director are transferred to the vice director in the event of the director's death, resignation, removal outside the division, or inability to serve, careful selection of candidates for vice director is just as important as for director.

The Incumbents

These persons presently hold the offices of director and vice director, respectively, in the divisions conducting elections this year: *Central* — Don C. Miller, W9NTP, and Kenneth A. Ebner, K9EN; *Hudson* — Stan Zak, K2SJO, and George A. Diehl, W2IHA; *New England* — John C. Sullivan, W1HHR, and Fred E. Evans, W1JFF; *Northwestern* — Robert B. Thurston, W7PGY, and Ronald D. Mayer, K7BT; *Roanoke* — L. Phil Wicker, W4ACY, and Gay E. Milius, Jr., W4UG; *Rocky Mountain* — Maurice O. Carpenter, K0HRZ, and Lys J. Carey, K0PGM; *Southwestern* — Jay A. Holladay, W6EJJ, and Peter F. Matthews, WB6UIA; and *West Gulf* — Raymond B. Wangler, W5EDZ, and Thomas W. Comstock, N5TC.

In Summary

Petitions need 10 or more signatures of full members and are due at League headquarters by noon, September 10. If there is only one candidate for an office, he or she will be declared elected by the Executive Committee; otherwise, ballots will be mailed not later than October 1 to full members of record September 10. To be valid, ballots must reach Headquarters before noon, November 20. The new term will begin at noon, January 1, 1981.

Additional Information

Nominees or, indeed, any member, may obtain a copy of the ARRL Articles of Association and Bylaws, along with a pamphlet outlining the duties and responsibilities of elected League officials. Interested persons should write or call ARRL Headquarters, 225 Main Street, Newington, CT 06111. Telephone: 203-666-1541.

For the Board of Directors:

July 1, 1981.

R. L. Baldwin, W1RU
Secretary

for rulemaking. RM-3239, filed by Robert J. Roehrig, requested that the Commission allow the transmission of facsimile on all amateur frequency bands where ATV is allowed. The second petition, RM-2861, filed by Henry B. Ruh, requested that FCC allow the transmission of television in all Amateur Radio frequency bands where the transmission of voice is allowed.

In its remarks, the Commission said it agreed that facsimile and SSTV emissions do appear to be similar in bandwidth and interference potential. The Commission pointed out that Amateur Radio operators have been transmitting SSTV on the hf bands for nearly 12 years, yet "we have received very few complaints of interference to voice operations." The Commission believes that allowing facsimile emissions on frequencies where amateur TV is allowed might provide an additional, useful operating mode without any negative impacts on the Amateur Radio Service.

The amendments would allow General, Advanced or Amateur Extra Class operators to transmit television signals on frequency bands between 3.775 and 21.450 MHz (currently, such operation is permitted in the Advanced and Amateur Extra Class sub-bands between 80 meters and 15 meters). The Commission noted that advancement in SSTV technology may have reduced the need for advanced technical skill on the part of the SSTV control operator. Additionally, the Commission feels that the restriction of SSTV operation to Advanced and Amateur Extra Class licensees has not provided any substantial incentive to General class licensees to upgrade their licenses.

Comments are due September 22, 1980, and reply comments are due October 22, 1980. *Rick Palm, K1CE*

LEAGUE COMMENTS ON DEL NORTE PROPOSAL TO CONTINUE RADIOLOCATION IN 420 TO 450 MHz

In response to a request from Del Norte Technology, Inc., the Commission has proposed (in docket 80-135) that nongovernment radiolocation be continued in the 420- to 450-MHz band subject to certain limitations (see "Happenings," June 1980 QST). The present rules would cut off all nongovernment radiolocation in this band on January 1, 1981. In its comments filed June 2, 1980, the League requests that the Commission not delete the cutoff date, as such a deletion would "pave the way for expansion of a use of the band which was never contemplated on a permanent basis by the Commission." A primary concern is the potential for interference to amateur activities — such as weak-signal work, ATV and repeaters — that would result from a continuation of, and expansion of, radiolocation in-band.

The League feels that because of the temporary nature of nongovernment radiolocation in 420 to 450 MHz, the Commission should do no more than extend the cutoff date. The extension would give the Commission more time to study all available alternatives. The League adamantly opposes any blanket, open-ended deletion of the cutoff date. — *Rick Palm, K1CE*

SPANISH EXAMS

The Private Radio Bureau, FCC, has intro-

duced Spanish versions of Amateur Radio examinations. Newly revised Amateur Radio exams now in use at FCC exam points include the first exams to be printed in Spanish. Combined examination Element 2/3, the 70-question examination for persons with no currently valid Amateur Radio license, may now be taken in either Spanish or English. Anyone wishing to take the Spanish version of this test may do so simply by asking the FCC examiner for it before testing begins. The bureau intends to eventually provide Spanish versions for all of the Amateur Radio written examination elements. — *FCC News Release*

ARRL-ORGANIZED IEEE TECHNICAL SESSIONS

The ARRL organized two highly accepted technical sessions for IEEE ELECTRO/80 at Boston this year. Attendance at session 5 was between 350 and 400 persons (Recent Developments in Communications Receiver Design). Session 8 (Current Developments and Applications in the RF Power Device Field) drew a crowd of approximately 250. A show of hands for each audience indicated that at least 80% of the attendees were radio amateur/engineer types! This year's ELECTRO had approximately 30,000 registrants. There were 400 commercial exhibitors. ELECTRO/80 was the eighth IEEE convention for which sessions were organized and presented by the League, commencing in 1972. This year marks the third time we presented twin sessions.

The ARRL sessions have ranked in the top 10 of the usual 34 or 36 technical programs, respective to popularity and attendance. We feel this is a result of our presenting rf-oriented themes and outstanding speakers; most sessions deal with non-rf subjects, such as computers, digital and logic applications.

ELECTRO/80 was held at the Prudential Center in Boston May 13 to 15. Our next technical session will be presented at IEEE SOUTHCAN in Atlanta, Georgia, January 13 to 15, provided the session proposal is accepted by the IEEE committee.

The League expresses its gratitude to previous IEEE technical committees for accepting us amateurs on their professional programs. — *Doug DeMaw, W1FB*

INQUIRY BEGUN ON CHANGES TO INTERNATIONAL RADIO REGULATIONS FOR MOBILE SERVICES WARC

FCC has issued a Notice of Inquiry to solicit public comments on changes to the International Radio Regulations dealing with the Mobile Services which might be considered at a World Administrative Radio Conference (WARC). The Commission said it expected that the International Telecommunication Union (ITU) would hold a WARC for the Mobile Services in the next few years to review the International Radio Regulations pertaining to Distress and Safety Communications, and the Aeronautical Mobile, Maritime Mobile and Maritime Mobile-Satellite, and Land Mobile Services. It said that other provisions as they applied to the Mobile Services would be considered as well. Such a conference, the Commission added, also would have to prescribe, for example, the use of frequency allocations to the Mobile Services from the 1979 WARC.

In issuing its Notice of Inquiry, the FCC said it wanted to solicit comments which the public

believed should be considered by the Commission in developing its proposals for the mobile WARC. Comments were due June 9, reply comments June 30, 1980. — *Federal Register*

BEHIND THE DIAMOND

This month's diamond spotlight shines upon Wyland Dale Clift, WA3NLO, known as Dale to his friends. Most people call him Wyland.

Seriously though, Dale, who is the deputy manager of the Membership Services Department, has come a long way in the three short years he has been employed at ARRL HQ. But part of the credit must go to the person who hired him (yours truly) for recognizing his potential: One feature of Dale's resumé stood out significantly — the fact that he worked at the Wayne County Court House Department of Probation as a counselor of juvenile delinquents. With a background like that, it was apparent that he would fit right in with the gang at HQ. And so he did.

Dale comes from South Canaan, Pennsylvania, having been raised on 900 acres in the North Pocono mountains. He was the salutarian and senior class president of his high school class. He attended The Pennsylvania State University (1971-1975), majored in political science and was a member of the senior honorary society, Skull and Bones. Of course, he also was a member of the Penn State Amateur Radio Club.

Dale's responsibilities as deputy department manager include editing the *License Manual*, assisting members with legal, zoning and regulatory-type problems, editing "Happenings" and "League Lines," and assisting with the general supervision of the department. Dale also serves as HQ liaison to the League's Ad Hoc Committee on Biological Radiation Hazards. He has a reputation for paying attention to details and for following through with members' requests until a complete answer is attained.

Dale lives in New Britain, Connecticut, with his wife, Cheryl (whom he met at Penn State) and a pet rock. His other interests include bicycling, hiking and running (he used to run after Cheryl; now he runs with her). He will be attending law school during the evenings starting in September, and hopes someday to run for political office.

One more thing — after working with Dale for three years this writer has begun to realize that there are more Penn State alumni in this world than there are grains of sand. If you are an alumnus or alumna of Penn State, why not drop Dale a line? — *Hal Steinman, K1FHN*



W. Dale Clift, WA3NLO, deputy manager, Membership Services Department

More ITU Conferences Planned; IARU to Participate

One conclusion of the 1979 World Administrative Radio Conference (WARC-79) was that specialized Administrative Radio Conferences would be needed on a number of subjects in the coming years. Some of these will be worldwide in scope, while others will be limited to one part of the world. In general, they will deal with specific radio services and will not be empowered to change the basic Table of Frequency Allocations.

One of the first of these specialized conferences to be scheduled is a World Administrative Radio Conference for the Mobile Services. Because a number of vhf and uhf amateur bands are shared with the mobile services, it is possible that a Mobile WARC could have some impact upon our use of these bands. For this reason, the International Amateur Radio Union and its member societies will be keeping a close watch on preparations for the Mobile WARC, participating in them as ap-

propriate. For example, the ARRL already has begun its preparations through participation in U.S. CCIR Study Group 8 and by responding to an FCC Notice of Inquiry on the subject.

At the present time, the Mobile WARC is scheduled to be held in two sessions, the first in March 1982 and the second in 1986. These plans are, however, subject to change by action of the ITU Administrative Council or Plenipotentiary Conference.

LIMA TO BE SITE OF IARU REGION 2 CONFERENCE

The triennial conference of IARU — Region 2 is scheduled for October 13 to 17, 1980, in Lima, Peru. Member societies throughout North and South America will be sending delegates to Lima. The Radio Club Peruano is the host for the meeting, which coincides with the 50th anniversary of the RCP.

In commenting on the objectives of the conference in the December 1979 issue of *Region 2 News*, Region 2 President Vic Clark, W4KFC, said:

"WARC-79 has vividly demonstrated the importance of regional cohesion in support of the amateur radio service. The conference in Lima will present an excellent opportunity for further strengthening of ties among the national amateur societies in this hemisphere. Increasing pressure on the radio spectrum requires that we plan together to use our frequencies cooperatively and efficiently, to prepare for their defense at future international conferences, and to reinforce public and governmental awareness of the many benefits of the worldwide amateur radio service. The Lima conference will be the occasion for discussions of other matters of mutual concern and to elect Regional officers and executive committee members for the ensuing three years."

To get the flavor of IARU Region 2 conferences, see the QST reports on the two most recent of these events: December 1978 QST, page 52, and July 1976 QST, page 46. Both the ARRL and the Canadian Radio Relay League will be sending delegations to Lima.

SOLOMON ISLANDS RADIO SOCIETY FORMED

A new organization has been formed in the Solomon Islands. The Solomon Islands Radio Society (SIRS) held its Inaugural General Meeting on October 10, 1979. Regular monthly meetings are planned.

There are currently about 30 licensed amateurs in the Solomon Islands, most of whom reside in Honiara, the capital. Honiara is on the north coast of the island of Guadalcanal, of World War II fame. It is hoped that this amateur population will increase greatly in the coming years as the many people with an interest in Amateur Radio are guided towards qualifying for a transmitting license.

Currently, activity from the Solomon Islands covers the whole spectrum from 1.8 to 432 MHz with such varied modes as RTTY and satellite operation. SIRS hopes to organize an awards program and to operate special-event stations using the national society call sign H44SL. Its officers are W. J. Elton, H44DX, president; Dr. G. W. Hughes, secretary; and G. Amundsen, H44CD, treasurer. Correspondence should be directed to the Secretary, SIRS, P. O. Box 418, Honiara, Solomon Islands. This address also serves as the CSL bureau for H44 stations.

SIRS was in contact with the IARU Region 3 Association and with IARU headquarters during its

initial organization, and has been accepted into IARU membership (see below). — SIRS

NEW VICE PRESIDENT FOR IARU

According to the IARU Constitution, the officers of the International Amateur Radio Union are provided by the Headquarters Society. Usually, the president, first vice president and secretary of the Headquarters Society serve in the same posts for the IARU. As an exception, another qualified and responsible official of the Headquarters Society may serve as an officer if recommended by the Headquarters Society and if elected by the member societies of the Union. It is under this exceptional provision that Noel B. Eaton, VE3CJ, serves as president of the IARU.

At the 1980 Annual Meeting of the Board of Directors of the ARRL, Victor C. Clark, W4KFC, did not seek re-election to the position of first vice president. Carl L. Smith, W0BWJ, was elected to that position. Carl served as director of the ARRL Rocky Mountain Division from 1961 to 1970, and since then as a vice-president of the League. He attended the 1978 Region 2 Conference in Panama as an ARRL delegate and was a member of the IARU Team in Geneva last fall. Carl is well known from his on-the-air activity as W0BWJ and KH6IPY.



Carl L. Smith, W0BWJ, the new vice president of the International Amateur Radio Union.

FOUR NEW MEMBERS FOR IARU

Voting has been completed on the applications of four

national Amateur Radio organizations for IARU membership. The Montserrat Amateur Radio Society, the Radio Society of the Gambia and the Solomon Islands Radio Society have been elected to membership. The IARU membership of Cuba has been reactivated under the name, Federacion de Radioaficionados de Cuba (FRC). The FRC application was delivered to IARU during WARC-79 in Geneva by a member of the Cuban delegation.

With the addition of these four member societies, IARU membership now stands at 111.

NEW ZEALAND ADOPTS 2-METER PLAN

Fm repeaters were introduced to the 2-meter band in New Zealand in about 1970. Seven frequency pairs were used, with inputs between 146.2 and 146.5 MHz, and with corresponding outputs 700 kHz lower. Subsequently, 600-kHz spacing between input and output became the standard throughout the rest of the world.

At its Annual General Meeting in late May, the New Zealand Association of Radio Transmitters (NZART) approved a new plan for 2-meter repeaters based upon 600-kHz separation. Repeater outputs will be at 50-kHz increments from 146.65 to 147.35 MHz, with corresponding outputs 600 kHz lower (146.05 to 146.40 MHz) or higher (147.65 to 147.95 MHz). This plan provides for 15 repeater channels, with the possibility of future expansion by using 25-kHz channelization.

An interesting feature of the New Zealand plan is the use of channels offset by 25 kHz for simplex operation: 146.475, 146.525, 146.575, 147.425, 147.475, 147.525 and 147.575 MHz. The objective is to avoid intermodulation problems between repeater and simplex operations. Fm operation is to be avoided in the 145.8 to 146.0 MHz "space window."

The new plan makes New Zealand compatible with Australia, which will greatly assist travellers and during band openings. There are already about 40 repeaters in New Zealand. For the next year or so, there will be a mixture of the old and new plans in use. Visitors are invited to write to the following address for up-to-date information: The Chairman, NZART Frequency Management Working Group, c/o Box 40-212, Upper Hutt, New Zealand. — NZART

OPERATING PRIVILEGES RESTORED IN LIBERIA

Col. Emmanuel T. Twegby, Minister of Posts and Telecommunications, announced to a group of Liberian radio amateurs on May 19 that their operating privileges were being restored. In so doing, Col. Twegby noted the invaluable services to humanity of the Amateur Radio community, particularly in 1972 during a lassa fever epidemic in Zoror, Lofa County. Col. Twegby also announced new procedures to control the importation of radio equipment in an attempt to curb unauthorized operations and requested the assistance of the amateur community in this effort. — Liberian Radio Amateur Association

*Assistant General Manager, ARRL

In Training

PRETEST/POSTTEST

From time to time every instructor wonders if he is doing a good job. Professional educators have spent untold hours trying to compose that perfect teacher evaluation form. Some forms have been effective and some not. So what do you do to check on your performance if you're a part-time voluntary instructor?

Let's be frank from the start. No one requires you to evaluate your training program. Any efforts must be completely at your option. But we feel obligated at least to present a possible framework for an elementary, but effective, evaluation.

If you decide to use an evaluation, you will want it to be simple. Time and effort are premiums to you. You'll want something to evaluate not just your teaching, but the materials used in instruction. Both must be considered in any meaningful appraisal of your work.

You will probably want something personalized — without an outside evaluator. Someone looking over your shoulder and telling you what to do, or not to do, appeals to no one. Control of any assessment should be totally in your hands.

You want something that creates more positive feedback than negative. Although there is never a guarantee of this, a well-designed evaluation technique includes plenty of room for teacher praise. But reality dictates that you gain constructive criticism to guide you toward improvement of your teaching strategies.

What, then, might be a good approach? A pretest and posttest can be used to evaluate your teaching. Nothing needs to be ordered, requested or bought. As mentioned earlier, no one else needs to be consulted. All you need to do is to construct a test based on the material you expect to teach in any level Amateur Radio course. True-false, multiple-choice, fill-ins — any type of question format (your favorite) is accept-

able. (As the FCC uses a multiple-choice format, you might choose to use that type of question.) You may choose to use final tests in the back of your instructor's guide or student workbook for *Time in the World*. But understand this assumes you follow the texts exactly. In fact, you probably teach the course a little or a lot differently.

What next? Before you start formal instruction, simply give the test to your students. Now, you're probably saying, "But I haven't had a chance at their brains yet!" That's perfectly correct, and that's also why you're giving the pretest at the initial class meeting. You want to discover what background your students have before formal instruction. Be sure to explain to students that this "test" will have absolutely no effect on whether or not they will pass the class. You are evaluating the course, not the students.

Allow a reasonable amount of time for the test to be taken. Though some students might grumble that you collected their test before they were finished, assure them that it will not count against them, and, if anything, that it showed you that more time must be allotted for giving the test.

Continue with your first lesson, and teach the entire course as usual. After your first class, grade the papers. If anything, you might find some students who already have quite a bit of Amateur Radio knowledge. In future class sessions you might wish to challenge these students with some individualized advanced instruction if you have the time, materials or desire. The option is completely yours. Some other applications of your choosing might also come to mind, such as using more advanced students to take on tutoring of weaker students.

More importantly, be sure to give the same test at the conclusion of your course. This is your posttest. Now you have a point of reference. Typically, students will do better on the test after you've given them the benefit of your wisdom for a number of weeks! Grade this second edition of the same test and compare it to the first results. This comparison will be the most significant part of the pretest/posttest method.

Were there questions that students unanimously got close to it answered correctly? These were probably areas in which you achieved real success in teaching. Were there questions that students continued to

answer incorrectly even with the benefit of your instruction? These might be areas that you need to reexamine for technique, material, amount of time, review and content of what is taught. Be careful not to rule out the fact that you may have authored a "tricky" question which did not mirror the student's understanding of the concept. Again, only you can make this determination.

Some additional dos and don'ts might be appropriate here. If you choose to give out grades on the tests, do so only after the posttest has also been administered and graded at the end of the course. Praise the students for achievement as seen in the difference between pretest and posttest scores.

Don't teach just so that test questions can be answered correctly, at the expense of teaching concepts. With the thoughtful presentation of your lessons, this will be no problem.

Do redesign your tests to improve their effectiveness. Rewording questions often helps. Introduction of new subject matter also dictates changes. But you always have the flexibility to teach material in any manner you wish. You could conceivably use the same pretest/posttest validly for 20 years while changing your style of teaching the same material every year!

Doing well on a posttest can be gratifying and reinforcing to a student who just completed your course. Students should feel more confident about their future success in Amateur Radio and their upcoming FCC exam. Collective success by your students on the posttest should reflect not only your efforts to prepare them for their exam but the basics necessary to be well-rounded radio amateurs as you've seen fit to teach them.

Because of your efforts you should now have a clearer, more objective view of how and what you are doing in a classroom. Your students have in no way been penalized. No one but you formulated and scored the pretest/posttest. You alone are responsible for evaluating the results and deciding if any instructional changes are needed.

No two Amateur Radio courses are taught exactly the same way. Individuality in instruction is one of the joys of teaching. Pretest/posttest evaluation keeps your teaching objectives in line with your ultimate educational goals without sacrificing your personal touch in the classroom. — Bill Grim, W0MFK

Silent Keys

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

W1AMI, Henry J. Loisele, Worcester, MA
W1AYG, James O. Wood, Hingham, MA
W1DFA, Norbert J. Carney, East Hartford, CT
W1ERN, Romeo F. Saichione, Bridgeport, CT
W1VPL, Edgar A. Carlson, Grafton, MA
W1WIV, Edward F. Gibson, Lynn, MA
K1ZSN, William L. Pariseau, Webster, MA
W2CYX, Raymond L. Rijnorski, Franklin, WI
W2A2HEC, Emerson W. Babcock, Norfolk, NY
W2JN, Charles K. Atwater, Upper Montclair, NJ
W2MHM, John A. Sutter, Commack, NY
K2PBU, George R. Vermilyea, Gloversville, NY
W2SNE, Edward K. Price, Larchmont, NY
W2VMH, Fred C. Rose, West Caldwell, NJ
K2VN, Gen. Chester A. Charles, Sea Girt, NJ
W3CLT, Dr. Arthur Sharpe, Flourtown, PA
W3MFD, Thomas P. Miller, Towanda, PA
W3RVA, John S. Jurgoski, Pittsburgh, PA
W3TC, Henry U. Davis, Wayne, PA
W3ZS, Don F. Neufeld, Silver Spring, MD
W4CJV, Robert C. Hoyer, Cape Coral, FL
K4CXN, George H. McNeill, Morehead City, NC
W4DKJ, Arthur H. Lynch, Punta Gorda, FL
W4FIV, Frank P. Contorno, Bensenville, AL
W4GJ, Carl H. Harwell, Maiden, NC
*W4G1W, Joseph I. Moran, Clarksville, TN
W4GTU, Fred L. Miller, Theodore, AL
W4HYJ, James C. Williams, Lake Worth, FL
W4IAG, Howard W. Danner, Maiden, NC
K4IKX, Herman E. Schenck, Clayton, GA
W4IO, Clifford O. Tintich, Atlanta, GA
ex-W4IYA, Richard L. Pettit, Folly Beach, SC
W4KAW, Calhoun Norton, North Palm Beach, FL
W4KIG, Philip A. Baker, Gretna, VA
W4KLF, James L. Bentley, Raleigh, NC
N41V, Jacob Dubinsky, Ormond Beach, FL
W4NGD, Byron W. Stotts, Mims, FL
W4PFZ, Daniel J. Cof, Culpeper, VA

W4QDY, David A. Grubb, Hendersonville, TN
W4ROF, Kenneth P. Brown, Lewisburg, TN
K4TQW, Robert H. Kastle, St. Petersburg, FL
K4UBD, Alfred S. Lawrence, Greenville, SC
W4VU, Landon L. Chapman, Bristol, TN
W4YLR, Russell W. Conrow, Deltona, FL
K5AM, Robert H. Conner, Pittsboro, MS
ex-W5CLD, Lewis C. Anderson, Natchez, MS
K5CXN, John A. "Ike" Meissner, Los Alamos, NM
K5FHO, Peter K. Stenback, Houston, TX
W5DFWJ, Grady S. Baker, Dealing, LA
W5HS, John P. "Jack" Camp, Garland, TX
K5JW, Harold G. Fiddler, Frederick, OK
W5PVL, Homer L. Bellair, Kerrville, TX
K5SCX, Leroy L. Dunnahoo, Shattuck, OK
W5TJL, Oliver H. Knight, Houston, TX
K5UTQ, Norman C. Jarke, San Antonio, TX
W5ZUK, Willard K. Branch, Houston, TX
W5DBIX, Debra J. Sneed, Fresno, CA
ex-W6BLI, Harold Boynton, San Bernardino, CA
W6BZY, Glenn E. Palmer, San Francisco, CA
W6L1, William D. Shuge, Thousand Oaks, CA
K6H, Walter S. Robb, Woodland Hills, CA
W6HJL, H. Crosby McGeorge, Paso Robles, CA
W6LJQ, Richard N. Johnson, Palm Springs, CA
W6RVO, Desie C. Billingsley, Compton, CA
W6VRG, James E. Locke, Sebastopol, CA
K6YAT, Martin B. Jurgens, Santa Monica, CA
W7EBU, Walter E. Woodcock, Morton, WA
W7IBD, Warren T. Willis, Sun City, AZ
ex-W7KDX, Gene D. Byers, Bellevue, WA
W71NU, William F. Blewett, Butte, MT
W7MES, Clarence D. Sherbondy, Sierra Vista, AZ
W7THA, Richard J. Noll, Puyallup, WA
W7ZFD, Royal F. Underhill, South Beach, OR
W8B8W, William S. Pickert, Plainwell, MI
W8CRP, Harold W. Bowers, Orleans, MI

W8IT, Robert M. Nixon, Huntington, WV
W8MM, Charles A. Laper, Greenville, MI
K8NWL, Walter R. Bigelow, Hartford, MI
W8QGB, Mike Lawrski, Mt. Pleasant, MI
W8SV, Walker Faussett, Howell, MI
W8YU, Allen J. Pennybacker, Columbus, OH
W9BWB, Carl G. Wells, Chicago, IL
W9DLX, William F. Tripp, Ridgeway, WI
ex-W9FTY/W5KMI, Donald K. Hanan, Richland, IA
W9GGI, James P. Granneman, Wauwatosa, WI
W9LL, James A. Turner, Elgin, IL
W9VIN, Raymond L. Burnett, Antioch, IL
W9VQC, Val L. Ward, Mt. Vernon, IN
WD0ARW, Dennis E. Kotola, Babbitt, MN
WD0CRF, Victor W. Graf, St. Louis, MO
WD0HBI, Earl R. Fry, Wellington, KS
W0MYO, David H. Freeman, Kansas City, MO
W0WVL, Anton C. Theodos, Williston, ND
ex-KW6DP, Teis Fukushima, Wake Island
VE1GC, Ian R. MacLeod, Armdale, NS
VE3ADE, William Wight, Kitchener, ON
VE3APK, Charles H. Powers, Oakville, ON
VE7BK, Barney Ashton, Ganges, BC
VE7CF, Ernest Chesham, Burnaby, BC
VE7CM, Kenneth C. Bruce, Maple Ridge, BC
VE7MK, Norman I. MacDonald, Vancouver, BC
VE7UM, Arthur P. Hoskins, Vancouver, BC
G2CDB, R. A. Pittcock, Dorset, Great Britain
PY1AX, Joao V. Pareto N., Rio De Janeiro, Brazil
9M8HG, Horace G. Gray, Sarawak, Malaysia

*Life Member

Note: All Silent Key reports sent to Hq. must include the name, address and call sign of the reporter as well as the name, address and call of the Silent Key in order to be listed in the column.

YL News and Views

Conducted By Jean Peacor,* K1IJV

Radio-Lady of the Year

It's a foregone conclusion that Amateur Radio attracts many extremely talented and interesting people. To see such talent rewarded by peer recognition is heartwarming. At such a time, it reconfirms faith in the knowledge that you have indeed chosen one of the greatest of hobbies.

Donna Burch, W8QOY, of Portland, Michigan, was recognized recently for just such unusual talent. Donna was the recipient of the "Amateur Radio-Lady of the Year" award presented at the ARRL Great Lakes Division Hamfest, held in Muskegon, Michigan. You will see why as you read on.

Donna received her Amateur Radio license shortly after meeting her OM, Ralph, W8LCU, in 1954. They raised a family and Donna also was an active radio operator during the following years. In 1977, she was afflicted with eye problems which eventually rendered her legally blind. It was then, after braille and mobility training, that Amateur Radio became far more meaningful to Donna. She became particularly active in many YL nets and radio clubs. She



Donna Burch, W8QOY, "Amateur Radio-Lady of the Year."

served as president of Michigan's TASYL and acted as NCS for their net in 1979. Donna has a long list of net affiliations which include Buckeye Belle Net, WISYL, YLRL's Open House and the Upper Peninsula Net. She can be found on these nets almost any time of the day. Emergency situations, such as the blizzards of '78 and '79, find her to be one of the first to volunteer her help. She is Membership Secretary of Michigan's QRP Club and corresponds with members worldwide. She sponsors two DX-YLs through YLRL, has served on YLRL's Nominating Committee and is presently chairman for QCWW's Nominating Committee.

In her spare time, Donna is active in other organizations. Her interests include camping, backpacking, canoeing and dancing. All these activities certainly make Donna a well-rounded radio amateur.

It's the Great Lakes Division's good fortune to have Donna among their members. How well they know it. Congratulations to their "Amateur Radio-Lady of the Year."

SEARCH CONTINUED

The search for the longest-licensed active YL in Amateur Radio (see March QST, page 86) continues to be exciting. YLs contacted have responded in grand style. Then letters have produced fine reading; full of warmth and devotion to Amateur Radio. All cannot be reported in their entirety, but from time to time excerpts will be included, giving us all a better insight into the past.

Fifteen Minutes to Change Bands

Kitty LePine, W4PPQ, of Miramar, Florida, was first licensed as W2FKA in March 1933. All radio amateurs were experimenters in the '30s, sharing ideas and helping each other. With all due respect for today's gear, Kitty misses the constant tinkering necessary to stay on the air when she was first licensed. Those were the days when transmitters had so many stages it took Kitty 15 minutes to change bands.

In her 47 years of operating, Kitty has spread much good will. Whenever it has been possible, she has encouraged the wives of OMs contacted to just come to the mike and say hello. [Remember to observe third-party traffic rules — Ed.] Often this has sparked enough interest for the OM's wife to become licensed. In fact, Kitty's success ratio is so high in this regard, she urges all YLs to give it a try.

Flashing Purple Lights

Mary Knapp, W4UTO, of Greenville, North Carolina, has been licensed since 1935. Mary received her ticket about a week before she and Bob Knapp, W9OMW, were married. Fascination with flashing purple lights in Bob's radio shack (remember how 866s flashed?) prompted her action. Every time Bob keyed the rig, the tubes glowed and so did Mary's interest in Amateur Radio. In 1935, she became W4UTO.

Mary and Bob now live in Greenville. They are both QCWA and OOIC members and Mary has recently joined QCWW, chapter 120. Extensive travellers, operating mobile as they go, W4UTO and W4OMW may be driving through your town at any time — keep an ear out for them.

When 5 8 9 Was Pure Joy

"One's signal was the most important thing (if the rig was working at all). To receive a signal report of 5 8 9 was pure joy." That's the way operating was in 1939 for Lenore Jensen, W6NAZ, of Sherman Oaks, California.

Operating in the '30s provided many thrills for Lenore. The thrill of obtaining a second crystal for 40 meters, enabling her to QSY; of meeting another YL on 40 cw; of finally earning phone privileges; of sitting up all night calling "CQ FL"; of moving to an apartment having dc and the converter that created so much hash it necessitated shutting the transmitter down to receive; and of the 10-minute wait for tubes to warm up to transmit again, only to find that everything had drifted 10 kHz. Lenore remembers the tremendous feeling of power the first time she ever called "CQ DX" using a kW, having used 25 whole watts up until

that time. The kW had three stages. To change bands required opening the interlock of the six-foot rack door — pulling out and inserting new coils for each stage (always scared to death in the process). She remembers the tears the night of Pearl Harbor when another ham told her, in cw, to shut down, then signing with "God Bless America." She even remembers QSLing for every QSO, not just the rare ones, and mailing each card for a penny.

Can a newcomer fully appreciate all the advances Amateur Radio has made? When Lenore turns on her superior store-bought rig today, finding it as stable as Gibraltar and her scheduled station precisely where expected, all her earlier experiences give her a true appreciation for today's state of the art.

HAYLARC — A CLUB WITH A GOAL

When HAYLARC (Huntsville Area Young Ladies Amateur Radio Club) was formed in February 1977, education was designated as one of the club's main goals. Because only a few of the members were qualified to teach code classes for Novice and General licenses, something they hoped to do, they chose to take Amateur Radio into the classrooms of the Huntsville schools. The program was designed to educate young people from grade 3 through high school in all aspects of Amateur Radio.

A letter of introduction was sent to city schools describing the service. Several members volunteered to present the programs, while others helped to gather visual aids and literature, and prepare charts. The first programs were so well received, HAYLARC decided to purchase a copy of the film "Moving Up to Amateur Radio" to use as an introduction to each program. A question-and-answer period follows the film. The children's questions will give those presenting the program an opportunity to demonstrate the code oscillator, 2-meter equipment and code tapes, and to refer to charts, maps and so forth.

The classroom teacher is provided information as to when local classes are offered and who children can contact if they are interested in pursuing Amateur Radio as a hobby. Experience has shown that children do have many questions, and they at least learn the difference between Amateur Radio and CB. This school year the club has presented their program to grades 3 through 7. Next year they hope to include high school classes.

When HAYLARC was formed, most members were Novices and Technicians. Since that time, many have upgraded to Advanced and Extra Class licenses. In attempting to educate others, they too have learned much.



Lenore Jensen, W6NAZ, is well known for her many Amateur Radio activities. Among other activities, she serves as an official radio officer aboard the *Queen Mary*, operating W6RO and meeting tourists; works with Recording for the Blind, Inc.; assists ARRL in public relations and runs daily phone patches for servicemen via Army MARS.

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



Where Do We Go From Here?

The readers of this column, from last month's QST and other sources, know the great loss Amateur Radio suffered on May 23rd when our Phase III satellite was sent plunging into the Atlantic following a failure in one of the first-stage engines of the Ariane launch vehicle. If those of us who were eagerly awaiting the advent of this first truly useful amateur communications satellite felt a loss, imagine how the handful of dedicated hams who toiled for up to five years to make Phase III a reality must have felt. Many of these people, such as Jan King, W3GEY, and Karl Meinzer, DJ4ZC, to name just two, spent many hours away from their families, sometimes working half a world away from home to build, test and install on the launch vehicle what was to become this triumph for our hobby. But it was not to be, at least not in this first year of the '80s.

What has been the effect of the tragedy of "Black Friday" on those people who worked so hard? For the first few hours, it was one of "What's the use?" But soon, as messages of support poured in, including WIRU's inspiring challenge in "It Seems to Us" for July, their attitude changed to one of hope and resolve. They vowed that the amateur satellite program is not at a dead end and that a new "Phase III" will yet make it into orbit. It was concluded that the top priority now is to document all of the immense amount of detailed technology that went into the construction of the lost spacecraft, with a view of being able to build another just like it, or at least its first cousin. As you might imagine, such committing to paper does not always get done in the most precise manner when a tight launch schedule must be met.

Following this, the next order of business will be to locate individuals and groups who can take the documentation produced and accomplish the ticklish task of fabricating the various pieces of electronic and mechanical hardware necessary to construct a satellite. Although, to most of us, a satellite consists mainly of the transponder which receives, amplifies and retransmits our signals back to earth, there are many other complex systems on board which are necessary to support the transponder. There are, of course, antennas, solar arrays, the battery, the battery charge regulator, sun sensors and their associated electronics and an active attitude stabilization

system. Finally, there is the "brain" that makes the whole thing play. This is the satellite's computer, or, as it was called in Phase III, the Integrated Housekeeping Unit or IHU. All of these pieces must be built to the painstaking specifications required of space hardware. While some of the same people and groups that put our lost Phase III together may be available to do the job again, there is no guarantee that all of them will. New blood may have to be found.

Once all of these units have been built and checked, the next task is to install them on the structure and conduct the numerous tests necessary to make certain they work properly as a complete system and that the entire satellite will hold up under the rigorous conditions of launch and survive the harsh environment of space. All of this takes time and the labor of dedicated and talented people. In the construction of amateur satellites, as opposed to that for commercial and military spacecraft, most of this labor is volunteer. It is necessary, however, to have the full-time attention of a few key people to make sure everything runs smoothly and to make the necessary contacts with individuals in industry and government. They don't take kindly to telephone calls at 8 P.M., when most of us are available for our volunteer work! Then, of course, there is travel necessary to coordinate the task of groups working on various aspects of the job. These may be, and usually are, separated by miles, if not an entire ocean. There are also the numerous long distance and overseas telephone calls to settle all kinds of details. Yes, being hams, those involved try to handle as much of this long-distance coordination as possible over the air, but sometimes the band just isn't open or one party may not be able to get to a rig. And then, there's the QRM. It certainly would be a shame if two vital pieces wouldn't fit together simply because someone was tuning up on the frequency when critical dimensions or component values were being exchanged. There is the cost of shipment of pieces as well as the finished satellite itself. Often it must be sent to several places in order to receive necessary prelaunch tests. Many components are donated by industry, but many are not and must be purchased. Space-qualified parts do not come cheap, and if we desire a reliable

spacecraft, its parts cannot be bought at the local electronic store or at the hamfest flea market.

What all this boils down to is that, if the resolve of those individuals who must accomplish the job of building a replacement for what was lost on "Black Friday" is to culminate in the new satellite we so greatly want and need, it will take more than dedicated labor. It will take money. The reason that this plea is being made in "The World Above 50 MHz" is that hfters certainly would have been the first to benefit from Phase III, once it was up there. We are also the ones other hams look to for information and guidance on equipment and techniques necessary for satellite operation. We can assist in raising necessary funds, not only by contributing ourselves, but by urging others to contribute.

Certainly, many amateurs were planning to put some expenditure into equipment for use with Phase III. Those on tight budgets would naturally be expected to make the maximum use of what they already have and put out perhaps \$25 to \$50 to provide their stations with Phase III capability. On the other hand, there are sure to be many who would purchase, new, all of the necessary commercial gear to generate 1 kW erp at 435 MHz and augment their 2-meter setups with circularly polarized antennas adjustable in azimuth and elevation. Their expenditures might easily have amounted to \$500 to \$1000. One possible formula for determining how much a particular individual should contribute to insuring that a Phase III replacement is built might be some percentage, say 25 to 50% of the amount that person expected to invest to equip his or her station for Phase III operation. In this way, everyone's contribution should be in line with what he or she can afford. Naturally, for those who already have everything ready for Phase III, there is even more reason to contribute. They already have an investment to protect. These are among the many who are becoming Life Members of AMSAT. Others, who already are Life Members, are joining again. Whatever formula or method each of us takes, let's put WIRU's words to work and "Press on!"

Tax deductible contributions may be sent to: AMSAT, P. O. Box 27, Washington, DC 20044. If we all do our part, we'll be QSOing on the new Phase III in just a few short years.

CONTESTS

The first Spring VHF Contest, sponsored by the Ramapo Mountain ARC, was quite a success. From my vantage point here near our nation's capital, the event markedly increased activity over what would normally be expected on a weekend in March. The club reports that, although only about 50 logs were turned in, inspection of the entries shows that approximately 350 stations were actually participating. Entries were received from all states east of the Mississippi,

plus Alaska, Texas, Oklahoma and Arkansas. Conspicuous by its absence was that great bastion of VHF contesting, California. Could that have been because the rules did not permit the use of channelized fm? The club notes that most participants thought this rule to be a good one. Top honors went to WA2DPU in SN1, with a total of 238 contacts and a multiplier of 42 for 11,508 points. Runner-up was WB1FVS, CT, with 7138 points. Next year's affair promises to be even bigger and more interesting.

Conditions, as seen from here in the East, were fair for the first 24 hours of the June QSO Party. Then, Sunday afternoon, 6 meters exploded with extremely strong E_s signals. Florida and Texas stations seemed to be doing a particularly good job of racking up contacts. VP5AA and C6ACY were also extremely busy.

Some double hop was noted also. Section multipliers should be phenomenal.

For the ARRL UHF Contest August 2 and 3, WB6NMT informs me that his group will be active from XE2BC on 1-1/4 meters through 23 cm, and possibly 13 cm as well. EME capability will be available on both 1-1/4 meters and 70 cm. They may also do some 2-meter EME work several days before and after, but not during, the contest.

ON THE BANDS

6 Meters — As this is being written, June 12, it is too early to pass judgment on the 1980 E_s season. As predicted by WA4MVI and others, it appears to be

*Send reports to Bill Tynan, P. O. Box 117, Burtonsville, MD 20730, or call 301-384-6736 and record your message.

somewhat below par but it has had its moments, including some pretty good double hop. Also, there has been that increased activity from the Caribbean, which has caused fewer openings to go unnoticed and added considerable excitement to the ones that did catch the attention of alert 6-meter operators. W400 of West Palm Beach, Florida, can certainly be put into the alert category. Gene reports that KP4CK, KP4EIT, NP2AE, 2F2DN and C6ACY are becoming regulars. On May 13 the 6Y5RC beacon was in with good signals. A quick phone call aroused 6Y5RS, who went into W400's log as country number 27. That same evening brought PJ2DEW, not to be confused with PJ2DW. The following evening, Gene heard the 50.070-MHz signals from the YV5ZZ beacon, but unfortunately Ed was not to be found. Speaking of beacons, G3COJ passes along the information that a 6-meter beacon is now operating in the British Isles. The call is GB3SIX and it is on 50.020 MHz from the QTH of GW3NNE. Now for the bad news: Hours of operation are when Band-1 TV is off, which is 0000 to 0730Z from April through September and one hour later the remainder of the year. Power is 25 watts into a 4-element beam aimed west. Closer to home, I am informed that the Oakville ARC has a beacon operating in the Toronto area. It puts out 10 watts on 50.077 MHz under the call VE3RDL. Another beacon report comes from W3IWU, near Philadelphia. Herb says that he heard the ZB2VHL beacon weakly for about 10 minutes around 1625Z June 2. The band was open strongly to VE1 at the time. This appears to be another case of multihop Es across the Atlantic. No other 6-meter signals were heard from the other side of the "pond," although another report has reached me via W6ABN that the following day (June 3), at about 1615Z, ZS3E was receiving a lot of TV and commercial signals up to 53 MHz. Best direction was said to be north. Koozie did not hear any amateur signals on this occasion. That same day, about 1850Z, W6ABN reported double hop Es, with 2s, 3s and 8s putting good signals into his Apple Valley, California, QTH.

C6ACY sends along quite a detailed report on his 6-meter operation over the past few months. The list of ZLs and LUs worked back in March and April are enough to make a DX-starved 6-meter man drool. Then on May 4, Tim's report notes the beginning of openings to the U.S. and Canada. As of June 5 he had worked 31 states, mainly east of the Mississippi. An automatic CQ machine is run when he is around the shack. Stations wishing to break can do so during periods when the CQer is not transmitting.

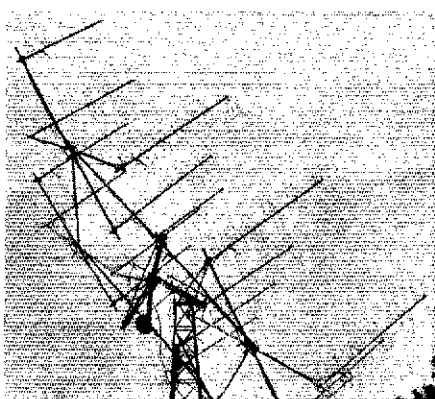
In addition to Es, there has been a little aurora to make things interesting. During Saturday night/Sunday morning of the SMIRK Contest, June 7 and 8, VE1AVX and VE1ASJ worked VE8BY on what appeared to be auroral E. Bob reported that signals were quite weak, but steady, at his Bridgewater, Nova Scotia, location but they were stronger at VE1ASJ's QTH of St. John, New Brunswick. Among the several buzz sessions, one of the best heard by this conductor took place in the early evening of June 12. A number of 1s, 2s and 8s were heard along with VE1ASJ. The best signal was that of VE2DFO who was worked with relative ease with the 100 watts I am presently running.

VE2DZE writes to pass along the information that VE1AVX is the first 6-meter-only recipient of the CANADAWARD. Dave also says that he is now the administrator of the award. For information, address: Dave Goodwin, VE2DZE, 4 Victoria Place, Aylmer, PQ J9H 2J3.

N7JH's OVS report contains an interesting reference to hearing "unusual noise" on 6 meters, peaking in the direction of Mount St. Helens, on the morning of May 18 when the mountain blew its top. A more-derailed description of the characteristics of the noise as well as reports from other locations and other bands would be welcome.

2 Meters — The last few days of May and the first couple in June produced some pretty good 2-meter Es across the southwest part of the country. W5UWB, 40 miles southwest of Corpus Christi, Texas, reports working WB7BVV, Kingman, Arizona, and K7ICW, N7AKB, WA7ZWO, and K7ZOK, all of Las Vegas, and WB7EPA, Phoenix, along with WB6QIA, WA6PEV, K6RKD and W6ZGC. The opening started about 0350Z for John. Signals ranged from well over S9 to quite weak. WA5IYX, San Antonio, longtime follower of Es on 6 meters, as well as on the TV channels and the fm broadcast band, got in on the same opening. Pat, newly active on 2 meters, worked KD6R, near San Diego, and WB6WLR, Anaheim. He reported that signals began to come in weakly about 0245Z and built up to S9, with deep fades about 20 minutes later. It was all gone by 0400Z. W5JTI, Vicksburg, Mississippi, notes Es on three evenings, May 29, 31 and June 1, local time. On two of these occasions, George worked W7LUX, Flagstaff, Arizona. W5FF/K5FF, near Albuquerque, and several other New Mexico stations, were worked on the 31st.

Tropo has also made its seasonal improvement.



The unusual 2-meter EME array at WB5LBT, Baton Rouge, Louisiana. Bob's antenna is made up of sixteen 7-element loop Yagis, each 9.7 feet long. Spacing is 10 feet. The system is on a polar mount.

WB5IHG took good advantage of this on May 12 while driving to work at about 0600 Houston time. Pat contacted, on ssb, W4GJO in northwestern Georgia and W5EUB, also mobile but located 80 miles north of Mobile, Alabama. Both stations run Squalos and solid-state amplifiers in the 100-watt class. Pat wants to know the current 2-meter DX record for mobile-to-mobile contacts. He believes that his mobile-to-mobile contact of about 500 miles (800 km) may be the record for such operation. He contends that, to count, each antenna must be mounted on its respective vehicle such that normal highway speeds can be maintained. Can anyone top his and J. W.'s feat? W3WUL, Wilmington, Delaware, caught a good tropo session on May 30. Between 0200 and 0500Z, Bruce hooked up with K1XR, W1JSM, G4COA/W1, AFIT and WA1UPB, all in New Hampshire, along with Maine stations K1WHS, W1BJ and WA1DZJ. He reports that the stations located within about 100 miles were "down in the mud" but that some of the New England stations were very loud.

WD0FOY in Akron, Iowa, sends along an interesting account of a tropo session which culminated on Friday evening June 6. Al says that WB0TEM and K0VXM in nearby Vermillion, South Dakota, were among others taking part in the excellent conditions in his part of the country. K0VXM reportedly worked 23 stations in eight states. For many, it was their first South Dakota contact. The high spot of the evening for WD0FOY was when W4QDW in the Florida panhandle came back to his call. That represented a new state and a great thrill. The Florida station, which was 1050 miles (1690 km) away, was also worked by WB0TEM, who hooked up with stations in Texas, Oklahoma, Kansas, Arkansas and Nebraska. WB0TEM also worked K5SW, Oklahoma, and WB0TEQ in western Kansas, on 70 cm. This same air mass also figured in another outstanding QSO. See the "23 Cm and Down" section.

This year's edition of the SWOT Contest will be run beginning at 0000Z August 1, and ending at 2359 August 7. That's right, one week! The test is open to all who can operate on 2 meters. You don't have to be a SWOT member, but contacts with SWOT members count two points while others count one point. Exchange is the same as in the ARRL UHF Contest (see July QST, page 72), using one-degree grid squares. Your multiplier is the total number of grid squares worked. SWOT members should add an "X" after their grid designator. For more information, including SWOT membership requirements, send an s.a.s.e. to Len Hoops, W5JTA, 1704 Glenn Dr., Fort Worth, TX 76131. SWOT is a very worthwhile organization for anyone interested in 2-meter ssb or cw. It sponsors nets in various parts of the country as well as this annual contest, and its Newsletter is very informative. The June edition contains no less than four good technical tips useful to 2-meter operators.

1-1/4 Meters — A National calling frequency of 220.1 is strongly urged by K5FF in her 220 Newsletter for May. Lee says that it should work the same way that 144.2 is supposed to work on 2 meters. Once contact is made, move up for strong-signal, protracted ragchews, and down for weak-signal, DX-type contacts. K5FF also says that she and Fred (W5FF) will be listening especially for signs of Es on the band this summer. They also intend to concentrate on this band during the Perseids meteor shower coming up the second week in August. The May Newsletter contains a note on an interesting 1-1/4-meter Yagi designed by W0PW (better known to many as W0EYE). It has 15 elements and is said to provide a gain of 16.3 dBi.

Those wishing construction information should send an s.a.s.e. to K5FF, P. O. Box 73, Edgewood, NM 87015. Better yet, send her a stack of envelopes, addressed and stamped of course, to receive the Newsletter in the months to come. It's filled with the latest in 1-1/4-meter ssb/cw happenings.

This band may turn out to be the best we have for EME from the standpoint of propagation and simplicity of equipment. In any case, the successful QSOs continue to mount. K5FF has now completed with WB6NMT, and W1JR has worked W6PO for the greatest distance ever covered on 1-1/4 meters — 2675 miles (4308 km). Let's hope that some DX stations get on in countries which have access to the band.

70 Cm — The VE4MA trek to the QTH of K0ALL over the June 7 and 8 weekend went well for most of those needing North Dakota on 70 cm. Barry set up his EME paraphernalia on Friday evening and was ready to go by moonrise Saturday. Unfortunately the weather did not cooperate, as clouds obscured the moon all day. Despite this handicap, LX1DB, W1JR, ADIC, K4QIF, WB5LUA, K2UYH and W6ABN went into the log. On Sunday the sky was clear and G3WDG, WA7BBM, W7FU, W0PW and K9KFR were added. From Japan, JA9BOH writes that he has switched from 2-meter EME to 70 cm. Since making the change, Kinjo has worked a total of 28 stations in 12 countries. He has a moon window of 145 to 300 degrees (at zero declination) and is available for skeds from 0900 to 2230Z Monday through Friday, 0000Z to 2400 Saturday, and 0000 to 2330Z Sunday. Rig consists of a pair of 4CX250s delivering 700 watts to sixteen 13-element K2RIWs. Most-wanted stations for skeds are YV5ZZ, HB9SV, G3WDG, GW4COT and YU2RGC. Address is Kimio Maegawa, 67-9 Shimo Asojima, Ohno, Fukui, 912 Japan.

On the terrestrial scene, N4CD, Lynchburg, Virginia reports that his new antenna, consisting of two stacked, 16-element Yagis, is noticeably better than the single one he had up before. Bob says that K2RIW's signal is now "99.9% copiable" on every schedule. AJ6T writes that a Bay-area 70-cm net meets every Thursday evening on 432.1 at 2100 local time.

23 Cm and Down — Those mountaintop DXpeditions down in the Southwest continue to bring success. Last month the 23-cm contact between K6ZMW and K7GNV was reported. This time it's K7GNV working WB5TCO, on Mr. Worthington, New Mexico, from a mountain pass east of Phoenix. During the same operation, Ralph worked K6ZMW again, this time over a 402-mile (647-km) path. Also copying the signals from K7GNV was N6CA, but Chip's 5 watts couldn't quite make the grade from the Los Angeles Basin over the rugged peaks. From the East Coast, WB2WJK, Mt. Olive, New Jersey, writes that he now has about 20 watts of ssb and cw on 23 cm. The rig is a Sota transverter driving an Adler Electronics 7289 cavity amplifier feeding a single 28-element loop Yagi. Steve's first QSO was with K1PXE, Milford, Connecticut. Signals ran S9 plus 20 dB over the 100-mile (160-km) path. Next worked was WA3JUF over a 90-mile (150-km) hilly path. On this contact, signals ran about S7 to 8. Steve has since worked eight other stations and is quite excited about prospects for 23 cm. His hilltop location, 1100 feet above sea level, should not hurt.

WB5LUA, near Dallas, reports that, following an entire week of good tropo conditions, he hooked up with state number three by working W9ZIH, Hickory Hills, Illinois, at 0332Z June 6. Signals at WB5LUA ran about 10 dB above noise. Al's rig delivers 45 watts from a 2C39 to four 45-element loop Yagis at 85 feet. Receiving is aided by an NE-244 GaAs FET preamp mounted at the antenna. W9ZIH runs 150 watts output to a 6-foot dish.

Longtime 23-cm booster K4QIF has now joined the band's EME ranks. During the May weekend of the ARRL EME Contest, Rusty completed a QSO with VE7BBG and scored a near miss with PA0SSB.

WB5LUA has compiled a directory of active 23-cm stations. For a copy, send a large s.a.s.e. with 28 cents postage to Albert J. Ward, Route 7 — Box 32, McKinney, TX 75069.



WB2OTK/4 at his new QTH in Jacksonville, Florida.

Washington Mailbox

Conducted By Richard K. Palm,* K1CE

The Traffic Handler's Rule Book

Last month, as you may recall, we looked at the rules as they pertained to the contest. This month, we beam down to the world of traffic handling — the ritual of the ancients. The rules provide a unique problem to the traffic handler in his everyday dealings with third-party messages, station identification and the like.

Q. What types of messages may be handled by radio amateurs on behalf of third parties?

A. Ah, the ageless question. First, let's define third-party traffic: "Amateur radio communication by or under the supervision of the control operator at an amateur radio station to another amateur radio station on behalf of anyone other than the control operator" (97.3v). Third-party messages may be originated and relayed via Amateur Radio provided the message content does not involve the following: *Material compensation*, "either tangible or intangible, direct or indirect, to a third party, a station licensee, a control operator, or any other person," (97.114[b]). This includes messages to a net manager asking for postage reimbursement for a net newsletter, or requesting a stamp for a QSL card; *business communications*, meaning "any transmission or communication the purpose of which is to facilitate the regular business or commercial affairs of any party," (97.114[c]). A message sent to one's wife stating AM BUYING NEW RIG X 88 and the reply DONT COME HOME X 73 would be okay, but a message to a retail store reading PLEASE SEND NEW RIG COD X 73 would not. In many cases, there is a "grey area" where it is often difficult to decide whether or not to pass a certain message. Some advice: When in doubt — don't! Of course, this doesn't mean that you should start canceling every message you receive that appears out of the ordinary. Simply use a little common sense when handling messages on the air.

Q. What about the legality of sending a message to a nonprofit organization such as the ARRL HQ?

A. Chances are, such a message could be construed to be facilitating the normal business affairs of the League. In this case, the League is a "business," and by sending the message DID NOT GET MY APRIL QST X 73, you are involving material compensation and the commercial affairs of Hq. (97.114[c]). The same applies to requests for the *Repeater Directory*, contest forms, operating aids and so forth. Don't send a message to FCC via the National Traffic System asking for 500 610 forms for the Heavy Hitters Amateur Radio and Taxidermy Society.

Q. How about a message requesting medical supplies from the Red Cross during an emergency? Wouldn't this message be considered to be facilitating the normal course of business of the Red Cross?

A. The key word is *emergency*. Emergency

communications must relate directly to the *immediate* safety of life of individuals or to the *immediate* protection of property (97.3[w]). In an *emergency* situation, the FCC does not prohibit U.S. amateurs from handling traffic relating to the saving of life and property. Requests for emergency supplies from a Red Cross center would be permitted under these circumstances. Normally, such communications would not be permitted.

Q. During our local vhf traffic net last night, I heard a message being passed that sounded illegal. What should I do if I ever have such a message sent to me on the net?

A. Decline to handle it.

Q. How does an operator go about identifying his station when engaged in net operation? Does he have to give the call sign of every station in the net when signing clear?

