

# QST

April 1982 \$2.50

devoted entirely to Amateur Radio

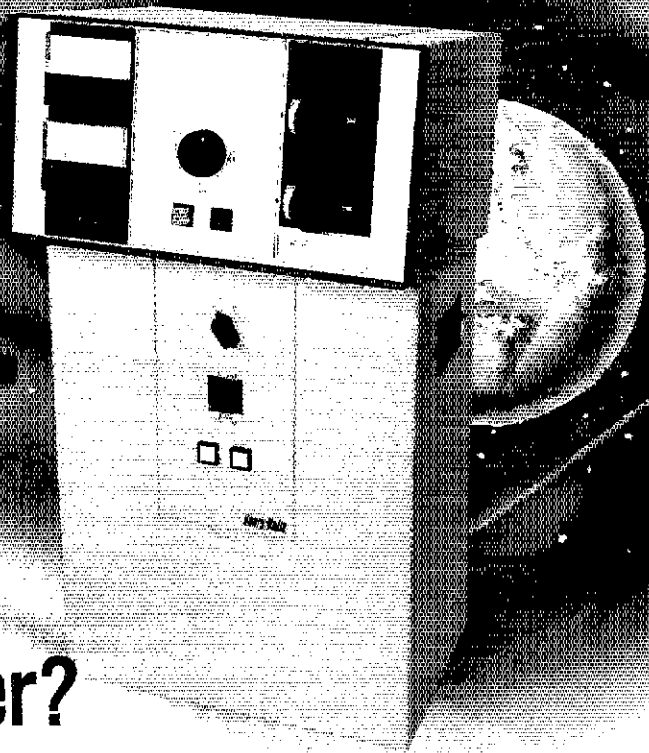


April Fool?

Page 3

# 3K Classic

Is this  
the world's finest  
Amateur linear amplifier?



*We think it is...and we think you'll agree with us.*

*2K Classic and 3K Classic  
pictured above*

Ever since we made our first Amateur amplifier almost 20 years ago, our goal has been to make the finest, most rugged and reliable amplifier possible. Now with the 3K Classic we have accomplished this. It contains all of the famous Henry amplifier features plus the magnificent 8877 tube, rugged heavy duty power supply components and advanced antenna switch relay for semi break-in on CW. This is the amplifier of every Amateur's dreams!

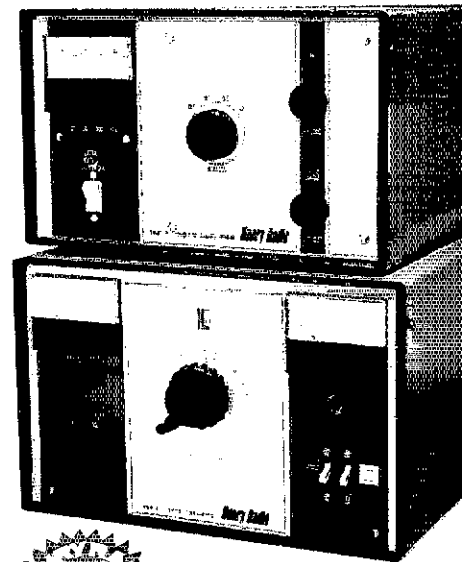
The 3K Classic/X with heavy duty power supply and 10 meter operation is available for sale outside the USA where FCC type acceptance is not required.

*The 2K Classic* The 2K Classic represents the culmination of years of experience in developing, manufacturing and improving the 2K series. It remains as always a "workhorse", engineered and built to loaf along at full legal power for days or weeks without rest. A look inside shows why! It is truly a "Classic" amateur amplifier. Heavy duty, top quality components along with its rugged construction assures you trouble free operation. It will put your signal on the air with greater strength and clarity than you ever dreamed possible. The 2K Classic operates on all Amateur bands, 80 through 15 meters (export models include 10 meters). Price \$1295.00

*The 1KD-5* ...Another fine member of the famous Henry Radio family of superior 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-4, 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 Eimac 3-500Z glass envelope triodes and a PI-L plate circuit with a rotary silver plated tank coil. Price \$945.

Henry amateur amplifiers are available from select dealers throughout the U.S. And don't forget the rest of the Henry family of amateur amplifiers...the Tempo 2002 high power VHF amplifier and the broad line of top quality solid state amplifiers. Henry Radio also offers the 4K-Ultra and 3K Classic/X superb high power H.F. amplifiers and a broad line of commercial FCC type accepted amplifiers for two way FM communications covering the range to 500MHz.



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# Henry Radio

Prices subject to change without notice



# ICOM IC-290

The Latest State of the Art in 2 Meter Mobile



## 5 Memories/Priority/Scan/Squelch on SSB.

### FM Tone

- 5 Memories - Store your favorite frequencies.
- Priority - Store your most important frequencies.
- Programmable Scan - Search for signals.
- Squelch - Silence when no signal.

### SSB/CW/Scan/Receive

- SSB - Receive and transmit.
- CW - Receive and transmit.
- Scan - Search for signals.
- Receive - Receive signals.
- Squelch - Silence when no signal.
- FM - Receive and transmit.
- MO - Monitor only.
- AGC - Automatic Gain Control.
- NB - Noise Blanker.

## 7 Memory Channels

Store the whole band in 7 memory channels.

- 7 Memory Channels - Store your favorite frequencies.
- Adjustable Squelch - Silence when no signal.
- 15 KHz or 5 KHz - Squelch width.
- Stop on busy - Stop when a signal is received.

## ICOM Performance

- 144 MHz - 144.000 MHz to 144.999 