A. When checking into a roundtable or traffic net, it is not necessary to give any other station's call sign, simply your own: "This is . . . WA1VEI no traffic" does the trick. When signing out of a net, however, you must give at least one of the other stations' calls in addition to your own (97.84[a]). If you wish, you can simply give the net name and your call when checking out: "Near Eastern Traffic & Philosophy Net . . . from WA1VEI, clear."

Q. When a third-party message is being passed on a repeater traffic net, what is the logging obligation of the repeater licensee?

A. The licensee of the repeater must log any third-party traffic passed on the repeater, including a brief description of the traffic content. This notation may be in a form other than written, as long as it can be readily transcribed by the licensee into written form (97.103[b2]).

Q. Our traffic net often serves as an outlet for incoming and outgoing international traffic. Is this legal, and what regulations should we be aware of?

A. The handling of international third-party traffic is forbidden except under certain conditions:

(1) The country must have a third-party agreement with the United States. Countries that have such agreements include (North America) Canada, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua and Panama. (South America) Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela. In Europe, 4U1ITU-Geneva is the only station with which third-party traffic may be handled. (Asia) Israel and Jordan. (Africa) Ghana and Liberia.

(2) When handling third-party traffic with these countries, amateurs may handle messages on behalf of third parties provided the messages are of a character that would not normally be sent by any existing means of elec-

trical communication, except for the availability of the amateur station. Messages shall be limited to those of a technical nature and to remarks of a personal nature for which, *by reason of their unimportance*, recourse to the public telecommunications service is not justified. It is *very* important for amateurs to heed this international law to preserve and enhance respect for Amateur Radio throughout the world.

So, sending a message that says HI RINALDO X HAVE YOU INSTALLED YOUR NEW TRIBANDER YET QUERY, would be okay; but sending a message HI JUAN X DO YOU NEED ANY HELP WITH INSTALLING YOUR NEW GOVERNMENT QUERY would definitely not be okay! (Article 41, ITU regulations).

There are certain other conditions that you should be familiar with when handling international third-party traffic. A good review of international regulations pertaining to Amateur Radio can be had by reading chapter 9 of the ARRL *Radio Amateur's License Manual*.

Q. During the course of our traffic net recently, a station made an announcement to all net stations concerning the upcoming net members meeting. Isn't this transmission a one-way communication?

A. Yes, but the rules allow for certain one-way communications. In this case, "an information bulletin consisting solely of subject matter having direct interest to the Amateur Radio Service" would be permitted (97.91[b]).

Q. On a traffic net today, I was relaying a message when an unidentified station came on frequency and started transmitting a violin concerto in E minor. What are the rules pertaining to malicious interference, and what should I do if this happens again?

A. §97.125 applies: "No licensed radio operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal." Additionally, "the transmission of music by an amateur station is forbidden" (97.115). What should you do about it? Simply ignore it (except in the case of a repeater, when the control op can simply turn it off). Don't give the offending station satisfaction by acknowledging his presence. Contact the nearest FCC Monitoring Station while the infraction is occurring. Don't bother with your cassette recorder — tape recordings are of no practical use to the Commission after the fact.

If you have a good idea of who is causing the problem(s), try applying some peer pressure, perhaps through a local ham club. In cases such as this, a little common sense and some good judgment can go a long way. QST

[Note: Questions appearing in this column are typical of those frequently asked of the FCC and other agencies. Answers, prepared at ARRL, have been reviewed by FCC staff. Interpretations contained herein concurred with those of the FCC's Personal Radio Branch. Numbers in parentheses refer to specific sections of the FCC rules.]

How's DX?



Conducted By Clarke Greene,* K1JX

DXpeditions for Fun, Not Profit

Lots of DX-oriented hams don't enjoy their favorite aspect of this hobby to the fullest. It's a fact, though. Zoning restrictions, cosmically priced private dwellings and the objections of both family and neighbors often prevent even the most enterprising DXers from erecting a competitive antenna system. Even though there are countless DXers who perform Goliath achievements with only David means, the going can still be pretty tough and frustrating. Many would-be Honor-Rollers give up entirely, or let 2-meter fm be their last contact with Amateur Radio.

Someone once said that "discretion is the better part of valor." The fellow who originally spoke those misquoted words didn't have DXers in mind, but his suggestion might provide a means for the closet DXer to satiate his desires. Rather than lust after the DX attracting those pile-ups, why not travel to some DX location and attract your own following? Not only will you be skillfully avoiding the conflicts mentioned earlier, but your family might view Amateur Radio in an entirely new light. The skills developed while operating from the other end will also enhance your success when returning to your (perhaps) modest station.

Before we investigate the logistics necessary for such an undertaking, let's check out the financial commitment necessary. No, it won't be free, or even close. A DXpedition definitely is more expensive than a trip to an amusement park, but by carefully choosing the destination, the time of year and the accommodations, the costs can be amazingly reasonable. Depending on where you live, the cost can be as little as \$350 per person for a several-day trip. That may sound like a lot (which it is), but it compares favorably to the price of a tribander on a 50-foot tower. Admittedly, you can use a tribander for a lot longer than a week. But consider what it really costs for that beam. The land underneath the tower cost something; the permit to put up the tower; the concrete; the TVI complaints; and the divorce. (Let's ignore the last two.) The point is, when all is considered, a DXpedition can be pretty attractive. (The other conclusion is that DXing, like most everything else, ain't cheap.)

Since the place is the thing, so to speak, the first step in your DXpedition planning should be a trip to a travel agent, who can save you a ton of time, hassle and money. An example: A few years back WAISQB and K1XA wanted to go on an expedition for the CQ World Wide DX contest. Chod approached his travel agent with a list of desirable DX locations. A few days later she called back with a great deal: Since there was a large amount of interest in Senegal at the time as a result of a television series, there was going to be a chartered "Roots" trip to Senegal at the time of the contest. The price was quite reasonable and 6W8MM made quite a splash in the contest.

Package deals like this are planned all the time, but only travel agents know about them.

They also have access to the best deals offered by airlines. Another factor to consider when planning a trip is the accommodations at the other end. Will the hotel or cottage allow ham radio antennas? A travel agent will find out and might even be familiar with some locations that have permanent radio installations. All in all, the trip to the travel agent is the best investment.

Once you determine where you might be traveling, the next step is to apply for a license. A word of caution: It takes months in a lot of countries for a license to be issued. Since airline passage is often booked months ahead of time, it behooves you to make your plans at least six months in advance. As soon as you make your decision where you're going, immediately contact ARRL HQ for reciprocal licensing information. It may even be that there is no agreement with your destination. Getting a license is critical to the trip, so don't waste any effort in getting it in your hot little hands.

Of course, inoculations, passports and visas have to be considered. Again, these travel details can be gathered from your travel agent.

Once these "trivial" matters of transportation, lodging and licensing are resolved, the fun part of the trip — ham radio — can be worked on. If you've never operated from outside your own country, think of it like Field Day. You



Elmar, DF4GV, visited Corsica last year, signing F0JFC. This year he and DJ9GI operated from Liechtenstein during July.

have to bring everything. There probably won't be a radio store where you'll be going. Antennas, feed lines, radios, power adapters, microphones, keyers and all the rest have to be packed. This can't be stressed strongly enough: Bring *everything* you'll need, along with spares of expendable items. A blown fuse, with no replacement, can ruin your whole trip.

For reliability reasons, the best policy is simplicity. The fewer items to break, the fewer items that *will* break — and the easier to fix those that do. Keeping that simplicity edict in mind, let's examine the major components of the station you'll bring.

1) Antennas. Probably the most important consideration of the trip, the antenna system is also the most difficult to plan. Since you

probably don't know what you'll find when you get there, it's difficult to predict what kind of antenna supports will be available.

All things considered, dipoles are hard to beat. They pack away in the confines of your suitcase. Being so lightweight, they'll install in almost any tree; in a pinch you can even hang them from your balcony. For 160 through 40 meters they're almost mandatory. On the higher bands dipoles are pretty effective, especially if installed over 30 feet high.

Another good possibility is a trap vertical. Especially where there are few trees, a vertical can be a godsend. But like the books say, a good ground system is absolutely mandatory. Be prepared to lay down lots of radials. But even if you can't put down a good radial system, the vertical can still be very effective. Several expeditions have gotten excellent results by placing a vertical on the beach or, even better, on a post out in the water.

Listening on the air, you hear lots of comments about this or that expedition not having a beam or a kilowatt. The complainers cite the expedition's lack of signal as the reason they didn't work a new country. Don't listen to that nonsense. Consider this: You'll probably be running a 200-watt transceiver. That's less than 10 dB down from a kW. The difference in gain between a dipole at a given height and a tribander at that same height is 6 dB or less. At worst, that means that you'll only be down 16 dB from the heavy-baggage, tough-installation route. Since you won't be competing in the pile-ups, the signal advantage probably isn't worth much. Careful management of the pile-up at your DX end easily overcomes the signal disadvantage you might be at. So don't worry about bringing a beam.

On the subject of antennas, remember to bring lots of coax and all the connectors you'll need. Your antenna might have to be installed 200 feet from your room, so you'll need that line. RG-58 or the new RG-8X are perfect for the job. Bring lots of rope to support the dipoles; parachute cord is ideal for the job. It's very strong, lightweight and not too expensive. Most hardware stores or camping supply stores will have parachute cord. One last note: you have to bring all the tools that you'll need to put up the antenna — needle nose pliers, diagonal cutters, a knife and soldering implements will all be useful.

2) Radios. If you own a transceiver, you're probably in good shape. Many modern transceivers have built-in power supplies that make them ideal traveling companions. If you are in the market for a transceiver or have a choice of several, some of the features you'll find useful are built-in power supply, cw filter (if you're so inclined), RIT (receiver incremental tuning — a real must) and, possibly, a remote VFO. Built-in keyers and separate VFOs are also to your advantage. One very important feature to look for is the ability for the rig to operate on both 120 and 220 volts, 50 or 60 hertz. Many of the places you might be visiting don't use the USA power standard.

3) Power adapters. Not only will you encounter various power sources, you'll also find different outlets in the walls. Fortunately, a trip to a luggage shop or Radio Shack will provide you with all the adapters you'll need. Important: The voltage converters commonly available will *not* work with electronic equipment; they'll burn up your rig. If you must run a 120-volt-only rig on 220 volts, go to your local electronics emporium and buy a stepdown transformer of adequate rating.

4) Microphones, keyers and the like. A hand-held microphone will do nicely, but anything that you are comfortable with will be fine. The same is true of keyers, as long as you keep the power requirements in mind. Since many areas of the world use 50-hertz power, your prized electric clock probably won't work. A windup clock or a wristwatch is the ticket here.

Remember that you'll need extra fuses, logs, pencils and tools. All these little components will fit easily into your suitcase, along with your bathing suit or ski gloves. In fact, the most efficient means of transporting all your gear (with the exception of the transceiver) is along with your other belongings. The transceiver can go into a separate suitcase, or you might prefer to treat it as carry-on luggage.

The big day finally arrives. You arrive on East Nowhere Island. Your first problem — customs. Be prepared to pay a refundable bond on your rig. Most countries are reluctant to let you just waltz in with a transceiver that can be sold for two or three times its U.S. price. Our old friend the travel agent can advise you here.

You might also want to investigate acquisition of a carnet through your Chamber of Commerce. Also, have your license in hand when you arrive. It may smooth your way through customs.

The most efficient way of learning all the vagaries of your exotic paradise is to befriend and communicate with a local ham. Foreign hams, perhaps unlike domestic hams, are a very friendly, hospitable lot and are usually genuinely glad to see another ham. Often, the most enjoyable experiences on DXpeditions are the social contacts made with the local hams. In five years, you'll never remember your pile-ups, but you'll likely remember having dinner with Jacky, the local ham.

Once you've set up your station and you're ready to go, what next? Be prepared for the pile-up. The only real advice is: *Be firm*. If you choose to work by call areas, and some K1 calls when you're working W6s, tell him to stand by for the first call area. At the risk of sounding arrogant, you should remain in control of the pile-up. Spare the rod and spoil the pile-up, so to speak.

The practice of going by call areas not only thins out the pile-ups but it also allows those areas where the propagation isn't so hot to get a shot at you. On cw, the practice of listening up two or down one works quite well. Anybody (including you) with RIT can handle the situation.

All these suggestions are only that: suggestions. A few hours of practice will soon have you handling the pile-up in fine shape, as long as you keep control. Try to ignore state-side "helpers." It only slows you down, and you

can do as well as they can — better. Again, be firm. In the law of supply and demand, you're the one in demand. You set the rules. By your actions you set the pace and give most people the best chance to work you.

When you get home, you'll probably be greeted by a bag full of QSLs, unless you choose to enlist a QSL manager. If you decide to manage your own QSLs, you'll be busy until your next DXpedition, whenever that may be.

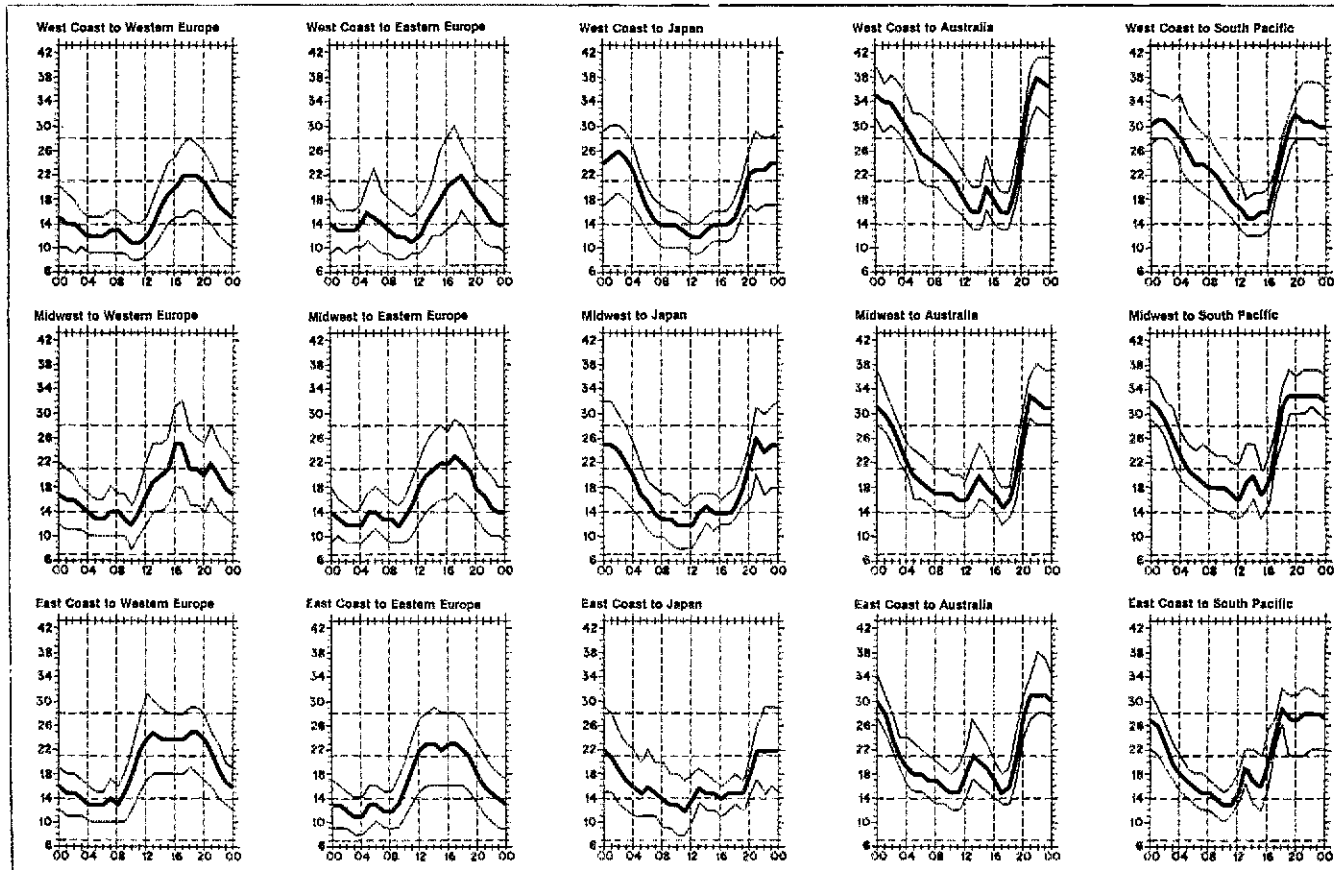
NEW OPERATING AIDS FOR THE DXER

Several months ago we printed a listing of DX newsletters published at that time. Subsequently, *The West Coast DX Bulletin* was retired and *The DX Bulletin* ably took up where the WCDXB left off.

Other bulletins also have appeared on the scene. *QRZ DX* is a weekly bulletin originating from Texas. The subscription rates are comparable to the other bulletins currently published. *QRZ DX* usually averages 10 pages in length, and includes a color photo or two, a weekly propagation forecast, QSL listings and, of course, the "hot skinny" on what's on the bands. For information, contact the editor, K5FUV, at P. O. Box 494, Howe, TX 75059.

More recently, the *DXers Newsletter* began to appear. It's similar in format to the famous *Long Island DX Bulletin*, giving up-to-date information about active stations. One interesting goal of the *DXers Newsletter* is to be "for the little guy as well as DX that's rare." Our operating theory is, if you haven't got it, it's rare. Therefore, there will be a lot of not so rare DX listed for the DXer who hasn't got to the DXCC status yet. Address is: P. O. Box 1458, Morristown, TN 37814.

One of the most complete QSL listings to be found anywhere is the *W6CO/K6HHD List*. Printed in a newspaper format, the list is sent out monthly. Imagine 3-1/2 pages of the *Wall Street Journal* totally devoted to QSL listings, and you've got the picture. Contact Jay O'Brien, 6606 Fifth St., Rio Linda, CA 95673, for details.



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

This last one isn't a bulletin, and doesn't give hot tips about what's currently on the air. The new *ARRL Operating Manual* is a totally revised version of the previous edition. Among the chapters describing traffic handling, satellite work, award hunting and many other topics, is a large chapter devoted exclusively to the art of DXing. Up-to-date operating aids are provided in addition to text. Much of the material on several diverse DX topics, like QSL managing and QSLing, has never appeared before. This one is available for \$5 through your local electronics store, or from ARRL hq. 105-1

QSL Corner

Administered By Joan Becker

ARRL-Membership Overseas QSL Service

This is an "outgoing" service that allows ARRL members to send DX QSL cards to foreign countries at a minimum of cost and effort. While QSLing direct to foreign amateurs is faster, it is also more tedious. Time spent searching for addresses in the foreign *Callbook*, addressing and stuffing envelopes, and mailing could be better spent operating DX. And, the cost of IRCs, airmail postage and envelopes can be prohibitive.

An unlimited number of QSLs may be sent for distribution 12 times per year. The fee is just \$1 per pound or portion thereof (155 QSL cards average a pound).

The ARRL-Membership Overseas QSL Service operates *only* in an "outgoing" capacity. To receive QSLs from DX stations, see "The ARRL DX QSL Bureau System," published every other month on this page.

U.S. amateurs may send SWL reports to foreign short-wave listeners. Unlicensed (associate) members may send SWL cards to foreign amateurs. QSL managers: write for details.

Requirements

1) Presort your DX QSLs alphabetically by call sign

prefix (A3, AP, C6, CE, F, FG, G, GI, GM, IA, 3A2, etc.).

2) Enclose the address label from the brown wrapper of your current copy of *QST*. This information shows that you are a current ARRL member. Family members may also use the service by enclosing their QSLs with those of the primary member. Include the appropriate fee with each individual's cards and indicate "family membership."

Sightless members who do not receive *QST* should indicate that the QSLs are from a "sightless member."

ARRL affiliated club stations may utilize the service when submitting club QSLs by indicating the club name. Club secretaries should check affiliation papers to ensure that membership is current.

3) Enclose payment in the form of a check, money order or cash.

Sending large amounts of cash through the mail is not suggested. Please do not send stamps.

Here is some QSL information for those of you who would like to QSL direct to the station location. It is passed along as we receive it and therefore may not be entirely accurate.

A13E/KX6 (A13E)
A4XIQ (K2JLL)
A7XE (DK3GB)
CT2DF (WB3FD)
C21BS P. O. Box 162, Rep. of Nauru
DJ7SB/F1 (DL6KB)
EA9GT Bureau of P. O. Box 15311, Ceuta, N. Africa
EA9IB P. O. Box 213, Melilla, Spain
EC9AA (EA1QF)
E13PG P. O. Box 6128, Addis Ababa, Ethiopia
FH0FLP (DK9KD)
FK8DI (H13XCU)
FM7AY (K2JLL)
F80E10 (F6CVI)
HC1EE (K8LGI)
HL9KE (K4WSB)
IS0VMB (WB1DQC)
JT1BG P. O. Box 158, Ulan Bator, Mongolia
J28CC P. O. Box 215, Djibouti
J5AG (SM3CXN)
K6L H/AH8 (K6LH)
K6L PI/KH3 (N6AHV)
K7SE/P15 (K7SE)

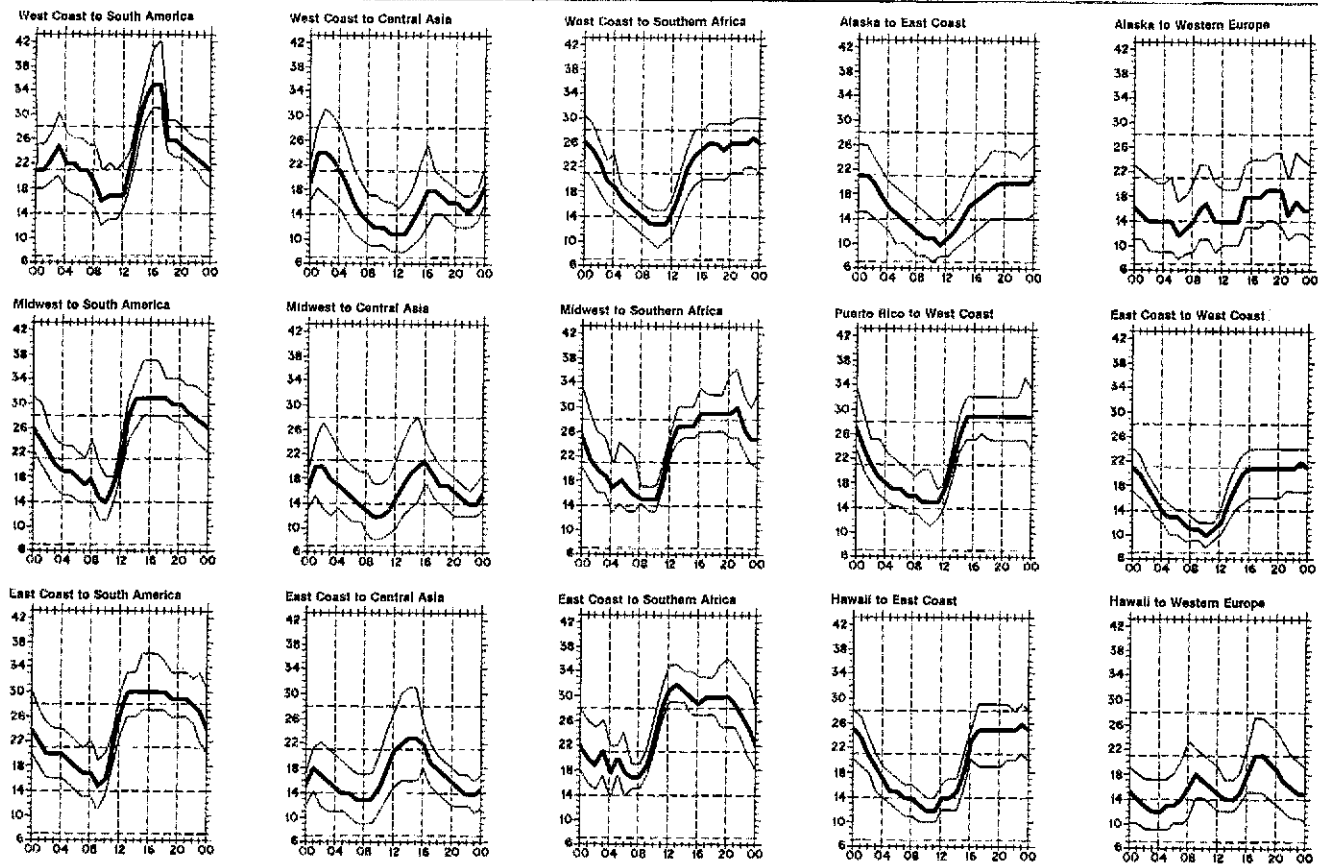
PT7WA (WD4DXK)
SV1IG/A P. O. Box 3751, Athens, Greece
SV0AA (N2OO)
SV0AT (AF4B)
TG9ML (K5BDX)
TI9TE P. O. Box 128, Liberia, Costa Rica
VP2EEV (K8ND)
VP2VFD (K11JU)
WA4CEH (N4AA)
ZB2CJ (G3ATU)
4A2MX (XE2MX)
4S7MX (SM3CXN)
5N4ROF (W4FRU)
5W1CN (ZL1AA)
8Q7AR (K2UJ)
8Q7AW (DJ2BW)
9H3BC (G3XMD)
9M6MU (N2CW)
9M8HG (KB2EN)
9Q5GB (W7KTI)

QSL MANAGER VOLUNTEERS

W6NLG
KE5J
WB1GLH
W4JEY
(ex-WA5RHM)



Igor, UW3HQ, was the guest of the Twin City (MN) DX Association. Here he is listening at W0UO's station.



lowest curve (optimum traffic frequency, or fof2). See January 1977 *QST*, page 58, September 1977 *QST*, page 35 and January 1979 *QST*, page 11, for a complete explanation. The horizontal axis shows Coordinated Universal Time (UTC); the vertical axis, frequency in MHz. Data are provided by the Institute for Telecommunication Sciences, Boulder, CO. These predictions, for August 15 to September 15, 1980, assume a sunspot number of 143, which corresponds to a 2800-MHz solar flux of 188.

The ARRL DXCC is awarded to amateurs who submit written confirmations for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from May 1 through May 31, 1980. 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

DF6GQ/103	I1ZQD/169	VE2XB/100	KA1GC/105	K3KNL/103	W4QJW/123	KB5AQ/100	N6BFA/104	N7ADU/107	WD9DWC/104
DF9RW/107	JA1DNZ/120	VE3BXF/109	W1AUT/151	KA3BV/100	W4HHJ/104	KB5Y/105	N6BQI/115	W7GKN/101	WD9FKS/104
DJ2TI/296	JA3BEY/161	VE4ADG/110	W1OD/100	W3QVC/100	W4KWC/100	W5RJV/109	N6BTY/117	W7ZOI/105	AG0U/115
DJ8TF/115	JF3KNQ/115	VE5JQ/121	WB1HKV/100	K4BZH/135	W4YCB/106	W5UJO/132	N6HL/184	AD8OI/114	KA0BAI/110
DJ8FV/104	JG3FEA/130	VE6ARN/142	K2UVG/100	K4CQL/102	WD4FAB/101	W5LWP/105	W6NLG/102	K8LDS/110	N0AIE/108
DJ8RV/108	JH4PRU/112	XE1FX/244	KA2FOE/103	K4KYI/112	WD4HUT/103	W5MTV/105	W6ST/101	K8BKS/102	N0AUN/101
DJ8GQ/W2/103	JA5BSO/219	YU2OM/121	N2DE/105	KA4BAS/111	WD4OUA/100	W5SKQ/248	W6SX/106	N8AJF/114	N0BGH/106
DK2PS/148	JH6UJP/204	YU3CCD/109	W2ILT/135	KA4BFT/145	AA5E/109	W5TEQ/133	W6BIL/106	WD8JXO/105	N0BGH/106
DK7SS/115	JA7MA/328	YU3TMN/101	W2IUC/101	KA4EOS/104	K5MBE/235	W5SABG/101	W6BKK/110	W89V/110	W0JZ/37
DL0XX/103	KG4FW/125	YU3TZZ/105	W2OTS/100	KA4JK/100	K5CRO/116	W5SHMX/110	W6BKM/100	W89TNC/109	W0JZ/37
HA0HS/131	LZ1A2/109	4S7DA/110	WB2CJL/100	KB4JR/102	K5CTZ/106	AB6R/110	W6FEK/103	WD9AEU/103	WB0OH/109
HB9BM/129	SM4AMJ/119	KA1EI/100	WB2FQI/102	N4CIV/105	KA5V/231	K6QS/107	AJ7V/245	WD9DKJ/113	WB0SYT/107
HB9OM/125	UB5WE/323	KA1EK/100	WB2IRK/154	N4XC/108					

Radiotelephone

DA1MV/140	HB9BOM/117	SM4AMJ/102	7X5AH/102	WA2VCM/125	KA4BFT/104	N6APW/102	WA7USI/101	WR8KZ/214	WB9UTM/100
DJ2TI/264	HC1FM/104	UB5WE/322	KA1EI/100	WB2GHV/112	KA4BWD/101	N6BFA/102	W87VU/110	WB8RE/101	WD9AQJ/100
DJ5JH/246	HC1HW/105	VE3LNU/125	KA1GC/100	WB2IRK/153	W4KPP/110	N6BLN/101	AD8OI/114	WB8AT/220	WD9HKI/107
DJ8RV/104	HC8OGS/108	VE4ADG/110	A1ZF/106	WB2OPH/100	W4XP/110	N6HL/170	AENR/100	WB8TR/102	K0NNR/123
DJ8SL/102	IT9ZG/334	VE6ARN/108	K2EY/242	WB2SD/100	W4WVW/149	W6LUR/100	K8KOI/104	WD8DVC/101	KN0QJ/121
DK9CK/106	JG1HE/104	VK2DCA/VK9N/103	K2ZGC/128	WB3TR/102	W4BCT/115	W6NHB/124	W6NHB/124	WB8DKT/104	W0JZ/37
FR4R/120	JF3KNQ/115	XE1FX/240	K2BZH/126	WB3GOP/106	K5MBE/235	W6PVA/131	K8BC/158	K9LW/136	W0SE/114
FR8V/120	JH4PBM/208	XE1LCH/201	WB3KDY/109	W2LTI/115	K5TNP/139	W6BZF/101	K8BDE/111	K9AW/124	W0SAR/103
FORDO/130	JH4PRU/107	YU2OM/116	W2UT/120	K4FCW/107	WB5SKQ/248	WD6BNH/101	N8AJF/109	W9HGK/105	WB0OH/109
G4FHL/109	LA4HW/226	4S7DA/104	WA2TI/101	KA4BAS/101	K6MQ/103	WN6CND/109	N8BGE/103	W9WYN/110	WD0GEP/110
G4GEE/104									

Cw

DJ2TI/148	DK9NM/112	JA1DNZ/100	SM2EK/105	WB1BW/101	K3NB/103	N4TN/137	N5AIL/110	WA8SAE/111	N0XA/111
DJ3BE/109	EABRU/101	JR1FBL/100	VE1BQO/108	N2AIF/102	WB3AVN/107	W4HRB/124	K6SMH/111	WD8MOV/108	W0JLC/142
DJ5JH/142	G0GJA/111	JA3BEY/156	ZL1UJ/100	W2FY/143	AA4NG/100	WB4STU/100	K7EG/101	AB9V/109	WB0YU/103
DJ8GQ/W2/100	IX1OAR/111	OK1KRS/156	WA1SPM/102	K3EW/105	K4BZH/128	K5FNQ/124	W8CEU/199	WB9LHR/103	

RTTY

W2IUC

5BDXCC

K6UD	K5KR	SP9ECV	K0SVX	K7UU	ZL1BOO	AA7A	EA8PP	VE7DP	K2SX
DM2DEO	DF2FO	SM0AQD	N7US	YU3IF	DJ7YM	WA1UVX			

Endorsements

Mixed

DF9ZO/188	SM1CXE/336	KA1EP/212	N2WS/225	KA3BFX/167	W4HLY/172	W5QIX/309	W6RKP/354	WB7OUL/272	K9TI/160
DJ1BV/305	SM2EKM/320	N1ACW/282	W2ARQ/237	W3AP/318	W4JD/325	W5UR/342	W6SC/325	WB7UXK/152	K9UJ/210
DJ4SO/204	SM5AKT/233	W1ELR/335	W2AXZ/270	W3DO/219	W4NO/325	W5CRG/204	W6SN/335	WB7VUN/151	K9WA/225
DJ5JH/312	SM5FC/317	W1ETH/167	W2EQS/342	W3KH/260	W4QCU/291	W5ZDO/273	W6TWT/340	K8JH/178	K9F7/310
DJ8CR/315	SM6AYM/202	W1FJ/335	W2FG/333	W3LB/325	W4JJW/260	A6EU/291	W6ZYC/319	K8LJG/320	N0KQ/264
DK3G/320	SM7ABL/215	W1KIB/288	W2FY/197	W3NV/311	W4ATL/300	K6ARE/120	W6DUG/321	K8MNG/225	W9AB/337
DK5PR/315	SM7ASN/326	W1JDE/261	W2GND/222	W3WGS/204	W4WYN/290	K6HHD/178	W6HHD/178	W6ND/225	W9DE/318
DK9MC/153	SM7BIP/307	W1LOQ/317	W2HAZ/300	W3VPL/125	W4CCT/139	K6KCM/125	W6TKT/179	K8BC/194	W9FAM/192
DL1LD/310	SM8AQD/290	W1QUS/283	W2HZ/329	W3EWB/163	W4FJO/279	K6LAE/324	W6TOO/271	W6AD/326	W9H2/338
DL7SV/292	SM8GMG/266	W1RBU/227	W2KXL/197	A4A/321	W4MXI/196	K6OJO/320	W6BLF/280	W6CHV/237	W9PQ/301
F2AIA/309	SP3DO/325	W1RED/301	W2MIG/308	A4G/301	W4CFH/240	K6SMH/169	W6BRSU/180	W6KBZ/232	W9TY/280
F2BS/321	IG9AL/251	W1RFQ/185	W2PK/271	K4AIM/342	AD5O/231	K6XN/240	W6BZU/290	W6KNH/302	W9WNB/335
G2ZQW/262	UB5WF/349	W1VVP/290	W2PPG/332	K4CYX/257	A15B/270	K6YCM/302	K7EG/233	W6KRC/319	W9WNB/335
G4BWP/201	VE1MF/219	W1ZK/237	W2PSU/310	K4HRG/304	K5BDX/148	K6G6/169	K7JH/181	W6KUZ/203	W9WNB/335
HB9BS/200	VE3CPJ/252	WA1EOT/299	W2QL/283	K4KPH/256	K5BZJ/311	N6AW/324	K7OXB/289	W6LZV/273	W9WNB/335
HB9MO/339	VE3HJ/304	WA1GTQ/127	W2RS/315	K4LTA/303	K5FJ/352	N6HC/149	K7RS/205	W6MD/128	K0DEQ/251
HB9T/258	VE3JC/V163	WA1UVX/267	W2UE/354	K4NE/240	K5OG/260	N6PV/170	K7SFN/170	W6MFW/260	K0IEA/320
I2AY/253	YU1DZ/185	AA2Z/200	W2VJN/330	K4OAH/223	K5RE/234	N6RS/307	N7EG/240	W6QF/322	K0INR/141
I2EGD/200	YU2BOP/258	K2GAT/250	W2W/313	K4SMX/323	K5TA/201	N6RV/300	W7CWS/338	W6UPH/149	K0RWL/176
I2JH/200	YU2PCAL/261	K2IGW/263	W2W/313	K4TXJ/240	K5VN/330	W6AKM/180	W7FQ/196	W6YGR/339	K0SVX/285
I2MMI/200	YU2HJ/132	K2MRB/261	W2W/313	W2MPT/270	K4BWD/126	W6BL/208	W7FY/229	W6ACJ/127	K0SYT/280
I2PDT/181	YU2OB/291	K2NJ/266	W2W/313	W2NCL/260	K4CD/152	N5OK/300	W6BYH/320	W6AOC/270	N0RR/321
I2TNO/248	ZL1AV/332	K2RZ/127	W2W/313	K4PH/256	K8ALX/161	N5UD/312	W6KPC/304	W6ABN/300	W6H2/323
JA1JAN/321	6Y5DA/180	K2YGM/286	W2W/313	K4S4A/250	W5EWF/134	W5HFN/126	W6KZL/356	W6LGM/280	W6WJA/199
JA1UOP/329	K1ADI/282	K2ZG/120	W2W/313	K4CT/202	W5HFN/126	W5HFN/126	W6LUL/125	W6MBW/214	W6OIZ/243
JA2JF/300	K1CC/300	K2BEN/285	W2W/313	KD4Z/200	W5HFN/126	W5HFN/126	W6MUM/328	W6MUM/328	K9AWK/331
JA2BJ/329	K1DP/250	K2BNU/255	W2W/313	KD4Z/200	W5HFN/126	W5HFN/126	W6MUR/351	W6MUR/351	K9HLL/270
JA9CZ/273	K1H2/284	N2ARE/160	K3EW/210	KU4N/206	W5HFN/126	W5HFN/126	W6MUS/270	W6MUS/270	K9HGM/286
LA2A/V152	K1JA/208	N2CM/142	K3NDI/305	N4GG/300	W5HFN/126	W5HFN/126	W6NXX/290	W6NXX/290	K9KU/311
OH3XZ/281	K1TN/294	N2DT/285	K3OTY/311	N4SA/323	W5LW/274	W5LW/274	W6PLK/307	W6PLK/307	K9SM/335
OK1KRS/171	K1VKO/228	N2MF/260	K3UA/310	N4TN/310	W5QB/347	W5QB/347			WD9GML/160

Radiotelephone

DJ1BV/293	IN3ANE/228	SM7ABL/198	N1AC/241	W2MIG/300	AA4A/315	K5OG/232	W6HFL/337	WB7PCJ/205	K9SM/323
DJ4OK/162	JA1JAN/313	SM8AQD/276	N1ACW/271	W2MPT/270	K4AIM/342	K5SSB/202	W6HFL/263	WB7RUN/127	K9UAA/260
DJ6IN/187	JA1OCA/326	SV8JE/182	W1DO/318	W2NCL/260	K4CX/253	K5TGE/240	W6KBB/240	K8CDM/226	K8BQD/204
DL7SV/271	JA1UOP/324	TG9AL/251	W1KSZ/282	W2PSU/301	K4UAS/279	K5VNI/294	W6KPC/309	K8GWM/280	K8BNI/201
DL9SV/280	JK1NLS/197	UB5WF/332	W1EHL/160	W2QL/270	K4CT/190	N5AML/140	W6LOC/323	K8LJG/315	W9BEK/336
EA4LH/330	JA2JF/300	VE3FJE/302	W1LOQ/289	W2EAN/311	KV4X/125	N5AM/130	W6MUS/265	K8OOG/127	W9DF/283
EA7ABV/139	JA7MA/327	VE3HZH/176	W1PCD/292	W2ELJ/154	N4BHI/176	W5EFA/259	W6VZ/226	K8TL/161	W9DMH/199
F2HS/319	JA9BJ/327	VE3HJ/176	W1EHL/160	W2EHL/160	N4GG/212	N4GG/212	W6VZ/226	K8W/225	W9GBC/170
G3NML/162	JA9CZ/270	VE4AS/301	W1GBA/220	W2MID/241	N4JA/241	W5UR/325	W6VZ/226	W6BA/250	W9H2/332
G4WV/317	KH6DA/201	VE4KJ/270	W1HNN/220	W2B8N/289	W4CYC/308	W5URN/179	W6VZ/226	W6BJR/128	W9H2/332
G4BWP/188	LA5WN/153	VE6AGV/260	W1KYN/299	W2BND/200	W4HLY/170	W5CST/200	W6VZ/226	W6KNN/300	W9TY/152
H8XJQ/157	LU2AFH/297	VP2VBK/242	W1NSJ/187	W2BZF/129	W4JL/243	W5SCG/201	AJ7V/245	W6NVP/259	W9WNB/335
H51BG/173	LU3AJW/219	XE1NI/251	W1SMU/150	W2BZF/129	W4LMX/349	W5SKU/150	K7EG/187	W6R1/325	W9WNB/335
HLNU/251	OA4BS/310	YU2OB/252	W1UW/264	K3EW/190	W4GL/152	W5LW/274	K7OXB/289	W6YGR/296	W9WNB/335
I2SLA/310	OE1SKC/174	YU1KZ/329	AG2K/124	K3HP/251	W4AING/250	K6HHD/176	K7RS/203	W6ACJ/126	K0SVX/275
I2JFG/180	OE2GKL/292	ZL1AMN/305	K2YI/260	K3OTY/311	W4ATL/290	K6OJO/319	W7GSC/201	W6BKM/202	N0RR/321
I6ICD/200	OE3KTA/260	ZL1AV/316	K82C/174	KA3BFX/164	W4BGO/154	K6XN/220	W7KTI/225	W6MUR/148	W6CM/357
I7RNI/305	PA0KB/285	ZL1BOQ/212	KC2Q/175	W3AP/286	W4CWR/151	K6YCM/301	W7OM/309	W6MUR/148	W6NZA/220
I8INW/216	PY2OB/274	K1MIZ/151	W2ARQ/237	W3DR/228	W4DVR/200	N6AW/319	W7COO/187	A19U/181	W6RAO/159
I8LEL/291	PY6GN/286	K1SCQ/178	W2FG/322	W3WGS/202	W4KWR/140	N6RS/300	W7UVO/280	K9HOM/282	W6RAO/159
I9RKF/200	SM2EKM/315	KA1AWH/136	W2HZ/319	WB3CHS/200	K5FJ/339	W6AED/301	W7OUL/263	K9KU/286	W6LHK/158
IC8EGQ/260	SM5FC/317	KA1EP/201	W2IOQ/300	WB3JWC/206	K5HT/150	W6CND/242			

Cw

F3A1/280	SM8GMG/266	AB1V/135	W1LQ/155	WB2FFY/162	AB4Z/180	W4JD/183	K5BDX/139	N6PV/160	W9SLV/230
F6CRT/221	SM5AKT/226	K1JA/182	K2NJ/154	W3AP/224	K4CX/130	W4NBP/214	W5UR/212	N6RV/179	K0DEQ/200
OK5PR/140	SM6AYM/202	K1WJ/177	W2MIG/227	W3TVR/184	K4OAH/213	W4WJ/250	A6U/251	N8BM/200	K0SVX/194
DK6NC/133	SM6GRH/184	N1ACW/175	W2QL/171	AA4AK/150	KU4N/158	W4WYN/154	K6GBL/260	W8FX/125	N0JG/126
DL1ES/204	VE3JC/V126	W1KSZ/135	WA2CBB/154	AA4KT/153	N4GG/140	AG5C/151	K6XN/138	W9TY/254	WB0TTL/152
SM8AQD/251	YU2OB/174								

Club Corner

Conducted By Sally O'Dell,* AE8P



Adrian Club sits at the portal to Hell.

ADRIAN CLUB HAS DEVILISH GOOD TIME

Have you been thinking about all the exotic places in the world you could set up a ham station? Have you ever wondered what it is like to be at the *other* end of a pileup? Or, more to the point, are you looking for activities to help make your club more active? Read on and see what Ted Rachwal, K8AQM, has to say about his club's experiences.

A DXpedition in Hell

At first impression, when someone tells you to go to Hell it doesn't sound like much fun. But take it from me, I've been there (and back), and it's terrific! Perhaps some explanation is in order.

As a result of the South Texas Amateur Radio Society's (W5TEX) expedition to Luckenbach, a group of "serious minded DXers" from the Adrian (Michigan) Amateur Radio Club decided they must devise an appropriate DXpedition of their own. But where to go? Spratly, Pitcairn, and Abu Ai had recently been aired, and the number of rare DX areas was limited. The question was put to the general club membership. When the suggestion to sponsor a club DXpedition was floated, one member, way in back, responded, "... go to h—!" And so it was decided: Our DXpedition would take place in Hell — Hell, Michigan, of course.

In Michigan, we have a bona fide town complete with post office with the honest-to-goodness (goodness?) name, Hell. Despite what you might think, Hell is a small community of 100 residents and is located approximately 60 miles northeast of Adrian.

Under the leadership of several club members, plans were made for a casual and relaxed 24-hour operation to put one of the "rarest" spots on earth on the air. Since some amateurs have worked all places between heaven and hell, we figured there just might be a few amateurs who might want to add Hell to their worked list.

Boy, were we wrong! After some publicity in several of the amateur magazines, we started receiving letters and cards requesting specific frequencies, times and dates! Things grew, and before long the Hell DXpedition became a project of the entire Adrian Amateur Radio Club (W8TQE). What a terrific club project! Committees were formed, plans made and equipment secured for an all-band 80-10 meter ssb-cw and 2-meter fm effort.

On August 25, 1979, a caravan was formed carrying beams, towers, dipoles, verticals, transceivers and even a linear for 20-meter ssb. The operation was set up from downtown Hell. With four beams, three dipoles and a vertical in operation, there was no doubt

there would be rf emanating from Hell. We do want to inform the amateur community that Murphy's main home is Hell; so if you think Murphy prowls the heavens — forget it — he's in Hell, too.

Working around the intermod, all the rigs were checked and put right before startup time, 1600 UTC. A check of our published frequency a half hour before zero hour found several stations on several bands standing by and asking us to please QSY as this frequency was to be used by the Hell DXpedition — wow! Our calculations were right. Someone did want to work us.

At 1600 UTC, August, we started. "QST, QST, this is W8TQE/HELL, the Adrian Amateur Radio Club's DXpedition to Hell. QRZ!"

Now we know what it feels like to be on the receiving end of a pileup. The pileups on all bands were tremendous. Not even in our wildest dreams did we expect this kind of response. After the initial shock settled, we began working the pileups. It was a chance for our club members to experience the problems and learn the procedures DX stations must go through in working the U.S. multitudes. We did manage to take the time to respond and explain our operation. You can imagine the confusion when you tell someone your QTH is Hell!

Do you have any idea how many comments you can get with a QTH of Hell? "Nice to raise Hell tonight." "Hell of a nice QSO." "You've got a Hell of a good signal." And the list goes on and on. Including the above comments, we enjoyed the many compliments regarding our operation: "Thanks for putting fun back into Amateur Radio." "What a great idea." "You guys sure have a super club." "Worked you on three bands. You guys must be having a ball."

After consuming gallons of coffee, hundreds of sandwiches and thousands of cookies, we closed at 1600 UTC, August 26, after 24 hours of operation. We had logged 2288 QSOs on 80-10 meter ssb-cw and 2-meter fm. It's important to note that we did not forget the Novices: Our Novices worked over 100 Novice stations. Despite marginal propagation, we worked 48 states (never did hear Rhode Island on KH6) and 17 countries.

It was a great idea, we *do* have a super club and we *did* have a ball. As a club we learned how DX stations cope, we learned about each other and we left with terrific memories. But it's still not over! QSLing is a major part of any DXpedition, and ours was no exception. If your club station hasn't many QSLs then you need an expedition like this! We received over 1800 QSLs, and we returned to each a special certificate commemorating W8TQE/HELL.

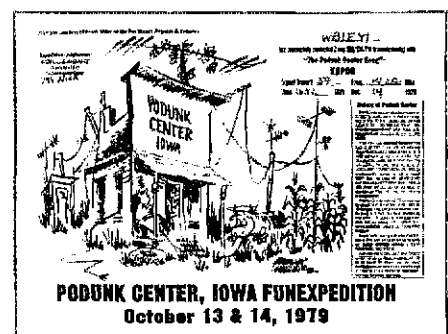
The Adrian ARC wishes to thank all those stations who participated. Their efforts made our expedition a success. The conduct of the stations in the pileups was superb.

And we're still crazy! We had so much fun that we will be returning to Hell this year. At least some of us will, as the rest will be completing the circle and operating simultaneously from Hell, Michigan, and Paradise, Michigan in August 1980!

You Can Do It, Too

Any club can go on a "DXpedition." The trip doesn't have to be to a foreign country; it can be a special event. One example is the Hudson Amateur Radio Council which sponsored a "DXpedition" to Liberty Island (New York) in November 1976. In the shadow of the Statue of Liberty, they set up antennas and equipment to celebrate 200 years of freedom.

A group of hams in Texas set up the "Law West of the Pecos DXpedition" in April 1980. The South Texas Amateur Radio Society spent 24 hours operating in Langtry (home of the infamous Judge Roy Bean).



POBUNK CENTER, IOWA FUNEXPEDITION
October 13 & 14, 1979

Can your certificate bring as many chuckles as this?

Your club can sponsor a "DXpedition." All you need is some time, enthusiastic support and imagination. It is essential to start planning well in advance. But, as Ted said earlier, "It's not over when the operating ends." A well-designed, eye-catching certificate caps the event. Your club certificate can hang in shacks around the world. You may not live next door to Hell or the Statue of Liberty, but use your imagination; what interesting place can you put on the radio map? A well-planned, well-executed trip will leave you and your club feeling worth all the good words passed to you via ham radio. [QST]

O'Dell, "WL2USA = Freedom," QST, February 1977.

Strays

MORE OPERATORS NEEDED FOR THE ASTEROID INTERCEPT NET

□ In addition to the cities listed in the "Stray" on page 33 of May QST, the Asteroid Intercept Net (AIN) needs precision operators in or near the following cities: Tucson and Flagstaff, Arizona; Denver, Colorado; Las Cruces and Albuquerque, New Mexico; New Orleans, Louisiana; Memphis, Tennessee; Jackson, Mississippi; Lexington, Kentucky; and Columbia, South Carolina. AIN's objective is to support amateur astronomers in their measurement of an asteroid by the observance of a star occultation (eclipse). For details send an s.a.s.c. (necessary) to Bill Shoats, K5BY, 709 Ballentine St., Seabrook, TX 77586. — Bill Shoats, K5BY

QST congratulates . . .

□ Bob Christensen, W0ZPM, of Humboldt, Iowa, winner of the Associated Press Top Spot News Award for 1979. Bob was cited for courageous coverage of Iowa's "killer tornadoes" during the summer of 1979.

*Club Program Manager, ARRL

Operating News

Conducted By John F. Lindholm,* W1XX

From KBNC8035 to KA4NID: My First 19 Days

I had put it off long enough. CB just didn't fill my hunger, and I wanted to become a ham. Having a real love for the art of communication for many years, I devoted myself to my new studies. With the help of Ken, K4UVJ, I began preparation to take the Novice test.

Finally, the telephone call came that Ken had received the test material. I can still remember sitting at his kitchen table and actually trembling from the excitement of taking that Novice test. Then the long wait began. For six weeks I sat by my rig and monitored the Novice bands using a trap dipole antenna at 35 feet. There were times that I would pace around the house in anxious anticipation of getting on the air. The postman knows me well now. Daily I would meet him and remind him of what I was waiting for. Others were waiting for income tax refunds, but I was waiting for my new Novice ticket. The feelings and emotions of those six weeks will long be remembered.

I had my radio shack all set up with charts, maps, books and file systems. Like a space launch, everything was checked, and re-checked, as I tried to be totally prepared for that big day when my ticket would finally come. I had thought it all out, and everything had its place. One big decision was whether my first transmission would be to answer a CQ, or should I call CQ and let fate take its course. After several weeks of pondering, that issue was also settled in my mind.

It was a beautiful morning, that cool, crisp, clear, March 17, 1980. There was a letter from the FCC, and I ripped it open. My entire family, wife Betty and three children, Tony 16, Timmy 14 and Tanya 10, were loudly joyous with me during this exciting time. They all gathered around to watch this first transmission. Everything was ready, and now, look out world!

CQ DE KA4NID K After several calls on a clear frequency, I heard a return reply.

KA4NID DE WA2KZF AR I had my first Novice contact. I'll bet most operators can remember their first contact. Through the day and night, my Amateur Radio honeymoon had begun. My first goal was to work all 50 states (WAS). To me this was like basic training in the military. It was something I had to get behind me before I could feel the real eliteness of being an Amateur Radio operator. So, while keeping the Amateur's six-point Code in mind (considerate, loyal, progressive, friendly, balanced and patriotic), my basic training continued.

While I worked new states, the urge to work DX bit me. This was helped by the second letter I was looking for. Uncle Sam's income tax refund helped speed my new antenna addition. So on my wife's birthday, my new four-element, three-band antenna, went up 60 feet. With the help of neighbors, the fully assembled tower, rotator and beam were pulled up by

rope and guy wires to a secure position next to the house. Every minute move of the operation had been calculated, written out and debated prior to actual assembly.

There seemed to be a lull when I got to 48 states. The last two were hard to get. I became more familiar with propagation during my first weeks of operation. I could have checked into a Novice WAS Net, but wanted to do this all on my own.

Then I heard number 49. I landed W0TAC, from Minnesota. Only one to go. With an "oh, what the heck" attitude, I found a clear frequency on 80 meters. QRN was moderate. So here goes:

CQ DEL CQ DEL DE KA4NID K

A faint signal is heard. QRZ?

KA4NID DE N3BDG AR

It was Dave from Newark, Delaware.

N3BDG DE KA4NID FB FB

He shared my excitement and we exchanged QSLs. At 1030 UTC on April 5, 1980, I signed with my 50th state. Basic training was over.

During my first 19 days as a Novice, I had worked all states, contacted 31 DX countries, and checked in regularly to the Kentucky Novice Training Net and Tennessee Slow Net.

Although basic training is over, my real learning and growth in Amateur Radio is yet to be experienced. I'll bet you remember your beginning days, too! — David C. Alleman, KA4NID, Smyrna, Tennessee

WIAW NOTE

The complete WIAW summer operating schedule appears in April QST, page 97. A WIAW schedule also is available on request from ARRL headquarters. Please enclose an S.A.S.C. See the "Contest Central" section of QST for times and dates of WIAW Code Proficiency Runs.

SCM ELECTION NOTICE

To all ARRL members in the Missouri, Southern New Jersey, Quebec, South Carolina, Western Pennsylvania, Eastern Massachusetts, Saskatchewan, Nebraska and New York City-Long Island sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures on that petition. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL
225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for

this Section for the next two-year term of office. (Signature . . . Call . . . City . . . ZIP . . .)

An SCM candidate must have been a member of the League for a continuous term of at least two years and a licensed amateur of General Class or higher (Canadian Advanced Amateur Certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, September 5, 1980.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on October 1, 1980, returns counted November 18, 1980, and SCMs elected as a result of the above procedures will take office January 1, 1981.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition, for a two-year term beginning January 1, 1981.

If no petitions are received for a section by the specified closing date, such section will be resolicited in January 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.

John F. Lindholm, W1XX
Communications Manager

REPEAT SCM NOMINATING SOLICITATION

Since no petitions were received for the Manitoba and Oregon sections as a result of notices in the January and February QST, nominating petitions for these sec-

tions are herewith resolicited. See the above notice for details on how to nominate.

SCM ELECTION RESULTS

The following elections were conducted for two-year terms of office beginning July 1, 1980:

Balloting Results: In the Illinois Section, Edmond A. Metzger, W9PRN, received 1663 votes and Michael Reik, WB9YJF, received 485 votes. Mr. Metzger is declared elected.

In the Northern Florida Section, Billy F. Williams, Jr., N4UJF, received 605 votes and Fred Marchman, AA4FG, received 563 votes. Mr. Williams is declared elected.

The following were elected for two-year terms of office beginning October 1, 1980:

Uncontested:

Ohio
W. New York
Connecticut
Louisiana
South Dakota

Allan L. Severson, AB8P
Louise J. Keller, WA2AOG
Stanley Horzempa, WA1LOU
James R. Giammanco, N5IB
Erwin C. Heimbuck, Jr., K6OTZ

SCM APPOINTMENTS

In the Los Angeles Section, Stanley S. Brokl, N2YQ, has been appointed to complete the term (until September 30, 1981) of Perry Masterson, KD6C (resigned).

In the Alberta Section, E. Roy Ellis, VE6XC, has been appointed to complete the term (until June 30, 1981) of Sydney Jones, VE6MJ (resigned).

In the Orange Section, Fried Heyn, WA6WZO, has been appointed to complete the term (until March 31, 1981) of Roy C. Zuckerman, AC6H (resigned).

*Communications Manager, ARRL



N5FN, SCM Southern Texas

MEET YOUR SCM

Introducing Roger D. Coday, N5FN, the SCM of Southern Texas. He lives in Brazoria and is employed as a production supervisor for Dow Chemical of Freeport, Texas. Roger has made great strides in his amateur career, being first licensed as WN5TNN in 1976 and upgrading to an Extra in less than four years. He is a contender, past EC of Brazoria County and member of the National Weather Service SKYWARN program, and has served as assistant net manager of the Texas Traffic Net and 7290 Traffic Net. CW is his forte. Roger is also an avid sportsman who loves camping, football, boxing, track and fishing.

Strays



The Anchorage (Alaska) ARC recently named Tom Moore, KL7Q, ham of the year for 1979, an honor that had been bestowed on his wife, Mary, KL7P, for 1978. Tom and Mary have progressed through their amateur careers together, going from Novice to Extra Class in unison. (photo by Glen Alvord, KL7HX)

I would like to get in touch with . . .

LJ Novices in the USA to exchange letters. I am 18 years old and have been a radio amateur since 1972. Harry Popov, Nikola Botushev str 109A, Burgas, Bulgaria.

LJ High Speed Club (HSC) members. Please send your name, call, address and HSC number to "Laci" Radnay, W1PL, 66 Wheeler Ave., Melrose MA 02176.

OSCAR Operating Schedule

OSCAR 7				OSCAR 8			
DATE (UTC)	Orbit No.	Time UTC HR MN	Eqx W. Long. Degrees	Orbit No.	Mode	Time UTC HR MN	Eqx W. Long. Degrees
1 Aug.	26,125	01:08	89.0	12,267	AJ	00:47	65.0
2 Aug.	26,137	00:07	73.8	12,281	J	00:52	66.2
3 Aug.	26,150	01:01	87.4	12,295	J	00:57	67.5
4 Aug.	26,162	00:00	72.3	12,309	A	01:02	68.7
5 Aug.	26,175	00:55	85.9	12,323	AJ	01:06	69.9
6 Aug.	26,188	01:49	99.5	12,337	X	01:11	71.2
7 Aug.	26,200	00:48	84.3	12,351	A	01:16	72.4
8 Aug.	26,213	01:42	97.9	12,365	AJ	01:21	73.6
9 Aug.	26,225	00:42	82.7	12,379	J	01:26	74.9
10 Aug.	26,238	01:36	96.3	12,393	J	01:31	76.1
11 Aug.	26,250	00:35	81.2	12,407	A	01:36	77.3
12 Aug.	26,263	01:30	94.8	12,421	AJ	01:40	78.6
13 Aug.	26,275	00:29	79.6	12,434	X	00:02	54.0
14 Aug.	26,288	01:23	93.2	12,448	A	00:07	55.2
15 Aug.	26,300	00:22	78.0	12,462	AJ	00:12	56.5
16 Aug.	26,313	01:17	91.6	12,476	J	00:16	57.7
17 Aug.	26,325	00:16	76.5	12,490	J	00:21	58.9
18 Aug.	26,338	01:10	90.1	12,504	A	00:26	60.2
19 Aug.	26,350	00:10	74.9	12,518	AJ	00:31	61.4
20 Aug.	26,363	01:04	88.5	12,532	X	00:36	62.6
21 Aug.	26,375	00:03	73.4	12,546	A	00:41	63.9
22 Aug.	26,388	00:57	86.9	12,560	AJ	00:46	65.1
23 Aug.	26,401	01:52	100.5	12,574	J	00:50	66.3
24 Aug.	26,413	00:51	85.4	12,588	J	00:55	67.6
25 Aug.	26,426	01:45	99.0	12,602	A	01:00	68.8
26 Aug.	26,438	00:44	83.8	12,616	AJ	01:05	70.0
27 Aug.	26,451	01:39	97.4	12,630	X	01:10	71.3
28 Aug.	26,463	00:38	82.2	12,644	A	01:15	72.5
29 Aug.	26,476	01:32	95.8	12,658	AJ	01:19	73.7
30 Aug.	26,488	00:32	80.7	12,672	J	01:24	75.0
31 Aug.	26,501	01:26	94.3	12,686	J	01:29	76.2
1 Sept.	26,513	00:25	79.1	12,700	A	01:34	77.4
2 Sept.	26,526	01:19	92.7	12,714	AJ	01:39	78.7
3 Sept.	26,538	00:19	77.5	12,727	X	00:00	54.1
4 Sept.	26,551	01:13	91.1	12,741	A	00:05	55.3
5 Sept.	26,563	00:12	76.0	12,755	AJ	00:10	56.6
6 Sept.	26,576	01:07	89.6	12,769	J	00:15	57.8
7 Sept.	26,588	00:06	74.4	12,783	J	00:20	59.0

Orbit predictions by Project OSCAR, P. O. Box 1136, Los Altos, CA 94022. To keep abreast of the latest developments, tune in to the regular phone and cw bulletins over W1AW, AMSAT bulletins transmitted around 29.490 MHz on Mode A, 145.960 MHz on Mode B, and 435.160 Mode J, during O 7 and O 8 reference orbits, and AMSAT nets (East Coast at 0100 UTC Wednesdays; Mid States at 0200 UTC; West Coast at 0300 UTC, all on 3850 kHz LSB; international net at 1800 UTC Sundays on 14.280 kHz usb and 1900 UTC Sundays on 21.280 kHz).

Soviet RS data have been discontinued.

O 7 progresses an average of 28.7374° W per orbit in a period of 114.9422 minutes.

O 8 progresses an average of 25.8023° W in a period of 103.2026 minutes.

O 8 modes of operation are Mondays and Thursdays — Mode A. Tuesdays and Friday — Mode AJ. Saturdays and Sundays — Mode J. Wednesdays are for experimental use on Mode A or J or recharge Mode D.

Mode AJ is simultaneous operation of both transponders.

Spacecraft Frequencies

Spacecraft	Uplink	Downlink	Beacon
O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz
O 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.100-435.200 MHz	435.095 MHz

Formulas for calculating approximate downlink frequencies. x = downlink frequency.

OSCAR 7

Mode A $x = \text{uplink frequency} - 116.450 \text{ MHz} \pm \text{Doppler shift}$
 Mode B $x = \text{uplink frequency} - 578.100 \text{ MHz} \pm \text{Doppler shift}$

OSCAR 8

Mode A $x = \text{uplink frequency} - 116.458 \text{ MHz} \pm \text{Doppler shift}$
 Mode J $x = \text{uplink frequency} - 581.106 \text{ MHz} \pm \text{Doppler shift}$

Note: A minus sign in front of the downlink frequency indicates that the passband of the satellite is inverted in that mode. This means that signals transmitted up to the satellite at the low end of the uplink passband will appear at the high end of the downlink passband.

Additionally, upper-sideband signals transmitted on the uplink will appear as lower-sideband signals on the downlink.

Further information on the radio amateur satellite program can be obtained free of charge from ARRL HQ.

Public Service

Conducted By Robert J. Halprin,* K1XA

Handling Instructions — Who Needs 'Em?

Handling instructions are an optional component of the preamble in a formal radiogram message. These instructions are signified by the letter group *HX*, plus at least one other letter, denoting which instruction has been chosen. Complaints have been registered that traffic handlers ignore the *HX* designators, as messages make their way through the network. It's alleged that the seven *HX* indicators are hard to memorize, and the problem is often compounded with the assumption that the handling instruction only applies to the delivering station. The question is — are handling instructions necessary for the proper handling of traffic, or are they just so much excess baggage, causing amateurs to withdraw from traffic activities altogether?

First, let's take a look at the official definitions of the instructions:

HXA — (Followed by number.) Collect landline delivery authorized by addressee within ____ miles. (If no number, authorization is unlimited.)

HXB — (Followed by number.) Cancel message if not delivered within ____ hours of filing time; service originating station.

HXC — Report date and time of delivery (TOD) to originating station.

HXD — Report to originating station the identity of station from which received, plus date and time. Report identity of station to which relayed, plus date and time, or if delivered report date, time and method of delivery.

HXE — Delivering station get reply from addressee, originate message back.

HXF — (Followed by number.) Hold delivery until ____ (date).

HXG — Delivery by mail or landline toll call not required. If toll or other expense involved, cancel message and service originating station.

Now, let's try to gauge the practical utility of each:

HXA — Would this one be used more than

once in a lifetime? It is said that *HXA* comes in handy during emergency-related situations. Sure, but is it not a long-standing practice that crisis traffic is delivered immediately from any level?

HXB — The cancellation indicator is helpful during SET, and so on. But the same purpose can be served by an operator's note.

HXC — This one eases the non-delivery paranoia, and involves only the delivering station. It doesn't drag everyone into the morass, unlike *HXD*. But *ARL SEVEN* (from the numbered radiogram list) could accomplish the same thing, while putting some real, i.e. third-party (not ham-to-ham) traffic into the system.

HXD — This prosign makes the IRS regulations look attractive. A real classic. If anything is going to be ignored, this one is; *HXD* makes excessive demands on one's traffic handling consciousness. Furthermore, should FCC go ahead and eliminate the need to keep a message file, *HXD* will be blown right out of the saddle.

HXE — *ARL SEVEN* and this designation are similar, if not matching.

HXF — Hey baby, you'll be lucky if the message gets there at all!

HXG — At last, the one with the most merit. But whether we like it or not, for the most part, delivery by mail or toll call shouldn't be expected. After all, in normal times, the person signing the message can call or write (same for *HXA*). For example, sending a message to a post office box is pointless. We do not, however, recommend refusal to deliver *after the fact*. No one is forced to accept a radiogram, but once an amateur does so, he/she should see it through to delivery. If it was understood in the traffic realm that cost-delivery isn't expected, then *HXG* would no longer be necessary.

Yes, the devil has been doing the advocating so far. There are eloquent spokespersons in radioland who support the retention of the handling instructions and favor expanding the criteria. Let us hear from you.

Along these lines, there are, in fact, amateurs who feel the trace procedure (*HXD*) should be more formal and exacting. But then trafficking becomes more cumbersome, derogating recruitment efforts. A school of thought has it that the message trace is actually a punitive measure, since it can't resurrect a lost message after it's obsolete. The trace procedure won't turn back the clock, although it may reform the miscreants. But the overriding issue does not involve tracing, or handling instructions, if the truth be known. What is of major concern is that hams must be responsible and reliable when it comes to accepting traffic for delivery. It's that simple. Again, traffic squads are composed of volunteers. But, once that voluntary commitment is made, it is common courtesy to get the message to its destination, or take all measures to that end.

To take it one step farther, the rapid movement of traffic from origin to destination is not the only objective of the National Traffic System (which is the primary means of traffic exchange in modern times). The other goal, of equal import, is the training of amateur operators in the handling of written traffic and participating in directed nets. This is why net hopping and other transient activities, though expediting delivery now and then, are contrary to NTS guidelines. Since the two objectives often conflict, one should not get too worked up if a given message does not reach its destination "immediately." The fact remains that, under routine conditions, a message of a crucial nature should not be in the amateur circuits in the first place. Thus, there is little need for handling instructions that make traffic handling less pleasant for the participants and hinder the growth of the system itself. It may be viewed as sacrilegious in some quarters to say this, but the best and most efficient way to communicate a piece of critical, time-valued information, not in the context of a communications emergency, is to use the telephone.

PUBLIC SERVICE DIARY

[] Maracaibo, Venezuela — March 3-4, 1979. YV5HI/YVI called into the Intercontinental Amateur Traffic Net (INTERCON) on 14.313 MHz requesting help obtaining some medicine not available in Venezuela. W4PPC coordinated efforts for Florida and New Jersey hams to locate this medicine, and it arrived in Maracaibo 14 hours after the first emergency request was received. (W4PPC, PRA 5F1a)

[] Fort Collins, Colorado — March 19-22, 1979. Local hams assisted the Larimer County Sheriff's office during the rescue of six snowbound people in the mountains west of here. WD0FTF, trapped in his cabin by several feet of snow, contacted W0OWP and AG0B via W0ADD and asked them to send help. The hams kept communications lines open for three days until sheriff's officers completed the rescue. (AG0B)

[] Tijuana, Mexico — May 13, 1979. Members of the 3-BC Amateur Radio Club were scuba diving when they received an urgent request, via 2 meters, to assist local authorities with a drowning. (WB6SCF)

[] Melbourne, Kentucky — May 28, 1979. When



N4APY (left) and WA4HMM are two of the operators of the University of Alabama (Birmingham) station WB4TJX. The club was directly involved in an emergency on the high seas. See "Public Service Diary." (UAB photo by Dick Gunthorp)

WA4TMZ's houseboat engine failed, he called for help on the OH-KY-IN VHF Society's 2-meter repeater. Local hams arranged for a boat to come to his rescue, but the would-be rescuers came upon another boating mishap upstream and stopped to help. The Kenton-Boone Water Rescue Team was contacted, and they towed the houseboat to safety. (WB8JGW, SCM Ohio)

[] Gulf of Mexico — July 10, 1979. Members of INTERCON on 14.313 MHz provided communications between the yacht *Kismet* and the Coast Guard. *Kismet* had lost her way and was sailing into the path of Hurricane Bob. The Coast Guard recommended a safe course, and the yacht sailed to safety. (N1ADX)

[] Atlantic Ocean — July 10, 1979. The crew of the sailing vessel *Impossible Dream* called into the INTERCON Net saying that the ship was demasted, out of fuel and caught in an Atlantic storm. Net members contacted the Coast Guard in San Juan, and the ship was saved. (N1ADX)

[] St. Martin, West Indies — August 17, 1979. A passenger on a yacht equipped with Amateur Radio became ill after being stung by a jelly fish. The University of Alabama in Birmingham (UAB) Radio Club station, WB4TJX, established a phone patch between a nurse on the yacht and members of the UAB medical faculty. Doctors diagnosed the problem and pre-

*Assistant Communications Manager, ARRL

scribed drugs from the yacht's medical locker. The patient recovered fully. (WA4JYU)

11 Baldwin, New York — September 1, 1979. N2PX and his wife were traveling to a picnic when they met a lost child on the road. They passed the information to WB2GJG via N3AQ/R. WB2GJG notified the Chemung County Sheriff's Department, and the child was reunited with her mother. (WA2TCZ and K2DNN)

11 Dillon, Montana — September 3, 1979. An Air National Guard fighter jet hit a grain elevator and crashed into a fuel processing plant, setting one of four 17,000-gallon gasoline tanks afire. The crash knocked out telephones and power, and members of the Butte Amateur Radio Club provided 2-meter communications for police, fire and medical officials via WR7ABY. (W7OIO)

AMATEUR RADIO EMERGENCY SERVICE REPORTS

11 Southwest Arizona — April 8-10, 1979. A tornado struck two small communities, destroying more than 120 homes. Hams handled 80 messages on 40 and 2 meters for the Red Cross and the general public. (WASVNV, ex-SEC Arizona)

11 Fort Chino, Quebec — May 23-26, 1979. Hams handled H&W messages on 40 meters after flooding left 400 people homeless. (VE2DEA, SEC Quebec)

11 Waco, Texas — July 13-15, 1979. Members of the "Texas Shootout" drag boat races. Hams manned 2 meter communication posts in the rescue boats, at the finish line and at the starting and staging areas. They also helped coordinate the rescue of a sightseer who fell more than 100 feet from a sheer cliff. (AF5HI, EC McLennan, Hill and Bosque Cos.)

11 Galveston Co., Texas — July 21-28, 1979. Local ARES/RACES members provided communications during a refinery fire and explosion. Later in the week, they provided extensive 2-meter communications when flood waters devastated the area. (WB5ASA, EC Galveston Co.)

11 Morgans Point, Ontario — August 24, 1979. Local hams participated in a drill based on a fire in a pleasure craft on Lake Erie. They provided communications via repeater VE3WCR between the lake, two airports and the hospital. (K6GMU/VE3, EC Port Colborne)

11 Longs Peak, Colorado — September 2, 1979. WB6IWK, WA7HGX and K01HS provided emergency communications via WR7ADD when a mountain climber fell more than 150 feet into a boulder field and received severe head injuries. The hams were able to direct the St. Anthony Flight for Life Helicopter to the victim, and the rescue was completed one hour and 15 minutes after the first call was made. (W0GUG, Asst. Dir., Rocky Mt. Div.)

11 Bonneau, South Carolina — September 20, 1979. When 63 cars of a 163-car freight train derailed and blocked an access road used by 6000 people, local hams used their 2-meter hand-helds to direct traffic through a temporary detour. (N4BCD, DEC Zone 8)

11 Southwestern Virginia — September 21-22, 1979. Heavy rains and flooding struck the area, and local RACES and ARES members provided communications for the Virginia Office of Emergency and Energy Services and local police departments. The communications were carried out on 2 meters through WA4YRI/R, WR4AFE, WR4AXO and W4CAZ/R and on the Virginia Emergency Net "R" on 75 meters. (N4NK, ASCM Virginia)

11 Lawrence, Kansas — October 2, 1979. An Amtrak passenger train derailed, killing two people and injuring 99. Local hams used WR0ACH and WR0GJH/R to provide communications at the accident site. The hams assisted the Red Cross, the EOC, the Lawrence Memorial Hospital and the local police department. (WD0CYX, EC Zone 4B)

11 Genesee Co., Michigan — October 8, 1979. Genesee Co. ARES members heard two men on 146.52 talking about breaking into a building. The hams contacted police and tried to get a fix on the location of the transmissions. Police later found that a service station had been broken into and the floor safe stolen. The hams told police all they had heard, and the evidence helped the authorities catch up with the thieves in December. (Genesee Co. ARES)

11 ARRL Section Emergency Coordinator Reports. For May, 35 SEC reports were received, denoting a total ARES membership of 17,970. Sections reporting were Ala, Alta, Ariz, Ark, Del, EBay, Ill, Ind, Iowa, Kans, La, Mar/Nfld, Mich, Mo, Mont, NFla, NTex, Ohio, Ont, Org, SV, SDgo, SJV, SBar, SCV, Sask, SFla, SNJ, Utah, Va, Wa, WVa, WMass, WNY, Wis.

NATIONAL WEATHER ASSOCIATION AWARDS

The National Weather Association has announced its Awards Program for 1980 and, as was the case last year, organizations and members of the Amateur Radio community may well qualify for recognition under two of the award's categories. They are:

1) The greatest contribution to meteorological operations by an organization that is not directly a part of the professional meteorological community. This category could include such things as clubs, ARES or RACES groups or nets that are providing services to the National Weather Service.

2) The greatest contribution to meteorological operations by an individual who is not a member of the professional meteorological community. This could be one key individual who was instrumental in establishing a net or ARES group, or it could be an amateur who has, in one instance or over a long period of time, provided key observations or communications support to a weather agency.

Narrative nominations, with comments or endorsements by a recognized appropriate authority, should be forwarded by September 30 to Mr. Edward J. Marec, Chairman, Awards Committee, 25 Hillcrest Dr., Pembroke, MA 02359 — Bruce Eggers, WA9NEW, 14 Judith Rd., Chelmsford, MA

COMMUNICATIONS SERVICE OF THE MONTH

On December 11, 1979, the 35-foot Choei Lee yacht *Gambit* was struck by a mammoth "rogue" wave while sailing in the South China Sea. The force of the wave smashed the porthole glass and broke the main boom. The crew of the yacht suddenly found themselves adrift and taking on water.

Gambit's captain, WH2ABD/mm, put out a distress call on 14.345 MHz and was heard by YB3KA and JAZAUL. Because the estimated position of the yacht was 100 miles southeast of Hong Kong, YB3KA called VS6CT and VS6AG for help. While VS6AG notified the Hong Kong Marine Department Search and Rescue Center, N4ACX/KH2 broke in to say that he had alerted Anderson Air Force Base on Guam.

VS6CT and VS6AG maintained contact with the yacht and helped coordinate the search, which eventually involved two Royal Hong Kong Auxiliary aircraft, a USAF Orion aircraft, two freighters and the U.S. Navy destroyer *Henry B. Wilson*.

While the search was going on, the wives of three of the yacht's crew members arrived at the shack of KG6RN and were able to communicate with their husbands.

After more than 18 hours of searching, the *Gambit* was located about 102 miles away from her original position. All four crew members were rescued. — VS6AG and VS6CT

REPEATER LOG

According to reports received between May 20 and June 20, the following repeaters and simplex frequencies were involved in the delineated public service events.

Weather Emergency	Criminal Activity	Medical Activity	Vehicular Emergency	Public Safety Events	Search and Rescue	Fire	Power Failures	Drift Alerts	Total
WA1YHL									1
WR2AAC									1
WR2APB									1
WB2NHO									1
W2VIL									1
K3JSZ									1
VE3RPT									1
VE3TOR									1
VE3TTY									1
WR4AIO									1
WR4ASY									1
WR4AXO									1
W4BBB									1
W4CUE									1
WA4LZH									1
W4SKH									1
WB4SLZ									1
WR5ABA									1
WR5ABI									1
WR5ABY									1
WR5AIB									1
WR5ANX									1
WR5ANY									1
WR5APK									1
WR5APN									1
WD5FEI									1

Weather Emergency	Criminal Activity	Medical Activity	Vehicular Emergency	Public Safety Events	Search and Rescue	Fire	Power Failures	Drift Alerts	Total
WR6ADX									1
WR6AEN									1
WR6ASH									1
WR6BJM									1
WR7AAT									1
WR7ACY									1
WR7AEL									1
WR7AIA									1
WR7ALH									1
WR7GWW									1
WR8ABO									1
WR8ACG									1
WR8ACV									1
WR8ADP									1
WR8AES									1
WR8AGE									1
WR8AGU									1
WR8AIL									1
WR8AJL									1
WR8AZO									1
WR8BJP									1
K8GJU									1
WD8IEL									1
WB8SEC									1
K8VJP									1
K8WYH									1
WR9AHJ									1
WB9DFD									1
WB9TCH									1
WB9TH									1
K9UXP									1
K9XA									1
WR0ABF									1
WR0ACD									1
WR0ACM									1
WR0ADD									1
WR0AED									1
WR0AEV									1
WR0AEZ									1
WR0AFI									1
N0AYA									1
W0AZR									1
W0FEE									1
WB0GJH									1
WB0SBH									1
W0UPS									1
Simplex									1
Total	16	3	4	45	4	4	17	5	26

NATIONAL TRAFFIC SYSTEM

Pursuant to due notice, the Eastern Area Staff of the ARRL National Traffic System met in Syracuse, New York, on May 3 and 4, 1980. Present were K2KIR, WB4PNY, N2YL, WA1VEI, W2MTA, W2RO, W4SHJ, WA4CKK, WD8KZX, VE1WF, VE3GOL, W4SQQ, W1QYY, KB6R/R and K1BA. Observers were W2FR, W2ZOJ, KB4N, WA2PUU and K1XA. Highlights of the meeting, courtesy of K2KIR, are as follows:

1) K3KW resigned as TCC Eastern (evening) Director and W4SQQ was recommended as his replacement. K4SCL was announced as being reelected as a member-at-large.

2) The Staff requested that SET weekend be moved to the third weekend of October because of the potential conflict with Canadian Thanksgiving. They also unanimously recommended that the 1980 SET be used to exercise the so-called Plan B level of activation of the inter-area NTS schedule; that is to say, SET participation at NTS (region, area and TCC) levels should encompass four cycles of operation on Saturday and again on Sunday of SET weekend. The Staff also requested that September QST include a feature article in preparation for the SET Plan B activation.

3) Within the Eastern Area, Cycles 1 and 2 of Plan B (corresponding to area nets at 11:30 A.M. and 2:30 P.M. local time) were defined as the responsibility of the day time managers and Cycles 3 and 4 (area nets at 5:30 P.M. and 8:30 P.M.) the responsibility of the evening managers. For purposes of clarification, here is a chart of the four cycles:

Cycle 1	Cycle 2	Cycle 3	Cycle 4
Area			
Nets at 1130 local	1430 local	1730 local	2030 local
Plan A consists of Cycles 2 and 4 — implementation of Plan A commenced June 1, 1980.			
Plan B (to be activated in times of overload) consists of all four cycles.			
4) The Staff recommended measurement criteria for evaluation of the revised schedule during the coming year: (a) rate; (b) % net sessions held and reported; (c) % liaison functions successful; (d) number of different stations participating at each NTS level; (e) total traffic cleared; (f) average traffic travel delay (E-W, W-E); (g) traffic listed, not cleared. EAS also			

6) After a discussion of the role of NTS in Canadian traffic-handling activities and a review of some of the concerns of Canadian traffic handlers, EAS recommended that a Central Canada region and a Pacific Canada region be created, analogous to the existing Eastern Canada region.

1 - CALL
2 - ORIG.
3 - RCVD.
4 - SENT
5 - DEL.
6 - TOTAL

QST

QRGEeeeeee? May 10 FMT Results

Aside from a few reports of "Russian Woodpeckers" and stateside QRM, the May 10 Frequency Measuring Test was classed as a "smooth run," with 91 participants submitting a total of 1273 measurements. The umpire measured the transmitted frequencies for the early run at 14,064.590, 7100.779 and 3544.450 kHz. The late run checked out at 14,098.923, 7039.079 and 3526.293 kHz.

Each FMT seems to bring one or two entries with numbers transposed when copied from worksheets. Be sure to double check your figures before mailing FMT reports, as all entries must be received before WIAW transmits

the official results (dates reported with FMT details in QST, "Contest Corral"), approximately 12 days after each FMT.

Seventy-six of the 91 that submitted entries measured within 100 Hz, a requirement for OO "precise frequency measurement." They are listed as follows, with average error preceding their calls: (0 Hz) W1JH K2RG WA4AXA WA4CAW W4JBU W5FMO W5LW K5JW W5ZTN W6CDF WB6LCI W7ANF Ex-7HM W8CUJ W8OK W9TJ K0BRS K0MOZ N0RK (1) W1PLJ K1VOH W3BFF K3LPP W3SV W4NTO W4RHZ N5BQK WA5NOM W6CBX

W6RQ W8ZM W8NWU (2) W1BGW W1UI W3WD W4HU W8UCI WA3OVC WD4APM (3) K1BWB W2ND WA3YTI N4NE K9WMP W0AP W0KL (4) WA3CFC K3TXG WB8STQ (8) K7AW (10) W0GW (13) W8HZA (15) W8LNU (16) K1OGF (17) W3FYK (18) W2AIQ (20) W4PKD (21) W8ZRL (24) W1IXO (25) WD4SLG (27) K5FSA WB9VUO (29) N2EY W4QN (31) W0ZAZ (34) VE3FCU (37) WA3RXX (40) W7SK (41) KH6CZ (43) W3GVR W6SSB (44) W3GQJ (47) W1QV (60) W0TIV (63) W6AEE (72) W4NM. All entries measuring over 100 Hz have been individually notified.

EXCERPTS

I was able to get a solid-state amplifier hooked up to my BC-221 frequency meter so that its output was sufficient to drive a digital counter. This proved to be a lot easier than trying to zero beat signals with the transmitter VFO (K2RG). As I am an OO, I make a point to participate in all FMTs. I also enjoy the challenge (K0MOZ). I wonder if we will have FMTs on the new bands (W1PLJ). [No news of it at this writing — Ed.] Equipment used: HRO-50 receiver for WIAW, Grundig table radio for WWV, homemade frequency standard, counter and VFO. You don't have to be rich to have fun! (K1VOH). FMTs are lots of fun! Keep up the good work (W3SV). Had a nice string of 108 consecutive FMTs (27 years) going until

the February run was interrupted by a hospital visit (W6RQ). [Glad to see that you were able to join us for the May FMT — Ed.] Equipment used was a Collins 511-3 receiver, 0-459/URT master oscillator, Tektronics RM-15 oscilloscope, and a homemade frequency counter with a homemade 5-MHz frequency standard somewhat similar to that described by Richard Silberstein, W0YBF (September 1974 QST). Measurement method is to obtain a 1-kHz beat note in the receiver between the unknown frequency and the master oscillator (receiver BFO off). This 1-kHz signal is run to the horizontal external input of the scope, and a 1-kHz signal from the counter time base is run to the vertical amplifier of the scope (through a 1-kHz filter). The master oscillator is adjusted for a steady Lissajou "circle" on the scope, and the master

oscillator frequency is read out on the frequency counter using the 1-Hz resolution range. Measurements are made above and below WIAW's signal, and 1 kHz is added or subtracted as appropriate. Readings are averaged to obtain final results (W3WD).

FEEDBACK

Our apologies for omitting W0USL and ex-7HM on the February FMT listing. They both averaged 0 Hz error.

September 14 (UTC) is the date for the next scheduled FMT. Full details may be found in the "Contest Corral" column of this issue. Good luck! — Jeannie DeMaw, W1CKK

Rules, September VHF QSO Party

If you think back to the last year of vhf contests you'll remember that each one was strikingly different. In last September's vhf contest, excellent tropo conditions produced big totals on 2 meters through 70 cm. January VHF SS conditions couldn't have been rated anything better than just plain average. Most recently, in the June vhf contest, 6 meters produced the fireworks.

So, on to September. Sure would be nice to see tropo, F2 and Es all on one weekend, but surely that's too much to ask. As you may have noted from the paragraph above, the hot spots change radically from one contest to the next, and from afternoon to evening, so you'll want to make sure you are prepared for more than one band if you want to catch the hottest action.

While you're thinking about it, now, send off that S.A.S.S. to ARRL hq. for the proper forms so you will really be ready when September 13 rolls around.

Rules

1) **Object:** To work as many amateur stations in as many different ARRL sections and countries as possible using authorized amateur frequencies above 50 MHz.

2) **Contest period:** Begins 1900 UTC Saturday, September 13, and ends at 0600 UTC, Monday, September 15. Operate no more than 28 out of the 35 hours. Off-time must be in increments of 30 minutes or more. Listening time counts as operating time.

3) Categories:

(A) Single Operator

(B) Multioperator. Multioperator stations must locate all equipment (including antennas) within a circle whose diameter does not exceed 300 meters (1000 feet).

4) **Exchange:** Name-of-section. Must be acknowledged by both operators for credit by either. A one-way exchange does not count.

5) Scoring:

(A) Score 1 point for 50 or 144 MHz QSOs; 2 points on 220 or 420 MHz; 3 points for higher uhf bands. Multiply the sum of these points by the total number of different ARRL sections plus different DXCC countries (not included in an ARRL section) worked *per band*. Note that KP4, KP2/KV4 and KG4 are in the West Indies section; KH6, KH2, etc. are in the Pacific section. Crossband QSOs do not count. Aeronautical mobile stations may not be counted for section multipliers.

(B) Stations may be worked once per band, regardless of mode. Example: W6XJ (San Diego) works A16V (San Joaquin Valley) on 50, 144 and 220 MHz. This gives W6XJ 4 points (1 + 1 + 2) and also three section multipliers. W6XJ may contact other SJV stations on these bands for contact points, but no additional section multipliers.

(C) Foreign stations may only work stations in ARRL sections, giving their country name in the exchange.

6) Fm restrictions

(A) Retransmitting either or both stations, or use of repeater frequencies, is not permitted.

(B) Only these recognized simplex frequencies may be used: 144.90 to 145.10; 146.49, .52, .55 and .58 and 147.42, .45, .48, .51, .54 and .57 MHz. This restriction prohibits use of all repeater frequencies, including 146.76 and .94.

(C) Use of the national calling frequencies 146.52 and 223.50 MHz is restricted to 4 hours total operating time on each frequency, in increments not to exceed one hour each (mark clearly in log). An off period of at least 15

minutes must follow each operating period.

7) Miscellaneous:

(A) Fixed, portable or mobile operation under one call from one ARRL section only is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOC); one operator may not give out contest QSOs using more than one call sign from any one location. The intent of this rule is to accommodate family members who must share a rig, not to manufacture artificial contacts.

(B) Only one signal per band (6, 2, 1-1/4 etc.) at any given time is permitted.

(C) While no minimum distance is specified for contacts, equipment should be capable of real communications (i.e., able to communicate over at least a mile).

(D) Multioperator stations may not include QSOs with their own operators except on frequencies higher than 2.3 GHz. Even then, a complete, different station must exist for each QSO made under these conditions.

8) **Reporting:** Entries must be postmarked no later than 30 days after the end of the contest. Use ARRL VHF QSO Party forms or a reasonable facsimile.

9) Awards:

(A) Top single operator station in each ARRL section.

(B) Top multioperator station in each section from which three or more entries are received or where exceptional effort has been displayed.

10) **Disqualifications:** See January 1980 QST, page 90

Contest Corral

A Roundup of Upcoming Operating Events



Conducted By Tom Frenaye, *K1KI

AUGUST

1-7

SWOT QSO Party, July QST, page 78.

2-3

ARRL UHF Contest, July QST, page 72.

VO DX Contest, July QST, page 78.

Illinois QSO Party, July QST, page 78.

6

West Coast Qualifying Run, (W6OWP prime, W6ZRI alternate), 10-35 wpm at 0400Z August 7 (9 P.M. PDT August 6). Frequencies are approximately 3590/7090 kHz. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send to ARRL for grading. Please enclose your full name, call (if any) and complete mailing address. A large self-addressed envelope will help expedite your award/endorsements.

9-10

European DX Contest (WAEDC), cw July QST, page 78.

14

WIAW Qualifying Run, 10-35 wpm at 0200Z August 15 (10 P.M. EDT August 14). Transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 147.555 MHz. The complete WIAW schedule appears on page 97 of April QST, and is also available for an s.a.s.c. to ARRL. Other details are the same as for the August 6 listing.

16-17

SARTG WW RTTY Contest (No rules received for this year's contest; assume the same as for last year.) Sponsored by the Scandinavian Amateur Radio Teleprinter Group. Three eight-hour periods: 0100Z 0800Z and 1600Z-2400Z on August 16 and 0800Z-1600Z August 17, 80-10 meters. Single op or multiop, single transmitter. Exchange signal report and serial number. Count five points for QSOs with your own country, 10 for different country, same continent, and 15 points for different continent. U.S., Canadian and Australian call districts considered different countries. Same station may be worked on each band. WAVE/VK call areas plus DXCC countries count as multipliers. Score equals QSO points times sum of multipliers per band. Logs must contain band, date time (UTC), call sign, exchanges sent and received, points and multipliers. Use separate log for each band. Multiplier stations must list all operators with call signs. Logs should be received no later than October 10, 1980 by C. J. Jensen, OZCCJ, Meisnersgade 5, 8900 Randers, Denmark.

New Jersey QSO Party, sponsored by Englewood Amateur Radio Association, from 2000Z August 16 until 0700Z August 17, and from 1300Z August 17 until 0200Z August 18. Phone and cw. Suggested frequencies — Phone: 1810 3900 7235 14,280 21,355 28,610 vhf; cw: 1810 3535 7035 14,035 21,100 28,100; Novice: 7135 21,105 28,105. Exchange serial number, signal report and ARRL section or country (counties for NJ stations). NJ stations count one point per WAVE QSO, three points for DX. Multiply QSO points by number of ARRL sections worked (including NNJ SNJ). Stations not in NJ multiply NJ QSOs by NJ counties (max. 21) for final score. Mail entries so they are received by September 13 (with a large s.a.s.c. for results) to Englewood ARA, Box 528, Englewood, NJ 07631.

Rhode Island QSO Party, sponsored by East Bay Amateur Wireless Association, from 1700Z August 16 until 0500Z August 17, and 1300Z August 17 until 0100Z August 18. Exchange signal report and state/province/country (RI stations send county). EBAWA members will also send MBR. RI stations score two points per QSO (except five points per QSO for RI Novice and Technicians). Others score two points per RI QSO and five points for RI Novice and Technician QSOs (signing 'N' or 'T'). RI stations multiply QSO points by sum of RI counties, states, provinces and countries worked. Others multiply by

RI counties worked (max. 5). All stations add five points per QSO with EBAWA members. Suggested frequencies — Phone: 3900 7260 14,300 21,360 28,600 50,110 14,200 fm simplex; cw: 1810 and 50 kHz from lower edge; Novice: 3710 7110 21,110 28,110. Club aggregate scores also earn awards (min. three entries). Mail by September 15 (s.a.s.c. for results) to EBAWA, Box 392, Warren, RI 02885.

23-24

All Asia Contest, cw, June QST, page 81.

24

WIAW Qualifying Run, 10-35 wpm at 2000Z (4 P.M. EDT). See August 14 listing for more details.

30-31

Four-Land QSO Party, sponsored by the Brightleaf ARC, from 1800Z August 30 until 0600Z August 31, and 1300Z August 31 until 0100Z September 1. Exchange signal report and state/province/country (fourth call area stations send state and county). Suggested frequencies — Phone: 3940 7260 14,340 21,360 28,600; cw: 3575 7055 14,070 21,070 28,090; Novice: 10 kHz from lower end of Novice bands. Fourth call area stations multiply QSOs by sum of states/provinces/countries. Others count two points per QSO; multiply by sum of fourth call area counties plus states worked. Send s.a.s.c. for results. Mail entry by October 1 to Bob Knapp, W4OMW, 105 Dupont Circle, Greenville, NC 27834.

SEPTEMBER

1

Amateur RTTY Art Contest, sponsored by the Southern Counties Amateur Teleprinter Society, from September 1 through November 30, 1980. Entries must have been originated by means of manual input to a teleprinter using a standard communications keyboard, and may be submitted by the originator of the art or by the amateur on behalf of a family member. Submitted art may be of any subject suitable for transmission by Amateur Radio. Submit as many entries as desired. Each entry should have a short title. Art may contain overline shading. Tapes of entries shall be formatted to permit a reasonably short running time, and be compatible with machines which do and do not downshift on space. Compatibility with machines which interchange bell and apostrophe is not required. At least three functions must be used between each line: CAR RET, LF, LTRS. Maximum of 72 characters per line (including space). Tapes limited to a maximum running time of 40 minutes at 60 wpm for the art itself. Prints must be in one single part — no splices. Each entry must have been transmitted for the first time via Amateur Radio after September 1, 1979, and must be accompanied by a confirmation (QSL card or letter) of at least one receipt of its transmission, identifying the title of the art and the call letters of both stations. The tape and prints of each entry shall carry the full name of the author, call letters of the submitting station, and mailing address. This should be on the beginning leader of the tape and punched in the tape to appear on page copy when reproduced. Entrants must submit one five-level paper tape and five prints of each entry and by such submission agree that the tapes and prints may be used, duplicated and published for any purpose. Entries will be judged on the originality of the author in selection and subject matter, on excellence in producing the art and formatting the tape, on overall appearance of the art when viewed from a distance, on suitability for publication and on compliance with contest rules. Awards, Mail entries no later than November 30 to RTTY Art Contest, Norm Koch, K6ZDL, Box 1351, Torrance, CA 90505.

3

West Coast Qualifying Run, 10-35 wpm at 0400Z September 4 (9 P.M. PDT September 3). See August 6 listing for more details.

6-7

LZ DX Contest, sponsored by Bulgarian Federation of Radio Amateurs, 24-hour period September 7, cw only. Single-operator all band and single band, and

multioperator/club station categories. Exchange signal report and ITU zone. Avoid lower 10 kHz of each band, except only lower 5 kHz on 7 MHz. Count six points per LZ QSO, three points for QSOs on other continents and one point for QSOs on your own continent. Multiply total QSO points by sum of ITU zones worked per band for final score. Separate logs for each band. Mail by October 7 to B-F-R-A Contests, Box 830, Sofia 1000, Bulgaria.

Frankford Radio Club 50th Anniversary QSO Party, 48-hour period. FRC members send signal report, FRC and number of years FRC membership. Others send signal report and serial number. Suggested frequencies — Phone: 3850 7250 14,280 21,360 28,600; cw: up 40 kHz from lower edge. Certificates to DX stations with 15 QSOs, WAVE with 25 QSOs and FRC members with 50 QSOs. Plaques to stations in each category making largest number of QSOs. Send logs to Jack Heisey, K2FL, 616 Chestnut St., Palmyra, NJ 08065.

8

WIAW Qualifying Run, 10-35 wpm at 0200Z September 9 (10 P.M. EDT September 8). See August 14 listing for more details.

10-12

YL Howdy Days, sponsored by the YLRL from 1800Z September 10 until 1800Z September 12. YL/YLT operators work YL/YLTs only. Exchange status (member or nonmember). Work each station once only, regardless of band or mode. Score two points for QSOs with YLRL members, one point for nonmembers. Log must show whether member or nonmember and be signed. Mail entry by October 13 to Jane O'Donnell, WA2DMK, Newcomb, NY 12852.

13

ARRL Frequency Measuring Test, begins with a call-up at 0200 and 0500Z September 14 (10 P.M. EDT September 13 and 1 A.M. EDT September 14). WIAW transmitters will be on the air simultaneously on 20, 40 and 80 meters for the duration of the test but, to correlate your readings with those of the umpire, measurements should be made during the specified periods. Approximate frequencies and measuring periods for the early run are 14,075 kHz between 0207 and 0212Z, 7010 kHz between 0215 and 0220Z, and 3550 kHz between 0223 and 0228Z. For the late run, 14,050 kHz between 0507 and 0512Z, 7015 kHz between 0515 and 0520Z, and 3560 kHz between 0523 and 0528Z. Submit your averages for each period to be compared with the umpire, a professional frequency-measuring laboratory. Indicate how many readings you took to form your average. Your report must be received at ARRL hq. by September 24. WIAW will transmit official results in an ARRL bulletin beginning September 26.

13-14

European DX Contest (WAEDC), phone, July QST, page 78.

10 Meter Portable Contest, sponsored by the Associazione Radioamatori Italiani. From 1200Z September 13 until 1600Z September 14, with a required four consecutive hour time-off period. Phone and cw. Use 28.0 to 28.2 and 28.5 to 28.7 MHz only. Fixed and portable classes. Portable stations must sign portable and must use other than the normal QTH and antennas. Exchange signal report, serial number and ITU zone. Enter mixed mode, phone only or cw only. Each station may be contacted only once. Score two points per QSO in the same country, five points different country, same continent, and 10 points different continent. Multiply QSO points by number of ITU zones worked for total score. Logs must include time (UTC), call sign, complete exchange, points, your input power. Separate cw and ssb logs. Awards, Mail by December 31, 1980, to Sanremo A.R.I. Section, P.O. Box 114, 18038 Sanremo, Italy. Enclose at least one IRC for results.

CAN-AM Contest, phone, sponsored by the Ontario Contest Club and Canadian DX Association, from 1800Z September 13 until 1800Z September 14. (Cw: September 27.) Three classes: single operator, multioperator single transmitter (includes single-operator club stations, and single operator other than the licensee) and club competition. QRP category on a

trial basis. Exchange signal report, serial number and multiplier abbreviation. W/K stations use two-letter postal abbreviations (CA, CT, CO, etc.), U.S. Caribbean possessions use CN, U.S. Pacific possessions use PC, Canadians use NF (VO1, VO2), NB, NS, PE (Prince Edward Island), SI (Sable and St. Paul Islands), PO, ON, MB, SK, AT, BC, NW, YU. Count three points per W/VE QSO and two points for W/W and VE/VE QSOs. Multiplier is 50 states, two possessions, 10 Canadian provinces, two territories, one island (65 possible per band). Stations outside of their call area must sign /KH6 or /3 or whatever is appropriate. Final score is QSO points times sum of multipliers per band. Phone and cw sections of the contest are separate but overall cw plus phone scores will be used for overall competition. Trophies, plaques and awards. For club competition the club secretary must submit a list of those eligible and their scores. Logs must show time in UTC. Do not use separate logs for each band. Mail entries by October 15 (October 29 for cw) to: Yuri Blagovitch, VE3BMV, Box 292, Don Mills, ON, Canada M3C 2S2.

Pennsylvania QSO Party, sponsored by the Nittany ARC, from 1700Z September 13 until 0400Z September 14 and 1300Z-2200Z September 14. Exchange signal report, serial number and ARRL section (county for PA stations). Suggested frequencies — Phone: 3980 7280 14,280 21,380 28,580; cw: up 50 kHz from lower edge. Count one point for ssb QSOs, 1.5 points for cw QSOs and two points for 80-meter cw QSOs. PA stations multiply QSO points by sum of ARRL sections plus PA counties. Others multiply by PA counties worked. PA mobiles calculate score for each county and add together for final score. PA club competition. S.a.s.c. for results. Mail by October 15 to Douglas Maddox, W3HDH, 1187 S. Garner St., State College, PA 16801.

Washington State QSO Party, sponsored by the Boeing Employees ARS, from 0100-0700Z September 13, 1300Z September 13 until 0700Z September 14, and 1300Z September 14 until 0100Z September 15. Exchange signal report, serial number and state/province/country (county for WA stations). WA stations score two points for phone, three points for cw QSOs (including other WA stations) and multiply by sum of states/provinces/countries worked for final score. Others score two points for phone and three points for cw QSOs with WA stations, multiply by WA counties worked. Add one multiplier for each eight stations worked in the same county. Suggested frequencies — Phone: 1815 3925 7260 14,280 21,380 28,580; cw: 1805 and up 60 kHz from lower edge. Novice: 3725 7125 21,150 28,160. Mail entry by October 15 to BEARS Contest Committee, c/o Willis Propst, K7RS, 18415 38th Ave., South, Seattle, WA 98188.

20-21

Scandinavian Activity Contest, cw
Maryland-District of Columbia QSO Party

23

WIAW Qualifying Run

27-28

Scandinavian Activity Contest, phone
AGCW QRP Contest
CAN-AM Contest, cw
Delta QSO Party
Classic Radio Exchange

OCTOBER

4-5

VK/ZL/Oceania Contest, phone
California QSO Party

11-12

ARRL CD Party
VK/ZL/Oceania Contest, cw
RSGB 21/28 MHz Contest

15-16

YL Anniversary Party

18-19

QRP International QSO Party
Janiboree on the Air (BSA)
Y2 (GDR) Contest
RSGB 21 MHz Contest
ARRL Simulated Emergency Test

25-26

CQ WW DX Contest, phone

The Biggest Birdbath in Illinois

The number one question, after we'd decided to go AMSAT/OSCAR hunting, was where to locate the equipment. Marc Erickson, WB9SXM, very generously offered to allow me to keep the gear at my shack. "Your neighborhood is all ranch houses and we'll have a better shot toward the horizon," he pointed out.

The number two question was how to get my XYL, Ann, to accept the idea. A few more bits of equipment presented no problem. But the antenna — that was a problem!

Marc and I had decided that an 8-foot dish was the minimum that would do the job for us. Twelve feet would be better. Now an 8- or 12-foot parabolic reflector is not an inconspicuous object in the center of a backyard garden. I had a suspicion that my wife would look at a big dish in her garden as a bother.

The Situation Called For Strategy

Sitting in the living room with Ann one evening, I was looking through *Audubon Magazine* when I saw an item that gave me an idea. "Gosh, this is interesting. It says here that birds in the suburbs need water even more than food. They can always scrounge something to eat, but there's often no water for them," I misquoted. "Now, a *real* birdbath would attract every bird in the county." I figured that this would do the trick, as we're both birdwatchers.

She bit and was soon urging me to find a good-sized birdbath. The spring migration was not far off.

Good News

I was on 220 MHz to Marc while Ann was still telling me how important water is for birds. We were discussing ways of making a parabola when one of the locals broke in. "Why are you guys wasting your time?" he asked. "The Super Giga Company, over in Glenview, is selling dishes that don't quite meet specifications. Cheap."

When we saw the "Super Giga" dish, we knew immediately that this was what we wanted. The sales manager graciously agreed to hold it until we could make arrangements to ship it to my place. A rather large check changed hands.

The next couple of weeks saw us wiring, testing, rewiring and retesting. One day I lugged some concrete blocks into the garden. "For our new birdbath," Marc and I planned to set up the dish on a Saturday when I knew that Ann would be shopping downtown.

We finally had the monster in place, and somehow the backyard had shrunk to half its size, or so it seemed. We were just snaking the coax and control cables through a basement window when Ann arrived, loaded with packages. She dropped them all.

That's No Birdbath — Or Is It?

Marc disappeared, leaving me to face the static. When Ann simmered down to simple violent anger, she became coherent. She may not be licensed, but she's not stupid. (She had gotten the picture immediately.) She made

three basic points: (1) This was obviously some kind of radio gear; (2) it looked terrible and (3) it was a cheap trick on my part. She would have continued, but it started to rain and we had to pick up her packages and go indoors.

I had left the dish horizontal, which the Super Giga man had suggested as the preferred position when not in use. While Ann was reading the riot act — several riot acts — it stopped raining. Suddenly we heard a racket from the backyard which, when translated into meaningful sound, became the voices of dozens of birds.

We looked out the window. A sparrow was perched on the horn at the focus of the parabola. More birds were on the rim of the dish and birds were flying in and out of the bowl, splashing and chirping like a badly designed double-conversion superhet. "See," I said weakly, "a birdbath."

Peace was restored — or at least an armed truce. Ann had me on the ropes, and knew it. I walked quietly, kept issues of *QST* concealed in the *Wall Street Journal* and wore headphones when I operated.

Marc and I were constantly on the 220 repeater as we made final checks for our assault on AMSAT/OSCAR. It looked as though we were ready. Marc had his computer working out antenna angles to catch the satellite passes. One day he said, "I think that you can make it in about 20 minutes. Here are the azimuth and elevation settings. I'll be right over."

What Kind of Bird Is That?

I switched off the radio and warmed up the satellite gear. I was about to swing the dish into position when my wife appeared at the head of the basement stairs, binoculars in hand, very excited. "Julian, come up right away! I think there's a Bachman's warbler on the birdbath! I want you to verify the identification!"

"Bachmans don't come this far north," I told her. "But AMSAT/OSCAR will be ready for access in 15 minutes. I have to get the dish pointed . . ."

"I know they don't. That's why it's such a rarity. Come up and look — what are you doing with that switch?"

"The birdbath — the antenna — has to be pointed at the spot where the satellite will . . ."

"You move that birdbath and scare that bird away and it's the end of our marriage!" Her voice had gone up about 40 dB and 3000 hertz. "Come up and identify that warbler."

I recognized an ultimatum when I heard one. I may be a licensed amateur, but I'm not stupid. I went.

Now, during bird migrations, we have the biggest birdbath in Illinois — maybe in the world. — Julian N. Jablin, W9JW1, Skokie, Illinois

[Editor's Note: Our thanks to Julian and Marc for finding another reason for sticking with small Yagis. They're all you'll really need for effective satellite communicating — except, humm, 28 warblers perched on a 14-element, 70-cm beam . . .]

Section Activities

A-1 OPR X EC X DXCC X RCC X WAS X STM X OES X OTS X NM
SCM X ARES X OVS X SEC X OBS X TCC X OD X NTS X WAC X CP X

CANADIAN DIVISION

ALBERTA: SCM, S. T. Jones, VE6MJ — SEC and Asst SCM: E. Roy Ellis, VE6XK. Net Mgr (APSN) VE6AFO Net Mgr (ATN) VE6BBL. VE6ABC has taken the reins as asst net mgr for ATN due to absence of VE6BBL. VE6HO busy handling emergency traffic due to the mountain crisis. CARA and NARC gearing up for Field Day. To further the Government's favorable impression of the hams, as a result of the Provincial radio tests in March, an extensive up-dating and reorganizing of all emergency systems is underway. See your EC or SEC if you are interested in assisting. ATN (cwi) 31 sess, 162 QNI, 16 QTC. Traffic: VE6CHK 139, VE6HO 77, VE6ABC 27, VE6QNI 15, VE6XK 8, VE6VS 7, VE6SA 5, VE6EO 4, VE6MJ 4, VE6WN 2, VE6AAT 2.

BRITISH COLUMBIA: SCM, H.E. Savage, VE7FB — British Columbia Emergency Net, 3650 at 0300Z has found that the energy conservation of 10-15 wpm is increasing the check-ins. Nanaimo Emergency Net at 0230Z Fridays. The nets are all showing healthy check-ins but no traffic seems to be the failure on both nets. Even lack of traffic in the VE7 area from National Traffic System. Quoted from form on "Dullest ham activity in fifty years operating." Traffic: VE7ZK 86, VE7COA 44, VE7FB 23, VE7BLO 12.

MANITOBA: SCM, Peter Guenther, VE4PG — A/SCM: VE4TPJ. SEC: VE4TR. STM: VE4RO. NMs: VE4E, VE4EJ, NM VJ, VE4MG, our OBS, is awaiting repairs, but should be back shortly. With all the fires up north, it's nice to have a strong standby station near the Pas and Flin Flon areas. VE4DS sure timed it right and hope he enjoys his annual stay up north. VE4AI has moved to the west coast, and will be missed. All nets show signs of summer and the QNI is way down and normal for this time of year. MMN QNI 375, QTC 30, 31 sess; MEPPN QNI 767, QTC 22, 31 sess; WRIN reports an average of 15 per sess and no traffic in 4 sess; MTN QNI 123, QTC 29, 31 sess; VE4LB 17, VE4JE 11, VE4JA 9, VE4IX 6, VE4AA 3, VE4FK 3, VE4AD 2, VE4EE 2, VE4PD 2, VE4GB 2, VE4NM 1.

MARITIME — NLFD: SCM, D. R. Welling, VE1WF — A/SCM: VE1OFG. STM/NM: Open 0101Z. SEC: VE1ASW. Silent Key VE1BNN: hospital VE1BHW VE1BNT. New ex. ex. NBARA: VE1BTR. pres.: VE1UN, vice pres.: VE1S, S.J. BKJ BMR AU VW CB, ex. comm. VE1WF attended EAS meeting in Syracuse, NY. VE1OC attended Antique Wireless meeting in CT. Several from this section attended Dayton Hamfest. VE1SH submitted resignation as President of CHRL. LCARC held their annual dinner. VE1BMN & VE1BPM new members APN. VE1EJ reactivated. Preparations for FD well along. MAARC finalizing plans for Lobster Rally. APN 31 sess, QNI 185, QTC 3096, QTR 564 MINS. Traffic: VE1WF 232, VE1CGR/HO 90, VE1BMN 70, VE1EJ 27, VE1BXA 23, VE1OC 9, VE1KR 6, VE1YO 4, VE1ASW 2.

ONTARIO: SCM, Larry Thivierge, VE3GT — A/SCM: VE3BGM. STM: VE3GOL. By the way, you read this column, many will already have learned of the sudden passing of our very popular and capable SEC, VE3APK, who was recently awarded a citation at the annual banquet of the Canadian Red Cross. Our sincere sympathies to his XYL and family. In keeping up with the revamped of the NTS, the Ont. Southern Net (ONS) has implemented a daily sess, on 7045 kHz at 2000Z with VE3KK as Net Manager. VE3HTL new OTS appointee. A large group of amateurs, spouses and guests gathered in Port Credit to honour IARU President Noel Eaton, VE3CJ, at a special appreciation dinner. VE3ITM replacing Oakville ARC secy. VE3BMC, who has been transferred. Northtown ARC executive for 1990/91 season is: VE3BHP, pres.: VE3IMI, vice pres.: VE3FDX, recy: HGM and VEDJP, corr. secy.: VE3FIS, treas. VE3ID has moved to VE7. Land. As soon as he receives his xtals for his unit, VEOMDM on the MV Tarantula will be on the air again. A new net called the Nickel Basin Net (NBN) and managed by VE3IGU has been activated in the Sudbury area on 2 meters at 1830 local. VP2MF gave the KWARC a slide presentation and talk about life on the island of Monsarrat. New calls include VE3LS LFI LFM LFK and LFG from the Windsor ARC and VE3s MKZ MKC and MCN from the Toronto area. VE3KOI leaving the "Sooi" for London. VE3GFN bitten by the sailing bug. SET dates have yet to be finalized as of this date. Nipissing FM Inc. now able to print photographs in their monthly newsletter. Upgrades to Advanced include VE3R, recy: HGM and VEDJP. VE3KK has been awarded with an A-1 Operator's Club certificate — what's next? Peterboro ARC members VE3s IRK IQM FOP and KOH provided communications for the recently held annual White Water Kayak races at Lakeside. Traffic: (May) VE3CWA 703, VE3GOL 504, VE3JUR 113, VE3DPO 180, VE3HTL 164, VE3JLL 160, VE3CYH 126, VE3GT 113, VE3KK 107, VE3SB 78, VE3BVG 58, VE3ISW 58, VE3GFN 51, VE3IFP 45, VE3DVE 34, VE3DUK 33, VE3FGU 32, VE3APK 27, VE3ABG 23, VE3JPP 22, VE3AWE 20, VE3EWD 19, VE3ANJ 17, VE3GNW 17, VE3FPI 14, VE3KXB 14, VE3AIZ 12, VE3KXB 6, (Apr.) VE3FVG 29, VE3AYZ 13.

QUEBEC: SCM, Harold Moreau, VE2BP — SEC: VE2DEA. STM: VE2FFE. AJ1AVE2 will be active in J-Land during August as JH3QL. VE2BZL very active on LCN, more stations are needed. See your SCM. RAQI annual convention to be on August 22-24 at Tadoussac, Que. Check on the Quebec phone net, VE2AGQ, for details. VE2ZG est le nouveau president du club de Radio Amateur de la Mauricie. VE2EAK a Maintien son certificat "AMATEUR" Traffic: VE2EC 91, VE2FFE 32, VE2FE 30, VE2EKG 29, VE2BZL 15, AJ1AVE2 8, VE2FWE 8.

SASKATCHEWAN: SCM, Norm Waltho, VE5AE — STM: VE5XG. SEC: VE5WM. NMs: VE5HG. VE5DC. VE5SF. VE5WM. SATN, 351 QNI, 28 QTC; SPN, 850 QNI, 8 QTC; SKTN 2-M, 212 QNI; RARA, 378 QNI, 2 QTC; PWXN 510 QNI. The Rock Point repeater has a new call, VE5XW in memory of the late Ian Wallace. VE5FA has a new rig. VE5XZ will have a new F17B and XYL soon. The Regina ARC provided communications for the Tom Drope Open

Tennis tourney on May 17, 18 and also provided communications for the annual Beaver Days held at Wassana Trails. No rain yet at this QTH and I still don't know where my ground is! The Southwest ARC held a picnic on June 15, an annual affair. Traffic: VE5HG 29, VE5AE 26, VE5AAT 16, VE5WM 15, VE5NJ 7, VE5ACN 4, VE5UX 2, VE5XS 2, VE5HE 1, VE5TT 1, VE5MP 1.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DCQ — SEC: W3PO. STM: W3QO, W3A3WJ, PSHR: K3JL 90, N3AKC 85, W3A3WJ 85, W3DKC 62. KA3AWO is a new General. Congrats to W3BFC and his new bride, DARC SPARKS, submitted by W3LZN, is the new title of DARC's newsletter and KA3CZK and W3BLBM combined artistic talents to produce a complete heading for AE3H, club editor, Mark Aug. 17th for the Delmarva Hamfest. Phone K3BHP at 999-1454 if you can help. W3BLBM is awaiting his Advanced call. W3PO is recovering from his eye injury. DEPNI QNI 61, QTC 9, DTN QNI 293, QTC 50. Traffic: (May) W3PO 170, N3AKC 152, K3JL 87, W3QO 82, W3DKX 59, W3A3WJ 39, W3BDUG 36, W3WD 21, KA3DPR 5, (Apr.) W3PO 116, (Mar.) W3PO 236.

EASTERN PENNSYLVANIA: SCM, N.W. Pfeil, W3VA — SEC: W3A3PO. STM: W3BJVZ. NMs: AA3B AG3R AJ3R WA3WNP. Net reports: EPA QNI 638, QTC 384 in 59 sess; EPAEPTN QNI 437, QTC 216, in 31 sess; PFCN QTC 293, QTC 297, in 27 sess; PTNN QNI 285, QTC 117, in 31 sess; ATN21 QNI 96, QTC 14, in 9 sess; LVN QNI 17, QTC 12, in 5 sess; LVN21 QNI 25, QTC 1, in 4 sess. OBS reports: K3EBZ W3BCAI W3BJVZ W3AVJ W3ID 00 reports: W3KEK W3FAF W3KGM. OVS reports: KA3DZD W3COA W3BJVZ W3BJVZ. BPL AJ3R KB6FR3 W3A3TO W3A3WJ W3A3JF. PSHR reports: W3A3WNP W3DOP W3BFEJ K3JZS W3BCAI W3BFEJ W3A3WJ W3BUR W3BJVZ W3A3CFJ W3B3GZJ N3AIU AA3B. New Amateur Radio Study Group on 7245 kHz 7:30 P.M. local time Mon thru Fri. Contact W3BCAI for info. KB3CH had a FR time operating KB3CH/ON4 in Kessel-Lo, Belgium. W3BJUK (QSL Mgr for FR8DD) now Extra and waiting for 1X2 call. KA3BOD received 30 wpm code proficiency sticker. W3HK reports 2-mtr and credit cards stolen from his car. W3BCAI now QSL Mgr for EA8RL. New gear: W3BFKQ a FT901DM; W3EEK a TR4200; N3AIU a kever. MURGAS Club holding outdoor meetings during summer months. N3BEJ likes to work those Bikethons. Notice and Tech on interested in traffic look for LVN on 3740 kHz at 4:30 P.M. local time on Sat. For more info contact N3AIU. W3A3HE gave an interesting talk on Army MARS at Carbon ARC meeting. W3BUR celebrating 50 years in ham radio. W3EU secy ORN washes out 160 at times. W3A3TO going QRT for the summer months. New calls: KA3BQU now N3BFP; KA3CHP now N3BFW; KA3ECE now N3BHF. W3A3WNP reports PFN banquet a great success with EPA SEC and STM in attendance and W3A3CFJ and W3BHM received net certificates. AJ3R and W3BJVZ finished another year at school. W3A3CFJ makes BPL for first time. W3ID reports grass cutting and garden slowing down antenna work. K3AKN reports a successful mock disaster drill in Thompsonstown with 7 mobiles and 1 base in action. KB6FR3 sends traffic reports to VE3L and SARA provided communications for Motorcycle Enduro at Port Clinton and Run for Your Life at Pottsville. Don't forget big EPA Section basket picnic at Tuscorora State Park 5 miles north of Tamaqua, Sat August 30. All hams and their families are invited. Traffic: (May) W3A3WJ 1334, KB6FR3 540, AJ3R 531, W3A3TO 454, W3A3CFJ 291, AA3B 188, W3DP 151, W3BI 136, W3FAF 125, W3BFEH 120, W3JPF 119, W3BJVZ 113, W3VA 105, W3B3GZV 101, N3BEJ 81, K3NGN 81, W3BCAI 59, N3AIU 46, W3A3OFP 31, KA3CHG 28, W3B3GUR 27, W3AVIL 20, W3BCUF 17, K3JZS 17, AF3E 16, W3ADE 13, W3GL 11, KA3ECE 10, W3ID 10, W3B 8, K3EBZ 7, W3HK 7, AD3X 7, W3BUR 6, K3NB 6, W3B3GZ 4, W3A3VJ 3, N3CJ 3, (Apr) W3FAF 195.

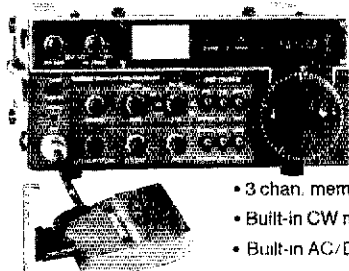
MARYLAND DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — W3CUE is still sending 20-50 wpm code practice. Congrats to N3AIP new Advanced and to W3ACPL new General. W3BKDG new codes under AK3X, he says the new call and 40 meters takes some getting used to. K3HPG sports a new 2-mtr rig. W3CQD takes the summer off with no skeds. K3NTM has a new station wagon for the expanding brood. W3DOI and the XYL celebrate their 16th. Congrats. KA3DBN is the new PRA of Bowie W3FZT has a nice report on the Washington County Net. N3AFM keeps an ear out and a finger in 6-meter activity. KB3AP with BARC news: they provided communications in the March of Dimes. Provided communications at U of MD Hospital while installing a new telephone system. This is the 4th time they have done this for an area hospital. K3HZU was coordinator. And they got to N3AIP new Advanced and to W3ACPL new General. W3BKDG new codes under AK3X, he says the new call and 40 meters takes some getting used to. 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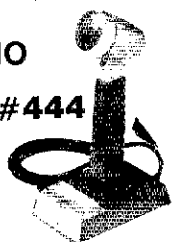


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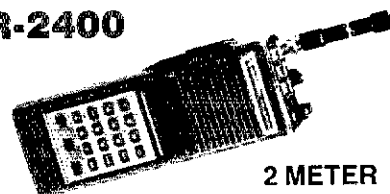
TS-180S/DFC



TS-120S

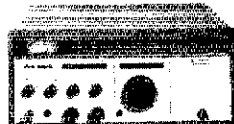


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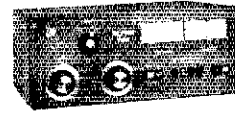
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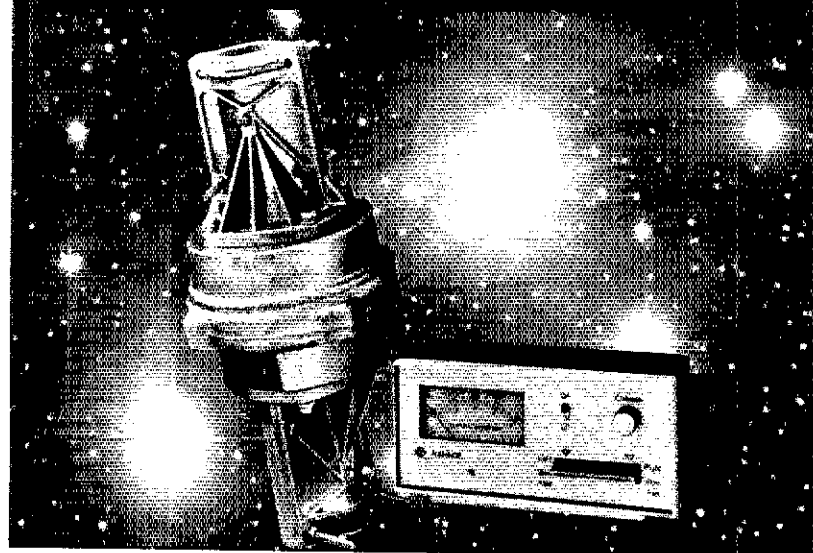


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and recuperation in Arizona. WD9JUZ has a new 6-meter beam trying to WAS 50 MHz. WD9JDS is a proud new father of a baby girl. John Hunton, Treasurer of the American Radio Relay League, Inc. spoke at the May 30th meeting of the Sagamon Valley Radio in Springfield. KA9HXP and KA9HJO have upgraded and are graduates of the Lamoine Emergency Amateur Radio Club. New appointees this month include: WA9VLK as OBS and N9BAP as OBS and OBS. N9ALC received her DXCC certificate. Her OM, W9LMQ, will not get his rig back. KA9ACU KA9ACV WB9OGH and WB9UBN have received their Advanced tickets. N9AMF has a new Yaesu FT 901DM and his XYL is using a new Kenwood TS 120S. The JARS (Joliet Amateur Radio Society) will celebrate their 40th anniversary this year. WHOT reports that the 9RN Daytime Net passed 311 messages during 64 sss and that Illinois participation was 100 percent with W9LJL W9YCE W9NKG WD9FDB WB9WGD W9TLU W9CFF WD9EVV and K9BVE checking in. The CENOS ARC participated on the annual Memorial Boat Races and devoted their time and equipment to help make it a success. WB9ROZ and N9AJB are now Advanced. The McHenry County Wireless Assn reports that their code and theory classes graduated KA9LJW and KA9FRX as Generals, KA9ADJ WB9YKZ WD9HEP as Advanced and WB9GSB WD9IRR KA9ATP KA9Y advancing to Extras and awaiting new calls. Hamsters will host their annual hamfest Sunday, August 10th at Santa Fe park in Willow Springs. The CAND had a traffic total of 716 messages during 62 sss and Illinois stations active were WB9FLZ W9NKG WB9WGD W9HOT WD9FDB and W9LJL. KA9QJ spoke at the May Chicago Suburban Radio Assn meeting. The Illinois State ARRL Convention will be held at Peconica sponsored by the Rockford Amateur Assn for the third consecutive year, on Sunday August 31st. Traffic (May) W9LJL 365, W9HOT 296, K9BVE 284, K9PNG 210, WB9PUK 206, WB9JSR 132, K9SW 105, WB9WGD 98, W9OK 93, N9TN 90, WD9FDB 76, W9YCE 66, KA9ALR 64, W9LNO 61, W9TLU 60, KN9BAM 52, K9EEA 50, W9KR 39, W9PRN 22, K9UN 22, W9OK 20, WD9HZF 9, W4IZI 8, (Apr.) WB9PUK 144, KA9ALR 100, K9SW 29.

INDIANA: SCM, Bruce Woodward, W9UMH — SEC: W9UMH. STM: W9LJL. NMs: ITN W9QY QIN WD9GXW ICN N9AEI VHF W9PMT. May net reports, all nets meet daily except IPON.

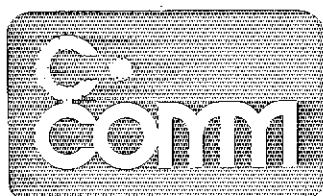
Net	Freq	Time	QNI	QTC	Sess.
ITN	3910	1330/2300	2042	211	67
QIN	3655	1430/0100/0400	866	392	91
ICN	3708	0015	92	26	29
IPN	3910	2130	1135	138	31
IPON	3910	1300 Su	116	5	4

Indiana 100% ICN, CAN, D9RN, 9RN VHF nets report: QNI 2850, TFC 179, from 20 nets. Total Indiana VHF nets 48. In the Fort Wayne Radio Club "Hampslatter," W9FC comments on the club call W9LE. I am familiar with Indianapolis Red Cross WA9LQG, Rose Potty W9NAA, Purdue W9YB, Indiana K9IU, Terre Haute W9UUU, Clark County W9JBQ, Lake County W9LJ, for these stations are somewhat active as traffic handlers. With Field Day over, the club calls "mothballed" for another year. We probably won't hear too many of them. It would be nice if the club could come up with an active program to use their call. I would suggest a weekly NCS slot, a traffic generating activity, or just a check-in now and then. Thanks to W9OZJ for the traffic generated from the Connersville Home Show. Thanks to Marion County RACES and the 1676 repeater for an excellent weather net. I am sure this is also true everywhere in the state, it's just that NWS at Indianapolis International Airport is responsible for alerting 46 counties in Central Indiana and they need the input badly from the other county spotter programs. Please make it a part of your program to keep NWS Indianapolis informed. Congrats to the brass pounder of the month W9LJW via WD9GXW's fine newsletter. W9LJL's forum on traffic and Nets at the MAARC Hamfest was great. N9AEI made another pitch for the ICN. If you are a code and theory instructor, please remind your new Novices about the ICN. If you want to brush up on cw traffic handling at 5 to 7 words a minute, they would be glad to have you. Congrats to W9HKZ on his 79th birthday. From W9UJO: "Taketht great care that that which you worketh upon is grounded, least you be lifted to high frequency potential causing thee to emit strange unintelligible sounds." Silent Key: WB9BEP, Jonesborough. Traffic: (May) W9LJL 1071, W9FC 124, WD9GXW 123, N9AEI 114, WA9OCF 72, W9HUF 57, W9EI 49, K9FZX 49, W9PMT 45, W9XND 44, W9LJW 39, N9PS 36, W9IOH 32, W9WVJ 32, W9JTS 24, WD9JAB 22, W9WEI 18, W9QOK 17, W9UJO 16, WA9GJL 15, K9KTB 15, W9BUE 14, WB9VJE 10, W9BDB 9, K9CGS 9, K9DII 9, W9DLF 8, N9BJX 7, K9SEJ 7, KA9BSF 4, W9FG 2, (Apr) WB9YU 100, W9TG 34.

WISCONSIN: SCM, Roy A. Pedersen, KF9HI — SEC: W9OAK. STM: K9UTO. NMs: W9AYW, W9IEM, W9BIC, N9AUG, W9DM, K9LGU. Remember, SWITCH TO SAFETY — don't work on hot circuits, linears, etc., with the switch on, yours truly got burned. New Novice Baraboo KA9HSD. WIN-E certificates to AG9G WB9ICH W9MNG KA9AAD AI9K, WA9LDX now KB9MQ. New hams Watertown area KA9GRH N9BKA are Techs. KA9HKQ KA9HPF Novices. New Novices Phillips area KA9HPW KA9HXX, father and son, WD9HLM WA9HLM W9LQZ ran phone patches between Camp Dix, New Jersey and Fort McCoy, Wisconsin. Green Bay 2-meter Net had 25 checkins and 2 messages. North Wood Traffic Net had 479 checkins and handled 30 messages. I'm very glad to see more stations getting PSHR. I sure would be pleased to have more stations in all of our nets and a whole lot more traffic. KA9CBN now KB9NG. KA9CID now KB9NF. W9UW has 14 AVQ, but long wire works better. The WNA thanks all those commercial companies who have donated prizes for the WNA picnic. KA9CPA made RPL. I'm very glad to see the fine participation in CAND and 9RND, thanks to those stations representing Wisconsin. W9SM has triband beam on Marathon County Courthouse. Traffic: (May) KA9CPA 1169, K9ASC 304, W9GXY 177, WB9YYP 141, WD9LUX 138, W9YCV 130, N9AZI 116, N9AUG 108, W9F52 97, W9DND 90, W9IEM 89, K9FHI 75, WD9DHF 75, WD9BGM 65, WB9ICG 40, W9AYK 54, WD9DM 53, K9AKK 50, W9DO 47, W9UCL 45, KA9CBN 42, K9AD 37, W9FDY 37, W9LJL 33, K9KSA 26, K9BNF 25, W9ESM 24, WB9WHQ 23, WB9WNA 22, K9HDF 21, K9FM 20, N9CP 19, N9AZH 17, N9UW 16, W9SEL 15, W9SOJ 14, WD9AJA 11, WB9PAW 11, K9ANV 10, WB9YPZ 10, W9CJE 8, K9UTQ 5, (Apr) W9GXY 219.

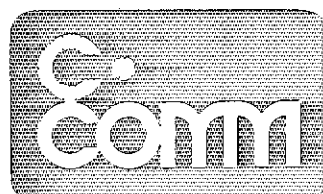
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MINNESOTA: SCM, Helen Haynes, WB9HOX — Congrats to WB9UDV and XYL, who were married Saturday,



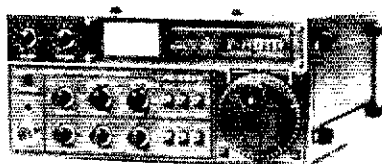
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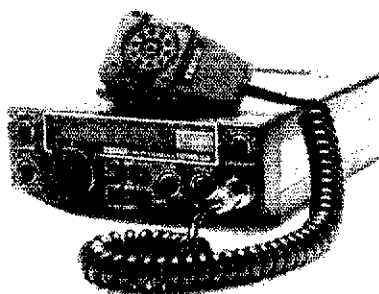
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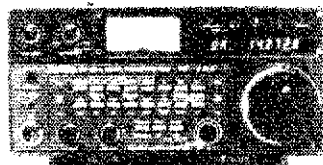
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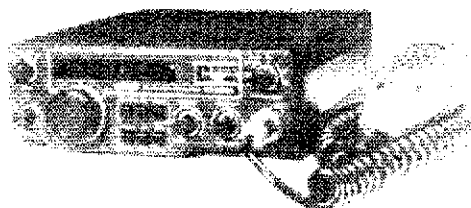
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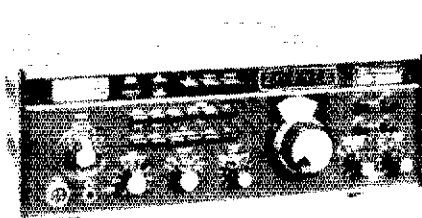


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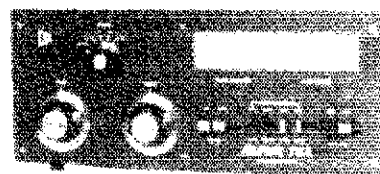
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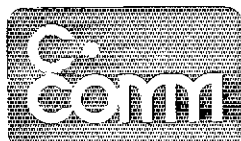


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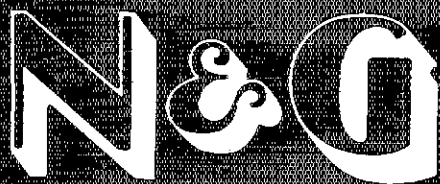
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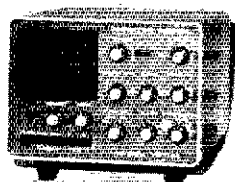
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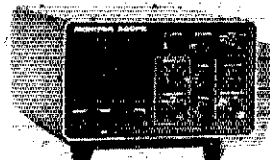
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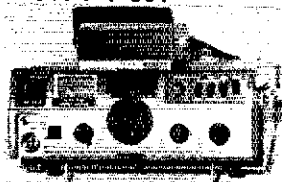
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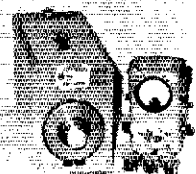
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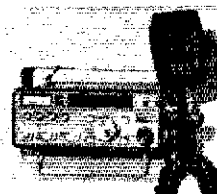
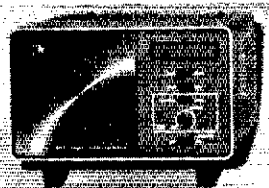
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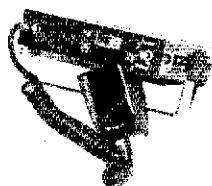
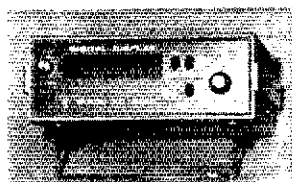
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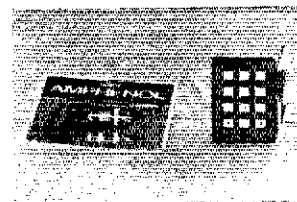


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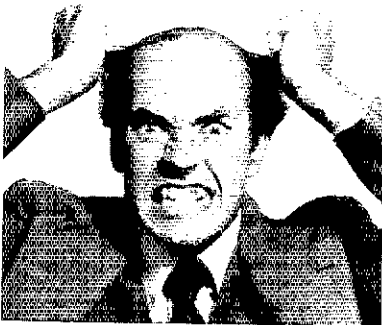


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June 21. Rumor has it they will make their home in the immediate Twin City area. A long happy life is our wish to you. W0N2B is now an honorary member of the Capital Amateur Radio Society after using the station there a number of times, while in DC attending the Congressional Senior Citizen's info program. Nice going. The St. Cloud Hamfest will be held in Whitney Senior Citizen's Center on August 12. Please note this is a new location. See you all there. Novice to Gen. K0GNF: Novice to Adv: K40USS, Gen to Adv: W0B0JUR and N0BLA. Congrats to you all. W0ZBJ is now K0Z0 sorry you didn't get rid of that Z as you had wanted, but congrats. After missing two scheduled take offs, Rochester's first hot air balloon race was on. Some 13 balloonists baffled to see who could land closest to the head balloon. Some of the balloonists, as well as the ground crew are Amateur Radio operators. We hope this will be a yearly event. Speaking of balloons, W0P0J recently received his solo license and his XYL, W0G0J is training for hers. To the families of W0G0J, W0U0M, W0F0EB, W0S0QU and W0B0LOS the Minnesota Section extends our deepest sympathy to you in the loss of your loved ones.

Net	Mgr	Freq	Time	QNI	QTC
MSSN	K0CZ		83		17
MSSN n	W0A0IN	39.45	1705Z	477	58
MSPN n	K0BT		2345Z	755	141
WNX				465	101
MSSN 1	AF00			172	132
MSSN 2	K0FIZ		0300Z	139	55
RAES				136	16

Traffic: W0A0TC 402, W0H0Z 286, W0H0C 231, K0P1Z 109, K0BT 101, W0D0FX 98, W0A0NE 91, W0D0CGM 78, W0Z0BJ 54, W0A0IN 49, W0R0Q 40, W0D0UW 38, W0N0ZB 32, W0A0Y 30, K0C0E 26, W0S0CN 21, W0B0VA 20, K0J0CF 19, N0JP 13, W0A0VT 13, AF00 12, W0A0CI 12, W0OPX 11, K0TS 11, K0BN 10, K0P0E 08, W0B0GS 4, W0W0XU 3.

NORTH DAKOTA: SCM, Lois A. Jorgensen, W0A0RW — SEC: W0B0TEE. OBS: W0DM. NM: W0C0RH. QD: W0C0LD. The Skywarn Spotters and EC of the western and central part of state was busy as weather was threatening. The radio clubs are getting ready for Field Day. Hope to have lots of reports on their activities. Good Luck to you all. W0R0B's call letters are now K0W0 K0BT is back on the air at her QTH. Wish a speedy recovery to W0K0TZ and W0B0TYR. Don't forget the Dakota Division ARRL Convention Sept. 26-28 at Holiday Inn at Fargo.

Net	Freq	Time/Day	Sess	QNI	QTC	Mgr
D A T A	3996.5 kHz	1730	17	129	9	W0C0RH
		CDT/Dy				

Goose 1990.0 0900 4 45 2 W0C0D
River CDT/Su

Traffic: W0A0RW 69, N0A0FP 26, N0B0QW 9.

SOUTH DAKOTA: SCM, Lydia S. Johnson, W0K0JZ — SEC: W0D0VB. SEC: W0A0NM. NMs: W0H0J, W0W0E, W0A0NM. Congrats to PSNR earners W0A0NM with 119 points and W0B0MR 61; also to W0C0MU for passing General Class! Dakotas had 60% representation on TEN with K0FRE and W0A0NM doing the job. DTEN represented by W0DS BMS BMR. Sorry to hear that TCC station Fox, W0A0NM, had to relinquish that call letters (C.C. function) because W0A0NM scheduled it to daytime 550. W0A0NM has met it for six years with perfect attendance record! Fargo-Moorhead will host the Dakota Division ARRL Convention Sept. 26-27-28. St. Paul MN, the 1981; and Cedar Rapids, IA the National — July 23-24-25, 1982! Traffic: W0B0MR 262, W0A0VRC 210, W0A0NM 103, W0D0VB 102, W0FRE 99, W0H0J 81, W0M0Z 70, W0C0MF 70, W0K0JZ 40, W0G0 8.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5U0U — SEC: K5TML. NMs: W5L0GN, W5MYZ, W5POH, W5W0Z. Nets: QZK 3 760 000Zdy; APRN 3 937 1100M.S; M-Bird 3 928 2130M-F; APRN 3 995 2300dy; SCARC 28 765 0130M-F. SCARC officers: W5A0OB, pres.; W5B0JRE, vice pres.; W5E0J, sec. Treas. An 1 kW gen donated by SCARC by SW Bell for emergency use. EC W5B0FN reports 23 ARES registrations. The SCM attended a meeting of the newly organized Clinton ARC May 13th. Issued OBS to W5L0GN. Cancel EC of K5TML. Issue EC cert. to W5A0HQ Dallas Co, W5B0J Hot Springs, K5CAV Perry W5G0HD Boone, K5G0M Jefferson, W5A0PNT Grant, W5U0M Van Buren. Endorse EC for W5B0WGC W5D0VR W5G0TM W5KL W5B0LWJ & W5B0UA. K5TML reports 10 ECs made April reports. OBS W5K0U 4, W5U0U 3, traffic K5AJM 29, W5U0U 36, W5POH 20, W5E0J 9, K5K 2, W5B0GH 1.

LOUISIANA: SCM, Jim Grammamco, N5IB — SEC: W5L0PG. Shreveport. Congrats to W5MI who is now assistant net manager of RNS. N5RB asks all LAN members to send him a radiogram with current mailing address for new net roster. N5EK has a new roster ready for LAN. Send him a s.s.e. to get your copy. It seems that a number of hams now also have computers. Why not try that computer out on the RTTY net, LRN. See below for the time and freq. If you can't yet transmit RTTY, check in on cw and copy the net on your printer or CRT. By now, hurricane season is approaching its active time. Are you and your equipment ready for emergency operations? Congrats to W5E0AE, who won LA honors in the Novice Roundup. The CQ-WW contest will find K5AS and K5LU in VP11 and look for them the week prior also, on 160-10. BRARC Novice and upgrading classes are proceeding with steady attendance. W5U0PH and W5B0EH made Advanced, and K5VUV made Extra. Don't forget the LA convention Aug. 2 and 3 in Shreveport.

Net	Freq	Time	QNI	QTC	Mgr
LAN 3615 kHz		7 & 10 P.M. Dy			N5RB
LTN 3910 kHz		6:30 P.M. Dy	431	70	N5EK
LSN 3703 kHz		7:30 P.M. M-F	79	26	W5B0YRT
LRN 3557.5 kHz		6:30 P.M. Su			N5RB
LEN 3910 kHz		8:00 P.M. Su			W5L0PG

Traffic: N5B0V 108, W5V0MY 85, N5IB 62, K5TL 61, W5B0ZP 58, W5F0LM 42, N5EK 39, W5B0LBR 25, W5B0QJ 9, W5B0KT 6.

MISSISSIPPI: SCM, E. Ed Robinson, W5XT — SEC: W5F0XA. The weather has changed now from flood to drought. Summer dry and occasional thunderstorms brings tornadoes. Are you ready for an emergency? Sign up with your local EC (or check with W5F0XA). Good to hear from several OTs: N5XA K5QNE K5VU. Congrats to upgrades W5SGL to Extra, W5P0WL5 to Advanced MCARA, MC very successfully provided communications for local coast motorcycle club cross country run. Support your local club and all our nets. Thanks. CAND (W5KLV) sess 62, QTC 716, with DRN5 rep. 100 percent

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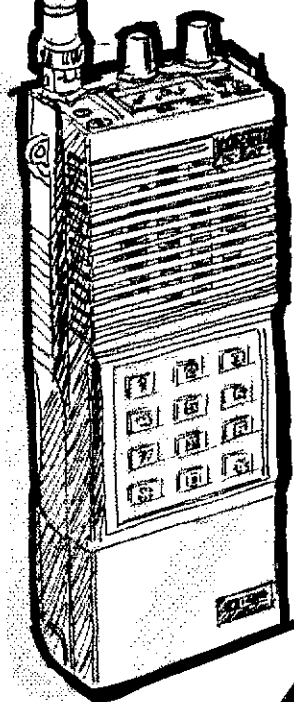
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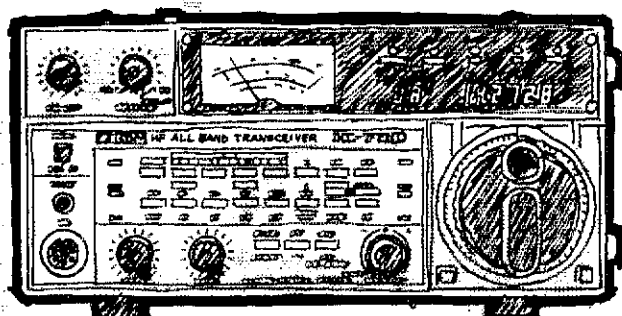
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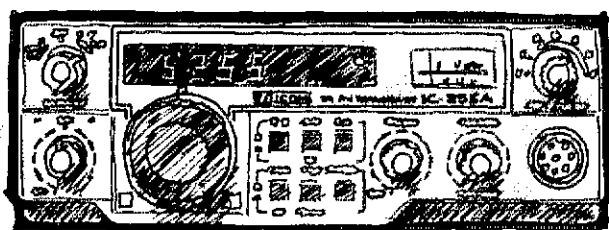
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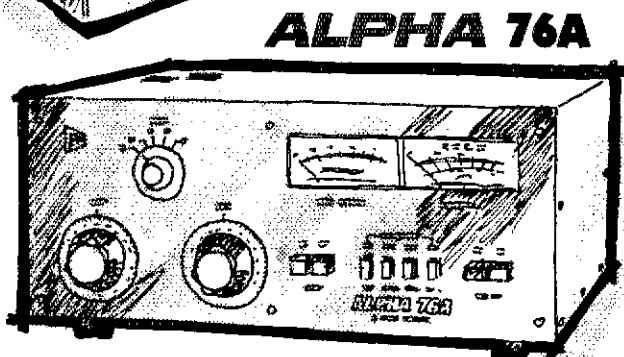


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Optional Micoder II Microphone/Auto Patch Encoder lets you phone through repeaters with auto patch input. Draws power from the 7401, so no mike battery is necessary.

The Squeech Control also functions as the receiver's sensitivity control to stop scanning only upon reception of "full-quieting" signals, skipping the weak ones.

The 100 kHz Selector button controls the VF-7401's tuning in 100 kHz increments. The 7401's 1 MHz Selector button lets you choose any 1 MHz segment of the 2-meter band.

The 10 kHz Selector advances in 10 kHz steps. In Scan, as it recycles from "9" to "0," it also causes the 100 kHz readout to advance by one digit. Depress once to resume scan function.

LED indicates kHz position.

The 0 kHz/5 kHz Switch gives you an effective choice of 800/2-meter channels in 5 kHz steps.

Dim/Bright Switch for bright illumination of frequency read-out and meter for daytime, and lower intensity for safe mobile operation at night.

The Manual/Scan Switch lets you choose your frequency manually, or have the VF-7401 find an active channel for you.

Lock/Latch Switch. In Scan Latch mode, a channel latch-up signal inhibits scan circuits when signal is detected, and the 7401 stays on that frequency. If it detects a 4-8 second break in received signal, scanning resumes. In the Scan-Lock mode, once the receiver scans to a signal, it remains on that channel until reset.

More features that make the VF-7401 the 2-meter rig that belongs in your shack and vehicle

No more searching through repeater guides while mobiling in unfamiliar territory - your new Heathkit VF-7401 will find the active channels for you. It will even alert you to band openings. You're going to enjoy building your VF-7401... and you're going to love using it. The VF-7401, the ultimate 2-meter rig... from the more than 200 Hams at Heath.

• Adjustable, 15-watt (nominal), solid-state, narrow-band FM Transceiver. Fully synthesized digital circuitry provides full-band coverage without need for added crystals.

- All-new, state-of-the-art circuits provide the exciting, exclusive features of 1 MHz bandwidth scanning, and Scan Lock/Latch capability on 2-meters.
- A receiver hotter than Heath's HW-2036A features dual-gate MOSFET front-end to minimize overload and adjacent-channel interference.
- "Power-up" on a pre-programmed frequency of your own choice, such as your favorite repeater.
- Convenient detachable mike using 4-pin connector.

- Power to the Micoder II Microphone (if used) eliminates need for a battery.
- Sturdy SO-239 rear-panel antenna jack.
- Chassis-mounted power and external speaker plugs.
- Improved synthesizer, eliminating need for panel mounted sync lock light.
- Tuning for Power Amplifier and output power level adjustment is accessible without removing case.
- Capability of mobile or base operation (with Model VFA-7401-1 AC Power Supply - 13.8 V at 4A nominal, transmit).



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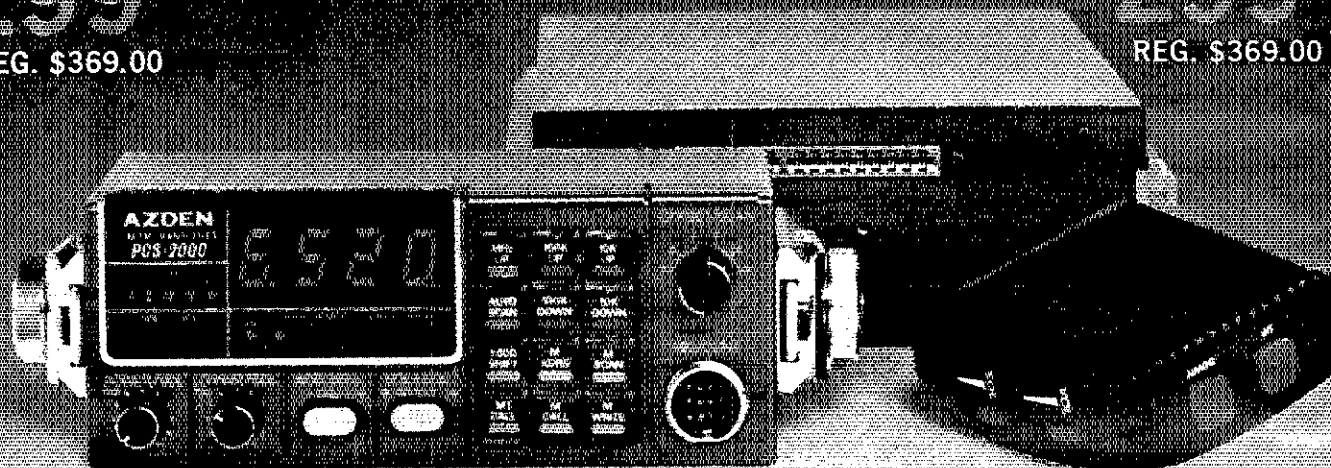
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- **DETACHABLE HEAD:** The control head may be separated from the radio for use in limited spaces and for security purposes.
- **SIX-CHANNEL MEMORY:** Each memory is re-programmable. Memory is retained even when the unit is turned off.
- **MEMORY SCAN:** The six channels may be scanned in either the "busy" or "vacant" modes for quick, easy location of an occupied or unoccupied frequency. **AUTO RESUME. COMPARE!**
- **FULL BAND SCAN:** All channels may be scanned in either "busy" or "vacant" mode. This is especially useful for locating repeater frequencies in an unfamiliar area. **AUTO RESUME. COMPARE!**
- **INSTANT MEMORY-1 RECALL:** By pressing a button on the microphone or front panel, memory channel 1 may be recalled for immediate use.
- **MIC-CONTROLLED VOLUME AND SQUELCH:** Volume and squelch can be adjusted from the microphone for convenience in mobile operation.
- **ADDITIONAL OFFSETS:** Provides three additional offset values: +0.4 MHz, +1 MHz and +1.6 MHz. Other offsets may also be obtained.
- **25 WATTS OUTPUT:** Also 5 watts low power for short-distance commun-

- ication.
- **DIGITAL S/R F METER:** LEDs indicate signal strength and power out. No more mechanical meter movements to fall apart!
- **LARGE 4-INCH LED DISPLAY:** Easy-to-read frequency display minimizes "eyes-off-the-road" time.
- **PUSHBUTTON FREQUENCY CONTROL FROM MIC OR FRONT PANEL:** Any frequency may be selected by pressing a microphone or front-panel switch.
- **SUPERIOR RECEIVER SENSITIVITY:** 0.28 uV for 20-dB quieting. Squelch sensitivity is superb requiring less than 0.1 uV to open receiver radio circuits are designed and built to exacting specifications resulting in unsurpassed received signal intelligibility.
- **TRUE FM, NOT PHASE MODULATION:** Transmitted audio quality optimized by the same high standard of design and construction as found in the receiver. The microphone amplifier and compression circuit offer intelligibility second to none.
- **OTHER FEATURES:** Dynamic Microphone, built in speaker, mounting bracket, external remote speaker jack (head and radio), much, much more. All cords, plugs, fuses, microphone hanger, included. Weight: 8 lbs.
- **ACCESSORIES:** 15' REMOTE CABLE....\$29.95. CS-6R A/C POWER SUPPLY....\$49.95. TOUCHTONE MIC. KIT....\$39.95. EXTERNAL SPEAKER....\$18.00.

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Ten reasons you should buy a Bright Counter

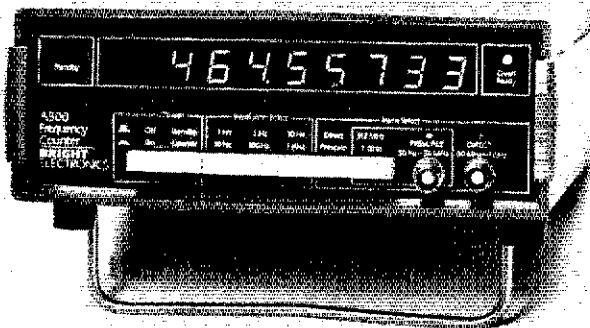
- (1) Accurate Conservative Specs
- (2) Contemporary Styling
- (3) 1 Year Warranty*
- (4) RFI Shielding
- (5) User Friendly Operation
- (6) Portability
- (7) Built in U.S.A.
- (8) First Quality Components
- (9) Useful Options
- (10) Factory Assembled and Tested

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NEW

OPTIMUM PERFORMANCE from your fine quality receivers and transmitters is assured when you are precisely on frequency with a carefully built BRIGHT COUNTER. BRIGHT COUNTERS have become well known to commercial two-way radio users for their ruggedness and reliability. Now for the first time BRIGHT introduces two new models, the A500 and the A500E, built with the same care as our commercial models but at budget prices. Aren't you glad you waited till now to buy your frequency counter?

BRIGHT'S new frequency counters feature RFI shielding, easy-to-read green LED's and professional styling that make the A500 and A500E compatible with the equipment in your shack. The A500 is not just another "pretty face." It is a highly, reliable accurate counter that will put you precisely on frequency every time. It will even show you the input that is selected!



PARAMETER	A500	A500E (Extended Range)
Frequency Range	50Hz-500MHz	50Hz-1100 MHz
Dynamic Range (Typical)	35Dbm@50Ω	35Dbm@50Ω
Resolution 50Hz-50MHz (best available quietness vary)	.1Hz 10Hz NA	.1Hz 10Hz 100Hz
Accuracy over Temperature	1 PPM 17°C.-30°C.	1 PPM 17°C.-30°C.
Sensitivity 50Hz-50MHz 50MHz-500MHz 500MHz-1100MHz	1-10MV 10-50MV NA	1-10MV 10-50MV 50-100MV
Time Base Description	10MHz Proportional Oven	10MHz Proportional Oven
Size and Number of Digits	9@.5"	9@.5"
Price incl. antenna & AC supply	\$185.95	\$215.95

Available options: Nicad Battery Pack (\$29.95)

FULL 1-YEAR LIMITED WARRANTY

COMMUNICATIONS MODELS

BRIGHT's C1000 and C600 frequency counters are known throughout the communications industry for their ruggedness and reliability. These units are housed in tough .125" metal cabinets. Built to exacting commercial standards, many companies rely on the C1000 as their local frequency standard. Whether you are an old timer, a large company or just starting in communications, you'll count more accurately and for less money with BRIGHT.

PARAMETER	C600	C1000
Frequency Range	50Hz-600MHz	50Hz-1000MHz
Dynamic Range (Typical)	38Dbm@50Ω	55Dbm@50Ω
Resolution 50Hz-60MHz (best available quietness vary)	1Hz 10Hz	—
60MHz-600MHz to 20KHz to 75MHz 75MHz-1000MHz	— — — —	01Hz .1Hz 1Hz
Accuracy over Temperature	1 PPM 17°C.-30°C.	1 PPM 0°C.-40°C.
Sensitivity 50Hz-60MHz 60MHz-600MHz 50Hz-75MHz 75MHz-500MHz 500MHz-1000MHz	20-50MV 10-50MV — — —	— — 20-50MV 10-50MV 50-100MV
Time Base Description	10MHz Proportional Oven	10MHz Proportional Oven
Size and Number of Digits	8@.5"	9@.5"
Price incl. antenna & AC supply	\$295.00	\$595.00

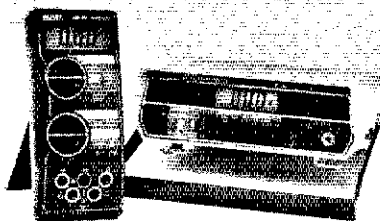
Available options: C1000-1.25 Extended Range, Full 9 Digit Resolution, Nicad Battery Pack
C600-Nicad Battery Pack

C1000 shown with full 9 digit resolution option

FULL 1-YEAR LIMITED WARRANTY

Need to measure volts, ohms or amps?

LCD DIGITAL MULTIMETERS



No doubt you own a trusted analog meter that has been your friend for years. You probably have wondered, though, about its accuracy and resolution since starting to work on your new rigs. The book says the emitter should be 3.2 volts but you can't tell whether its 2V or 3V. What you need is a BRIGHT DMM. We have two models to choose from; a convenient hand-held, and a bench/portable.

DM150	DM210
A hand-held DMM with 2 convenient rotary switches. It has 10A AC & DC ranges. Large bench-size .6" LCD display. Full five functions—AC & DC volts, AC & DC amps and ohms. The DM150's size, weight and .5% DC accuracy make it handy for your shack. \$119.95 (includes leads and battery).	A bench/portable DMM that is as happy in the field as on the bench. Large .6" LCD display with range and function annunciators. Full five functions—AC & DC volts, AC & DC amps and ohms. The DM210 with its .25% DC accuracy is a must for the serious ham. \$169.95 (includes leads and batteries).

FULL 1-YEAR LIMITED WARRANTY

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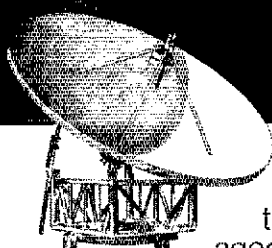
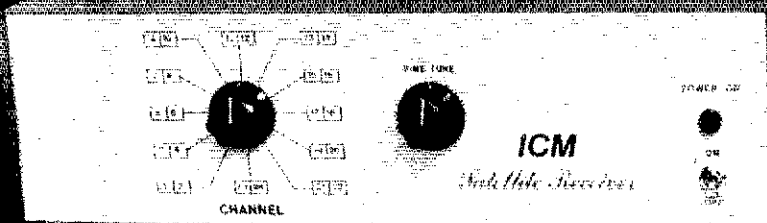
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by MS station N5AMK, DRN5 (WBSNKKD) sess 31, QTC 490, with MS rep, 100 percent by KA5AFT N5AMK, K50MD W5EDT, WBSHAS, W5EYM, K5FI, CGCHN (AG5X) sess 31, QNI 1836, QTC 144, MSBN (K5MK) sess 31, QNI 2238, QTC 48, MTN (K5OAF) sess 31, QNI 111, QTC 46, MN (WA5OPT) sess 25, QNI 549, QTC 11, MSN (KA5GGG) sess 12, QNI 56, QTC 8, RACES (N5AMK) sess 4, QNI 181, QTC 4, Capital AEN (KA5AGD) sess 4, QNI 90, QTC 4, Gulf States EN (KBSW) sess 11, QNI 602, QTC 37, with 2 weather emergency sess 19 and 25 May. Traffic: N5AMK 227, K5OAF 160, W5EDT 87, WBSNKB 40, W5KT 26, KA5AFT 15, W5EYM 11, K5FI 11, W5CSU 7, N5KA 1.

TENNESSEE: SCM, Earl Leonard, KB4G — STM: WB4PRF, SEC: W4NZW. Traffic Handling: I find it hard to believe that a true traffic handler would hold a piece of traffic until it became insignificant or forgotten. So I will direct this mostly toward the newcomer to the traffic system. Let me encourage you to follow through completely with any message you receive. Send it on its way as soon as possible, or deliver it as the case may be. A message should stay in one place no longer than necessary, usually no more than twenty-four hours or so. Don't be too eager and overload yourself with traffic and become a bottleneck in the system. It is rather disappointing to learn that a message you sent was never delivered. This does not speak well for the Amateur Radio Service either. So let's all try harder. Don't forget the Nashville Hamfest July 27, and the Cedars of Lebanon Hamfest, August 31. Hope to see you there. Appointments: JO K4LKA, GS WA4KOG, NM W4ZG, Coll: W4ZG, W4ZGMS WA4CNY, W4DDK, WB4LEH, KA4NID, WD4NJR, AF4T, W4WVN, WB4YSN, and W4ZJY. Phone nets: R0 sess, 3529 QNI, 247 QTC, CW nets: 31 sess, 258 QNI, 94 QTC, VHF nets: 84 sess, 2064 QNI, 84 QTC. Traffic: WA4CNY 644, W4OGG 183, WB4BKF 158, W4ZJY 136, WB4PRF 78, WB4GZF 74, WB4FMR 66, WD4NJR 65, K4VM 63, W4TYV 61, K4WOP 51, WD4SIG 46, WD4HKK 42, W4PST 40, WB4ZSZ 37, WA4CGK 22, N4BVY 11, WB4YPO 11, W4RUW 10, W4WVVW 9, N4BAQ 8, W4EWR 8, WB4MQ 8, W4DDK 6, W4DPO 6, AF4T 6, W4VJW 6, W4UJO 5, W4MRD 1.

GREAT LAKES DIVISION

KENTUCKY: SCM, Joseph E. Miller, K4DZM — STM: K4HRF, SEC: WB4ZML. Nets reporting: *section nets.

Net	QNI	QTC	Net	QNI	QTC
MKPN*	1086	73	PAWN	429	36
KIN*	1130	117	BARES	44	10
KNTN*	377	106	SARES	58	7
KYN*	300	192	JARES	17	5
KSN*	196	58	CARN	270	24
TRIST	280	42	AATN	44	4
SEKEN	31	1	9RN-D	48%	311
KPON	180	9	KHN*	453	33

Remember the Lexington Hamfest August 10. Let's all make plans to attend. WA4SVR/RP, in Louisiana being moved to new location. WA4KKV, DE: Dist 13, reports activity around Lexington plentiful. Traffic: WA4WSM 187, K4JLX 117, K4DZM 95, WB4APC 93, KB4OZ 91, KS4B3, KC4AV 59, WA4EBN 57, WA4GNP 53, WD4ONV 48, KA4AZT 45, WA4AGH 44, N4AOF 39, WD4LXX 39, WA4JTE 35, WA4SWF 34, K4HOE 31, WD4CQF 30, WA4AVV 26, WD4JTO 26, KA4GFU 22, WA4PKX 22, WA4JAV 21, WD4KDG 19, WA4YPO 18, WA4GAL 17, K4HRF 17, K4IKH 17, WB4AUN 16, K4AVX 13, WD4BSC 8, WD4CJQ 8, K4MHL 7.

MICHIGAN: SCM, James R. Seefey, WB8MTD — ASST: SCM, WB8DHB, SEC: WB8EFK, STM: WB8YHY, NBS: N8ABA, WB8BHE, WB8DHB, K8LNE, K8KMO, W8LRT AF8V, WB8YDZ, DECS: WB8FLK, K8RCT, W8VWY.

Net	Freq.	Time/Day	QNI	TFC	Sess.	Mgr.
QMN*	3663	1800/2200 Dy	170	45	93	N8ABA
MTN*	3953	1900	585	282	31	WB8LHT
GLETN	3932	2100 Dy	1054	200	31	WB8VOJ
UPN*	3922	1700 Dy	577	161	35	WB8DHB
MACS*	3953	1100 Dy	738	142	31	K8LNE
MNN*	3722	1730/2000 Dy	517	115	62	WB8BHE
BR	3930	1730 M/S	431	46	27	WB8HIN
WSSBN	3935	1900 Dy	556	29	31	WB8VAI
MATW*	3953	1600 Su	146	2	4	WB8YHY
VHF Activity	16 rpts		1301	60	104	AF8V

*NTS Section nets. **Mich. Amateur Traffic Workshop. Times EDT. Field appointments: QTS: WD8RNO, WB8IE, Silent Key: WD8RGE, OO reports: W3GQJ, K8JH, W8OG, CBS report: AF8V, Upgrades in UP reported by WB8DHB: to General, K2BEL, KA8CYE, NB8JF: to Advanced, WD8LAQ, WB8TGG: to Extra, NB8FJ. New officers for Oak Park ARC: WB8UGI, pres.; WB8RNB, vice pres.; KA8DMR, secy.; KB8DV, treas.; WD8RTB, member at large. Amateurs in Sanilac County helped with 16 mile walk for March of Dimes. W8CUP, Sanilac EC, reports WB8DNE, K8ESC, WB8UT, W8LUR, W8TKD, helped. The worst spring in many years brought out the best in Amateur Radio public service efforts. The May 13th tornado that struck Kalamazoo put the local group to a test which they passed with top marks, and put Michigan's new state-wide communications plan into actual use for the first time. The traffic handlers were ready and very able. "We could have handled more," was the consensus. DECS are listed at the head of this column for the first time. Only the appointments are new — these very effective leadership people have been doing the job for many months now as "ECs at Large." WB8FLK is responsible for NWS liaison in the eight county Detroit Metro area, and K8RCT and W8VWY handle recruiting, training, net coordination, etc. in respectively, Michigan's Upper and Lower Peninsulas. ARPSC workshops coming, for UP at the UP Hamfest, Aug. 2, 3; Gaylord, Sept. 13; and Lansing, Sept. 27. Traffic: (May) WD8KZX 334, WB8MTD 308, WB8YDZ 256, W8VWY 252, AF8V 248, W8RPM 214, K8KMO 202, WB8YRY 194, K8DTG 71, W8LRT 152, N8ABA 143, W3GQJ 123, KB8MX 123, WD8RNO 117, WA8OHB 116, KA8CPS 110, W8UJ 102, NB8IK 95, W8WVW 86, W8HX 76, WB8BHE 71, KB8V 70, WB8IT 61, WB8ZJY 60, K8LNE 58, W8YIQ 53, W8JVP 51, WD8IXZ 49, WA8TAO 49, WD8MJB 47, WD8BSE 43, K8GXV 42, KA8EPK 42, WD8NKT 41, W8CUP 40, W8WYO 40, WD8EIB 32, W8VOJ 31, N8RE 28, K8OCP 27, WB8HPZ 26, WB8SYA 25, W8TBP 25, AC8W 25, WD8JRT 24, W8JXJ 24, W8NXX 24, W8HIN 21, W8ZLN 20, WB8DJS 18, WD8OSE 17, WD8TTA 17, KA8ATV 16, WA8QAF 15, K8UPE 15, WD8BY 14, W8SCW 14, KB8GT 12, WB8EJ 10, K8BZ 10, K8DD 9, W8VIZ 9, K8ZJ 9, WD8ECT 8, K8JUE 8, N8AUZ 8, KB8MJ 7, WB8NB 7, W8JUP 6, K8BB 6, K8GG 5, W8SDB 5, W8FZL 3, W8WVL 3, KB8BS 2, WB8IEK 1. (Apr.) K8KMO 202, WD8BSE 46.

OHIO: SCM, Harold C. Chapman, WB8JGW — ASST: SCM: W8MOK, AF8O, SEC: K8AN, NMS: K8AAZ.

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HIGH DYNAMIC RANGE. 85 dB minimum to reduce overload possibility. Built-in, switchable, 20 dB attenuator for extreme situations.

SUPER SELECTIVITY. 8-pole monolithic SSR filter with 2.4 kHz bandwidth, 2.5 shape factor at 6/60 dB points. And optional 200 Hz and 500 Hz 6-pole crystal ladder filters. Eight pole and 6-pole filters cascade for 14 poles of near ultimate skirt selectivity. Plus 4 stages of active audio filtering. To sharpen that i-f response curve to just 150 Hz bandwidth. 4-position selectivity switch.

BUILT-IN NOTCH FILTER. Standard equipment. Variable, 200 Hz to 3.5 kHz, with notch depth down to -50 dB. Wipes out interfering carriers or CW.

OFFSET TUNING. Moves receiver frequency up to ± 1 kHz to tune receiver separately from transmitter.

"HANG" AGC. For smoother, clearer, receiver operation.

OPTIONAL NOISE BLANKER. For that noisy location, mobile or fixed.

WWV RECEPTION. Ready at 10 MHz.

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strength and transmitted standing wave ratio. Electronically switched.

SEPARATE RECEIVER ANTENNA JACK. For use with separate receiving antenna, linear amplifier with full break-in (QSK) or transverters.

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BROADBAND DESIGN. For easy operation. Instant band change—no tuneup of receiver or final amplifier. From the pioneer, TEN-TEC.

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QSK — INSTANT BREAK-IN. Full and fast, to make CW a real conversation.

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SUPER STYLING. The '80s look with neat, functional layout. "Panelized" grouping of controls nicely human engineered for logical use. New, smaller size that goes anywhere, fixed or mobile (4 $\frac{3}{4}$ "h x 11 $\frac{3}{4}$ "w x 15"d). Warm, dark front panel. Easy-to-read contrasting nomenclature. Black "clam-shell" aluminum case. Tilt bail.

MODULAR/MASS-TERMINATION CONSTRUCTION. Individual circuit boards with plug-in harnesses for easy removal if necessary. Boards are available.

FULL ACCESSORY LINE. All the options: Model 282 200 Hz CW filter \$50; Model 285 500 Hz CW Filter \$45; Model 280 Power Supply \$139; Model 645 Dual Paddle Keyer \$85; Model 670 Single Paddle Keyer \$34.50; Model 247 Antenna Tuner \$69; Model 234/214 Speech Processor & Condenser Microphone \$163; Model 215 PC Ceramic Microphone \$34.50; Model 283 Remote VFO; Model 287 Mobile Mount, and Model 289 Noise Blanker available soon.

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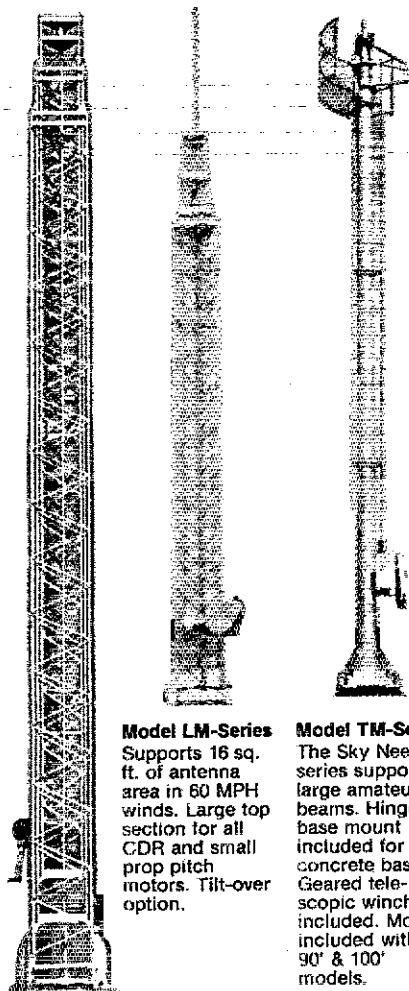
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Bank # Signature

Model Number	Nested Height	Extended Height	Wind Load or 50 MPH Antenna Load	Factory Direct Price
ED 40*	13' 0"	40'	6.0 Sq. Ft.†	\$ 492.00
MW 35**	20' 5"	35'	9.5 Sq. Ft.‡	435.00
MW 50**	20' 10"	50'	8.6 Sq. Ft.‡	668.00
MW 65**	21' 3"	65'	5.0 Sq. Ft.‡	913.00
W 36**	20' 6"	36'	9.0 Sq. Ft.	546.00
W 51**	21' 0"	51'	9.0 Sq. Ft.	844.00
WT 51**	21' 0"	51'	9.0 Sq. Ft.	923.00
W 67**	22' 0"	67'	9.0 Sq. Ft.	1,816.00
LM 237**	20' 6"	37'	16.0 Sq. Ft.	1,064.00
LM 354**	21' 0"	54'	16.0 Sq. Ft.	1,537.00
LM 470**	23' 6"	70'	16.0 Sq. Ft.	2,826.00
LM 470D** Motorized	23' 6"	70'	16.0 Sq. Ft.	3,221.00
TM 490** Sky Needle	28' 0"	90'	37.8 Sq. Ft.	10,560.00

*Triexium™

**Also available in Triexium. Please consult factory for prices.

†When properly guyed 2 positions.

‡Roof bracket or guyed at 1st level.

NOTE: All products FOB Visalia, CA. Prices and specifications subject to change without notice. Ninety day limited warranty. California residents add sales tax.

KENWOOD IS SPELLED T-R-U-S-T



The newest rig in Kenwood colors. Providing 15 memories, offset recall, scan, touch-tone®, 25 watts output and a priority feature. The touch-tone® pad is built-in for easy frequency selection or autopatch use, and the memories not only recall frequency, but the offset as well! Call for quote.

For both mobile or base operations (with an external supply), here's the answer to your VHF dreams. Dual VFO's, RIT, five memories and scan, FM, SSB, and CW, plus 100Hz resolution on the dial, make operating the TR-9000 both simple and exciting. OSCAR anyone?

The retail price of \$499.00 is great enough, but call for quote!



Not the first, but the best. Quality, with 1.5 watts output, full digital synthesis with visible LCD frequency display. The reputation that this rig is gaining is testimony enough to say here's the HT you've been dreaming about. \$395.00 retail price, but call for quote!

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8-POLE Active Filter
Selectable bandwidths: 180 Hz
120 Hz
80 Hz

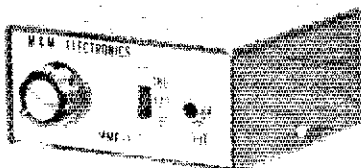
2 Watt Audio Amplifier
Power Requirements:
Int.: 2-9 V transistor batteries
Ext.: 12-18 vdc. @300 ma.
Cabinet Size: 4" w x 4" d x 2" h
Color: Silver with black vinyl top.
1 Year warranty on parts and labor

Cascaded low Q stages eliminate ringing. Three selectable bandwidths provide razor-sharp selectivity. Order today. If not completely satisfied return within 15 days for a prompt refund (less shipping and handling). Add \$1.50 shipping and handling. Alabama residents add 4% sales tax. Dealer inquiries welcome.

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MMF-1 CW FILTER \$42.95



WD8KBW WB8KWD K8OZ WD8PUH WB8YGW. Net reports

Net	ONI	QTC	Sess.	Time (Local)	Freq.
BN	530	217	61	8:45 & 10 P.M.	3.577
BNR	100	21	31	6 P.M.	3.605
ONN	121	41	30	6:30 P.M.	3.708
OSN	232	126	31	6:10 P.M.	3.577
OSSBN	2470	842	93	10:30 A.M./4:15 & 6:45 P.M.	3.9725
06mN	383	60	31	4 P.M.	50.160

Your present SCM, and his successor, MUST have your station activity reports, net totals and other pertinent information by the 7th of each month. PLEASE help us meet our deadline! Recent restructuring of ARES leadership has provided upgrading of four of our present Emergency Coordinators to District Emergency Coordinator: WB8KC, WB8KJ, and AB8P. They were selected first because of their areas of responsibility. Other selections will be made in the future and when certain areas of coverage are increased, 1980 officers for Dayton ARA are: WA2KOO, pres.; W8KDY, vice pres.; WB8KGO, secy.; WD8CKH, treas.; W8KWR, Jr. dir. The reporting of Silent Key information has been changed and it is hoped that future reports will be published more quickly — or at least published. Appointments: EC N8BOY/Ashabula WD8LWE/Crawford; DeC: WB8KO WB8LW K8JE AB8P.

Local Nets

Net	ONI	QTC	Sess.
BNR	78	63	23
COARES	39	119	31
FRN	49	1	4
LCN/NOARES	230	49	20

Traffic: K8NCV 512, K8AAZ 376, K8OZ 285, WA8GMT 176, K8FE 155, WB8FEM 145, WB8KBW 135, WB8GX 121, WB8WTS 116, N8CW 110, K8KRG 110, WB8MOK 97, WB8QZK 92, N8AKS 91, K8BDJZ-75, WB8MEK 70, WB8JGW 64, WB8SIQ 64, WB8QHV 63, WB8UBR 61, WB8HVA 56, K8BLQ 56, WB8MGA 55, WB8DTG 52, WB8SSJ 50, WB8PUH 48, WB8KFN 47, WB8KWD 47, WB8TKU 43, WB8WEG 43, WB8G 42, WB8YT 42, WB8TH 37, WB8OYO 35, WB8PD 32, WB8LZE 31, WB8OYK 30, WB8TP 30, WB8YGW 30, WB8YVW 29, N8JR 29, WB8AWM 28, WB8CJU 25, WB8M 23, K8AL 22, WB8SG 22, WB8HL 18, WB8PMW 18, AB8P 16, N8AIB 15, WB8MKC 15, K8CCTC 14, WB8ILX 14, WB8ROQ 14, WB8MGW 13, WB8QMP 13, WB8MAZ 12, WB8OQL 12, WB8QZM 11, WB8TRK 11, WB8VZK 11, WB8MRL 10, WB8PIY 10, WB8M 8, WB8QAC 7, WB8UY 7, K8CKY 6, N2MA 5, WB8WHF 5, WB8YF 4, WB8EKI 4, WB8NHV 4, WB8WNH 4, N8AHK 3, WB8NTR 3, WB8OXN 3, WB8VLR 2, WB8YUS 1

HUDSON DIVISION

EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV — Secy: WB2VJK, STIM: WA2SP, ASGM: WB2VJK W2IT, NM: W2SSS, K8Y, N2BDP, WB2ZCM, WB2ZAG, Net: NYPON 5 P.M. 3913; ESS (slow) 5 P.M. NYSPTN 6 P.M. 3925; NYS 7 P.M. 10 P.M. 3677; CDN (Tow) 6:30 P.M. 3494; HVN (Beacon) 7:30 P.M. M-F 3797; SDN (White Plains) 9:30 P.M. STIT 6806 MWIF 615/015. Putnam Emergency & Amateur Repeater League has adopted Constitution & Bylaws on June 18. Good luck fellas (and happy birthday is it?). Welcome to new Novice, KA2IJP, from family of KB2JG, NM for SDN. Welcome and congrats to N2BDW, new manager of Hudson Valley Net. Hope folks will give him a big hand as he breaks in. Also thanks to WB2QOH for the years in the saddle as he steps down. A note to all my ENY friends: difficult personal circumstances have made it nearly impossible to find time for SCM duties the last few months. Things will be worse (I?) in the next year. Therefore I must resign. By the time you read this a new SCM should have been appointed. I hope you will give him or her all the support and help. I have given me. I treasure all the friends I have made these three years. I3 and it has been my pleasure. May PSNR: WA2SP, WA2EQW, W2YJR, WB2ZCM, Traffic: WA2SP, 461, W2YJR 148, WB2HJU 122, WB2ZCM 72, WA2EQW 37, WA2CJY 32, AA2Y 23, N2EF 12, W2IQK 9.

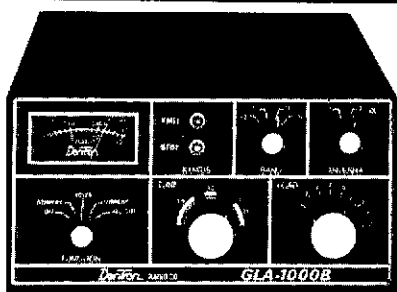
NEW YORK CITY — LONG ISLAND: SCM, Paul A. Lindgren, WA2UWA — Asst. SCM/NLI: WB2IDP, Asst/NYC: KA2CNN, STIM: WB2BNY. The following are traffic nets in and around the sections.

Net	Time/Day	Freq.	N M
NLI*	1900/2200 Dy	3.630	WB2BNY
NSPN*	1815 Dy	3.928	WA2SEL
BAVIN*	2030 M-F	147.315	KA2DBW
ESS	1800 Dy	3.590	W2VSS

Nets denoted with an asterisk are NTS sections nets. High ONI NLI: WB2TOC, W2AHV, W2MLC, WB2FUF, WB2BNY, NSPN: WA2SEL, WA2UWA, WB2TOC, WB2BNY, WA2USJ, NSPN making good progress under new manager WA2SEL. Those people who have not checked into this net ought to try it. You may be very pleasantly surprised. New and returning stations for NSPN are W2MLC, WB2VTN, and N2BKK. New and returning stations for NLI are W2GP, W2LYH, and K2EM. BAVIN celebrated its 1st anniversary June 6th. Congrats to KA2CNN, KA2DBW, WA2MEE, and the others who made this "impossible" idea work so well. W2DBQ received ARRL Certificate of Merit for the article about him in Newsday. Those who did not get a chance to read this really missed something. He is a very unusual and courageous amateur and person. New officers for LIDXA are: W2TDQ, pres.; N2KW, vice pres.; WA2YJH, treas.; N2KA, secy.; K2YGM, corr. secy. LIMARC finally hit upon a sunny day and had a very successful flea market. FCC exams at Stony Brook were a big success with lots of upgrading. SRC will be having a flea market in September. For further information see WA2SDI. Congrats to the following upgrading antennas: W2QOI and WB2ANT to Extra; WB2QY and KA2HIZ to Advanced; KA2EPW and KA2HGD to Technician. KA2CNN has been active in handling traffic from the Cuban refugees to their relatives in the NYC area. For many of them, this traffic has been their only means of communication. Maybe this will forever end the argument that non-emergency traffic handling is useless. SET coming up soon. Time for the ECs and NMs to start making your plans. Make sure to remember to send a participation message to the SCM. Traffic: KA2CNN 229, WA2UWA 178, K2HD 94, WB2TOC 93, W2MLC 87, N2BKK 70, N2GRT 68, K2GCE 66, WA2SEL 60, KA2DBW 56, WB2IDP 19, WB2KGT 19, WB2KH 17, N2NT 1.

NORTHERN NEW JERSEY: SCM, Robert Naukonn, WA2MVO — Secy: WB2VLE, STIM: W2XD, NMs: K2VX, KB2HM, W2PSU, WB2RMI, W2TCA, W2UEZ, WB2CJQ

Net	Freq.	Time/Days	Sess.	ONI	QSP
NJNIE	3695	7 P.M. Dy	31	601	246
NJNIL	3695	10 P.M. Dy	31	431	182

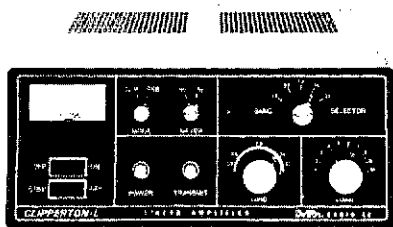


GLA-1000B Linear 160 - 15m w/some MARS coverage. 1200w PEP SSB, 700w DC CW, (4) D-50A, (6LQ6) with tuned input for rigs with solid state finals. Maximum drive - 150 watts. Built-in 117 & 234v power supply. 5 1/2" h x 11" w x 11" d - 24 lbs.

Regular \$399 - Sale Price \$339

Note: Limited quantity of GLA-1000 linears left in stock. Similar to GLA-1000B except does not have tuned input or switch for dummy load tune up. Not recommended for rigs with solid-state finals.

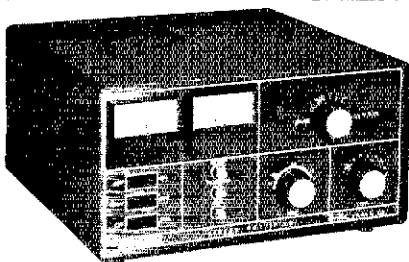
Regular \$379 - Closeout \$279



CLIPPERTON L Linear. 160 - 15m w/some MARS coverage. 2000w PEP input SSB, 1000w DC CW, RTTY, or SSTV. (4) 572B Triodes in grounded grid. Built-in 117/234v continuous duty power supply. HI/LO power. 6" h x 14 1/2" w x 14 1/2" d - 42 lbs.

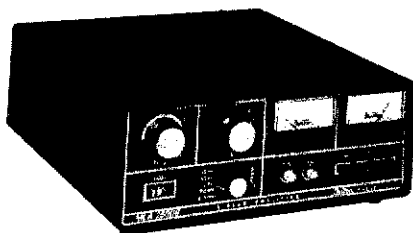
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FACTORY WARRANTY
on DenTron Sale items



DTR-2000L Linear. 160 - 15m w/some MARS coverage. Legal power limit on SSB, CW, RTTY or SSTV. Single Eimac 8875 operates with 65 to 125w drive. Built-in 117/234v continuous duty power supply. 7 1/4" h x 14 1/2" w x 14 1/2" d - 54 lbs.

Regular \$1329 - Sale Price \$999



MLA-2500B Linear 160-15m w/some MARS coverage. 2000w PEP input SSB, 1000w DC CW, RTTY or SSTV. (2) Eimac 8875, 65 w minimum drive for 1 Kw DC input. Built-in 117/234v continuous duty power supply. 5 1/2" h x 14" w x 14" d - 47 lbs.

Regular \$1299 - Sale Price \$749

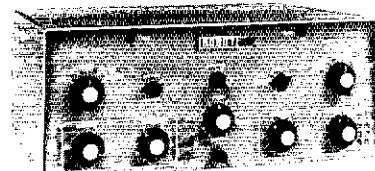


NEW! RT-3000 roller inductor tuner. Covers 1.8 to 30 MHz continuous. 50 ohms input. Output to coaxial cable, 50 ohms nominal (may be very low or high impedance). Tunes high and low Z wire antennas or balanced feed lines with optional balun. In-line wattmeter reads 200/2000w FWD or REF. Rated at 3 Kw PEP. 4" h x 12" w x 13" d.

Regular \$299 - Sale Price \$259

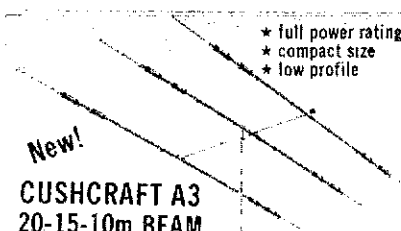
DenTron AT-3K 1.8-30 MHz 3 Kw PEP ant tuner

Regular \$259 - Sale Price \$219

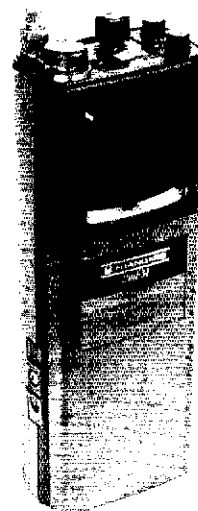


ROBOT Model 400 Slow Scan TV Converter

Regular \$795 - Sale Price \$599



Regular \$219 - Sale Price \$169



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STANDARD 146-A 5 ch. 2m FM H/T w/ 94 simplex & 34/94 xtals. 2w RF output. Uses 12.5v nicad pack. Provision for tone squelch, and/or sel. call, ext. mic. or spkr/mic. ext. 12v and earphone. Separate internal dynamic mike and spkr. Telescoping antenna. Meter shows battery condition on transmit and signal strength on rec. 2 lbs. 1 1/2" d x 3" w x 9" h. REGULAR - \$259.00

BP-7 Nicad battery pack REGULAR - \$41.00

USA-2 Desk top charger. Just drop in 146-A and automatically charge nicad pack. Connect base antenna by using UAD adaptor. REGULAR - \$38.00

PT-3644 Carrying case REGULAR - \$12.00

Total Regular Price - \$350.00

Closeout Price - \$149.00

LCC-2 Deluxe leather carrying case. \$25.00

Microphone clip kit for LCC-2. 5.00

HM-4 ASP Flexible rubber antenna. 7.95

MP08B Miniature external microphone. 35.00

CMA Mobile power & antenna adaptor. 20.00

UAD Antenna adaptor for USA-2. 15.00

CES 220 Back plate w/Touch Tone Pad. 49.95

Crystal certificates. each 5.00

Last chance on YAESU FT-202R 1 watt 6 channel Hand-Held. Only a few remaining at the previously advertised price of \$139.00. Add \$49.00 for NC-1 desk charger w/8 Nicads.

Quantities Limited on all Sale and Closeout items. Order direct from this ad. Send Check, Money Order or CALL TOLL FREE and place your order using Mastercard or VISA. Allow the following for UPS shipping charges & insurance in the 48 States. (Excess refundable).

146A & FT-202R - \$5.00; RT-3000, AT-3K & 400 - \$7.00; GLA-1000 & GLA-1000B - \$10.00; A3 - \$12.00; CLIPPERTON L & MLA-2500B - \$22.00

DTR-2000L too heavy for UPS - will be shipped via Air Freight, COLLECT for shipping charges.

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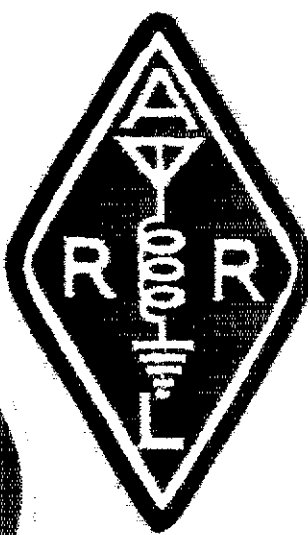
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And NOW you can proudly display your League Life Membership by adding the *Life Member Chevron*, designed to match the 3-inch and 5-inch emblem patches.

These washable cloth patches are perfect for affiliated clubs, individuals and emergency groups.

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1-7/16" x 3"	\$1.00
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Large Emblem Patch	
3" x 5"	\$2.00
Large Chevron	\$1.25
ARES Patch 3 1/2" diameter	\$2.50

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NJSN	3735	6:30 P.M. Dy	31	251	59
NJVN	49/49	10:30 P.M. Dy	37	279	183
NJPN	3950	6 P.M. Dy	35	645	338
UGEN	085/885	7:30 P.M. Dy	31		
ORTIN	72/72	Dy	31		
ORTTY	147/51	Dy	31		

Don't know what happened to the two missing vht net statistics? Think "Ironman" WB2RMI is enjoying the car too much now he's turned driving age! K2VX has hung up the gloves as NM on NJPN after two excellent years — well done! N2CR is taking over as NM for NJPN. NJN late has picked up in ONIs since the March confab. Our June confab will be history by this reading and we hope something positive will be able to be reported in the next issue of QST regarding the proposed statewide vht net. Novice and Advanced classes from Tech and above will be starting in September by the following clubs, Nutley ARC, Fairlawn ARC, Ramapo Mountain ARC and a class at the Ridgewood Adult Class. Contact the club secretaries in each of the above clubs or contact WA2MVG for exact dates for sign-up. Get those "would-be" Novices out of the woodwork! K2AGZ is on RTTY with a 19ASR and Flesher 1U. K2VAC has a 28ASR and there are about 12 regular check-ins on 147.51 with many on autostart. We are looking for more RTTYers in NNJ. W2PSU has a new Xitex on RTTY using a video screen. WB2RMJ has resigned as co-manager of ORTIN. Congrats for a job well done! Morris County Freeholders have designated June 22 to 28 as Amateur Radio Week in recognition of service by area members via Ramapo Mountain ARC, Morris County CD, Split Rock ARS and Mount Arlington repeaters. The following stations took part in handling traffic for the 125th anniversary of the Morris School District: WB2FSC, K2GBD, WA2ARZ, WB2LDN, A1ZY, WA2BGP, WA2BUY, K2BO, AG2H, AJ2H, N2XJ, WB2LQO, WB2MWO, WA2OLJ, WA2TYQ, and KB2HM. Traffic was taken by N2RC, N2ROP, N6YE, KA2GTY, K2HD, KA2CNN, and WA2JWH. Old Bridge DX group planning major all hand DXpedition on Liberty Island (Statue of Liberty) on July 4th weekend with K2LJ (Liberty Island) call. W2GWS has a new 14 element Yaqui for 2. WA2MVG and N2BC visited OBRA meeting. N2NS has left us and will be located in Columbus, Ohio and I'm sure will be involved in traffic in that area. We will miss you. WA2DPK took a "walk down the matrimony lane." QO reports from W2TPJ and WA2PZD. Those interested in joining the "Computer Conspiracy Group" join this ASCII/HF group on 147.54 autostart. For particulars call (201) 785-3593. WB2WLV to General and KA2HNG to Technician. K2BPP is back from the North Pole and showed his slides to the Sussex County ARC. N2BLM now a General and has a new linear to chase the DX. New officers for the BLUC are WB2LHY, pres.; W2HEP, vice pres.; WA2GZB, secy.; K2CBG, treas. N2BIM and N2WM got DXCC recently. WA2UDT reports new arrays on 2 & 6 and only a few states away to finish 5BWAS - 80 meters is holding him up! WA2JWH is new president of Fairlawn ARC. K2DVJ to Advanced, Sussex County ARC Hamfest Saturday September 6. Traffic: (May) WB2TOM 304, K2WIM 287, W2CQB 276, WA2PIP 234, K2VX 229, W2UCZ 179, W2TCA 171, W2MCA 152, KB2HM 139, WA2MVG 137, AG2P 127, N2XJ 126, W2KPD 124, K2BPP 93, N2CR 68, KA2G 44, N2BNB 33, W2DTH 25, WB2KLF 25, WB2FZY 20, W2ZLP 15, N2XJ 13, N2NS 12, N2BOL 11, WB2UQOI 11, W2UH 10, WA2DPK 6, W2CL 4, KA2EEQ 4, N2SU 4, WA2QWR 4, KA2HNG 2, (Apr.) WA2DPK 34, N2SU 18.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W0LFF — SEC: W0YVW, DEC: W0AVV, K0CY, W0VYG, W0YUI is going on DXpedition to 317 Land. W0ZFM awarded A1A award for coverage of Manson and Alcona tornadoes. His station, KH8I, used Amateur Radio for reports. KA0GJV hired up his shack instead of the rig, 100 percent again on N1S-TEN via W0SS, A10Q, W0YLS, N0SM, K0CP, AF0R, KA0X, W0PYD, W0UUP and W0TIL. WA0AUX and A10Q keeping DTRN hot. KA0EXF moved to Nashville. KA0BOI has WAS. W0ZKG has appreciation certificate from Central States VHF Society. KA0ADN and KA0BOT have WPNX Award. New gear. W0WJDJ SA-2040 and FI-2100B. KA0ADN HA-202A. W0BQC has 850 SSTV QSOs with 37 DX on A5. Congrats for upgrades to N0RJJ and KA0HHG for General, and N0AYM and W0YVU for Advanced. Welcome to KA0HUN in Malvern, KA0HUJ and KA0HUF in Storm Lake, and KA0HNB in Humboldt. W0YMW on 7.63.03 in Davenport area for phone, RTTY, ASCII, SSTV and FSTV coordination. Don't forget, Des Moines Hamfest Aug. 17th and Iowa 75-Meter Picnic near Waterloo on August 24th. Net Freq Time Days QNI QTC Secs. Mgr. Iowa 75M 3970 1730 M-S 1195 69 27 WB0AVV Iowa 71M 3970 2300 M-S 912 73 27 WB0AVV Traffic: W0SS 130, W0YLS 101, AE0R 85, KA0X 68, K0GP 56, A10Q 44, W0LFF 20, W0TILF 20, WB0AVV 18, W0BW 11, W0BQJ 5. KANSAS: SCM, Herbert M. Summers, K0HFX — SEC: W0KL. Congrats to a new ARRL affiliate club in Shawnee, Shawnee Radio Amateur Communications Team, Inc. W0ECG reports the new president of the Flint Hills ARC is K0TI and also the Butler County repeater will soon be active on 147.15/17.5. K0FPC has 132 confirmed for DXCC. W0AM going to try and pick up a few he has missed since the storm got his beams. All up and working now. W0PB and the Hiawatha ARC helped the law enforcement group recently in apprehending a drug "grower." Receiving notice that we have lost N0IN to the Stillwater, OK area, our loss is a big plus for Okie-land. W0FT had a day of fun recently providing communications for the Governor's Relay Run for Physical Fitness program in NW KS. He didn't say if he was as tired as the runners at the end of the race. New EC for Zone 12 is W0MI. New EC for Zone 14 is W0BDS and new EC for Zone 15 is W0ZUC. Net reports: KPN QNI 284, QTC 24, KSBN QNI 1223, QTC 209, KWN QNI 806, QTC 443, QKS QNI 284, QTC 127. Only three reported activity for the PSHR column. W0YH 119, W0FT 89 and K0EZ 79. W0KL reports ARES standing at 892 members — are you one of those counted??? Traffic: W0YH 181, W0FIR 130, K0EZ 128, W0HI 113, W0AM 107, W0FT 107, W0ACG 76, W0LBB 68, W0YLP 40, W0BRZ 39, K0BFX 38, W0PB 33, W0FDJ 32, W0CHJ 29, W0ASY 25, W0KL 16, W0LKA 16, W0RBO 5, W0FT 4, N0IN 2, N0LL 2. MISSOURI: SCM, L. G. Wilson, K0RWL — Asst. SCM: Joe Flowers, W0DTF. SEC: W0BFKY, W0UXI now has an antenna farm including a dipole for 160 at 90 feet and several monopole beams from 50 to 100 feet in the air. Sounds like blood is out for blood. It is hoped that everyone survived 1980 Field Day and we expect to see some outstanding scores from the Midwest Division. Our

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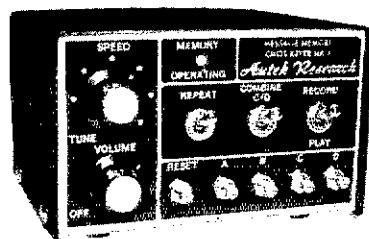
Autek filters gained their reputation by using a costly **INFINITELY VARIABLE** design. Yet, mass-production (we sell only **ONE MODEL** — the best) makes it a tremendous bargain. You're not limited by a few fixed positions. You vary selectivity 100:1, and vary frequency over the entire usable audio range. **PEAK CW** (or voice) with an incredible 20 Hz

BANDWIDTH, but also variable all the way to "flat." Imagine what the **NARROWEST CW FILTER MADE** will do to QRM! Reject whistles with the most flexible **NOTCH** you've heard. Wide or narrow. Depth to 70 dB. **LOWPASS** helps you cope with SSB hiss and splatter. Skirts exceed 80 dB. Most above features were in the popular QF-1 (See excellent review in March, 1977 QST.) The new "A" model is more selective, adds a **HIGHPASS** mode for SSB, and a great **AUXILIARY NOTCH** (35 to 60 dB) to give **TWO NOTCHES**, **NOTCH/PEAK**, **NOTCH/LOWPASS**, or **NOTCH/HIGHPASS**! If this doesn't convince you, please **ASK ON THE AIR**. Owners are our best salesmen!

Due to cost and panel-space limitations, even the latest rigs only include a fraction of the QF-1A features. We recommend you buy the best rig you can afford, spend \$3,000 or more, then add a QF-1A and listen to the improvement! **WORKS WITH** Yaesu, Kenwood, Drake, Swan, Atlas, Tempo, Collins, Heath, S/I, etc., **ANY RIG!**

Hooks up in minutes. Plug into your rig's phone jack, or attach to speaker wires. Plug speaker or phones into QF-1A rear-panel jack. That's it! Filter supplies 1 watt to fill a room. No batteries req. (+12 VDC hookup possible.) 6 1/2 x 5 x 2 1/2". Handsome light/dark grey styling. Get yours today.!

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Our classic MK-1 should make you wonder why anyone would buy an ordinary keyer, when memory costs so little! Records 4 messages. Just select "record," tap the A, B, C, or D message, and start sending at any speed! Record over old messages as easily. Playback by tapping the same button. Each message holds about 25 characters (letters, numbers). Total 100 characters. Handy repeat switch repeats message forever until reset. Very useful for CQ's. **YOU SIT BACK AND WAIT FOR A CALL!** Another switch combines two messages for 50

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This "state-of-the-art" keyer pleases beginners and CW "pros" alike. **DOT AND DASH MEMORIES. TRIGGERED CLOCK. IAMBIC. SELF COMPLETING. JAM PROOF. 5 to 50+ WPM. LATEST CMOS FOR LOW CURRENT.** Built-in monitor, speaker. Widely adjustable tone, volume. Perfect weighting at all times. No fiddling with an adjustment that varies with speed. **NEW: DUAL TRANSMITTER OUTPUTS** key ANY modern (post

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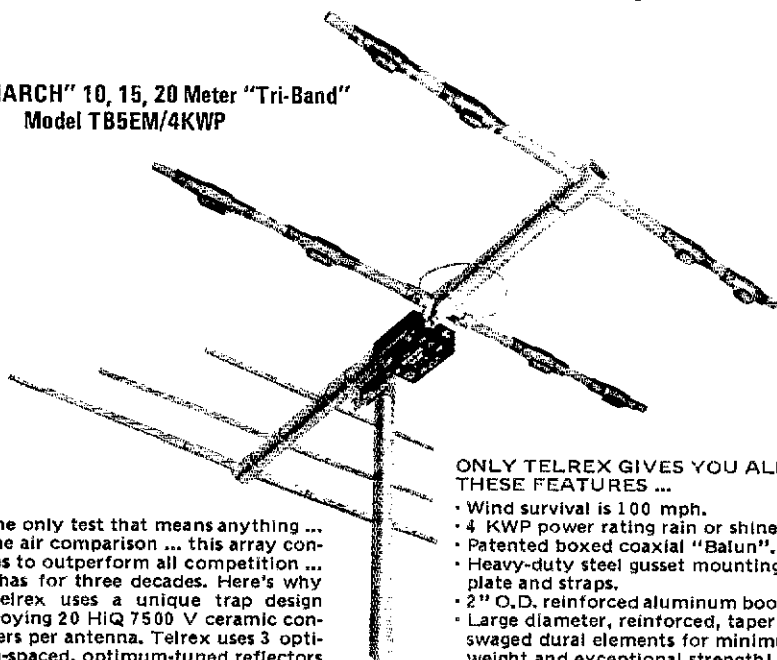
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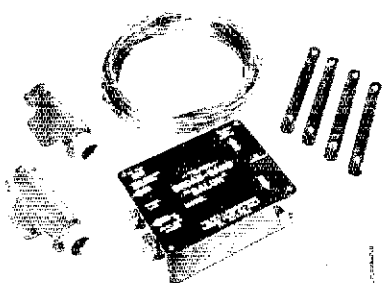


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- Large diameter, reinforced, taper swaged dural elements for minimum weight and exceptional strength!
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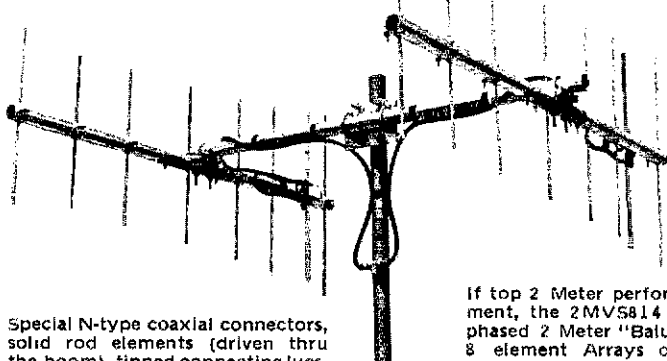
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deepest sympathy to the family and friends of W0GJ and W0BAM who joined the ranks of the Silent Key. News is a little short this month, probably because it is the "Vacation Season." Speaking of vacation, California, here we come

Net QNI QTC Net QNI QTC
MOSSBN 600 57 ACE 23 1
HBN 416 61 NEMOE 101 0
MON 173 128 MON 2 147 69

See you next month. Traffic: W0BMA 252, W0QUD 178, K0BNK 143, K0SI 125, W0BY 115, W0TF 79, K0PE 30, K0EM 24, K0RWL 2.

NEBRASKA: SCM, Rex P. Greenwell, K0KP — SEC: WABAS. Preliminary reports indicate that Nebraska amateurs once again came to the aid of the Gulf and Island tornado emergency. Traffic links were set up along with emergency stations and communications were provided in and out of the area. On behalf of the SEC and victims of the tragic emergency, THANK YOU for your expertise and assistance in this unfortunate situation. Once again Amateur Radio has shown its worthiness in times of peril. It is with sorrow to report the passing of W0VYX, there was never a time when he turned down a piece of traffic or phone patch. His Silent Key will be keenly missed. Field Day activities went off in a big way in Nebraska! Stations were set up across the state and activity was reported heavy, a lot of experience and gained and everyone seemed to have a good time! FBI The Central ARC has installed a new tower at the repeater site, an improvement they've been planning for a long time. Nebraska repeater frequency coordinator WA0WRI, has a new listing of Nebraska repeaters hot off the press! Contact him for more information.

Nets QNI QTC
Cornhusker 713 12
Morning Phone 1344 23
Sunday AM ARES 168 2
Nebraska Storm 1041 160
Platte Valley 2 Mtr 62 6
Western 202 6

Traffic: W0QB 324, W0EUT 137, K0AIF 95, W0BOK 54, W0N1K 51, K0BRS 46, W0HOP 28, W0APCC 27, W0HTA 26, W0A00X 21, W0CNI 20, W0QEX 18, W0VYX 16, W0BQWR 15, W0BGMQ 11, N0ATK 4, W0ALOY 3, K0SFA 3, W0APY 2, W0DJU 2, W0O0X 2

NEW ENGLAND DIVISION

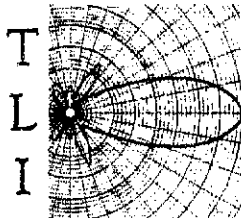
CONNECTICUT: SCM, Stan Horzepa, WA1LOU — SEC: W1SY STM, WB1AIU.

Net-NM Freq. EDST Sess. QTC QNI
CN-K1EIR 3640 1900+2200 62 256 320
CPN-WB20SY 3965 1800/1000 Su 31 119 334
NEN-WB1GCP 3720 1815 31 74 237
Nutmeg-WA1ELA 3988 2100 31 57 318
RASON-WB1FSM 1373 2100 MWF 13 16 99
WESCON-WB2PJ 7818 2030 31 83 463
Hi QNI CN: WB1ESJ WB2PJU CPN: WB1FZ WB2PJU
WA1ZXT Hi QTC Nutmeg: W1EFW Stamford ARA members providing communications for Greenwich Memorial Day (and race). SEI-New England Division Convention conflict resolved ... SEI moved to third weekend of October. Candlewood ARA crew, led by W1ENL, handled traffic and manned checkpoints at Lake Waramaug 50 km marathon. SCARAFest (August 17) looks to be biggest event of the summer ... see you there. Tri-City ARC took over the air at Watford airshow on August 25. Southglow meeting at computer store demonstrated the versatility of microcomputers. W1AW test broadcasting ASCII at 110 baud, 170 Hz shift, after each RTTY (Baudot) transmission. N1AQV KATIEUE and WA1ZXT upgraded their tickets. New appointments, KATIEUE GO, W1GCF OPS & OIS, WB2PJU reminds WECOnners that Prospect ARA repeater (147.915/315) is back-up repeater for that net. A number of GT PSRR regulars qualify for new PSRR certificate ... notify ARRL headquarters (c/o K1XA) if you've PSRR'd 12 times since June '79. W1DFT's spring was sort of silent. Traffic: (May) WB1GPT 212 WB2PJU 212, WB1AGZ 152, K1GCF 103, W1EFW 103, WB1DGR 67, W1DFT 61, W1BDN 55, K1XA 51, WA1ZXT 51, WB1FZ 47, W1GVT 46, K1AGC 43, K1CMX 37, WB1ESJ 36, W1OD 31, WA1LOU 26, WB20SY 21, KATIEUE 19, W1KV 18, W1CUH 4, K1EUV 3. (Apr) W1DFT 151.

EASTERN MASSACHUSETTS: SCM, Rick Beebe, K1PAD — STM, WA1TBY, SEC, WA1BLG, ASGM, WA9NEW.

Net Mgr Freq Time (loc)/Dy QNI QTC
EMRI WA1VAB 3.658 19/2200/Dy 372 286
EMRIPN W1FJ 3.898 1730/Dy 351 164
EM2MN WA1IFE 90/30 2000/MWF 86 32
EM2MN WA1IFE 145 8 2000/TTH — —
NEEPN K1BZD 3.945 0830/Su 55 18
HTTN K1BSO 04/54 2230/Dy 508 154
FMRIS KATBJY 3.715 2030/Dy 91 47

Amateurs from as far away as the Cape got involved in the Tall Ships effort in Boston during the end of May. Amateurs helped the Red Cross for five days providing communications between their field locations, two command posts, Boston Ambulance Service and Red Cross headquarters downtown. Radiograms were also sent from visiting sailors. The radio operator aboard the Christian Radich (LA3UV) was entertained by local hams and plans were made to monitor the subsequent transatlantic race via ham radio. All in all a successful effort with at least one TV and two radio PR announcements being made. Hams at Hewlett Packard, Andover, ran a Novice class with all six receiving Novice tickets. Chelmsford Club presented WA1QYM with annual Cameron Memorial Award in recognition of his efforts in establishing the VHF/UHF 2-meter repeater station at Westford Pt. Framingham Club planning another flea market and member N1GB had an article in June QST on his computer operated rotor control. Wellesley Club supplied critical communication for BAA Marathon once again this year. Some Billerica ARS members made the trek to Dayton this year. Gapewick Club members showed XYU/L appreciation by having a ladies night including dinner, corsage etc. Massachusetts ARA members helped with March of Dimes Walkathon. Whitman ARC held a Mother's Day message fair at the Westgate Mall in Brockton. Middlesex ARC had WA1WHU speak on legal aspects of Amateur Radio. Sturdy Memorial ARC helped with road race for Attleboro YMCA and has new Novices KATIEUE and KATIEZ. New Quannapowitt Radio Association officers are K1BDO, pres. AAM, vice pres. WB1CUW, sec. y. K1ZUP, treas. Minuteman Repeater Association newsletter honored past presidents W1WSN, W1PRI, W1EFH, Lou Savone, W1AE, K1GOI, N1DH and K21JZ. W1JH says that it appears the town of Chelmsford will soon drop its antenna case against him. Eastern VHF/UHF Conference held in Box-



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24
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Friday-Sunday, Aug. 22, 23, 24 only.

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July - early August. No Advanced Registra-
tions accepted after Aug. 8th.

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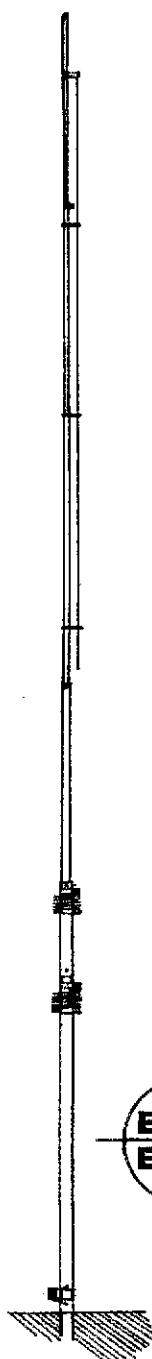
Only Butternut's new HF5V-III lets you use the entire 26-foot radiator on 80, 40, 20 and 10 meters (plus a full unloaded quarter-wavelength on 15) for higher radiation resistance, better efficiency and greater VSWR bandwidth than conventional multi-trap designs of comparable size.

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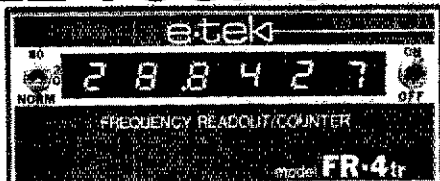
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boro, lots of fun Traffic: (May) WA1TRY 515, WB1E2T 243, KA1BJY 215, WB1GWE 160, K1GN 146, WB1DXH 127, K1BSO 122, K1BA 109, WA1YWK 94, K1COW 86, K4YX74, K1COP 70, K1C63, W1DMD 57, K1BZD 55, WB1ANT 29, WB1TPV 26, K1LQ 25, W1LE 24, K1H6JNQ 23, WA1FNM 18, W1ATX 16, W1PL 15, W1AOG 14, WA1IFE 14, W1PL 14, W1CE 10, AJ1R 9, W1PJ 8, WA1BLG 7, W1CZB 4, WA9NEW 4, K1UR 4, K9HI 3, W1XA 2 (Apr.) W1CE 12.

MAINE: SCM, Ed Bristow, WA1MUX — New SCM, W1RWG, takes over next month, good luck Cliff. PSRR: W1RWG KA1BO WB1BYR AF1L W1BJ. Sess/ONI/QTC: PTN 31/288/103; CMEN 13/188/19; SPSN 13/140/14; MSN 14/78/11; AEN 3/37/0. It's been fun serving the section, but time no longer permits. BCNU all. Traffic: (May) WB1BYR 129, W1BJ 105, N5YX/1 94, W1RWG 79, AF1L 75, W1HDC 49, WA1JZP 30, KA1BO 25, WA1MUX 25, W1AHM 16, W1KX 16, W1BMX 14, WA1ZUL 10, KA1EKT 8, WA1YNZ 6, W1CTR 5, KA1DDJ 12. (Apr.) W1KX 103.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1NH — SEC: K1RSC STM: W1TN NM: N1NH & WB1HFI The Amherst Radio Club Ladies Night chairman, W1MHX, reports 40 attendees. WB1AGB & OM went to Dayton. W1NH visited H0ZBEMM aboard the tall ship Gloria from Columbia, in Boston. K1JUL was the fox in last hunt by Nashua ARC. W1RTV to teach Novice classes this fall. KA1BXA editor of the Great Bay Area newsletter, WB1FGV assisted by N1ARR in new tower erection. It is sad to report WA1JXB Silent Key. WB1ASY awaiting new call. Welcome back to W1GUX after long vacation. WB1HFI looking for liaison on daytime 1RN. Contact him for details. Seen on Hwys & Byways. WB1DDD W1DGE & KA1DON. Don't forget the NH Traffic Handlers picnic set for July 26 at Pawtucket State Park. W1FYR has new Model 32 RTTY & Fleisher TR-128 UARI. Notice: the NH CW Net moves to 3633 on Aug. 1. WB1FKX now Advanced. W1TN received his 75-meter WAS. New antenna at W1E168 spaced 24 feet apart and above 100 feet. K1MFO has a new 1com IC2A. See you all at the central New England Net in September at Saunders Bay.

Net	Time/Day	Freq.	Mgr.
NENN	1815 Dv	3720	WB1CFP
NHN	1830 Dv	3633	N1NH
GSPN	1900 M-F	3945	K1APQ
	0930 Su	3945	
NHEPN	1900 Sa	3945	W1VTP
GSEF	2030 Dv	146.34/94 & .055/655	WB1HFI WB1HFI

Traffic: W1TN 203, W1QYY 103, K1OSM 0, W1FYR 64, W1MHX 38, WA1PEL 11, W1NH 2.

RHODE ISLAND: SCM, J. Fitterington, W1EOF — SEC: K1DIE STM: N1RI, WA1OSL, acting mgr., reports R1EM 24tr. Itc Net had sess. 21, QNI 19 & ITC 46. Several folks from Newport County Radio Club participated in communications for Tall Ships and OSTAR. The OSTAR thing was put together by WA2MPN who is now in Tiverton. Nice work! Congrats to KA1FE who is now Extra and KA1AVP who gets General with new call N1BAA. Also, the WA1ZCZ-KA1AVO household now has a third ham - son, KA1FBR — congratulations to his parents. Most of the clubs participated in Field Day and all enjoyed the biggest fun event of the whole year. RI ARES Net still thriving on Wed. evenings at 1730 P.M. local time on 52 simplex — all are invited to QNI. All upgraders and new calls are invited to let us know and we will note it here for all to know. Traffic: KA1BTU 219, KA1FE 81, W1EOF 74, N1RI 2.

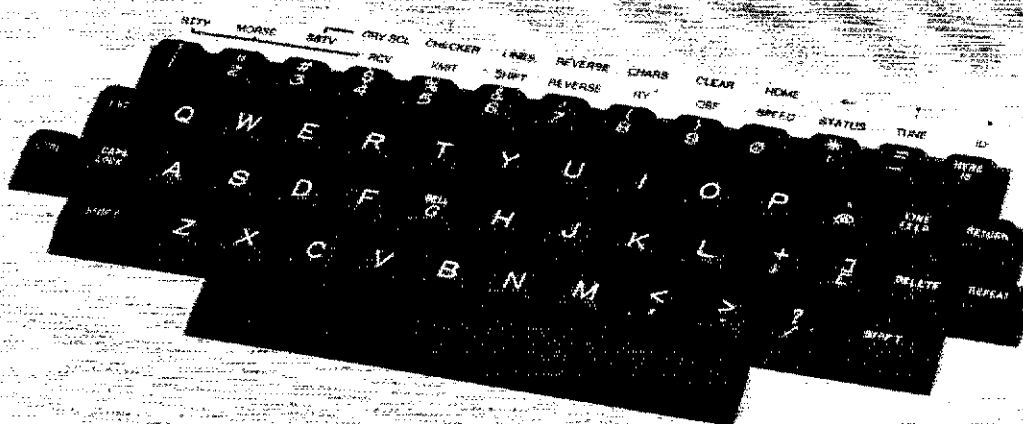
VERMONT: SCM, Bob Scott, W1RNA — In the last 2 months I have received letters from an Ex. Cl. lic. person with about 2 years op time who blames me for VT hams disinterest in our lic. nets, CD parties, etc. I WOULD like very much to see more activity along such lines, but I also know VT hams — they op if, when, where & how they want to operate; their own pleasure and time. I have found over the years they are THERE in emergencies, other times one wonders where they hide! I believe in their independence & appreciate the time given when really needed. Your comments would be appreciated. VTSSB 31/498/122; Carrier 25/439/44; VTRFO 4/2/13; VFN 4/62/4; GMM 27/510/49. New NCS VTSSB, WB1CAI & WA1ZMS. Rutland trying to form new RC. Rutland 2 FM rpt 146.04/64. Wanted: name & addr for K1KMQ. Hope u all enjoy the summer. Traffic: K1BQB 107, N1ARI 59, W1RNA 11.

WESTERN MASSACHUSETTS: SCM, Art Zavarella, W1KK — ASLMS: K1BE WB1VR. SEC: W1JP STM: W1TM. NMS: W1UD W1UPH WA1MJE. From NOBARC "Squelch Tale": Pros and Cons of Repeater linking their superb Mt. Greylock machines. Beware intruders: the last one caught and shot — a large porcupine! Central Mass. bulletin replete with info on NTS and ARES topics de W1DOY, DX and dietetic goodies, new members, and lesson En Français. Over 1200 runners in Charlie's 10 mile road race, radio controlled by K9ES, check points W1SPG, K1SE, K1COW, KA1FP, WA1EV, WA1FVX. W1ATFN WA1VVF WB1ABA WB1FBZ W1HFI. Also in the "racing", the No Worcester ARES unit, Leonmaster to Fitchburg race, radio assists K1JHC NCS. W1JTL N1AZG WA1GXN WA1DWS WA1KPO WB1FCV N1OGG W1UD. Two more WMA bits. W1NJM checked into WMN with thru tic and then to 1RN with his mimitable code finesse: WA1OPN awarded most deserved QTS. PSRR: K1JHC WA1MJE W1TM. Traffic: WA1MJE 510, W1UD 343, W1TM 175, K1JHC 70, W1KK 62, WA1OPN 34, WB1HIH 30, W1BVR 26, W1EFG 26, WA1YYW 26, W1UPH 16, W1ZPB 16, WA1DNB 11, W1JP 7.

NORTHWESTERN DIVISION

ALASKA: SCM, Fred Wegner, KL7HF — KL7JFT, Juneau EC, reports Comm Plan is up and running and has 10 ARES teams good work! AL7AW, Anchorage EC has the organization growing, final report later. KL7P & KL7Q moved to lower 48. Alaska's loss; they both did a fine job here. KL7BJD is living in Anchorage Pioneer's Home and is looking for her old friends on the air, look for her on 14.292. KL7JUL is new prexy of Anc ARC & KL7JIG is Veep. KL7AA originated 1738 messages at Mother's Day Bash. Congrats to AL7D, appointed STM. Alaska State Troopers 1000 mile relay race was well supported by hams from Anchorage and Fairbanks. AL7AC did a bang up job of supervising and coordinating. The annual Yukon 800 is coming up and we expect the same fine support. The Alaska hams really turn out for community support.

Net	Sess.	QNI	QTC
ALASKA BUSH			
ALASKA PACIFIC	21	1034	118
ALASKA SNIPER	31	621	205
SEASAW	22		22



The Robot Model 800 SUPER TERMINAL

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The Model 800 Super Terminal offers a complete list of features and capabilities, including our built-in demodulator, all in one package that connects directly with your amateur station's transmitting and receiving equipment. All that's needed to have a complete operating system is the addition of a standard TV monitor.

BAUDOT/ASCII OPERATING FEATURES

DISPLAY: Full 24 line by 72 character standard TTY display.

WORD MODE: Transmits a complete word each time the space bar is depressed. Any mistakes made in the word can be edited out prior to transmission.

LINE MODE: Transmits an entire line when the carriage return line feed key is depressed. Allows editing of the entire line prior to transmission.

AUTO START: The Model 800 writes characters on the screen only after detecting the presence of an incoming RTTY or ASCII data signal. This prevents printing of unwanted random characters on the screen while tuning or during gaps in reception.

PROGRAMMABLE WRU (WHO ARE YOU) AND SELCAL FEATURES: Upon receiving a user programmed 8 character code, the Model 800 will automatically key the transmitter and transmit one of its 64 character (HERE IS) messages. Upon receipt of the user programmed 8 character SELCAL code, the Model 800 will automatically go into receive mode and store up to a full page of received information in its display memory.

HERE IS: The Model 800 has two 64 character programmable HERE IS messages.

ON SCREEN STATUS INDICATOR: A status line at the top of the screen tells the operator exactly which combination of operating modes have been selected.

ON SCREEN TUNING INDICATOR: Accurate tuning is an absolute requirement for accurate trouble-free reception during poor signal conditions. The best results are obtained when the output of the mark and space discriminator filters are equal in amplitude. The on screen tuning indicator in the Model 800 is the "plus-plus" type, which provides this information.

CURRENT LOOP KEYS FOR HARD COPY PROGRAMMABLE NARROW SHIFT ID

DEMODULATOR: The demodulator built into the Model 800 is superior in quality to any RTTY demodulator offered on the market. The key feature which makes this claim possible is the use of separate two tone active discriminator filters for demodulation of the RTTY signal.

ADDITIONAL ASCII OPERATING FEATURES: The Model 800 will send and receive ASCII at 110 baud. It has all of the transmission and editing features of the RTTY mode.

SIMPLE TO OPERATE

One of the most important features to keep in mind with the Model 800 is that all functions that are used frequently are easily accessed by the user. Many competitive units boast elaborate features which are either not used in amateur operation or that require complicated access procedures which make them inconvenient. All of the frequently used control functions in the Model 800 are either associated with a key which is labeled with the function, or have silkscreening above the key which describes the function.

MORSE CODE OPERATING FEATURES

OPERATION: The Model 800 has all of the transmission and editing modes of RTTY during Morse code operation.

MORSE AUTOTRACK: The Model 800 automatically tracks incoming code without manual speed adjustment. The speed range for transmission and reception is 3 to 99 words per minute.

SIDE TONE OSCILLATOR: The Model 800 has a built-in side tone oscillator so that the operator can listen to incoming code as it is interpreted by the computer.

MORSE CODE TRAINER: The Model 800 can be set to generate random five letter groups of characters at any preset speed for Morse code training purposes.

SPEED INDICATOR: In addition to all of the other functions, the status line in the Morse code mode indicates the speed of the incoming code.

SSTV GRAPHICS OPERATING FEATURES

The ROBOT Model 800 allows alphanumeric characters to be typed in an SSTV format, displayed on a TV monitor, and transmitted as a normal SSTV picture. This eliminates the need for "menu board" or hand-lettered SSTV pictures, thereby freeing up the slow scan camera or scan converter for other operations.

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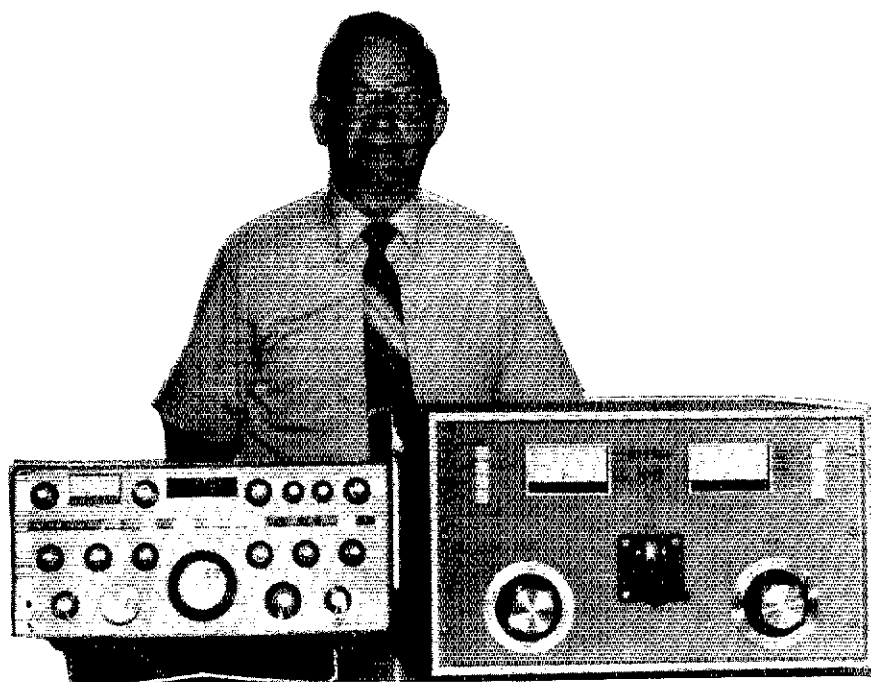
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- SELECTIVITY: Two 8 pole plus one 4 pole filter deliver 20 pole 1.4:1 shape factor (6dB/60dB), plus post detection 1.5, 1.0, .4 and .1 KHz band width.
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- Filter Capacitor: oil-filled, 25 mfd
- QSK CW: Full break-in, (2) vacuum relays
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IDAHO: SCM, Lem Allen, Jr. W7JMH — From the Kootenai Club Bulletin: WA7BDD and WA7BDC visiting Pasadena for daughters' college graduation. W7LOI won the grand prize at the Spokane hamfest — a new 2 meter rig! K7UBC and K7PPV visiting the coast. AD7N back from Dayton Hamvention — 168 exhibits! The Pocatello Club reports much interest in Field Day planning. South Pole slide presentation. Their repeater was down a few days due to power supply problems. People and things: Welcome to new Novice KA7HJF. AA6E/L7 has first place certificate for Idaho in the 1979 IARU Radiosport Championship. Congrats to K7CXG now Advanced!

Net	Freq.	Time	Sess.	QNI	OTC
FARM	3935 ssb	8 P.M. Dy	31	1304	68
CD	3930 ssb	8:10 A.M. M-F	22	652	18
IMN	3935 cw	9 P.M. M-F	21	207	122
ID FLS EMG	146.3494	F-M	4	56	0
MINI CASSIA	146.52/52	F-M	4	10	1

Get yourself and your station prepared for any emergency. Traffic: W7GHT 219, AC7P 82, W7JMH 47.

MONTANA: SCM, Robert Leo, W7LR — WA7OBH has WAZ, & 236 countries. RACOM VHF mtg Helena May 10th results: K7GQI, chmn.; WB7ETT, vice chmn.; W7WYG, secy. Treas. K7NM presented link plan, and plan for 220/450 tests 26 July & 9 Aug 1 P.M. MDST. Get new rpt sanction forms from K7GQI. WB7UTJ N7AFE & many others had yard & bake sale near Glendive & Sidney for their repeater fund. W7IDK Havre reports c.d. base improvements. W7TGU reports: MTN Apr QNI 1069, QTC 93; May QNI 968 QTC 104; lots of volcano traffic. IMN Apr QTC 85 QNI 262. On May 9 N7ANR N7AIK KB7BJ W7LR Q51 to Steamboat Mtn for work party. KA7EA reports lot of 2 & 8 mtr activity with les on May 14 15 20 23 25 26 29 to 30; hit 29 states. Also he rec'd OSCAR 1000 award, FB, WB7FBW designed FB QSL for Gallatin hams & ham club, expects printing 19000! Butte & Bozeman clubs plan MT QSO party 4 to 6 Oct. W7LR DX totals mixed 291300, cw 262271. Billings club has new MT callbooks available. See you all at the summer hamfests and conventions. IMN QNI 207, QTC 122. Traffic: (May) W7TGU 318, KB7BI 145, W7IXD 70, W7DEO 60, WB7TNH 41, W7NEG 22, K7CHY 8, W7JMX 5, W7LR 5, W7DB 2, W7LBK 2. (Apr) W7TGU 350.

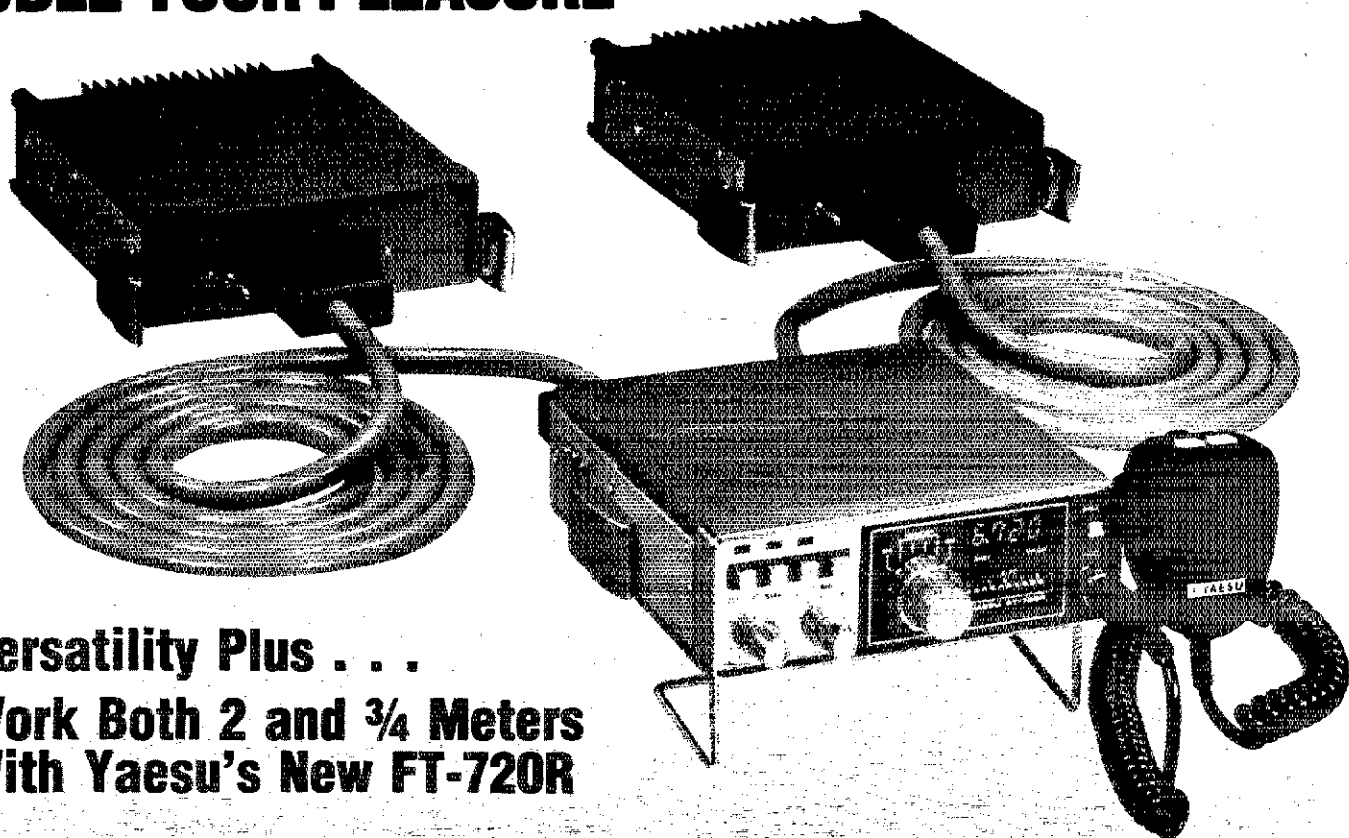
OREGON: SCM, Dale T. Justice, K7WWR — SEC: K7OLN. STM: W7VSE. Section nets

Net	Time	Days	Freq.	QNI	QTC	Mgr.
BSN	0045Z	Dy	3908			WB7PQU
OSN	0130Z	Dy	3587			K7JWV
PdxAARES	0230Z	Dy	147.32	728	58	K7WWR
PTN	0200Z	Dy	146.4	60	126	W7LRB
QARES	0130Z	Dy	393.5	283	94	W7HLF
JCARES	0215Z	Th-Sa	147.06	153	8	W7VSE
MPARES	0200Z	Mon/Th	146.85			WA7ZAF
SOFM	0230Z	Mon	146.64			W7FDU
WGN	0200Z	Dy	3702	384	153	K7ZIG

Mt. St. Helens dumped ash on NW Oregon May 25. A net was set up to track amounts of ash falling at different locations for local authorities. Over 50 amateurs stood by on city streets at midnight May 16th while a total changeover of telephone equipment took place in Hillsboro (18,000 customers). A good demonstration of capabilities was shown to city and county officials during the two hour period. Many amateurs helped with the Trask Mtn. motorcycle trials & Memorial Day weekend. Two emergencies were handled during the first day. KB7JW is new OSN Mgr. Welcome aboard. OSN has had 100 percent representation to RN7 so far this year. W7VSE is now the Section Traffic Manager. N7DB worked and heard lots of E-skip on 6 meters this month. He noted disturbed conditions during the Mt. St. Helens eruption May 18th. The Salem ARC toured Morrow Electronics. K7IOX now has his Extra. New Novice is KA7HID. Traffic: W7VSE 823, K7NTS 256, WA7IHS 106, KB7CD 86, W7LNE 39, W7LT 26, KB7JW 21, K7QPW 20, K7WWR 19.

WASHINGTON: SCM, Bob Klepper, W7IEU — SEC: WA7RWK. STM: W7DXZ. Nets reporting for May are: N7NCS QNI 1308, QTC 313; N7WSSB QNI 3045, QTC 313; NWSSBN QNI 662, QTC 61; WSN QNI 528, QTC 159; PSTS QNI 149, QTC 77; SCARES QNI 35, QTC 8. Not all reports are in yet, but I do want to thank the ARES and NTS groups and those individuals that pitched in to help during the Mt. St. Helens eruptions. I also want to thank those that were standing by to help but did not check in to the ARES H&W Net, but let me know by other means they were available. Some of the reports follow: W7GMC reports the Yakima ARES put in more than 200 hours and handled 458 pieces of traffic. W7JWJ and W7QGP handled 196 official Red Cross messages, 34 of them priority, 12 to hospitals; K7SH reports 12 to 15 amateurs manned 6 Red Cross evacuation centers and have plans to man 14 more in the Longview-Keto area on a 24 hour basis. During the eruption that hit the west side of the state, KA7GBR and his ARES group handled over 300 H&W messages in Lewis County. N7AFZ did yeoman duty as NCS on the ARES H&W Net the first day into the wee hours of the morning. W7ERH acted as NCS on the H&W net as did many others, but I have not heard from any others so far. DEC WB7QWC coordinated NCS stations from District 3 on the ARES H&W Net. WB7WOW handled H&W traffic and acted as NCS for 2 sessions on the H&W net. More reports in future columns. In the meantime, be prepared because no one knows if and when there will be another eruption. If it does, the same procedure will be followed. ARES will activate 350 for H&W traffic going out, with incoming after the outgoing has slowed down. Information will probably be given out on BawFaw repeater and 3987. Many stations near the mountain are keeping a watch and can be heard on BawFaw 147.06. KB3BL's program on "Non Ionizing Radiation" was well received by the West Seattle ARC at the April meeting. K7RBT and members of local club took part in annual Rhododendron Festival activities. PSTS Net has moved to the BEARS repeater on 145.33, times are the same. WB7QWJ has resigned as president of the North Seattle ARC due to his health. N7BDI has taken over the office of president. W7EQJ and W7KQ are SKs. W7BCS taking leave of QBS activities while attending school. WB7FP is now KB7G and is out of traffic nets with antenna for 80 meters down. Traffic: WB7WOW 1757, W7DX 1443, WB7TQF 720, K7GXZ 783, N7AFZ 237, W7FJZ 191, KL7IEB 170, W7GMC 148, K7FR 140, W7IEU 120, N7AJ 96, WA7BDD 65, W7GB 61, K7CIP 52, K7MGA 48, N7AFY 47, WB7BP 46, WB7CFH 34, WA7PHD 30, W7LG 24, W7BUN 19, W7APS 13, WB7QWC 7, W7ERH 6.

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25 watts	Power Output	10 watts
0.5 uV for 20 dB	Sensitivity	0.5 uV for 20 dB
quoting		quoting
10 kHz (-60 dB)	Selectivity	12 kHz (-60 dB)
12 kHz (-60 dB)		12 kHz (-60 dB)

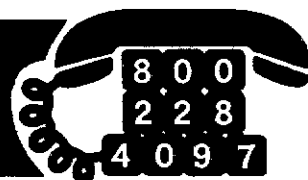
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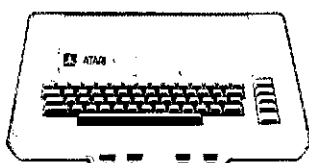
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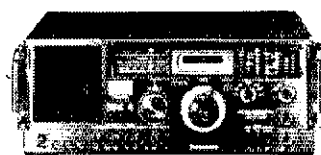
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A-144-20T	20-Element 2-mtr "Oscar" ant.	56.95
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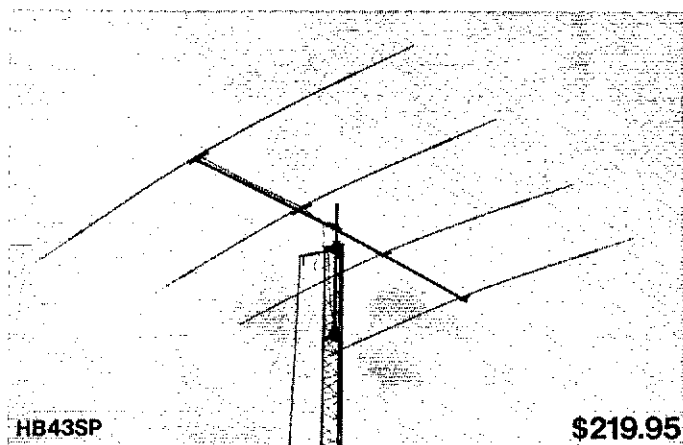
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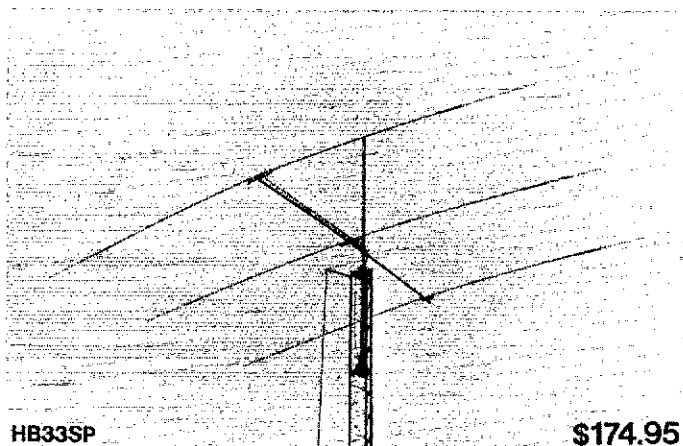
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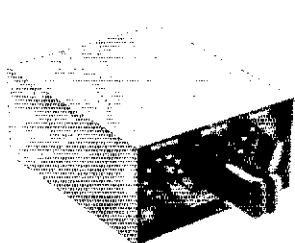
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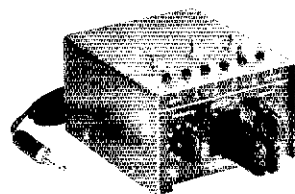
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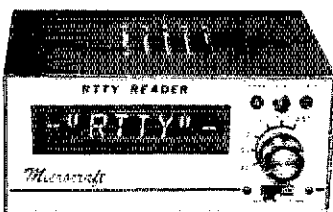
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PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W6RGG — Asst SCMS: K6UWR, W6ZF, VE3AGV/W6, SEC: W6BKOU, U. C. Berkeley's BEARS (Berkeley Emergency Amateur Radio Service) members provided communications for the third annual Lawrence Hall of Science Strawberry Canyon Run. K6XO WA6VEF KB6XN N6IG and I were at NPG on Armed Forces Day as part of the NCCC operator group. KA6EHF using a Microlog System on cw and RTTY. SBARA Nets: 145.80 Wed/8:30 P.M., 28.700 Sun/7:30 P.M., 28.150 Sun/8:00 P.M. Welcome to new EC for Southern Solano County. W66YYY MDARC's members provided communications for a trail ride with 100 horseback participants. The Run for Life with 1500 runners, and the Save Mt. Diablo Bike-A-Thon. Alameda County HACES provided communications for a Walk Around Lake Merritt for handicapped participants. All section clubs seem to be primed for Field Day — the QRM level will be mighty high! Traffic: K6UGS 43, W6BUZX 24, KA6ERF 10.

NEVADA: SCM, Ralph E. Covington, W7SK — ASGM: N7RH, SEC: WA7KCD. Las Vegas Club should have 3494 repeater autopatch system on the air by the time this is published due to the great effort of WB7URF AD7K W7OOF and WB7TRW. Field Day LVRAC Chairman was N7BPD. K7WYC busy putting up antenna system destroyed by Reno spring storm. Nevada Sagebrush Net meets nightly 7:30 P.M. on frequency on 3906 kHz. Items for publication in this column due by the first of the month. Traffic: W7BS 109.

PACIFIC: SCM, Pat Corrigan, KH6DD — SEC: KH6GKJ, STM: W6KON/KH6QJ. New EC, Guam, KH6FL. Amateurs in Guam should contact him and sign up for ARES, etc. KH6HJ went on another trip to "W." More stations getting on RTTY in Hawaii. Olomana rpt changing to 148.04.64 with all new equipment. 181.76 moving possibly to Mokuleia area. Mayor Fasi proclaimed Amateur Radio Week for Honolulu in June. Traffic: KH6JJP 26, KH6H 10, KH6HJ 4.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — SEC: W6BGFJ, ASGM: A6T, W6BNFY, the station at the Dept. of Social Services. Emergency Communications Center, was manned by WA6KGO WA6SEN W6BCCJ W6BROS and W6WGU during the eruption of Mt. St. Helens. Assisted by W6BVMK and the Disaster Preparedness Comm. Response Team from McClellan AFB, they handled 333 messages into the area. New netters for the J. L. Sabn Pioneer RC are: WA6NDZ, pres.; W6LVC, vice pres.; W6LEL, secy. W6VLY, trans.; W6BZV, W6BQJ, dir. The North Hills RC is donating 19 ARRL publications to the Carmichael Branch of the Sac. Co. Library. The Oroville RC had a club picnic at the Durham City Park. The Yuba/Sutter ARC participated in the Bi-County Disaster Drill. New calls: KA6KPZ and KA6GHI. KA6AWX is now KD6BO and N6AQR is KB6YX. Traffic: W6SX 28, W6DF 23, W6RSP 9.

SAN FRANCISCO: SCM, Art Samuelson, W6VV — SEC: W6BZRK, STM: K6TP, WA6ZHE traded in his Advanced for an Extra. Other upgrades are KA6EFK KA6ILU WA6OCA to Advanced, KA6ED KA6ISV (now N6CTL) and KA6JTA to General and KA6CDO to Technician. Also welcome new Novices KA6KXI KA6KXJ KA6KXK. W6GDN now KB6KW. EJS officers are WA6PYN, pres.; W6BKH, vice pres.; N6NE, secy/treas.; N6IG, trustee. The mayor of Sutter proclaimed the last week in June as Amateur Radio Week. Humboldt ARC had Field Day booth at Redwood Acres Fair. K6GWEIR was used for three public service activities recently, with K6LRN and W6BTKD planning two more such events for the club. W6RG enjoying new memory keyer. Congrats to W6RNL on another PSNR. Traffic: W6IPL 164, W6RNL 157, K6TP 63, K6JFY 31, W6GGR 2.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — SEC: WA6YAB. All clubs in the SJV are urged to notify the SCM of changes in officers, mailing address, or of any upcoming activities. Appointment renewed: OBS K6PSJ. The Fresno Hardest was a big success although attendance was down. W6BKWE won the TS 120, and W6XG won the ICA. The following were among the lucky: WA6RJR, K6Z, W6BZV, KA6PE, W6BZT, WA6YAB, WA6CDB, N6KE, K6OPE, W6DVL, W6QFR, W6BKO, WA6KZY, W6XP, W6LJK, KA6ITM, W6XG, WA6YYY, W6BIVZ, W6BTR and K6KMD. Congrats to the Fresno ARC for its top score among SJV clubs in Nov. SS. W6XP will now be on the DXCC Honor Roll. Congrats to W6BBIKT for his top score in the Novice Roundup. W6EPZ KA6AP KA6WD and KA6GKP are Advanced. KA6FYJ and KA6LUX are General. Be sure to attend the 1980 Pacific Division Convention on Labor Day weekend in Santa Clara. There are 4 months until the big 1981 Pacific Division Convention in Fresno May 16-18, 1981. Traffic: (May) N6AWH 240, WA6YAB 28, W6DPD 23, K6BDM 20, W6BTP 13, WA6JDB 8, W6BFRS 2, (Apr.) N6AWH 151.

SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: W6BIZF. New ECs W6PLT, San Jose and W6FMC, Santa Cruz. New member NPS ARC is WA6ODR. The stns handling tic as usual, W6BYV W6KZJ WA6UG and K6BML. A talk on switching power supplies by WA6LNV, was given to PAARA. W6WGD K6RB W6BHF W6OWF W6BGB and K6GDH are new with PAARA. Rpt on malicious interference was presented by WA6LJ. SPARK picnic was held at Coyote Park. New ARES roster for SCV now available from W6BIZF. K6BJR damaged by vandals. W6RYL W3AAS KA6KCI and K6GHA increased SCLARC roster. SCLARC enjoyed a big pot luck dinner and have plans finalized for Pacific Division Convention over Labor Day weekend at Mar. 10-12 in Santa Clara. Hope to see you all there — there is something doing for ALL the family. Info from WA6DXP. Congrats to the Gabilan ARC on becoming an affiliated club! By the time you read this, Field Day will be over and plans being made for next year — this is the one big effort for most clubs. FARS is planning its Novice class for the fall. Contact them if you wish to join. K6RU judged Home Brew Night at FARS and WA6NIL W6NBI N6BUA and NIL again for 1st-4th place. K6GJ had an antenna raising party. LERA ARC had W6TC as a speaker. Topic was "A New Class of Coaxial-Line Transformers." they also have a new tower and refurbished beam up. A talk by W6TC on "Basic Receiver Design" was given to SARC. W6PDD reports interest in a picnic for the GS Ladd Pioneer RC. See you in Santa Clara for the convention. Traffic: W6BYV 218, W6KZJ 116, WA6UC 72, K6BML 72, W6RFF 41, W6CF 2.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, AA4R — Asst SCM: N4UE, STM: K4VHT, SEC: WA4BFT, NM: JFQ WD4PDU, GN AB4S, Then WD4CNR. New SEC (John

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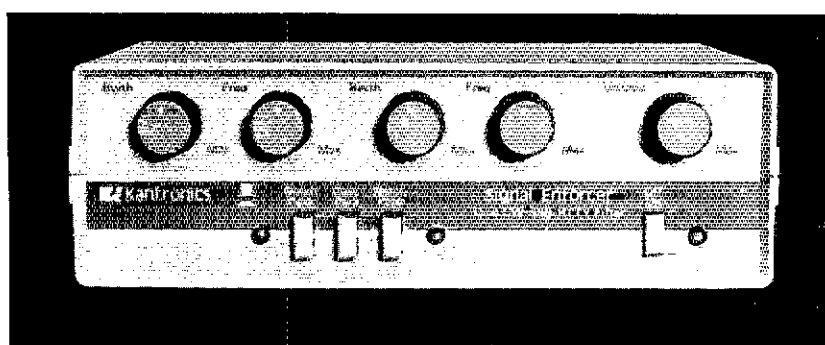
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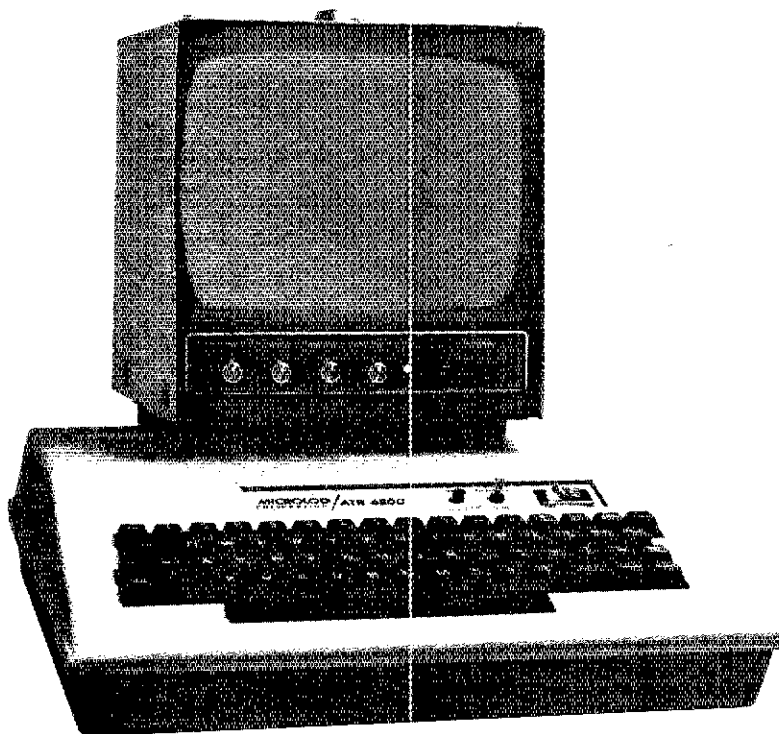
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Emergency Coordinator) is WA4BFT; all ECGs please contact him and update your ARES membership records. New Net for the Carolina (CN) is AB4 with K4GCN as Asst. NM. CN members please note it alternate frequency of the net is 7050 kHz. Congrats to the Fessenden ARC now an affiliated club of ARRL. Recent upgrades to Advanced include WD4HVS N4AU, K44BZG, N4ACI, N4ARZ, K4GHH, K44BZB, K44FC, K44UO & N4CJJ; to Tech K42GMR, Mecklenburg ARC (Charlotte) reports a number of members have been qualified as "Severe Weather Watchers" through attending classes conducted by the local Weather Bureau. Also the club donated \$1000 to the local American Red Cross Chapter, the second year in a row for such a donation. Brightleaf ARC (Greenville) now has its own office press for printing the club newsletter. Congrats to K4VHI, the first NC station to qualify for the ARRL new Public Service Certificate. New appointees include WA4JCS (GO) WB4HRR (EC, Catawba) N4BEX (E, Wilkes). Clubs are reminded to include the SCM on your newsletter mailing lists; this is the main source of news from around the section so be sure your editor helps out. Traffic: (May) AB4S 205, WD4CNO 178, WDBNYN 171, WB4WII 172, K4VHI 135, WB4VVL 121, WA4BFT 11, K4DHH 92, WA4SRD 95, W4VTP 65, WD4AIE 62, WD4CF 56, W4EAT 53, KU4W 52, K4VHO 46, WD4CNR 44, N4AE 43, W4FMN 43, K4TPK 43, WA4CUD 40, AA4R 41, KO4 38, WA4IHG 36, K4NLK 36, W4AGY 34, WD4PDU 3, WD4JJK 31, WA4QJL 30, K4CAM 27, K4FOV 2, WB4GCS 19, AA4OHY 23, WB4CYN 1, W4AUTG 18, N4ARY 16, W4EHF 13, K4ADNL 13, N4L 13, WD4JMZ 11, WB4FDP 7, WD4NAO 3, WD4ENB (Mar.) WB4WII 185, K4VHO 48, WA4LZD 42.

SOUTH CAROLINA: SCM, Richard McAbee, W4MTK, Asst. SCM, WB4UDK, SEC, K4VIA, STM, W4ANK, Inv. all who attended the ARES meet in Columbia, a good turn out. Congrats to all known Novices & upgrades. K44OGB, K44OGM, K44OGM, K44OGL, K44OJD, K44OJ, K44EYP, K44HPM, K44HOY, K44OVM, K44OOK, K44OP, K44OPR, K44PCF, W4MAF, W44KLU. Four new nets: 11:50 ARES Net, every 6th night, 7:30 P.M. on 3:03 MHz. 5:00 2-M Net, Daily, 0130Z, 147.089; SC 2-M SSB Net, Mon. 9 P.M., 144.250 MHz, Dixie Six M SSB Net, Sun. Wed. 9 P.M., 125 MHz. Won't you join them? Blue Ridge 2-M ARES busy with local SEI, included 7 schools, 7 hospitals, 14 ARES members on hand W/ on standby, congrats. Congrats to our new SFC, K4VIL Inv. for your cooperation. Checkins/Traffic: SC SSB Net 1546203; Blue Ridge 2-M Net 120741; Lancaster county 2-M Net 159118; Western SC Emergency Net 1471; Newberry County ARES Net 5:35; Carolina State Lin Net 5:13; Laurens County 2-M Net 3210; CNN 225550, 1; dent ARC ARES Net 6210; Dixie 6-M SSB Net 1710; SC 2-M SSB Net 2010. Traffic: K4ZN 467, W4ANK 154, W4FM 137, W4NTO 118, N4BCD 56, WB4MXW 49, WB4UDK 4, K44AUR 42, K4PRX 42, W4ODF 37, W4MTK 36, W4NOC 30, WD4BUM 28, K4VIA 26, K4LYU 20, AF4E 1, WB8TC14 10, W44VYS 9, WD4EDM 8, WD4UDL 4, N4E 4, K4KLP 1.

VIRGINIA: SCM, Rick Genter, K4BKX — ASGMC; Bud Smith, W4YC & Bill Stone, N4NK, SFC, N4AZL, SFC, W44STO, Chief OC, W4HU, Chief OVS, N4CD. Net: KHz Time-P.M. Sess. QTC QNI Mgr. VNTN 3907 Noon 31 145 355 N4LE VSBN 3947 6:00 31 383 545 N9ASX VSN 3680 6:30 29 166 312 WB4KS VLN 3680 7 & 10 31 449 826 KB4N VLN 3947 10:15 31 193 596 WA4YIU

Many thanks to WA4STO for compiling the traffic stat this month. Remember that from now on your traffic reports go to the STM (WA4SIO) and NOI to the SC (K4BKX). W4LXB received his QCWA cert. and participated in a 2 hr SEI conducted by Roanoke. W4VVG in FL. N4NKK is busy with his new ID and getting in the crops. N4IF has new 300 hour ASCU and is rebuilding a solid state RTTY. WA1VRL is back from FB vacation. 1-Land, W4KX is in Europe for 6 wks. W4JUI attend Ohio State Univ. class of '35 reunion. W4NWM says his new IHEJXX is easier to keep than his old 4 el quad. KB4N wore out his Triton; now has new Omron. WB4UHC's First Colony ARES group provided comm. in the Newport News Spring Thing. K44BOK is a new Fxt and is awaiting new call — congrats! EC, KM4X reports that Smyth Co. hams are preparing for Field Day. A good time was had by all at the Roanoke Valley and Manassas Hamfests — hope to see everyone there again next year. Members of the Old Virginia Hams Ass provided comm. for the 5 and 10 kilometer RUN sponsored by the American Heart Assn. Don't forget the Shenandoah Valley Hamfest at the Berryville Fairgrounds on Aug. 3rd. Arrangements are being made to avoid the conflict in dates of SEI and the ARRL section convention. There will NOT be a conflict. Details follow. WA4RES is the new editor of the Virginia Ham. To get your copy, contact treas., K4VWK, K4BKX or WA4FDV have about completed their move and plan to be back on the air soon. Traffic: WA4CCK 566, KB4 421, WA4STO 414, WB4PNY 412, W4JK 368, W4SQQ 3, WA4LJ 323, K4KNP 273, N4GIR 237, K44BOK 2, K4LGA 164, W3BBN 158, N9ASX 147, WB4FLT 12, N4AZL 112, W44YU 111, K4UH 108, N4N 102, WD4FTK 94, W4UQ 92, N4YO 91, N4IF 90, K4JM 8, AA4CK 80, N4LE 77, W4SHJ 66, W4NWM 66, W3BBQ 44EJ 57, K4GR 55, W4CEU 36, W44QWC, K4BKX 30, K4W 30, WB4KIT 28, W4QKN 28, W4JAZ, WB4UHC 25, K44FTG 23, WB4ODZ 23, W4LXB 2, WB4MAE 21, K4BOF 21, W4YVG 20, WB4DOZ, WD4FUV 16, W4AISA 14, KM4X14, WB4ZWI, K4AXF 13, WB4RWY 13, K4VWK 12, W4CFV 11, W4K 11, W4YE 10, WD4DUU 8, W44DNR 7, WA1VRL, WB4SHK 6, N4ATT 5, W4WWQ 5, K4JRT 4, W4TZC, W4DM 3, WB4ZNB 3, N4BHI 2, N4DW 2, WA4PBG, N4OT 1.

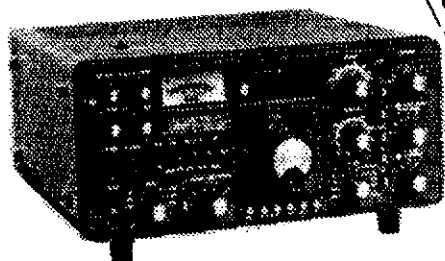
WEST VIRGINIA: SCM, Karl Thompson, K8KT — ST, KC8C, SEC, K8DEW, NMS: W8FZP, K8MHR, K8C, W8DLY, W8WVM, W8NDY, W8WCK & W8PAD conducted an Upshur Co. comm. test for local emergency services. New ECGs are: K8BX, Raleigh Co: W8DOR, Marshall Co. Hunt. Fest was enjoyed by all, congrats. KBOM & W8BCUR, Jackson Co. H. F. will be at Ged Lakes on Aug. 10. Bluefield H. F. at Brush Fork arm on Aug. 24. Phone Net with 514 ck-ins, 103 messages. Midday Net, 231 ck-ins, 48 messages. Bk, Dia. 2 M N 29 ck-ins, 4 messages. CW Net with 171 ck-ins, messages. WV Hillbilly with 144 ck-ins and messages. Traffic: KC8C 171, WB8TDA 99, WB8ZA, W8FZP 26, N8AJC 25, W8JWX 15, W8CAL 14, W8CKX, WB8UDY 10, K8BX 10, W8DHC 4, K8JQ 4, K8ETV, W8NDY 1.

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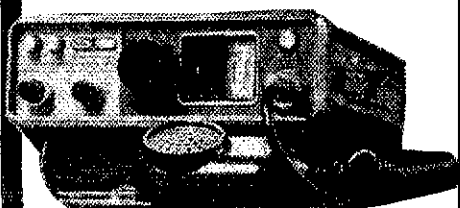
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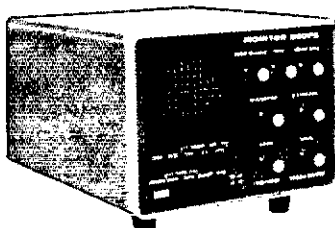
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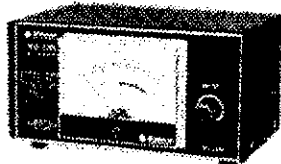
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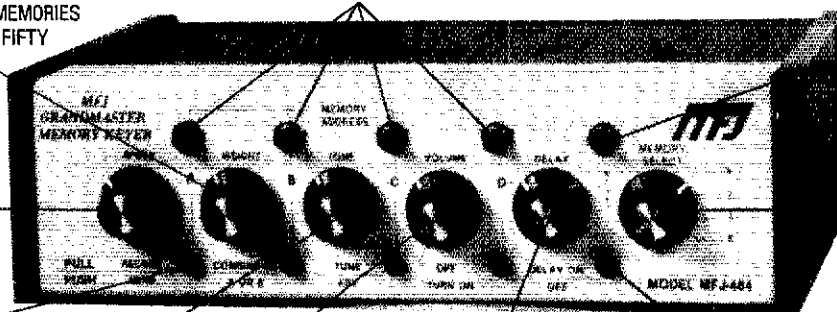
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LEDs (4) SHOW WHICH MEMORY IS IN USE AND WHEN IT ENDS.

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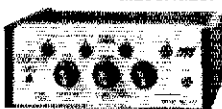
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ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Robert W. Poirer, K0DJ — SEC. W0ACD STM: W0BMLC, NM: K0CNV W0HWHI K0BZ W0DPAIT. Clubs recently obtaining ARRL affiliation are the Clements ARC and the Rocky Mountain Radio League. SEC. W0ACD, reports much ARES activity on Eastern Slope but still in need of FCC for several western and southern counties. If interested in an appointment, let either W0ACD or myself know. FCC news states that standard bandwidth limit will soon be legal on 50.1 to 54 MHz which modifies rule 97.65c. In other news, no new licenses will be issued for new clubs, RACES and military stations. Clubs, RACES and military recreation stations now holding licenses will be allowed to keep them. W0GW going to Phoenix to enjoy the hot weather for a few weeks. Congrats to W0GC new Life Member ARRL and new ECs N0FS and W0QCKG for Districts 1 and 19. Net lic: GWN 31 sess. QNI 139, QTC 725, QNF 918; Hi-Noon 31 sess. QNI 1408 QTC 211, internal 255, QNF 1235. Traffic: (May) W0BQZ 1840, W0AHJZ 1583, W0WV 1077, W0LAE 299, W0DPAIT 159, W0FE 106, K0DJ 106, W0HXB 72, K0BZ 72, W0GO 67, W0VLA 50, W0BUE 41, W0NFW 21, W0GW 22, W0LO 18, (Apr.) W0AHJZ 2973, W0EJD 17, W0AYNP 118, W0HXB 90, W0QDNM 63, W0LO 18, W0BUE 18, W0TX 8.

NEW MEXICO: SCM, Joe T. Knight, W5PDY — SEC. W5ALR, NMs: W05AHH & K05L. Southwest Net (SWN) meets daily on 3583 kHz, at 1930 local and handled 19 msgs with 203 stations in. New Mexico Roadrunner Net (NMRRN) meets daily on 3939 kHz at 1800 local and handled 203 msgs with 938 stations in. New Mexico Breakfast Club meets daily on 3940 kHz at 0700 local and handled 112 msgs with 737 checkins. Yucca 2-Mtr Net handled 7 with 433 checkins. Many Santa Fe, Los Alamos and Albuquerque hams reported a fine time at the Hyde State Park picnic. Lots of SAR activity the month with many rescues from the muddy Rio Grande river. Traffic: K05L 272, W5ENL 160, N5NG 141, W5JQ 97, AGSS 42, KA5DDW 38, K5MAT 19, W5BWW 16.

UTAH: SCM, Royce Henningson, K7OEQ — SEC. W07FCB, STM: W7OXC. It was a busy month for the amateurs in the state with Memorial Day and the weekend one of the busiest. A group of SLC amateurs were in a race. N7AOM K7R, W07ATO K7GLP, K7B7N, W07CGN, W7RF, W7A7NQN, while another group provided communications. In another part of the state, hams from SLC and Moab set up communications for the annual Friendship Cruise that takes place on the Green and Colorado Rivers, on a 196 mile course through deep river canyons with only two points where boats can be removed from the river before they reach Moab. W7MTF and K7BZ set up the station in Mineral Canyon, 30 miles from Green River, UT. W7ARK and K7DOU set up at MGM, 100 miles from Moab, and K7CGN was aboard one of the rescue boats. The Moab station, K7OEQ, was set up near the docks and had the following amateurs help out: W07VVA, W7B7M, W7AWK, W7UQM, W7DTP. There were 55 calls for rescue to remove broken down boats. One forest fire reported and a helicopter rescue and one drowning on the 4th event. There were 228 boats on the trip. W04NVO was appointed an OVS and OD. Traffic: K7HLR 277, W7ME 107, W7RO 40, N0AHA 32, W7OXC 16, AC7K 8.

WYOMING: SCM, Chester C. Stanwalt, W7SDA — As SCM: K7IKO, SEC: W7EIN, STM: W7SGG, NM: W7NHR, W7WFC, W7LYA, W7EYA received official appointment as manager of TWNE from ARRL 22 May. W7LYA has appointed W7GYQ as his assistant. Twelfth Region Net (12WN) evening meets daily 7:00 PM (summer), 5:30 PM (winter), 1800, congrats. W7BBO, new loc in Cokeville and W7QPA and K7QPA and K7HAI new Generals. W0PFJ reports Wyo Jackalope Net held 27 sess, with 626 QNI, 1 QTC, W7NHR reports Wyo Cowboy Net held 22 sess, with 719 QNI, 23 QTC. Traffic: (May) W7LYA 497, W7GYQ 156, K7KSA 154, K7VVA 78, W7NHR 30, K7FTK 21, K7SLM 12, W7SGG 10, W7SOT 10, (Apr.) W7LYA 389.

SOUTHEASTERN DIVISION

ALABAMA: James M. Bonner, K4UMD — SEC. W4IBB Birminghamfest '80 was a big success. BARG gave out hams a good hamfest, with the FCC there to administer tests. W0BQ winning the \$180, congrats. Don't forget HARC Hamfest Aug. 17th at Van Braun Civil Center in Huntsville. First time in this civic center will be a good one. Montgomery Hamfest will be in Sept. civic center in Montgomery, see you there. AEN manager reports 50 QNI, QTC 100 with liaison W4BEH, W4DQCF, AEND CW Slow Speed Net 143 QNI, 31 sess, 40 messages. AENB Regular CW Net QNI 244, QTC 10, 678 messages. AENM Phone Net QNI 2501, QTC 261, sess. CAND reports AL 100 percent into DRN5 1. W4CKS K5D14, W4AJDH, W4ARAY, K4VCL, W4AOF, Cullman Radio Club was assigned AENF, they meet on Tuesday. AENJ QNI 547, 30 sess, 8 messages. New members: HARC: W4AGS, W4GSW, N4VY, K4ALUF. New officers: BARG: K4ELV, pres.; W4BYM vice pres. New officers: HARC: W4BOK, pres.; W4FVC, vice pres. Field Day was a great success, no problems and old ones. We all see the need for a drill in emergency preparedness. Thanks for all who participated. Traffic: (May) W4AJDH 1302, W4CKS 14, N4CCT 110, W4ARAJ 83, K4AOZ 44, W4DHI 44, W4IE 27, W4AZPZ 25, K4UMD 21, W4ARMP 13, AA4J 1, K4JNX 8, K4AEWD 7, W4AJPK 7, W4AEKJ 6, W4ATVY, K4GGS 3, (Apr.) K4AOZ 82, W4AZPZ 78.

GEORGIA: SCM, Eddy Koschurki, K4JNL — SEC. K4VHC, SEC: K4SWJ, ASEC: W4HXE, STM: W43NAZ, Net Freq. (time tail ED) Mch. GGN 3995 0700 Dy 0800 Su K4DMK GSN 3995 1900 & 2200 Dy W4WXA GTN 3118 1815 Dy Vacant GSSRN 3975 1930 Dy W4ZVX ARES 3975 1700 Su W4ADIV GA TFC "A" 1243 1200 Dy W4GH GA TFC "B" 3957 1800 Dy W4GH GERN (RITY) 3620 2030 Fri W4AZHC Because of additional family & business interests W4AZQJ had to resign as NM of GTN. Many tx for the super job you did during your tenure. KAXA proud wearing his long awaited DXCC pin. Savannah has no emergency setup tx to the continuing efforts W4KGP. Convers AR Group continues to grow & has FB emergency plan. Central GA Skywarn Net now really Macon, Dublin, Warner, Robins, Milledgeville, Thomasboro, and continues to grow the line and coverage. Columbus ARC kept busy with horse shoe parathons & one hole golf classic. ARES net continues to grow, tx to NCSs and section members. Plea

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PSC	Same w/chgr. & clip	2	9.95	6.95
2CSD	D Size	2	6.49	4.45
2DH	Same w/chgr. clip	2	7.49	5.25
PSD	Same w/chgr. & clip	2	10.95	7.65
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Pace-Traps

Five new Scanners! New 800 MHz!

Communications Electronics, the world's largest distributor of radio scanners, welcomes the addition of Fanon to our product line. Fanon introduces two new high performance hand-held scanners. More importantly, Fanon has a complete selection of useful accessories to complement their Slimline models.

Electra Company, manufacturers of Bearcat brand scanners introduces three new scanners including a model that can monitor the exciting 800 MHz. band. The new Bearcat models will be available Fall, 1980, so reserve your scanner now!

A new product made by Electra, the Freedom Phone® is now available from CE. This is the ultimate cordless extension phone that can make and take your calls.

Bearcat® 300

The Ultimate Synthesized Scanner!

Allow 90-120 days for delivery after receipt of order due to the high demand for this product.

List price \$519.95/CE price \$339.00

4-Band, 50 Channel • Service Search • No-crystal scanner • AM Aircraft and Public Service bands • Priority Channel • AC/DC Bands: 32-50, 118-136 AM, 144-174, 421-512 MHz. The new Bearcat 300 is the most advanced automatic scanning radio that has ever been offered to the public. The Bearcat 300 uses a bright green fluorescent digital display, so it's ideal for mobile applications. The Bearcat 300 now has these added features: Service Search, Display Intensity Control, Hold Search and Resume Search keys, Separate Band keys to permit lock-in/lock-out of any band for more efficient service search.

Bearcat® 250

List price \$419.95/CE price \$279.00

50 Channels • Crystalless • Searches Stores • Recalls • Digital clock • AC/DC Priority Channel • 3-Band • Count Feature.

Frequency range 32-50, 146-174, 420-512 MHz. The Bearcat 250 performs any scanning function you could possibly want. With push button ease you can program up to 50 channels for automatic monitoring.

Bearcat® 220

List price \$419.95/CE price \$279.00

Aircraft and public service monitor. Frequency range 32-50, 118-136 AM, 144-174, 420-512 MHz.

The Bearcat 220 is one scanner which can monitor all public service bands plus the exciting AM aircraft band channels. Up to twenty frequencies may be scanned at the same time.

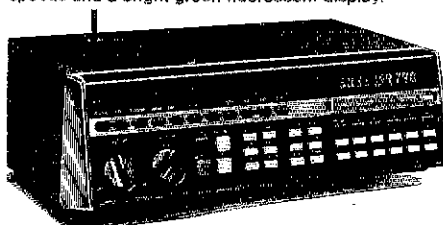
Bearcat® 211

List price \$349.95/CE price \$229.00

Frequency range: 32-50, 146-174, 421-512 MHz. The Bearcat 211. It's an evolutionary explosion of features and function. 18-channel monitoring. With no-crystal three-band coverage. Dual scan speeds. Color-coded keyboard. Even a digital clock. All at a modest price. More scanning excitement than you bargained for.

NEW! Bearcat® 210XL
This is a new model. Shipments will begin in Fall, 1980. List price \$319.95/CE price \$219.00

18 Channels • 3 Bands • Crystalless
Frequency range: 32-50, 144-174, 421-512 MHz. The Bearcat 210XL scanning radio is the second generation of the world's best selling crystalless programmable scanner—the Bearcat 210. It has almost twice the scanning capacity with 18 channels plus dual scanning speeds and a bright green fluorescent display.



NEW! 50-Channel Bearcat 300

Bearcat® 210

List price \$319.95/CE price \$209.00

10 Channels • 3 Bands • Crystalless

Frequency range: 32-50, 146-174, 420-512 MHz. Use the simple keyboard to select the 10 channels to be scanned. Automatic search finds new frequencies. The 210 features patented selectable scan delay, push button lockout, single antenna, patented track tuning, AC/DC operation. With no crystals to buy. Ever!

NEW! Bearcat® 160

This is a new model. Shipments will begin in Fall, 1980.

List price \$279.95/CE price \$199.00

16 Channels • 3 Bands • AC only • Priority

Dual Scan Speeds • Direct Channel Access
Frequency range: 32-40, 144-174, 440-512 MHz. The Bearcat 160 presents a new dimension in scanning form and function. The keyboard is smooth. No buttons to punch. No knobs to turn. Instead, finger-tip pads provide control of all scanning operations, including On/Off, Volume and Squelch. Green easy to read fluorescent display. Requires (2) 9 Volt batteries to retain memory when disconnected from AC Power.

Bearcat® 12

List price \$179.95/CE price \$119.00

10 Crystal Channels • 3 Bands • AC or DC

Frequency range: 33-48, 146-174, 450-512 MHz. More features, more channels, more action. The Bearcat 12 has automatic squelch, individual lockout and more.

NEW! Bearcat® 5/800 MHz

The world's first 800 MHz. scanner!

This is a new model. Shipments will begin in Fall, 1980.

List price \$179.95/CE price \$129.00

8 Crystal Channels • 4 Bands • AC only

Frequency range: 33-60, 144-174, 440-512, 806-870 MHz. The Bearcat 5/800 MHz is the only scanner on the market today that offers coverage of the 800 MHz. public service band and the other public service bands. Individual channel lockout. Scan Delay. Manual Scan.

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List price \$129.95/CE price \$94.00

8 Crystal Channels • 3 Bands • AC only

Frequency range: 33-50, 146-174, 450-508 MHz. The Bearcat 5 is a value-packed crystal scanner built for the scanning professional — at a price the first-time buyer can afford. Individual lockout switches.

Bearcat® Four-Six ThinScan™

List price \$179.95/CE price \$119.00

Frequency range: 33-47, 152-164, 450-508 MHz.

The incredible, new Bearcat Four-Six Thin Scan™ is like having an information center in your pocket. This three band, 6 channel crystal controlled scanner has patented Track Tuning on UHF, Scan Delay and Channel Lockout. Measures 2 3/4 x 6 1/2 x 1 1/2. Includes rubber ducky antenna.

NEW! Fanon Slimline 6-HLU

List price \$169.95/CE price \$109.00

World's smallest 6-channel, 3-band scanner!

The new Fanon Slimline 6-HLU gives you six channels of crystal controlled excitement. Unique Automatic Peak Tuning Circuit adjusts the receiver front end for maximum sensitivity across the entire UHF band. Individual channel lockout switches. Frequency range 30-50, 146-175 and 450-512 MHz. Size 2 3/4 x 6 1/4 x 1 1/2. Includes rubber ducky antenna.

NEW! Fanon Slimline 6-HL

List price \$149.95/CE price \$99.00

6-Channel performance at 4-channel cost!

Frequency range: 30-50, 146-175 MHz.

If you don't need the UHF band, get this model and save money. Same high performance and features as the model HLU without the UHF band. Order crystal certificates for each channel.

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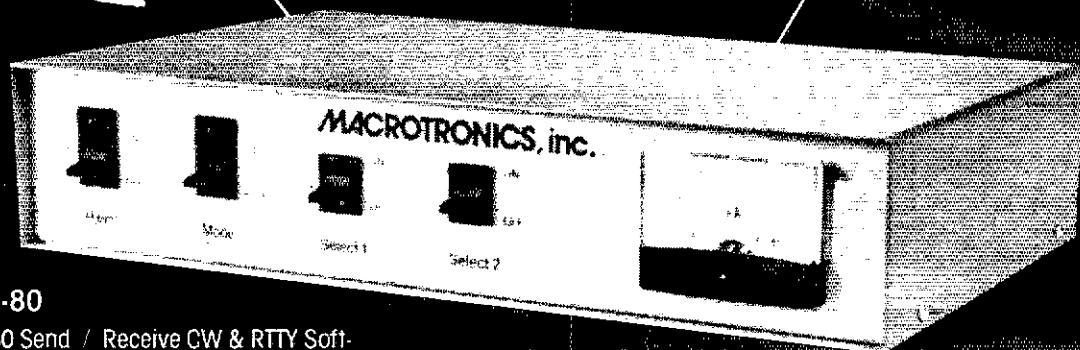
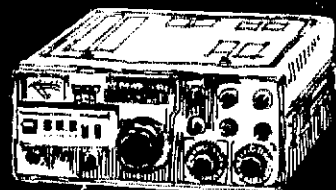
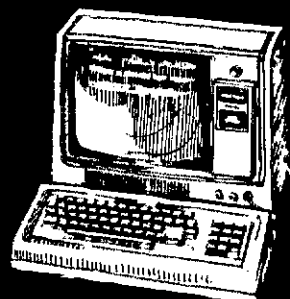


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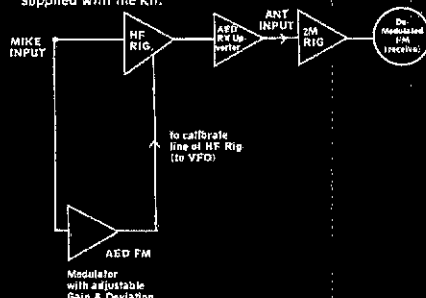
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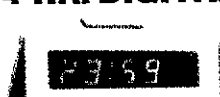
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checkin with us on Sun at 1700. GSSBN annual picnic on Sat., Aug 2nd at Madison. WB4TVX invites you to attend for a day of fun. Will the wrestling match between WB4DRM & WB4MH finally come off, come to the picnic & see. BGMRG in Newnan coming members busy with FB side. One way to get quality ops is for the Old Times to take time to teach the newcomers. Please do it in a professional manner. When writing letters to the League, please send them directly to them. Enjoyed sessions with W4RH K4UMD & W4IBU at B'ham. The team of K4AFVU & W4MOY displaying Gold Cup won in the 1980 YL-OM contest. Congrats on 2nd place WW & 1st in North America & US. New calls: WB4RRG now KW4M, WB4UFY now KC4DK. See you in Madison at the picnic. Don't forget Aug the 2nd. Traffic: (May) WA3NAZ/4 231, W4WXA 183, K4AZM 150, W4GH 98, WD4IYV 57, WD4ADV 52, W4ELO 49, K4EV 40, WB4ZVX 37, N4UJZ 32, W4FIZ 31, W4HON 19, K4BAI 18, W4BIA 17, K4JNL 16, N4BKV 9, A4AGA 8, K4PIK 4, AK4T 4. (Apr.) K4VHC 76, WD4LV 75.

NORTHERN FLORIDA: SCM, Fred Marchman, A44FG — STM: N4WA NM: WD4HX N4BZH N4WA. As of the time this is being written the big push is for Field Day. Judging from reports, FD participation is going to be at the highest level ever. Gull Coast ARC put on a demonstration for the local Red Cross, setting up portable and discussing Hurricane Frederic with KB4VJ in Mobile. Al. Red Cross shelter drill is scheduled for June 7th. A 40 ft. crankup tower has been acquired for the portable tower project. Congrats to N4BBY on earning BPL Medallion. W4UJL has resigned as EG for Orange County on Drs. orders. He has done an outstanding job and has been the major factor in N. Florida's good showing in the SEI. ORG picnic and swapfest scheduled for June 21. OBAA's 2nd Annual Funfest was great. Success with biggest ever attendance at new location. Putnam Co. picnic May 17 was enjoyable affair, with portable station set up by FG, K443U. He says this will be an annual affair. K4DDY honored by North Florida ARS for his years of instructing amateur radio classes. FB: Jax Hamlet planning coming along great, and a highly successful affair is anticipated in the new quarters. Hernando ARA planning emergency test June 18. FD location is at P-H Community College. WB4FVO, c.d. Director, has planned a series of Weather Watch programs. Lake Monroe ARS will hold FD at Sanford airport. "Florida Traffic Handlers Guide" is being revised by W4YU and Florida Skip Staff and should be out soon. Congrats to new Adv. K44HCL KC4C5 N4BFY W4WGR, K44NSR. Notice to Adv. in one without also to new Tech. W4DOH. Traffic: (May) WD4HIF 1156, N4PL 451, WD4HXS 265, W44CR1 262, A44FG 208, WB4TZR 192, KF4U 164, W4FZX 163, N4BZH 83, W4MGO 71, WD4NC 67, WB4FJY 66, W4JL 62, W4EYU 61, WB4ADL 43, WB4RIS 42, K4RNS 36, K4PXM 31, N4AXN 30, WB4DTS 28, WB4GHU 28, WD4PDK 28, N4BRY 21, KB4T 18, WB4WOO 14, W44ZTS 10 (Apr.) W4UJL 55, WB4FJY 45.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst SCM: W4KGI. SEC: A44WJ. STM: K4TH. New appointments: W4EIC OTS, WB4GCK OTS & NM, W410G OTS (previously erroneously reports as STM), K1PLR OO & OVS. The St. Petersburg ARC has a new repeater operational on 22.6 (input is 223.05). W4MEE had skeds with W4JL for Gator Bowl Box Sport show. ARES stations in Pinellas, Hillsborough, Manatee and Sarasota Counties went into action May 9th when a ship hit the Skyway Bridge over mouth of Tampa bay knocking down one span and killing 34 people. Cuban refugee operations generated considerable traffic via NIS, but most is handled via MARS. Dade and Monroe Counties ARES especially active. Amateur Radio circuits established to 33 shelters in Dade county on 24 hour basis until relieved by government communications. I don't know where traffic handlers get the idea they must seek a MARS station on our section level NTS nets for a message having an APO/FPO address. NTS routing calls for APO/FPO New York to be sent via 4RNEAN to New York where APO/FPO San Francisco is sent to San Francisco. June 1st here and with the hurricane season. All emergency equipment should be in readiness. By the time you read this, July 1st will be here and time for the annual change of operational control on our combined section level NTS nets. If things go according to previous agreements and understandings, QFN management will go to a Southern Florida station, QFNS to Northern Florida, AFNP to NFLA, 1P1N to SFLA. We are especially pleased with the large number of SFLA amateurs qualifying for Public Service Honor Roll listing — 16 in May — and many of these showing up near the highest in the USA. Check also the BPL listings where you should find 6 of our people listed. EG for N. Boulevard County is WB4WYC, 1003 Woodsmere Pkwy, Rockledge FL 32955. EG for Eastern Palm Beach County is WB4RLU, 1402 Berkshire Dr., W. Palm Beach, FL 33406. Traffic: (May) W3CJL 2922, K4TH 714, W4MEE 673, W3VR 602, K4SCL 462, W4FVV 425, WD4C0L 424, W44PFK 410, W4NFK 338, WD4AWN 305, W4GPL 250, K44NNG 218, WB4WRY 207, W4IRA 187, W4EIC 171, W4LX 145, WB4PIB 123, K4EUK 106, WB4NCH 95, W44HXU 89, W4DVO 85, K44LNA 89, W4KMN 62, N4ET 59, W4WRY 58, A44WJ 53, KB4OW 46, N4APE 41, WB4GCK 35, W4YNT 31, W410G 24, W4SMK 23, WB4KYE 22, KE40 19, WB4NJU 15, W44FKE 14, K44BBA 9, W4BK 6, N4K2 6, W44LWT 6, WB4SNX 4 (Apr.) W4AZE 15, WD4LWT 2.

WEST INDIES: SCM, Julio Negrón, KP4CV — WINS (West Indies Net) Slowdown May 1st as an unqualified success. Report for the month is as follows: QNT 115, QTC 27, 97% representation to 4RN, WINS meets daily 6:30 P.M. AST on 3710 kHz. STM KP4FEY and ORS KP4U report high traffic in connection with Cuban refugee problem. ARES nets every Thurs. at 8 P.M. AST on 3900 kHz and La Santa Repeater (147.69/09). PRARC advises new repeater at Cerro Punta will operate on 146.10/70. El Gato repeater 146.34/24 will be moved to El Yunque very shortly. Congrats to the Virgin Island Amateur Radio Club on its charter affiliation recently approved by ARRL. KP2A is VIARC pres. Traffic: KP4FEY 110, KP4U 129, KP4DJ 35.

SOUTHWESTERN DIVISION:

ARIZONA: SCM, W. L. Haskell, AG7D — SEC: N7EH. Newly assigned EG for Gila Co. W4TRG 1HA, in Tucson has new pres. N7EH. Kingman: W7KAX rec'd report of missing 3 year old girl who wandered away from home, he alerted ARES members who immediately participated in the search along with local police and parents. Two hours later the little gal was found by a member of the searching party. Participating were WB7BVV W7KAX W7RWQ KB7AG and K7GG. Another

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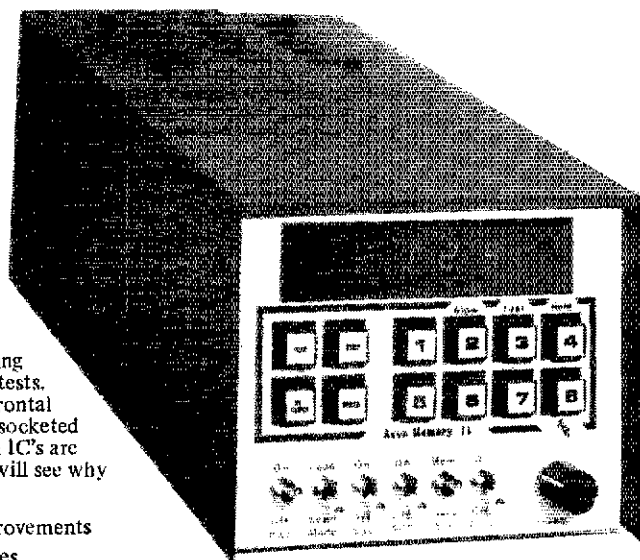
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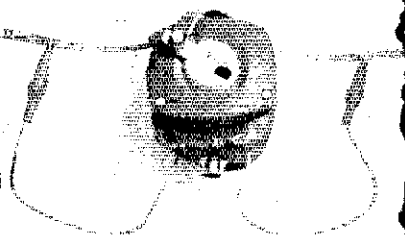
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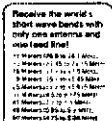


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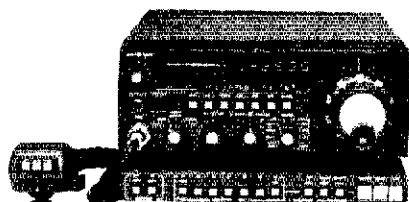
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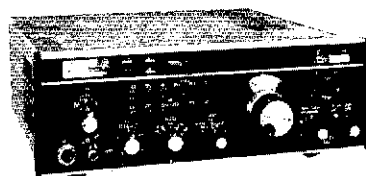
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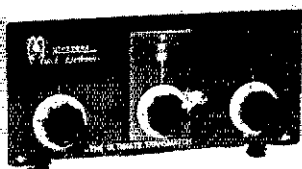
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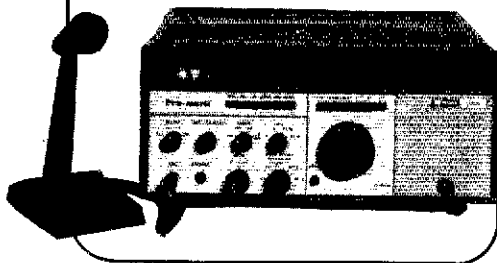


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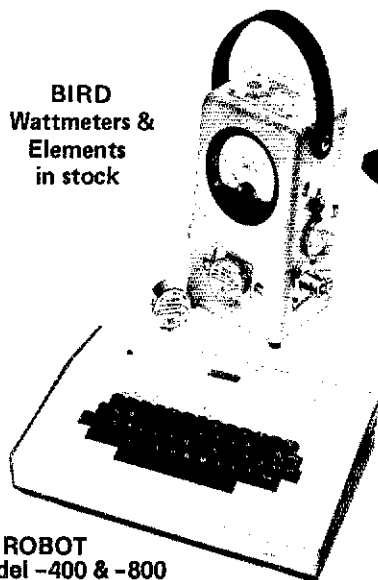


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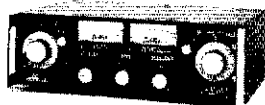
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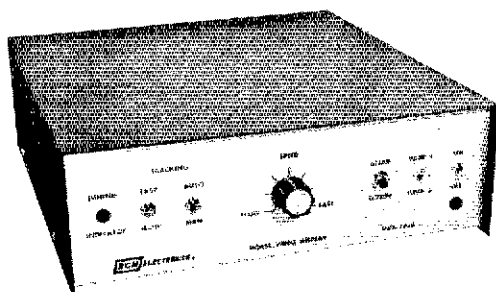
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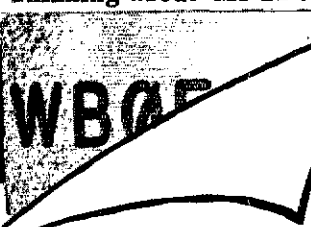
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"great" for Amateur Radio. The SW Div. ARRL Conv. will be in Scottsdale, AZ, Oct. 9-11, '81. Vic Clark, W4KFC, Honorary VP of ARRL visited the SARC and CARC during May. Vic's presentation: WARC and Flashes from ARRL! Flagstaff Jr. High proudly announces the licensing of two students, K4THBL and K4ZGZA. Instructor, W7YS, WA7NXL with the help of AMTRAC, is now an Adv. Class op. During the period of Apr. 11 to Feb. 11, MARC, Tucson, (mobile) rptd 58 accidents to the police and fire dept's. Rpts included motorist assist to criminal activities and accidents with injuries. Good work fellows! MARC also sponsors a course on personal safety. Instr is W0RGC. W7LDD and WB7RRV have rind to Tucson from Kavents — welcome back to civilization! A-10, QNI 1160, QTC 254 SWN, QNI 203, QIC 193, PHSR: K7NTG and W7EP. Traffic: K7MC 187, W7EP 155, K7NTG 124, K7NMO 62, WA7KOE 60, K7MC 52, K7JKM 19, KA5DDW 16, AC7D 11, WA7NXL 10, KB7HA 8, W7LVW 6, WA7WEB 6, N7EH 3, W7YS 2.

LOS ANGELES: SCM, Stan Broki, N2YQ — I am writing this months report by assignment from our new SCM, Stan Broki, N1YQ. Stan was appointed by ARRL to finish my term of office. I trust you will all give Stan the support and help that you have given me for two and one half years. On May 11, Mother's Day, 19 members of the Pasadena Radio Club, led by N6AVN and K6BFF, set up an Amateur Radio installation in Pershing Square, Los Angeles. This activity was part of the all day outdoor "Expo" that marked the opening of the three day American Red Cross National Convention. The Pasadena Club is affiliated with its local chapter of the Red Cross. Under the banner of the clubs call, W6KA, three operating positions — two hf and one vhf — were kept busy for 8 hours handling messages for some of the convention's 3100 delegates and providing a continuous demonstration of Amateur Radio. Both the weather and band conditions cooperated, and if subsequent commendations from Red Cross officials were any indication, the club's efforts were well received (pun intended) and greatly appreciated. K6INK provided a single up station for the Pasadena Club, handling 31 pieces of traffic in 5 hours. The club's efforts in the exercise provided much needed training for some of our Section operators. WA6L VO organized communications for the SW Division American Heart Assn out of Whittier. W6INH reports 4 new countries last month. K6CL reports retirement does not necessarily bring more time for operating. Traffic: K6INK 354, W6INH 328, KB6OT 195, WA6LVO 149, N6PZ 75, KB6FC 67, W6BRO 45, W6BWG 27.

ORANGE: SCM, Fried Hevri, WA6WZO — SEC: W6UBQ, DEC: WA6TLE (Orange County), W6LKN (Riverside County), K6GG5 (San Bernardino). New top appointments: WA6WZN as Asst. SCM — treas. LA Area Council ARC & past pres. of YLHC of LA; K6LI as STM — Editor "SCN" newsletter "Zero Beat" & past SCM manager, W6GYZ as DEC (Inve. Group) — pres. RSNP ARC. To become familiar with NTS the National Novice Net is a good place to start. NNN managed by K6LA meets Sundays, 2300Z on 21.150 MHz. Most section traffic is handled by the Southern California Net, a system of various multisection nets that include RTTY, cw and phone. Trv SCN daily at 0400Z at 145.045/645 (W6TIO/R); manager WA6QCA reported 358 checkins and 244 messages for the 31 sess of the month with top checkins, W6NTN WB6QBZ K6INK WB6OT N6BZS and DJ0WRW6. Also ARFS nets handle NIS traffic; the Riverside ARFS/RACES nets which meets every Sunday at 1530Z on 3.945 MHz (the control frequency during section wide emergencies) accepts checkins from the whole section. The QCC Council ARC consisted of over 30 ham organizations can be of service to clubs and individuals (member or not) with TVI, ham classes, club programs, PR, T-hunts, swap meets, etc. the official purchased the new ARRL film "The World of Am. Radio" — contact PRA WA6JFP. South Orange ARA elected: W6GEDP, pres.; N6CKT, vice pres.; WA6QCA, treas.; WA6CMF, secy.; WA6CUE, chmn of the board. A new club, WestCoast Amateur Radio Club, formed from the many students of W6BNOA — N6GCHX, pres.; N6CJO, secy.; K6BKIL, treas. Use 144.33 MHz simplex. K6LIFR was honored by W6BNOA as the 100th graduate of the WIC Am. Radio School. DEX and teacher W6GPR is moving back east. K6HOC has to replace him as secy. of the (WR5AAA) Catalina Repairer Assn. EC WA6PTU reports W6IF was able to dispatch help to a climber in Joshua Tree Monument on hearing a call by WA6WIF on a repeater. ARFS/RACES supported the Riverside Mountain Rescue Unit in both an exercise and an actual search which included K6CJD W6UBQ W6VJJ W6LKN N6BGG K6AFMW K6BBU W6VXD W6QMW W6BPLR W6BVXC W6BHKM and W6D6FL. South Orange ARS members WA6TLE WA6CUP N6CKT N6AWQ W6BSL W6BYWC and W6D6DP provided communications for the charity relay race from Newport Beach to San Diego. EC WA6TLE and W6CML have installed an ARFS repeater, W6AUP, on San Diego Peak; the PL is taken off for emergencies as well as the HB RACES Monday night net. (44.54/145.14 MHz, EC W6BIBI reports that W6RF K6LJA N6BNM DJ0WRW6 WA6OPS K6GK W6JJS W6AUG and many more provided communications for 3 north Orange County hospitals in a combined SET. Traffic: N6ANL 570, W6ELG 531, W6QBZ 261, W6NTN 171, K6A8 126, WA6QCA 45, WA6QMW 39, W6RE 23, W6CPB 17, A6E 14, K6WI 13, WA6WZO 11, DJ0WRW6 10.

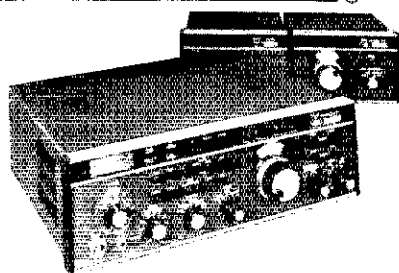
SAN DIEGO: SCM, Arthur H. Smith, W6INI — STM: N6GW, SEC: W6INI, Asst SEC: N6RD. San Diego was well represented at Fresno DX conv with W6BS W6BZF W6BCYS WA6EJL W6KBD W6KLLT K6NA W6PYN W6LOF W6H W6FA W6ZZ W6FAY. K6HAP is active on the Emerg Net. W6TJUA active again on cw with HW-16 on SCN. Call sign changes: W7IWN to K6MI, WA6UOU to K6RAW. Upgraded: to Extra K6BCC, to Advanced WA6BCC K6QCO WA6EOO. No. County Tlc Net (Palomar ARC rpt 13.73, 2000 nightly) reports 30 sess. and 72 msgs handled. Try this net to break into formal traffic handling. Poway ARS Ham of the Year Award went to W6MFL. New officers for SD 220 Club are W6BVSA, pres.; W6SIF, vice pres.; WA6HDB, secy.; W6GCYX, treas. Club meets on second Fri at No Park Rec Cen, 4044 Idaho St, at 1930. San Diego (city) ARS took part in emergency medical drill, involving Scripps Mem. Hosp., on May 15. AA6EE continues to excel by placing first in Idaho Section, while operating portable in 1979 IART Radiosport Championship. Traffic: (May) W6PVBH 215, N6GW 167, N6AT 112, K6MI 96, W6HUI 92, WA6SKU 58, W6FTY 52, W6BMLR 45, K6HAP 35, W6TJUA 18, WA6COE 5. (Apr.) W6PVBH 376, N6RD 45. SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — NM

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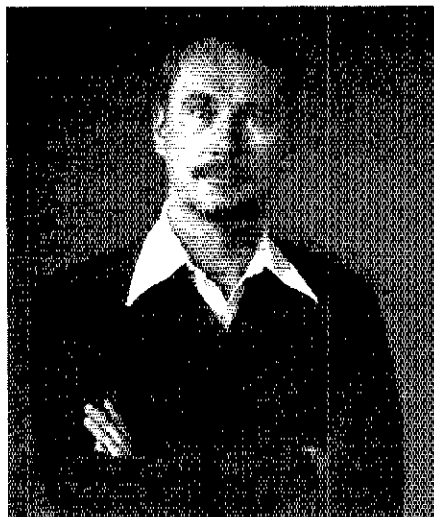
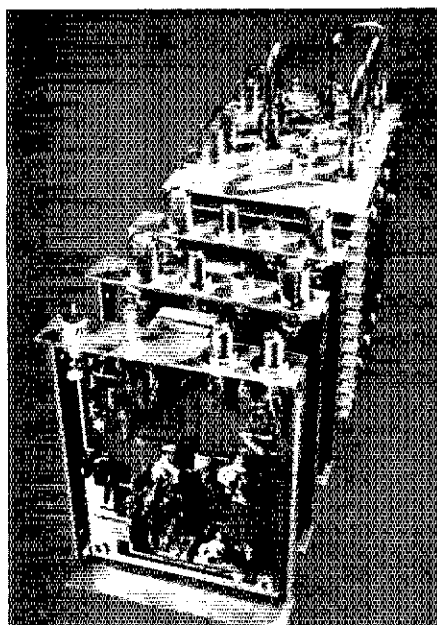
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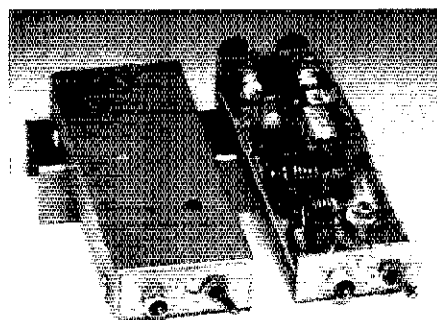


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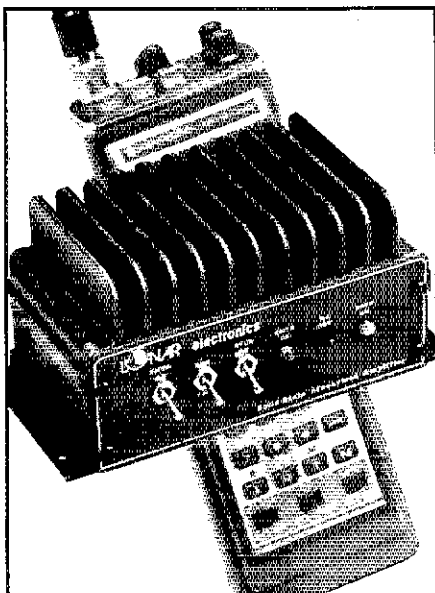
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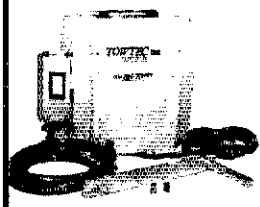
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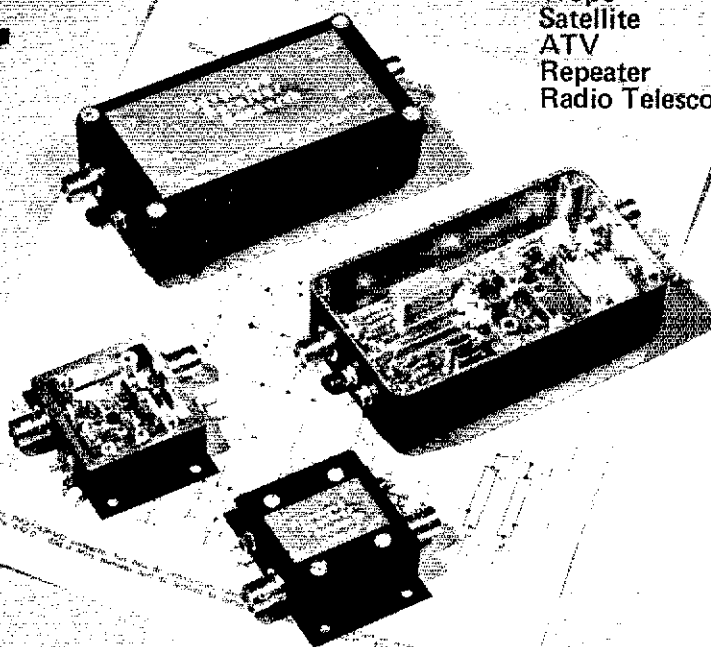
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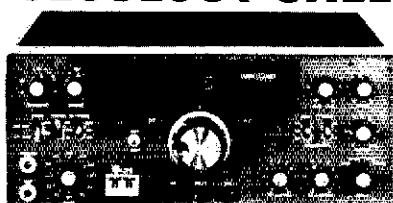


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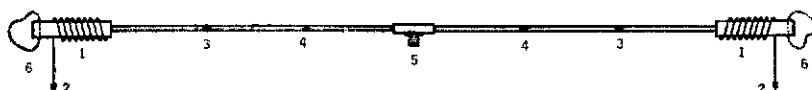
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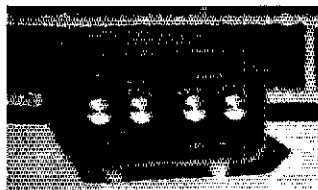
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VHF: W6KPS. NM HF: K6DZT. NM CW: N6WP. STM: N6WP. The Simi Settlers ARC has been very active. Four members have upgraded: WD6BZN W6TLD and WB6TMTF to Advanced and WA6TMS to General. They provided comms for the Pioneer Days parade with WD6CVT WD6BZN KA6HXX WB6QKF K6BU WA6AF N6AYV and WB6QX assisting. In addition they received their ARRL affiliation. Keep up the good work! The Coastal ARS is growing in SLO under leadership of W6JTA. They meet on 3937 at 8 P.M. Wed. The Santa Barbara Section Net Bulletin is published monthly by K6DZT. Contact him and volunteer your help with the net. W6RDL has moved to Tenn. W6KCG is a Silent Key. KD6CN is Poinsettia ARC Field Day Chairman. PSNR: K6YD 60, K6DZT 14, N6MA 21. This is my last column in this tour of duty as SCM. Many thanks to those who gave of your time and talents over the past nine years to make the many projects work. Special thanks to those who served in leadership positions: W6KPS and K6EYQ (PAM), WB6HJW and W6TA (SEC), W6UJ and K6OPH (RM), N6WP (NM and STM), W6KON (NM) and all the emergency coordinators. Without you it wouldn't have been possible. Monthly reports now go to W6POU. Traffic: N6YH 82, K6YD 74, WB6TRP 70, N6MA 30, W6POE 4.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Phil Clements, K5PC — ASST SCM: AESC, STM: W5VMP, SEC: N5WB, NMs: AA5J AESI. Our feature club of the month is the Bowie Amateur Radio Club. The club meets the first Mon of each month @ 7:30 P.M. The Bowie repeater, on 147.93/33 is now sporting a new "ID'er" and fills in a vital area of coverage between DFW and the Wichita Falls area. The club projects include a Novice class, with a Novice net in the mill; a Skywarn net, that uses the Henrietta repeater for direct liaison into the Wichita Falls wx bureau; and big plans for Field Day, with a Novice position included. The club newsletter, the "Bowie Amateur Radio Club News," edited by WB5MTT, includes news of upcoming meetings and events, a journal of club projects and activities, and the "Novice Corner," with operational aids and technical topics geared to the newcomer to our hobby. New officers in the E-Systems ARC of Greenville are: K2SCU, pres.; W5MIV, vice pres.; KA5GEU, secy./treas. It was great seeing so many N.T.X. amateurs at the West Gulf Convention/Ham-Com '80, which hosted a nice crowd of 3,500 or so this year. I hope you all had a fine time! Texas Slow Net (TSN) meets on 3745 kHz nightly @ 8:00 P.M. local time and had in May: QNI 263, QTC 47 in 31 sess. Net Mgr. is AA5J. Public Service Honor Roll for May: WA5QFD WD5EUE N5BT W5VMP WB5LAT AA5J W5HMR W5TI KB5UL WD5VD AE5I WD5JYI AJ5F and N5AWG. Traffic: W5TI 386, WD5HHK 291, N5BT 182, AA5J 169, WB5BKM 154, W5HMR 124, WD5EUE 122, N5AWG 67, K5OKM 66, WA5INJ 58, AE5I 55, WB5QXE 53, WD5JYI 50, WA5QFD 49, WB5LAT 42, KB5UL 39, W5VMP 36, WB5YK 35, W5CTZ 28, W5ERT 27, WD5VD 24, KA5AVQ 19, WA5EZT 18, WD5QR 16, AJ5F 10, K5PC 5, N5BQ 4, WB5PHM 4, K9MX 2.

OKLAHOMA: SCM, Leonard Hollar, WA5FSN — WB5TTU, new NM for OPEN. There are not enough words to express our appreciation to the many fine operators who have helped this past month with the SKYWARN watches. There is no way that I will try to list them all for fear that I might overlook someone. Will wait on reports from the various ECs. Tornados or strong winds caused damage in Altus and Reardon areas. Plenty of activity for the Altus and Woodward groups working directly with NWS through relays on 2 meters. A number of other public service activities will be reported separately. New wallpaper at W5LOW is a certificate of appreciation from Red Cross to serving operators, accepted by WA5JGU. WD5IDB and K5CXP new NCS on QLT. WA5AFO ready to put up new tower and beams. N5ECO and others worked with Special Olympics. Reports from 2 OBS, 2 OOS, 1 OVS, 31 OTS and 8 ECs. We still need help on early nets. One thing would be better propagation. Hi, if I missed anything, blame it on an early closing date. Traffic: WB5NKC 747, WB5NKC 505, W5REC 338, K5JGZ 326, W5RB 190, K5CXP 161, K5OWK 152, KB5EK 137, W5UYH 95, WD5IDB 90, WA5OUV 61, W5VU 57, WA5FSN 56, WB5EAY 54, K5FA 51, W5AS 47, W5SUG 42, K5CAY 41, WD5IFB 37, W5VOR 34, WA5HSH 30, W5VLW 29, WB5ELG 27, K5MGD 19, WA5AFO 17, WA5SEC 14, W5FKL 10, W5SAXH 9, WD5HR 9, WA5UTO 8, W5JJ 4.

SOUTHERN TEXAS: SCM, Roger Coday, N5FN — ASST SCM/STM: N5TC, SEC: AK5N. OO reporting this month, K5DL. WA5RVT, EC/OTS reports that WB5MZY and WB5PHO are new Asst CC for Brazoria County. KD5D is busy of late with church activities and attending classes for expectant parents. San Antonio area hams supplied communications for the Alamo West 250 Off Road Race in Bracketville as reported by WB5CIT. WD5HSN has upgraded cw station with the addition of solid state TR switch on DX60A. Also, has just graduated from Seminary. N5FN attended a meeting of the San Antonio ARC, and give talk on emergency communications. After the meeting it was discovered that the area was under a tornado warning and the local Skywarn Net was activated. A very fine demonstration under "real" conditions. KA6CSM has returned to Kansas, but will be back in Texas in July. K5RG has added a MFJ 484 Memory Keyer to station and has retired to a living vacation in Cozumel. K5RVF reports that southeast Texas hams supplied communications for the Bum Phillip's Celebrity Golf Tournament. K5GM keeping busy with QTC skeds and working DX on 15 and 20 mtrs. WB5TAY has a new FT 107M in station and is still learning what all the controls are. W5CKG along with DPS in Houston has organized 7, 3 man Emer-Response Teams. The teams are self-contained and will move into stricken areas to supply communications. Traffic: (May) W5KLV 587, WB5UYV 246, WB5YDD 208, K5H2R 198, W5SBE 192, WB5GE 181, N5TC 135, K5BTO 128, WB5MMI 114, W5SHN 95, K5GSM 85, WB5YV 80, K5BXN 80, K5QEW 45, WA5RVT 43, AK5N 39, K5RG 30, N5FN 20, K5GM 22, WB5TAY 22, WB5CIT 22, WD5DOR 19, WD5GKH 16, WD5FGY 12, WB5EFJ 11, W5KR 4. (Apr.) W5KR 22.

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P-5	C-5	5	P-354		35, 40
P-68	C-68	6, 7, 8			
P-81	C-81	9, 10, 11			
P-10	C-10	10			
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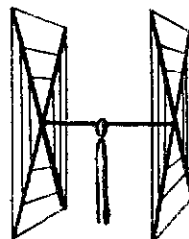
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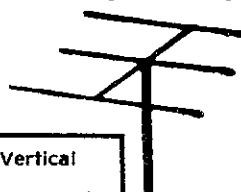
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1 - Instruction Sheet

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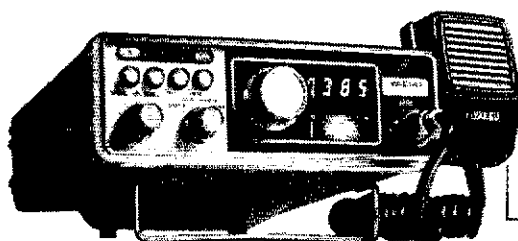
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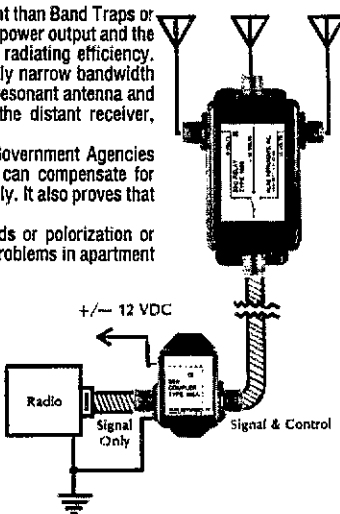
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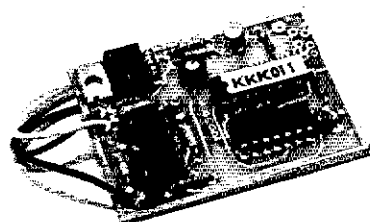
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Clubs/Hamfests

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CQ and QST 1950-1978 also 73 and Ham Radio issues for sale. Two dollar minimum order. Cost 50 cents each 1976 and later issues - all other 30 cents each including USA shipping. Send s.a.s.e. chronological order and payment to W6LS, 2814 Empire Ave., Burbank, CA, 91504. Available issues and refund sent within one month.

CONNECTICUT: The Southcentral Connecticut Amateur Radio Association (SCARA) will hold its first annual edition of Super Scaratest '80 on August 16 and 17 at the North Haven Ramada Inn. The two-day show will feature exhibits, a giant outdoor flea market, and on Sunday, an all-day auction as well. Awards throughout the two-day show including a solid-state low-band transceiver, a synthesized two-meter HT, a microcomputer system and a 600 MHz frequency counter. Want to know more? Look further down this column!

GOOD times at the Pines 1980 Hudson Division Convention. The Pines Hotel, South Fallsburg, NY, November 7, 8 & 9. Full program, exhibits, flea market, free entertainment and dancing at night. Advance registration \$5, with s.a.s.e. to Mike Troy, WA2TYV, 70 Ridge Street, Rye, NY 10580, \$6.50 at the door. Ask for hotel registration info. Room rates including all meals, banquets, per person double occupancy per night from \$38.50 to \$49.50.

HAMBURG, NY — HAM-O-RAMA '80 — 9th annual hamfest. Exhibits, tech programs, awards, flea markets. Plenty of free parking, free RV hookups. Erie County Fairgrounds, Sept. 12 and 13. Advance tickets \$3.00. Contact Ron Brodowski KC2P, 260 Hilltop Drive, Elma, NY 14059 716-652-6754.

PENNSAUKEN NJ: The Greater Delaware Valley Hamfest by MSWV A.R.C. on October 19, 1980 at Nashville East Cotillion Ballroom, Rt. 73 about 5 miles from Tacony Bridge, 8 A.M. to 5 P.M. set-up begins at 2 A.M. Reserved indoor tables \$5/table. Commercial displays, seminars, YL activities and outdoor flea market. Admission \$2.50 at gate and \$2 in advance (s.a.s.e.) Talk in 22/82 and 52/52. RV parking. Write or call GDV-80 Hamfest, 15 East Camden Avenue, Moorestown, NJ 08057 Ph.: 609-234-3926.

KENTUCKY: The Bluegrass Amateur Radio Society will host its annual ARRL Central Kentucky Bluegrass Hamfest August 10, 1980 starting 8:00 A.M. at the Fasig-Tipton Sales Paddock, Newton Pike, Lexington, Kentucky. Grand award. Hourly awards given. Forums, indoor exhibits & distributors, paved outside flea market. Admission \$3 advance; \$3.50 at gate; includes parking. Food service available. Talk in on 146.16/76 MHz. For details write Bluegrass Hamfest, Attn: Edward Bono, WA4ONE, 2077 Dogwood Drive Lexington, KY 40504.

ELMIRA, New York International Hamfest September 27, 1980. Chemung County Fairgrounds. Numerous programs, awards, and activities; gates open at 8. Contact John Breese, 340 West Avenue, Horseheads, NY 14845.

VIRGINIA State ARRL Convention — The Fifth Annual Tidewater Hamfest and ARRL Virginia State Convention will be in the great new Virginia Beach, Virginia Arts and Conference Center October 4 and 5, 1980. ARRL, Traffic,

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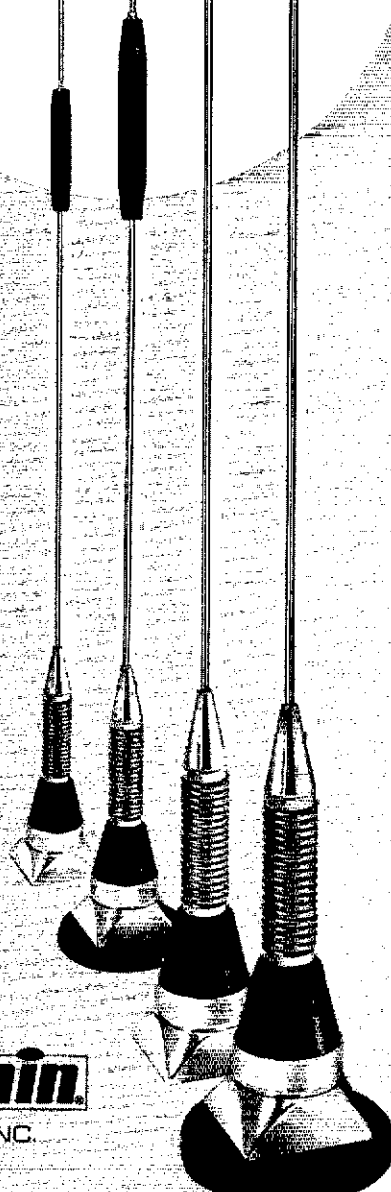
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	32¢/ft.	100	1.8	5.9
		200	2.6	8.5
		300	3.3	10.8
		400	3.8	12.5
	8237	100	2.0	6.6
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MUSEUM for radio historians and collectors now open. Free admission. Old time amateur (W2AN) and commercial station exhibits. 1925 store and telegraph displays. 15,000 items. Write for details. Antique Wireless Assn., Holcomb, NY 14469.

BERGEN Amateur Radio Association is having a ham and computer swap & sell on October 11, 1980, Saturday, to be held at the Bergen Community College, Paramus Road, Paramus, NJ. Tailgating only, bring your own tables, sellers \$3. Buyers free. S.A.S.E. brings flyer. Any questions, contact Vic, WB2PYE, 201-445-2855/201-664-0155 or Jim, KB2EI, 201-445-2855, 325 Wilson Avenue, Westwood, NJ 07675.

CINCINNATI Hamfest: 44th Annual — Sunday September 21, 1980 at Strickers Grove on State Route 128, one mile west of Ross (Venice) Ohio. Exhibits, awards food and refreshments available, fleamarket (radio related products only) music, good fellowship, hidden transmitter hunt and sensational air show. Admission and registration \$4. For further information: Lillian Abbott, K8CKI, 1424 Main St., Cincinnati, OH 45210.

FINDLAY Hamfest The 38th Annual Findlay hamfest greets you on Sept. 7th with a fine new indoor/outdoor location, The Hancock Recreational Center, just east of I-75 exit 161, on the north edge of Findlay, 40 miles south of Toledo. Main awards: a TS-120s w/supply, two TR-2400's, and an AT-120 matcher. Tickets \$2 advance and \$2.50 at the door. Reserve your tables early: \$2.50 per 1/2. Open Saturday 17:00 till 22:00 for forums and set-up, Sunday at 05:00. Join the over 6000 people attending Findlay Hamfest this year. For tickets, info, and reservations send S.A.S.E. to P. O. Box 587, Findlay, Ohio, 45840.

SEPT. 21st. LIMARC Sponsors ARRL Hamfair '80 at the Islip Speedway, Islip Ave. (Rte 111) Exit 43, Southern State Pkwy. Over 350 Exhibitors at the last show in June, no reservations needed. Info call at night, Sid Wolin, K2LJH, 516-379-2861, Nick Bellmann, KA2CAO 516-223-1076, Hank Wener, WB2ALW, 516-484-4322. Heavy Rain date, Sept. 28th.

SUPER Scarafest '80: A giant Amateur Radio and computer festival can be found at exit 12 off I-91. All hams in New England will be receiving direct mail info. Pre-registration (before July 1) will be \$4 and \$5 at the door. Send inquiries to P. O. Box 5265 Hamden, CT 06518 or call Jeff Wayne, K1YLV at 203-281-6038. Talk-in on 146.01/61. Watch the August issue of QST for our half-page ad with more details of this major ham and computer meet!

25th ANNUAL York County Hamfest on August 31st — rain or shine. 8:00 A.M. to 4:30 P.M. Registration \$3. All male adults are expected to register. XYLs and children free. Tail-gaters \$2. With tables under roof with power \$5. paid in advance. Deadline August 23rd Fly-ins right on site at York Airport at Thomasville. Hamfest held at U.S. 30 park at airport 10 miles west of York on U.S. 30. Talk-ins 146.37/97 and 146.52/52. Saturday night campers welcome (no facilities). Full service cafeteria. Clean restrooms. Contact LeRoy Frey K3POR 170 S. Albermarle St., York PA 17403 — Phone 717-854-1203.

BLUEFIELD Hamfest '80, Sunday, August 24th, Bluefield Armory, Dealers, indoor flea market, special tailgate area. Awards, food, \$2. in advance \$3 at gate. Children under 12 free. East River Radio Club, 2113 Hemlock Hill, Bluefield, WV 24701. Talk-in 89/49, 3.947.

RADIO Central Amateur Radio Club Ham Central "Flea Market" An ARRL Hamfest Aug. 10, rain date Aug. 17 9 A.M. till 5 P.M. Mt. Sinai Elementary School, Rte. 25A Mt. Sinai Long Island N.Y. \$1.50 buyers \$3. sellers. Talk-in 145.150 MHz WA2UEC/146.52 MHz simplex for info contact KA2BPE — Gack 289-0750, KB2LK — Jim 281-2534, WA2TWQ — Charlie 744-9561.

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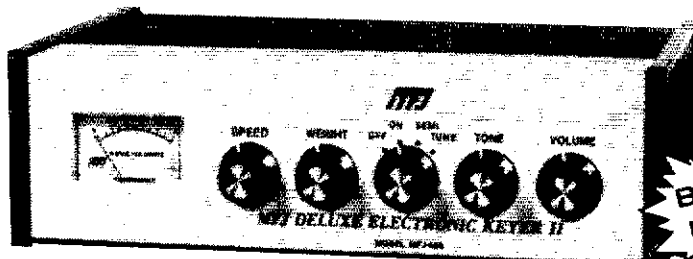
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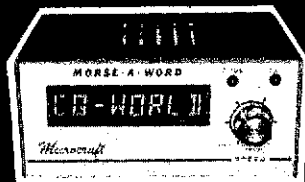
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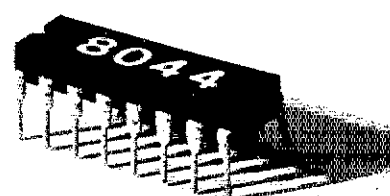
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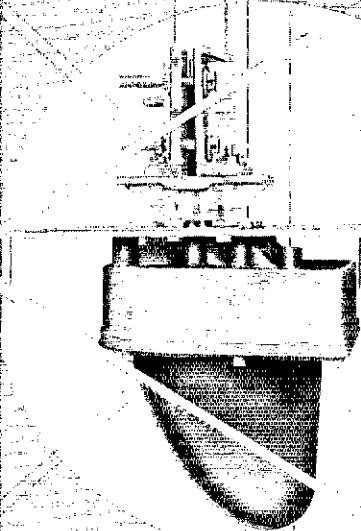
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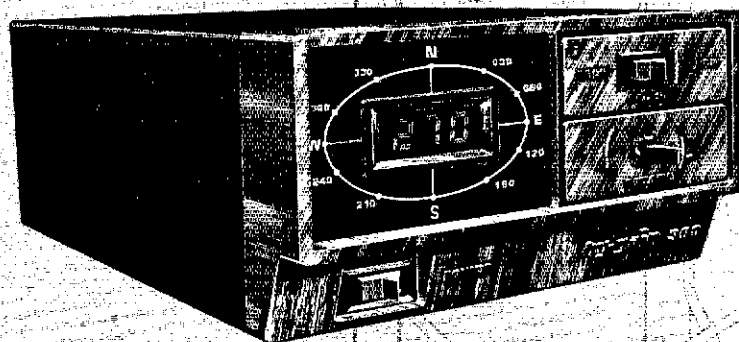
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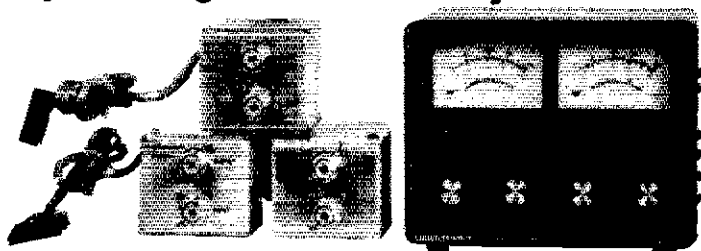
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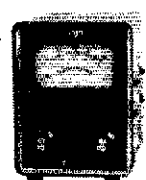
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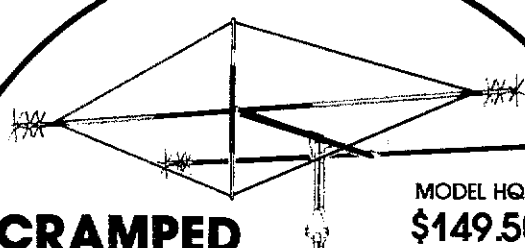
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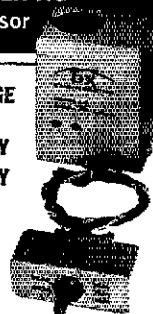
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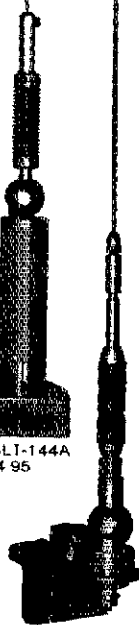
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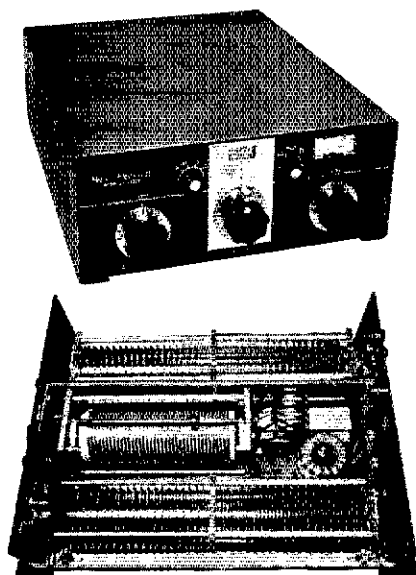
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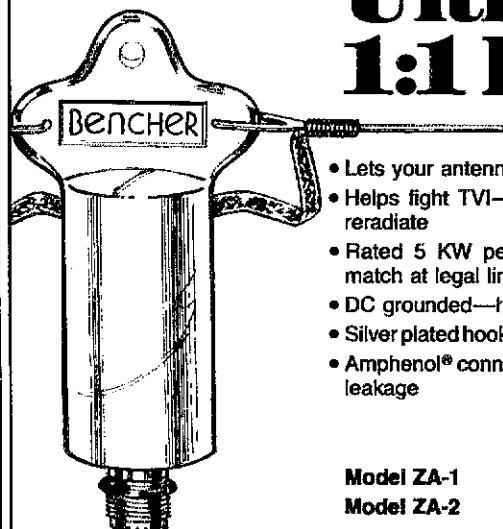


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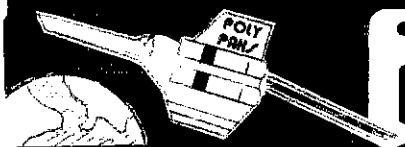
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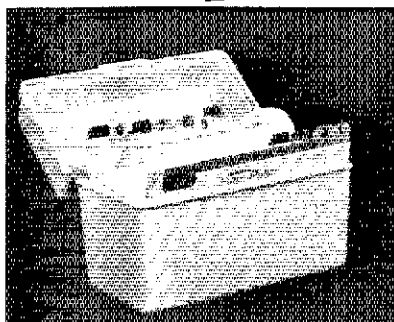
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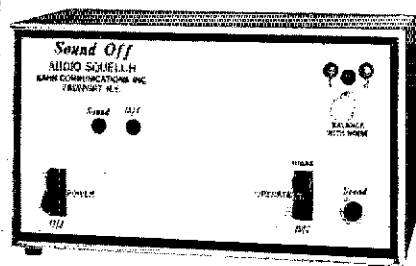
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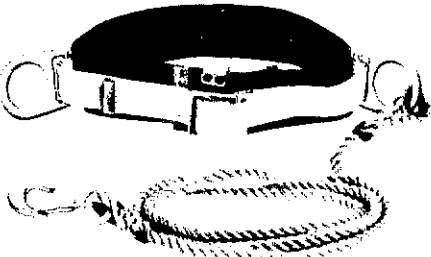
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DB1015A	3-El. 10/15 mtr Beam	\$129
64B	4-El. 6-mtr Beam	\$42
66B	6-El. 6-mtr Beam	\$89
18HT	Hy-Tower 80-10 mtr Vert.	\$279
18AVT/WB	80-10 mtr Trap Vert.	\$85
214	14-El. 2-mtr Beam	\$29
28DQ	80/40 mtr. Trap Dipole	\$49
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BN86	80-10 mtr. KW Buhu	\$14

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ARX 450	450 MHz "Ringo Ranger"	\$30
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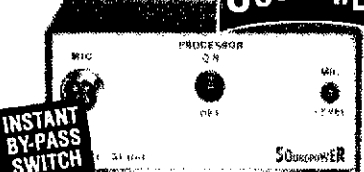
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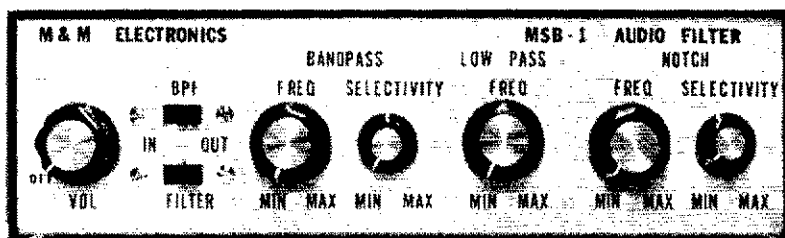
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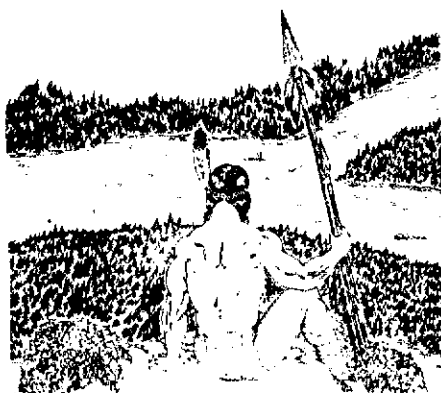
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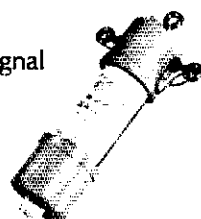
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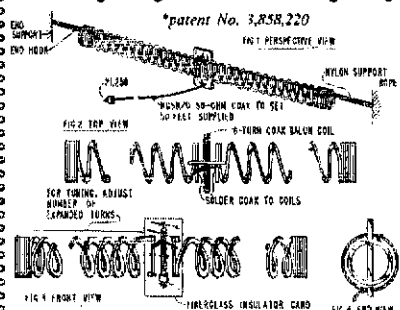
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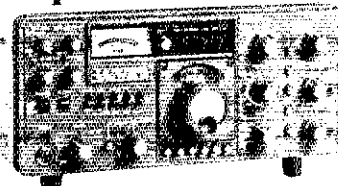
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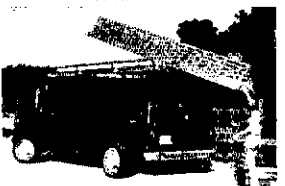
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HIGH-VOLTAGE antenna relays — Kilovac HVS-10/s17 DPDT \$30; (2) HVS-10/S9 SPDT \$25 each; Torr TMR-9A/E SPDT (No Vacuum) \$10; J. Wasiewicz, 229 Sarles Ln., Pleasantville, N.Y. 10570.

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TEN-TEC argonaut 509, excellent 6 watt cw/ssb transceiver, power supply, mike, mint, \$325. Buying newest Argonaut. Drake W-4 SWR-wattmeter, 2 kw, \$40. Stu Cowan, W2LX, Box 596, Rye, NY 10580.

YAESU FT101E, with SP101PB Both mint, shipped in original boxes \$625. Mark WB9PHM 1204 Kimbrough, Ft. Worth, TX 76108 817-246-6262.

1918 NAVY receiver SE143 #899N Kirke Beall W4E2T 2727 Hollywood Pensacola FL, 32505.

IC 701 PS/MIC \$975 FT101B \$475. FRG7 \$225. W6IIA, Jack Tate 213-242-3535.

SFLL Autek OF-1A filter \$50. Benchner chrome paddle \$40. DX-160 general coverage receiver \$100. WA4DPU 615-433-5073.

FOR SALE — G.E. Mastr Pro transmitter and receiver strips for 10 meter tm. 100 watts with crystals for 29.6 MHz. \$150. Also have for sale Pro 2 meter strips. Would like to buy set of Pro 6 meter strips. Sid WA4VBC 919-633-5566.

SELL: 55ft. All-aluminum, maintenance free, self-standing, tilt-over tower; TA-33 beam, HAM III rotator/100 ft cable; 100 ft. RG-8U. Now standing in Glenview, Illinois. Pick-up only. \$800. WA9FVD, 317-545-8755 evenings.

MOUNTAIN-TOP QTH. Beautiful north Alabama. Low taxes and cost of living, 3BR brick ranch. Absolute mint condition. New kitchen, new roof. 80 foot tower. TH6DX and 2 meter beams. Wooded corner lot. Adjacent to 2100 acre state park yet only 4 miles from downtown. Ideal retirement community. Pool and tennis membership. Owner transferring. Low \$70's. A.B. Watson, K4BBF, 3606 Skyview Drive, Huntsville, AL 35801. 205-533-6517 or 205-837-4000.

HEATH equip for sale, excellent condition; HR-1680 rcvr, \$125; IM-4100 freq counter, \$80; IO-4530 scope, \$200; IG-5280 rt generator, \$20; IB-5281 rel bridge, \$20; DX60B xmitr, \$35; GH-12A mike, \$5; HD-1250 dip meter, \$40. R.O. Grosmer, 422 Crest Road, Orange, CA 92668.

FT-901DM and matching speaker \$950; FTV-901R transverter with 2m \$285; 30' free-standing Universal tower \$120; K2ME, 609-799-1862.

WANTED: good copy of "How To Use Grid Dip Oscillators" by Rufus P. Turner. Write R.H. Yodice, 148 DuBois Road Shokan, N.Y. 12481.

25 WATTS synthesized 2 meter transceiver. AMCOM S-2-25 U.S. made. \$230. Mark WB9PHM 1204 Kimbrough, Ft. Worth, TX 76108 817-246-6282.

AMPEREX 5924A Brand New. I have two of these for sale, make offer. Call or write J. Sanderson, 3017 S.E. Tolman, Portland, OR 97202, 503-777-8080.

WILSON HT2202 220Mhz Handie-Talkie with TT paddle/charger/ext. mic/simplex plus 3 rpters \$300. WA9FVD evenings 317-545-8755.

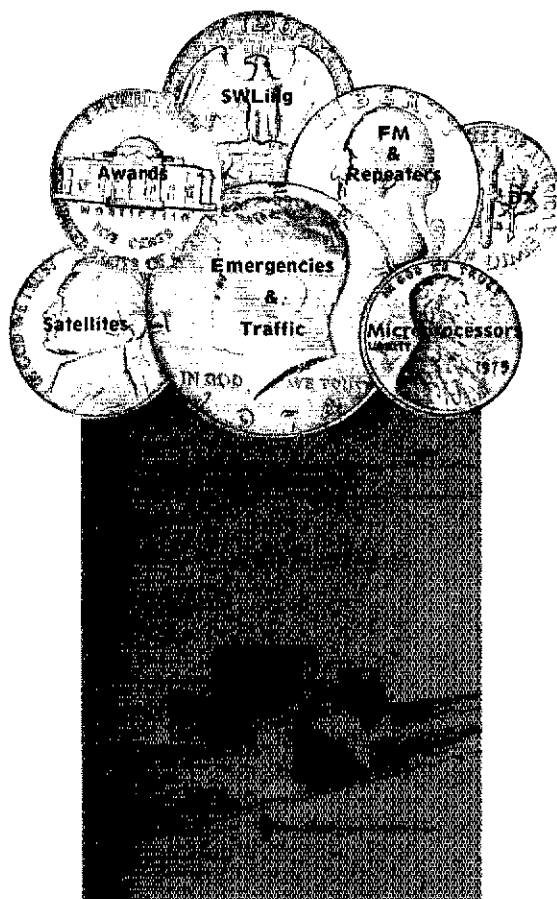
ROSS' All New Specials: KLM 661 \$498. KT34A \$297.31 Icom IC211 2 meter \$560. 551 6 meter \$374. IC-701S \$1099. AC and mic IC255A \$308. IC 251A \$590. Kenwood TV502S \$250. TV 502S \$240. TL 922A \$1000. MFJ 941B \$75.95. MFJ 752 \$75.95 Yaesu FT101F \$699. FRG7 \$285. F1625HD \$699. FT901D \$960. FP4 \$42. FSPI speaker \$15.95. FT207R \$349.90 Drake MM 4C \$130. TR/DR7 \$1347. L7 \$955.71 w/o tubes 1525 EM mike \$37.95 Tempo VHF One Plus \$298. S1 \$233.10 AEA Morse Matic \$174. Alliance HD73 rotor \$99.90 Hustler G6-144B \$65. 46TV \$69. RM 755 + 25 Ross Distributing Company, 78 South State, Preston, ID 83263 208-852-0830 Tuesday-Saturday 9:00 A.M. to 6:00 P.M. Monday closed at 2:00.

QUAD kits \$18-\$33. S.A.S.E. for information. WAC, 404 Sanders Rd., Huntsville, AL 35802.

KANTRONICS Field Day Morse/RTTY Reader, \$375. KL7PG. 3925 Brentwood Circle, Anchorage, AK 99502. Certified check or M.O.

ESTATE of WB2PRV, Kenwood TS820, VFO820, TR7400A w/ps, pickup up only 212-339-1292 evenings.

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WILSON SYSTEMS, INC. MULTIBAND ANTENNAS

WV-1A **\$64⁹⁵**

FACTORY DIRECT

4 BAND TRAP VERTICAL (10 - 40 METERS)

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 the 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-1A is supplied with a hot dipped galvanized base mount bracket to attach to vent pipe or to a mast driven in the ground.

NOTE: Radials are required for peak operation. (See GR-1 below)

SPECIFICATIONS

- 19' total height
- Self supporting—no guys required
- Weight — 14 lbs.
- Input impedance: 50 Ω
- 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: 1.1:1 or less on all

GR-1 **\$14⁹⁵**

The GR-1 is the complete ground radial kit for the WV-1A. It consists of 150' of 7/14 stranded aluminum wire and heavy duty egg insulators, instructions. The GR-1 will increase the efficiency of the WV-1A by providing the correct counterpoise.

33-6 MK **\$64⁹⁵**

Now you can have the capabilities of 40-meter operation on the SYSTEM 36 and SYSTEM 33. Using the same type high quality traps, the 40-meter addition will offer 150 KHZ of bandwidth at less than 2:1 SWR. The new 33-6 MK will fit your present SY36, SY33, or SY3 and use the same single feed line. The 33-6 MK adds approximately 15' to the driven element of your tri-bander, increasing the tuning radius by 5 to 6 feet. This addition will offer an effective rotatable dipole at the same height of your beam.

SY-40A

\$374⁹⁵

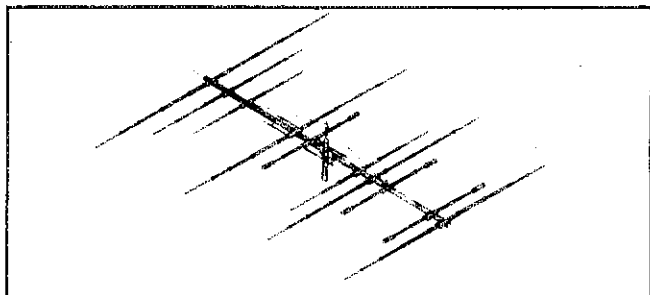
- ★ 3 MONOBANDERS on 1 Boom
- 4 elements on 20 mtrs FULL SIZE
- 4 elements on 15 mtrs
- 5 elements on 10 mtrs

The System 40A is the answer to the DXer who does not have space to stack monobanders yet wants the advantages they offer. Through the use of a switchable matching unit, only one feed line is required and complete coverage of both the phone and cw bands are available with only one setting.

Max. Pwr. Input.....	Legal Limit
VSWR @ Res.....	1.2:1
Impedance.....	50 ohm
Feed Method.....	Balun Supplied
Gain.....	CALL

Matching Method.....	Split Beta
F/B Ratio.....	CALL
Boom.....	2" x 26'
Longest Element.....	36'
Turning Radius.....	22'6"

Surface Area.....	12.1 sq. ft.
Wind Loading @ 60 mph.....	309 lbs.
Assem. Weight.....	75 lbs.
Shipping Weight.....	84 lbs.



SY-36

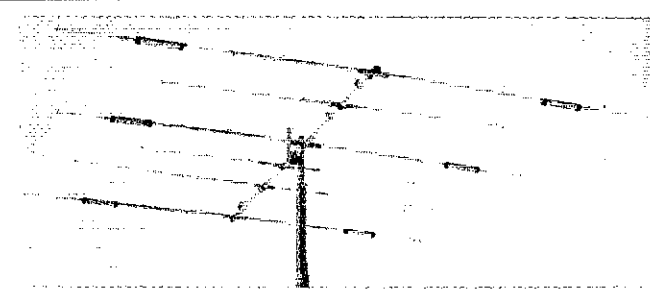
\$219⁹⁵

A trap loaded antenna that performs like a mono-bander! That's the characteristic of this six element three band beam. Through the use of wide spacing and interlacing of elements, the following is possible: three active elements on 20, three active elements on 15, and four active elements on 10 meters. No need to run separate coax feed lines for each band, as the bandswitching is automatically made via the High-Q Wilson traps. Designed to handle the maximum legal power, the traps are capped at each end to provide a weather-proof seal against rain and dust. The special High-Q traps are the strongest available in the industry today.

Band MHz.....	14-21-28
Maximum Power Input.....	Legal Limit
Gain (dBd).....	CALL
VSWR @ Resonance.....	1.3:1
Impedance.....	50 ohm
F/B Ratio.....	CALL

Boom (O.D. x Length).....	2" x 24'2 1/2"
Number of Elements.....	6
Longest Element.....	29'6"
Turning Radius.....	18'6"
Maximum Mast Diameter.....	2"
Surface Area.....	8.6 sq. ft.

Wind Loading @ 80 mph.....	215 lbs.
Maximum Wind Survival.....	100 mph
Feed Method.....	Coaxial Balun (Supplied)
Assembled Weight (approx).....	53 lbs.
Shipping Weight (approx).....	62 lbs.



SY-33

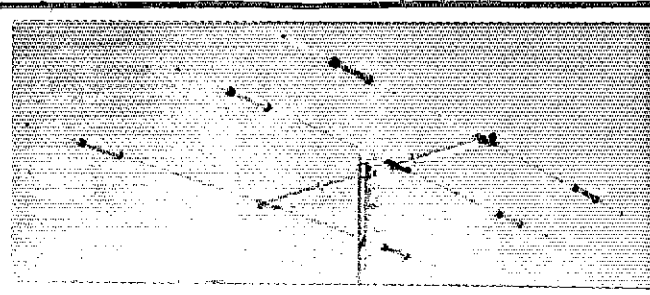
\$164⁹⁵

Capable of handling the Legal Limit, the SYSTEM 33 is the finest compact tribander available to the amateur. Designed and produced by one of the world's largest antenna manufacturers, the traditional quality of workmanship and materials excels with the SYSTEM 33. New boom-to-element mount consists of two 1/8" thick formed aluminum plates that will provide more clamping and holding strength to prevent element misalignment. Superior clamping power is obtained with the use of a rugged 1/4" thick aluminum plate for boom to mast mounting. The use of large diameter High-Q Traps in the SYSTEM 33 makes it a high performance tri-bander and at a very economical price. A complete step-by-step illustrated instruction manual guides you to easy assembly and the lightweight antenna makes installation of the SYSTEM 33 quick and simple.

Band MHz.....	14-21-28
Maximum Power Input.....	Legal Limit
Gain (dBd).....	CALL
VSWR at Resonance.....	1.3:1
Impedance.....	50 ohm
F/B Ratio.....	CALL

Boom (O.D. x Length).....	2" x 14'4"
Number of Elements.....	3
Longest Element.....	27'4"
Turning Radius.....	15'9"
Maximum Mast Diameter.....	2" O.D.
Surface Area.....	5.7 sq. ft.

Wind Loading @ 80 mph.....	114 lbs.
Assembled Weight (approx).....	37 lbs.
Shipping Weight (approx).....	42 lbs.
Direct 52 ohm feed.....	No Balun Required
Maximum Wind Survival.....	100 mph



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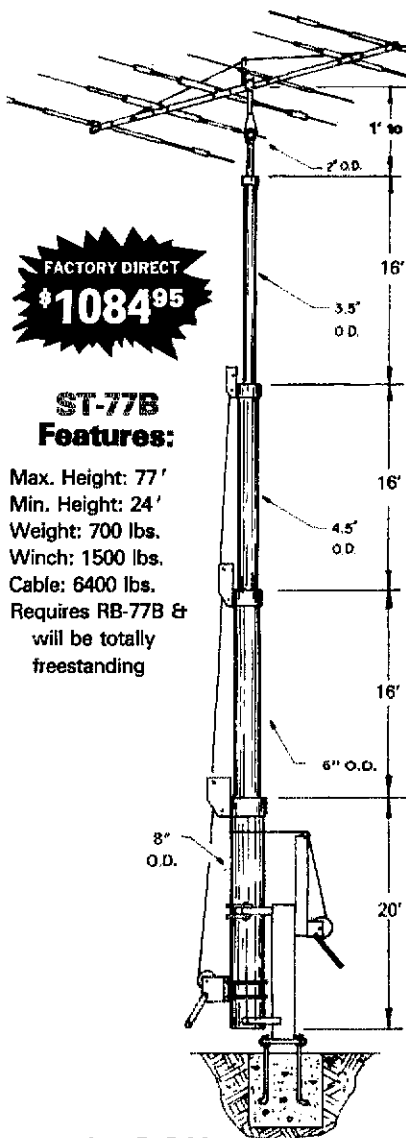
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SYSTEMS, INC.

4286 S. Polaris Ave., Las Vegas, Nevada 89103

Prices and specifications subject to change without notice.

WILSON SYSTEMS TOWERS

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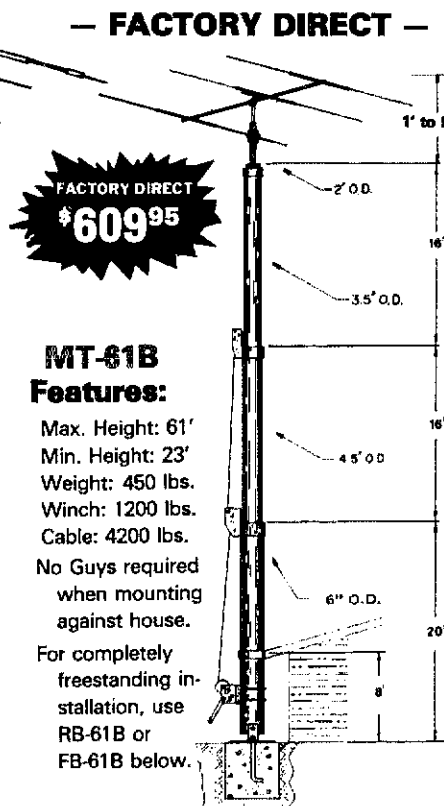
FACTORY DIRECT

\$1084⁹⁵

ST-77B

Features:

Max. Height: 77'
Min. Height: 24'
Weight: 700 lbs.
Winch: 1500 lbs.
Cable: 6400 lbs.
Requires RB-77B & will be totally freestanding



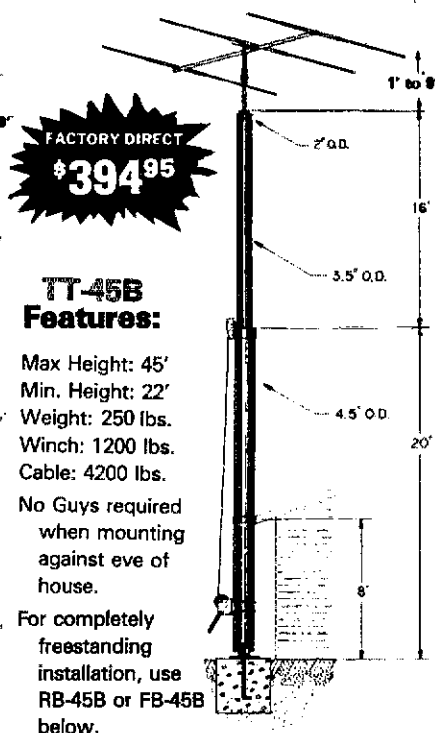
FACTORY DIRECT

\$609⁹⁵

MT-61B

Features:

Max. Height: 61'
Min. Height: 23'
Weight: 450 lbs.
Winch: 1200 lbs.
Cable: 4200 lbs.
No Guys required when mounting against house.
For completely freestanding installation, use RB-61B or FB-61B below.



FACTORY DIRECT

\$394⁹⁵

TT-45B

Features:

Max Height: 45'
Min. Height: 22'
Weight: 250 lbs.
Winch: 1200 lbs.
Cable: 4200 lbs.
No Guys required when mounting against eve of house.
For completely freestanding installation, use RB-45B or FB-45B below.

WIND LOADING			
Tower	Height	Sq. Ft.	Square Footage Based on 50 MPH Wind
ST-77B	69	18	
	77	12	
MT-61B	53	18	
	61	12	
TT-45B	37	18	
	45	12	

BASE CHART		
TOWER	WIDTH	DEPTH
TT-45B	12" x 12"	30"
FB-45B	30" x 30"	4 1/2'
RB-45B	30" x 30"	4 1/2'
MT-61B	18" x 18"	4'
FB-61B	3' x 3'	5 1/2'
RB-61B	3' x 3'	5 1/2'
ST-77B	See Below	Bases
RB-77B	3 1/2' x 3 1/2'	6'

IN STOCK

Wilson Systems uses a new high strength carbon steel tube manufactured especially for Wilson Systems. It is 25% stronger than conventional pipe or tubing. The tubing size used is: 2" & 3 1/2" .095; 4 1/2" & 6" .125; 8" .134. All tubing is hot dip galvanized. Top section is 2" O.D. for proper rotor and antenna mounting.

The TT-45B and MT-61B come complete with house bracket and hinged base plate for against-house mounting. For totally freestanding installation, use either of the tilt-over bases shown below.

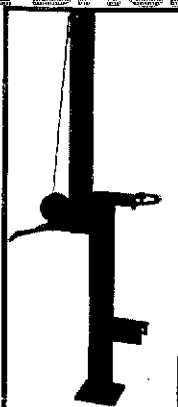
The ST-77B cannot be mounted against the house and must be used with the rotating tilt-over base RB-77B shown below.

TILT-OVER BASES FOR TOWERS

FIXED BASE

The FB Series was designed to provide an economical method of moving the tower away from the house. It will support the tower in a completely free-standing vertical position, while also having the capabilities of tilting the tower over to provide an easy access to the antenna. The rotor mounts at the top of the tower in the conventional manner, and will not rotate the complete tower.

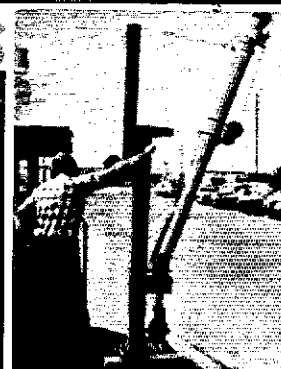
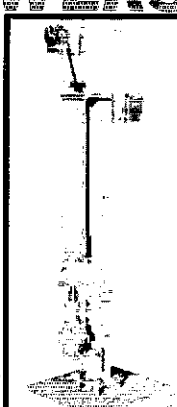
FB-45B.. 112 lbs... **\$184⁹⁵**
FB-61B.. 169 lbs... **\$284⁹⁵**



ROTATING BASE

The RB Series was designed for the Amateur who wants the added convenience of being able to work on the rotor from the ground position. This series of bases will give that ease plus rotate the complete tower and antenna system by the use of a heavy duty thrust bearing at the base of the tower mounting position, while still being able to tilt the tower over when desiring to make changes on the antenna system.

RB-45B.. 144 lbs... **\$254⁹⁵**
RB-61B.. 229 lbs... **\$339⁹⁵**
RB-77B.. 300 lbs... **\$509⁹⁵**



Tilting the tower over is a one-man task with the Wilson bases. (Shown above is the RB-61B. Rotor is not included.)

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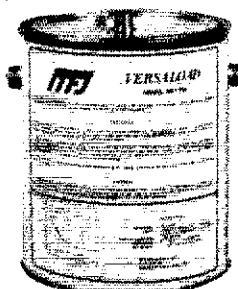
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transformer oil.
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1 KW CW, 2 KW PEP.**

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Run 1 KW CW or 2 KW PEP for 10 minutes, 1/2 KW CW or 1 KW PEP for 20 minutes. Continuous duty with 200 watts CW or 400 watts PEP. Complete with derating curve.

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COLLINS R-391-URR general coverage receiver with autotune. 500 kHz to 32 MHz. Excellent condition \$490. Freight paid to 48 states. WD8PUV, 4941 Harwich Ct., Dayton, OH. 45440. 513-434-7245.

NATIONAL NCX-3 home brew ps MFJ751 ssb/cw filter, Heath sidetone oscillator, Hallicrafters speaker, extra tubes, \$265. 212-634-3318 after 7 PM EDT. KA2FUW.

ICOM: New from Icom, IC-720 9 band ht transceiver with full general coverage from 0.1 to 30 MHz. Now taking orders for delivery in mid August. List at \$1298. First 25 orders for only \$1110. Icom IC-251A \$581; IC-551 \$374; IC-255A \$319; IC-260A \$415; Tempo S1-T \$250; S-1 \$225; S-5 \$260; S-6 \$299; S-2 \$295; S-2T \$340; New Ten-Tec Delta 580 still \$725; supply \$125; Omni-C \$889; Century-21 \$299; Argonaut-515 \$369; 444 Hercules \$1299. New Santec 2 meter HT-1200 \$325; 2 meter amps KLM, Henry, IHS, Icom, Mirage. call for price. AMRAD, INC. 716-235-7716 ask for JJ.

ROSS' Used Equipment Special: Heathkit SB 230 \$389. HW-7 \$68. HW 101. ac \$399. Swan 250 and AC 230. SS-200A, PSU-1 \$489. Drake R-4B \$359. Kenwood TS-820S \$899. TS-900, AC Speaker \$499. RS99A, Speaker \$345. TR 7400A \$270. National NCX5 PS, Speaker \$359. NGL 2000 \$795. Yaesu FTD401 \$469. FT101 CW fan \$535. FT101B \$539. FT101E, FVO101B \$799. YC601 \$150. FT620B \$299. FRDX400/FLDX400 needs work \$400. FT301S \$400. FT221 \$385. FV901DM \$315. FT7B \$600. FR101 FL101 \$795. FT301D \$580. Ross Distributing Company, 78 South State, Preston, ID 83263 208-852-0830 Tuesday-Saturday 9:00 AM to 6:00 PM. Mondays, closed at 2:00.

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RTTY — NS-CQ sends CQ automatically. Board, PROM programmed your call \$21.50 ppd. Wired/tested \$29.50 ppd. SASE for info. Nat Stinnette Electronics, Tavares, FL 32778.

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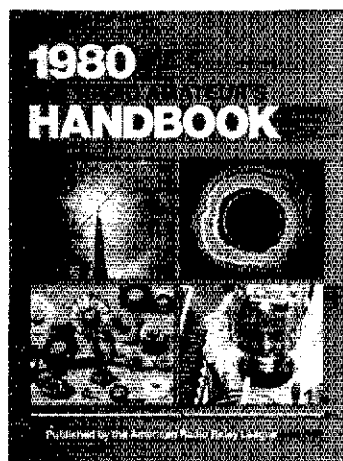
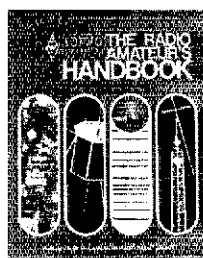
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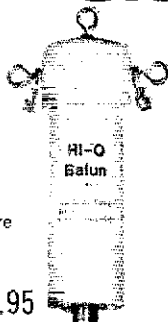
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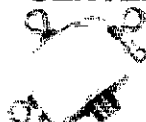
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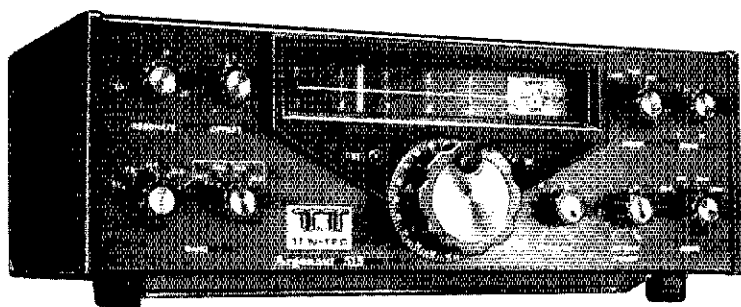
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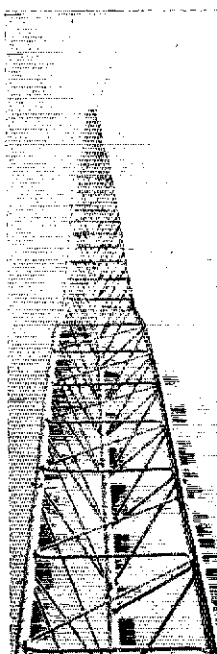
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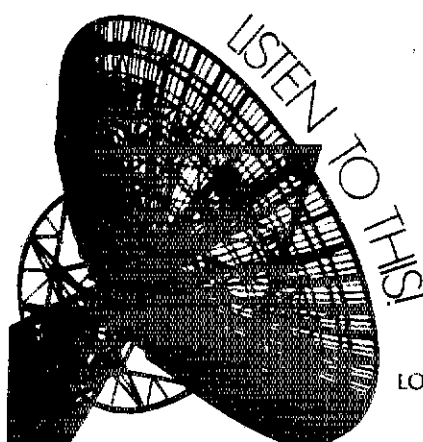
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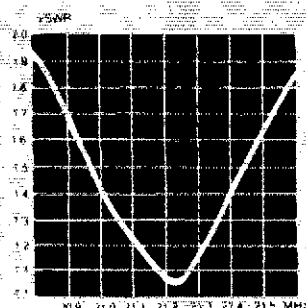
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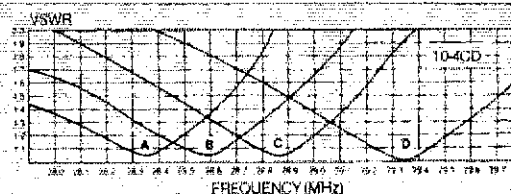
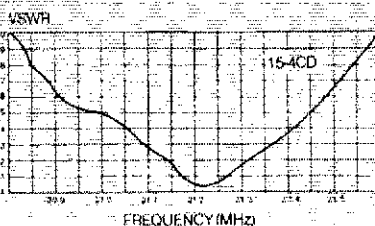
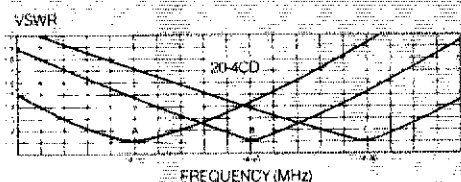
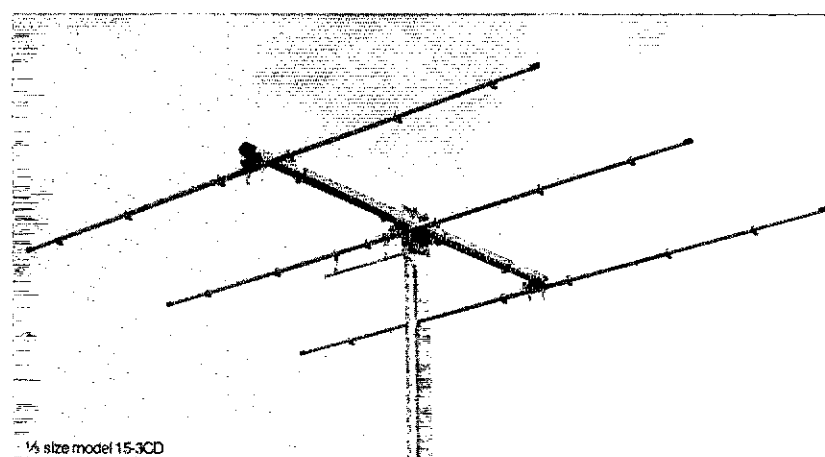
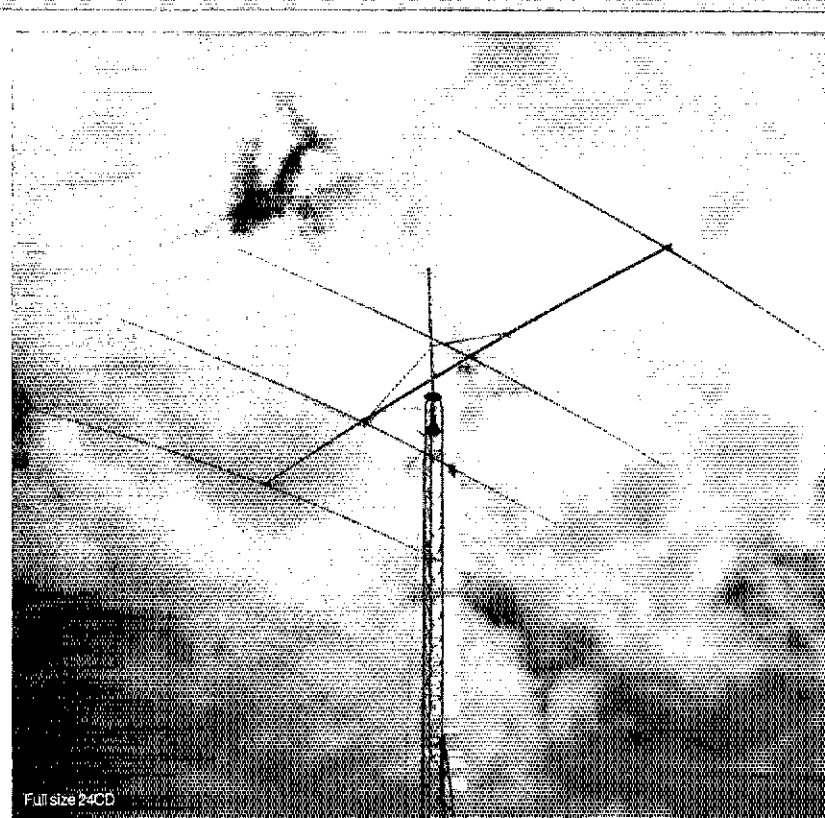
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Specifications

Model number	20-4CD	20-3CD	15-4CD	15-3CD	10-4CD	10-3CD
Frequency range (MHz)	14.0 - 14.35	14.0 - 14.35	21.0 - 21.45	21.0 - 21.45	28.0 - 29.7	28.0 - 29.7
Forward gain (dBd)						
Front to back ratio (dB)						
Boom length (ft) (m)	35 9.75	18 5.49	20 6.10	14 4.27	17 5.18	12 3.66
Boom dia (in) (cm)	2 1/4" - 1 1/2" 5.4-4.8	2 1/4" - 1 1/2" 5.4-4.8	2" - 1 1/2" 5.1-4.1	1 1/4" - 1 1/2" 4.8-4.1	1 1/4" - 1 1/2" 4.4-3.8	1 1/4" - 1 1/2" 4.1-3.8
Longest element (ft-in) (m)	35-10 10.92	35-8 10.87	23-4 7.11	23-2 7.06	17-10 5.43	17-8 5.38
Element dia (in) (cm)	1 1/2" - 3/4" 3.1-1.3	1 1/2" - 3/4" 3.1-1.3	1" - 5/8" 2.5-1.6	1" - 5/8" 2.5-1.6	7/8" - 5/8" 2.2-1.6	7/8" - 5/8" 2.2-1.6
E-plane B/width (deg)	60	56	57	56	57	56
Side lobe attenuation (dB)	40	40	40	40	40	40
1.5:1 VSWR Bandwidth (KHz)	300	800	500	500	600	700
Turning radius (ft-in) (m)	20 6.10	23 7.01	15-4 4.67	13-6 4.11	14 4.27	10 3.05
Weight (lbs) (kg)	55 24.95	30 13.61	25 11.34	20 9.07	18 8.16	11 5.00
Windload (sq ft) (sq m)	8.1 0.75	5.5 0.51	4.5 0.42	3.4 0.32	3.1 0.29	2.3 0.21



The Antenna Company
48 Perimeter Road, P.O. Box 4680
Manchester, NH 03108

Two Meter Boomers

Whether you have the space for the 3.2 λ 32-19 or the compact 2.2 λ models, two meter Boomers are your best choice. They offer the maximum gain available for their boom length (See NBS no. 688). They feature trigon reflectors for additional front-to-back ratio and clearer patterns. All stainless steel hardware and heavy gauge heat treated aluminum are used throughout. Whatever your choice of two meter amateur activity, the Boomer will fill your needs. For FM use the 228FB or 214FB. For CW/SSB on the low end use 32-19 or 214B, in EME, DX or just reliable QSOs Boomer will perform for you.

Six Meter Boomer

The new six meter Boomer offers more boom and more gain from its new element spacing. The six meter Boomer has Cushcraft's typical attention to detail, including T match feed with balun, and extra heavy duty mechanical construction. The key to this Boomer's super performance and relatively lightweight is special element spacing and boom length.

Specifications

Model No.	32-19	214B	214FB	228FB	617-6B
Frequency range (MHz)	144-146	144-146	144.5-148	144.5-148	50.0-51
Forward gain (dB)					
Front to back ratio (dB)					
E-plane Bwidth (deg)	2x14	2x17	2x17	2x17	2x19
H-plane Bwidth (deg)	2x17	2x18	2x18	2x18	NA
Side lobe attenuation (dB)	-60	-60	-60	-60	-60
SWR less than (typ)	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Impedance (ohm)	50	50	50	50	50
Recommended stacking distance					
E-plane (ft)	14	10	10	10	NA
E-plane (m)	4.27	3.05	3.05	3.05	NA
H-plane (ft)	12	10	10	10	22.5
H-plane (m)	3.66	3.05	3.05	3.05	6.86
Weight (lbs)	12	6	8	22	33
(kg)	5.44	2.72	3.63	9.98	11.79
Length (ft)	22	35	15	15	34
(m)	6.71	10.67	4.57	4.57	10.36
Longest element (ft)	40%	40%	40%	39%	114%
(m)	102.5	102	100.3	100.3	299
Turning radius (ft)	11	7.5	7.5	9.5	17.7
(m)	3.35	2.29	2.29	2.93	5.39
Wind load (sq ft)	3.5	1.7	1.7	4.0	4.8
(sq m)	.33	.16	.16	.37	.45

Stacking Kits

For stacking two Boomers, use the following coax harness and power divider kits:

32-19 = 32-SK 214B = 22-SK 617-6B = 617-SK

When stacking four Boomers, use the following complete stacking kits. They include H frame, harness, hardware and complete instructions.

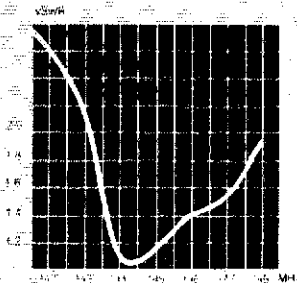
32-19 = 324-OK 214B = 224-OK

Specifications, Stacked Boomers

Antenna	2x214B	2x32-19	2x217-6B	4x214B	4x32-19
Forward gain (dB)					
Front to back ratio (dB)					
E/H plane beamwidth (deg)					
E-plane	34°	28°	35°	17°	12°
H-plane	19°	17°	20°	19°	15°
Stacking dist Vert (ft)	10	12	34	10	12
(m)	3.05	3.66	10.36	3.05	3.66
Horiz (ft)	10	10	10	10	14
(m)	3.05	3.05	3.05	3.05	4.27
Wt approx (lb)	18*	26*	62*	69	97
(kg)	8.16	11.79	28.12	31.30	44.00
Turn radius (ft)	8	11	18	9	13.4*
(m)	2.74	3.35	5.49	2.74	4.06
Wind Area (ft²)	3.4*	7.0*	9.6*	8.3	15.2
(sq m)	.32	.65	.89	.77	1.41

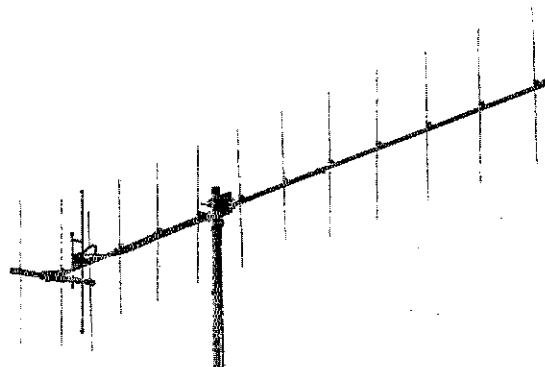
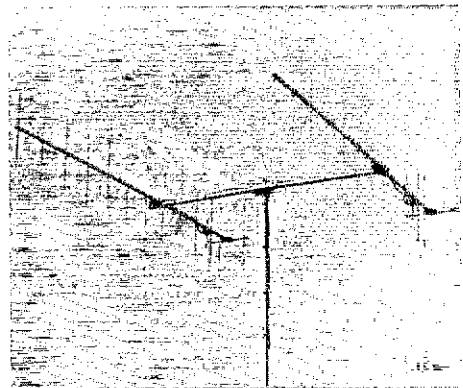
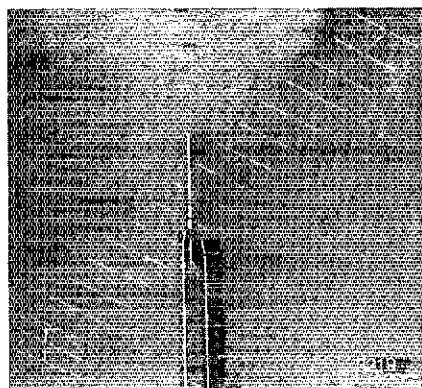
*Support mast not included

The normal dimensions and weights listed are for complete

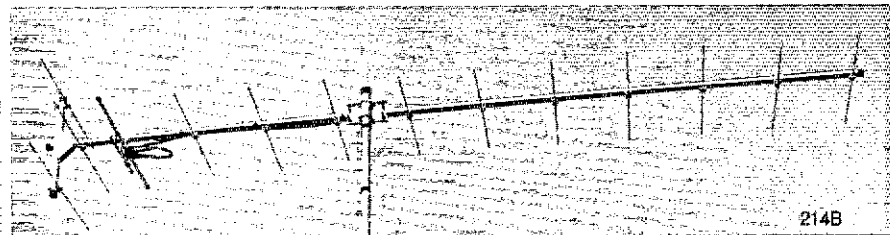


Boomer

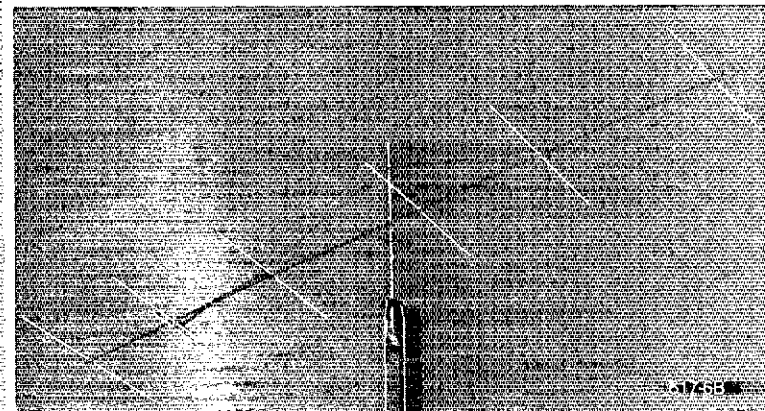
6 and 2 meter High Performance Yagis



214FB



214B



214FB

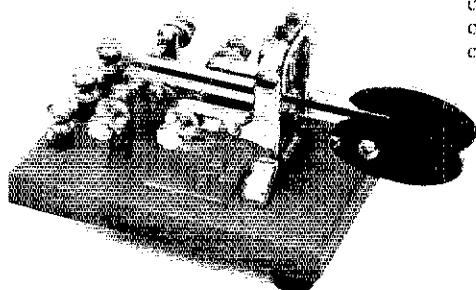


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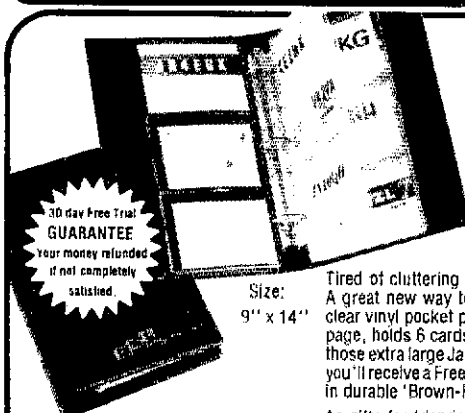
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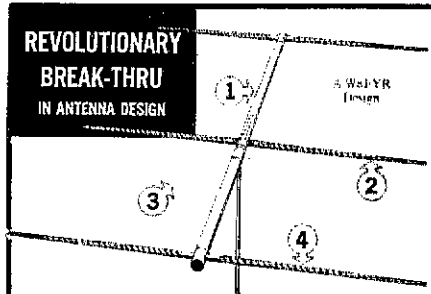
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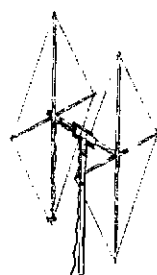
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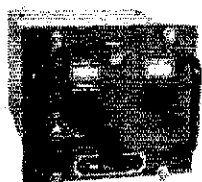
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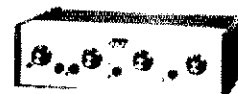
**Rivals long
wires**

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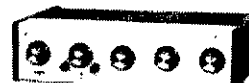
sits on your desk ready to listen to the world. Rivals, can even exceed reception of outside long wire. Unique Tuned Active Antenna minimizes intermod. provides RF selectivity, reduces noise outside tuned band. Also use as preselector for external antenna. Covers 300 KHz to 30 MHz in five bands. Adjustable telescoping antenna. Controls: Tune, Band Selector, Gain, On-Off/Bypass. LED. FFT, bipolar circuitry. 110 VAC, 9-12 VDC or 9 V battery for portable use. Phono jack for external ant. 5x2x6 in.



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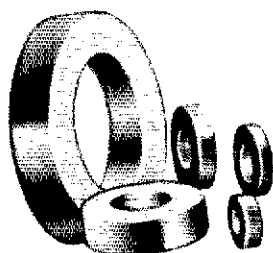
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AT-180	179.95	SAVE	25.00
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YAESU

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FP-707	Power Supply	162.00	SAVE 28.05
FC-707	Antenna Tuner	110.00	SAVE 15.05

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FP-4	12mhz power supply	50.00	SAVE 6.05
FP-12	12mhz power supply	135.00	SAVE 21.05
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Note: all items can be used with the 101Z series except (*) items

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KY-901*	Keyer unit	45.00	SAVE 5.05
MY-901*	Memory unit	124.00	SAVE 18.05
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SP-901	Speaker	35.00	SAVE 5.05
SP-901P	Speaker, Patch	76.00	SAVE 11.05
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PC-901	Antenna tuner	199.00	SAVE 29.05
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XFB-9B	AM filter	45.00	SAVE 5.05
XFB-9HCN	350Hz filter	50.00	SAVE 6.00
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VF-101Z	Remote VFO	175.00	SAVE 25.05
DC-101Z	DC-DC conv.	60.00	SAVE 8.05

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NC-2	3mhz drop-in chgr.	40.00	SAVE 13.05
NBP-5	Battery pack	23.00	SAVE 3.05
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LC-7	Antenna case	39.00	SAVE 5.05
TC-7	Telescope antenna	5.40	SAVE 2.45
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DRAKE

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SL-1800	1800Hz RTTY filter for 7m	55.00	SAVE 5.05
SL-6000	6000Hz AM filter for 7m	55.00	SAVE 5.05
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CUSHCRAFT

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37-19	144-146MHz 19 el.	\$99.95	SAVE \$16.00
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R-3	Tri-Band Range	119.95	SAVE 18.00
4-SK	Stainless Hardware for A-3	39.95	SAVE 4.00

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A147-11	146-148 MHz 11 el.	44.95	SAVE 7.00
A147-20	144 x 147 MHz 20 el	74.95	SAVE 12.00
A147-22	146-148 MHz 22 el.	139.95	SAVE 21.00
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A220-11	220-225 MHz 11 el.	42.95	SAVE 7.00
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A449-11	449 MHz 11 element	42.95	SAVE 7.00
AFM-40	144-148 MHz four pole	79.95	SAVE 13.00
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AFM-440	440-450 MHz four pole	67.95	SAVE 11.00
AR-2	135-170 MHz Ringo	27.95	SAVE 4.00
AR-6	50-54 MHz Ringo	44.95	SAVE 7.00
AR-220	220-225 MHz Ringo	34.95	SAVE 4.00
AR-450	440-450 MHz Ringo	34.95	SAVE 4.00
ARX-2K	135-170 MHz Ringo kit	21.95	SAVE 3.00
ARX-220	220-225 MHz Ringo kit	44.95	SAVE 7.00
ARX-450	440-450 MHz Ringo kit	38.95	SAVE 6.00

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LAC-2	Coax lightning arrester, double female	5.95	SAVE 1.00

VHF / UHF BEAMS

A50-3	50 MHz 3 element	54.95	SAVE 9.00
A50-5	50 MHz 5 element	74.95	SAVE 12.00
A50-8	50 MHz 8 element	99.95	SAVE 16.00
A144-7	144 MHz 7 element	32.95	SAVE 5.00
A144-11	144 MHz 11 element	44.95	SAVE 7.00
A430-11	432 MHz 11 element	42.95	SAVE 7.00

HUSTLER

HF TRANSCIVERS

5-BTV	5 band vertical	\$139.95	SAVE \$49.00
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DGT-144	2 meter mobile w/mount	45.95	SAVE 13.00
G7-144	6 db fixed station, 2 m	39.95	SAVE 5.00
MO-1	54" mast for tender	22.95	SAVE 6.00
MO-2	54" mast for bumper	22.95	SAVE 6.00
OD-1	Quick disconnect	16.95	SAVE 5.00
RM-10	10 meter std. resonator	18.95	SAVE 3.00
RM-10S	10 meter std. resonator	17.95	SAVE 3.00
RM-11	11 meter std. resonator	17.95	SAVE 3.00
RM-11S	11 meter std. resonator	17.95	SAVE 3.00
RM-15	15 meter std. resonator	17.95	SAVE 3.00
RM-15S	15 meter std. resonator	17.95	SAVE 3.00
RM-20	20 meter std. resonator	17.95	SAVE 3.00
RM-20S	20 meter std. resonator	17.95	SAVE 3.00
RM-40	40 meter std. resonator	21.95	SAVE 3.00
RM-40S	40 meter std. resonator	21.95	SAVE 3.00
RM-75	75 meter std. resonator	18.95	SAVE 3.00
RM-75S	75 meter std. resonator	18.95	SAVE 3.00
RM-80	80 meter std. resonator	18.95	SAVE 3.00
RM-80S	80 meter std. resonator	18.95	SAVE 3.00
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has SWR and dual range wattmeter, antenna switch, efficient airwound inductor, built in balun. Up to 300 watts RF output. Matches everything from 1.8 thru 30 MHz: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balanced lines, coax lines.

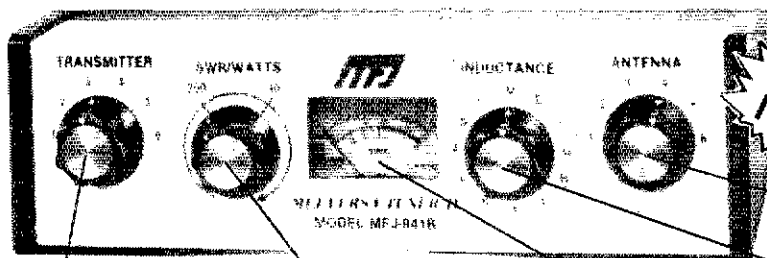
MFJ LOWER PRICES!

NEW, IMPROVED MFJ-941B HAS . . .

- More inductance for wider matching range
- More flexible antenna switch
- More sensitive meter for SWR measurements down to 5 watts output

NEW LOWER PRICE

\$79⁹⁵



Transmitter matching capacitor. 208 pf. 1000 volt spacing.

Sets power range, 300 and 30 watts. Pull for SWR.

Meter reads SWR and RF watts in 2 ranges.

Efficient airwound inductor gives more watts out and less losses.

Antenna matching capacitor. 208 pf. 1000 volt spacing.

Only MFJ gives you this MFJ-941B Versa Tuner II with all these features at this price:

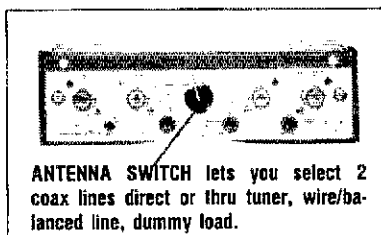
A SWR and dual range wattmeter (300 and 30 watts full scale) lets you measure RF power output for simplified tuning.

An antenna switch lets you select 2 coax lines direct or thru tuner, random wire/balanced line, and tuner bypass for dummy load.

A new efficient airwound inductor (12 positions) gives you less losses than a tapped toroid for more watts out.

A 1:4 balun for balanced lines. 1000 volt capacitor spacing. Mounting brackets for mobile installations (not shown).

With the NEW MFJ Versa Tuner II you can run your full transceiver power output — up to 300 watts RF power output — and match your



ANTENNA SWITCH lets you select 2 coax lines direct or thru tuner, wire/balanced line, dummy load.

transmitter to any feedline from 160 thru 10 Meters whether you have coax cable, balanced line, or random wire.

You can tune out the SWR on your dipole, inverted vee, random wire, vertical, mobile whip, beam, quad, or whatever you have.

You can even operate all bands with just

one existing antenna. No need to put up separate antennas for each band.

Increase the usable bandwidth of your mobile whip by tuning out the SWR from inside your car. Works great with all solid state rigs (like the Atlas) and with all tube type rigs.

It travels well, too. Its ultra compact size 8x2x6 inches fits easily in a small corner of your suitcase.

This beautiful little tuner is housed in a deluxe eggshell white Ten-Tec enclosure with walnut grain sides.

S0-239 coax connectors are provided for transmitter input and coax fed antennas. Quality five way binding posts are used for the balanced line inputs (2), random wire input (1), and ground (1).

NEW 300 WATT MFJ VERSA TUNER II'S: SELECT FEATURES YOU NEED.

NEW MFJ-945 HAS SWR AND DUAL RANGE WATTMETER. NEW LOWER PRICE

\$69⁹⁵



Same as MFJ-941B but less 6 position antenna switch.

NEW MFJ-944 HAS 6 POSITION ANTENNA SWITCH ON FRONT PANEL. NEW LOWER PRICE

\$69⁹⁵



Same as MFJ-941B but less SWR/Wattmeter.

NEW MFJ-943 MATCHES ALMOST ANYTHING FROM 1.8 THRU 30 MHz. NEW LOWER PRICE

\$59⁹⁵



Same as MFJ-941B, less SWR/Wattmeter, antenna switch, mounting bracket. 7x2x6 in.

ULTRA COMPACT 200 WATT VERSA TUNERS FOR ALL YOUR NEEDS.

MFJ-901 VERSA TUNER MATCHES ANYTHING, 1.8 THRU 30 MHz. NEW LOWER PRICE

\$49⁹⁵



Efficient 12 position air inductor for more watts out. Matches dipoles, vees, random wires, verticals, mobile whips, beams, balanced lines, coax. 200 watts RF, 1:4 balun, 5x2x6 in.

MFJ-900 ECONO TUNER MATCHES COAX LINES/RANDOM WIRES. NEW LOWER PRICE

\$39⁹⁵



Same as MFJ-901 but less balun for balanced lines. Tunes coax lines and random lines.

MFJ-16010 RANDOM WIRE TUNER FOR LONG WIRES. NEW LOWER PRICE

\$29⁹⁵



1.8 thru 30 MHz. Up to 200 watts RF output. Matches high and low impedances. 12 position inductor. S0-239 connectors. 2x3x4 inches. Matches 25 to 200 ohms at 1.8 MHz. Does not tune coax lines.

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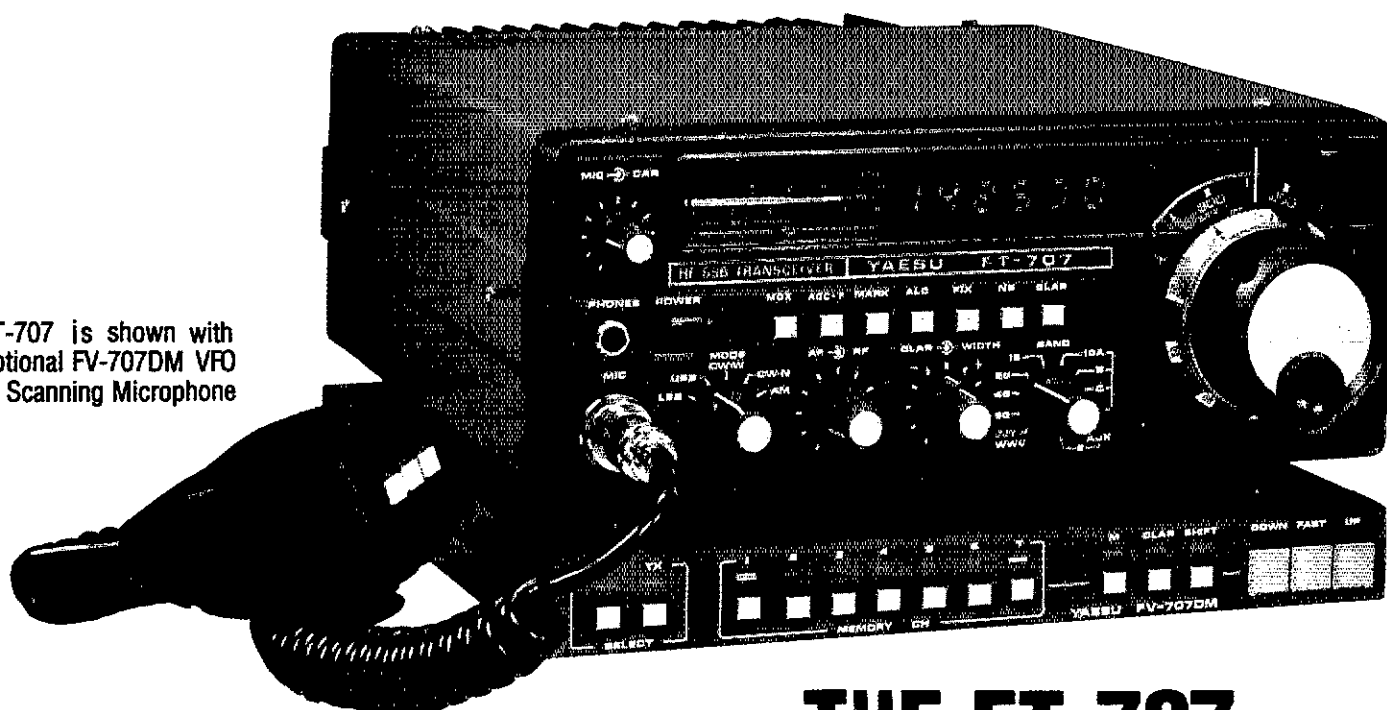


MFJ ENTERPRISES, INC.

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FT-707 is shown with optional FV-707DM VFO & Scanning Microphone



THE FT-707 "WAYFARER"

The introduction of the "WAYFARER" by Yaesu is the beginning of a new era in compact solid state transceivers. The FT-707 "WAYFARER" offers you a full 100 watts output on 80-10 meters and operates SSB, CW, and AM modes. Don't let the small size fool you! Though it is not much larger than a book, this is a full-featured transceiver which is ideally suited for your home station or as a traveling companion for mobile or portable operation.

The receiver offers sensitivity of .25 μ V/10 dB SN as well as a degree of selectivity previously unavailable in a package this small. The "WAYFARER" comes equipped with 16 poles of IF filtering, variable bandwidth and optional crystal filters for 600 Hz or 350 Hz. Just look at these additional features:

FT-707 with Standard Features

- Fast/slow AGC selection
- Advanced noise blanker
- Built-in calibrator
- WWV/JJY Band
- Bright Digital Readout
- Fixed crystal position
- 2 auxiliary bands for future expansion
- Unique multi-color bar metering—monitors signal strength, power output, and ALC voltage.

FT-707 with Optional FV-707DM & Scanning Microphone

- Choice of 2 rates of scan
- Remote scanning from microphone
- Scans in 10 cycle steps
- Synthesized VFO
- Selection of receiver/transmitter functions from either front panel or external-VFO
- "DMS" (Digital Memory Shift)

Impressive as the "WAYFARER" is its versatility can be greatly increased by the addition of the FV-707DM (optional). The FV-707DM, though only one inch high, allows the storage of 13 discrete frequencies and with the use of "DMS" (Digital Memory Shift) each memory can be band-spread 500 KHz. These 500 KHz bands may be remotely scanned from the microphone at the very smooth rate of 10 Hz steps.

The FT-707 "WAYFARER" is a truly unique rig.
See it today at your authorized Yaesu Dealer.

YAESU
The radio.



Top-Notch.

VBT, notch, IF shift, wide dynamic range

TS-830S

Now most Amateurs can afford a high-performance SSB/CW transceiver with every conceivable operating feature built in for 160 through 10 meters (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455-KHz second IF. Its optional VFO-230 remote digital VFO provides five memories.

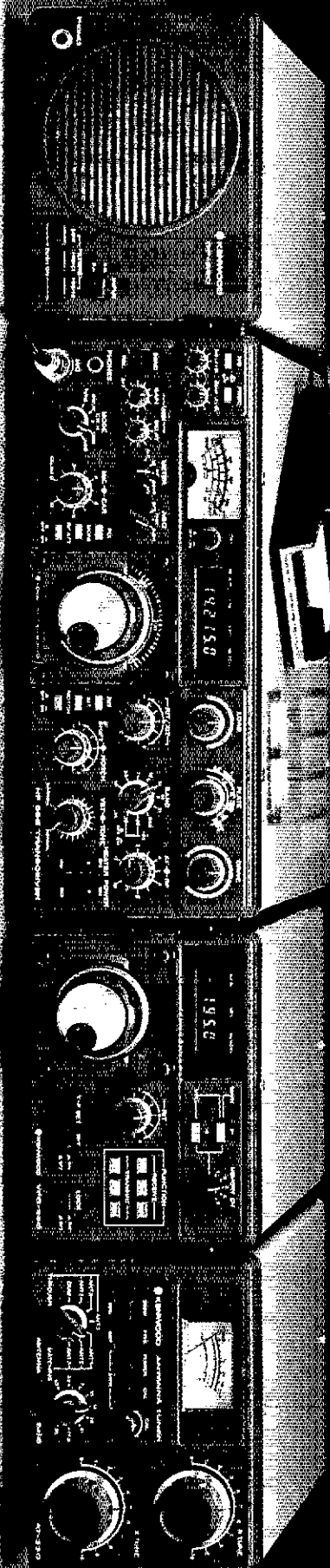
MC-50

SP-230

TS-830S

VFO-230

AT-230



Ask your Authorized Kenwood Dealer about the many operating features offered by the TS-830S...at a very reasonable price!

NOTE: Price, specifications subject to change without notice and obligation.



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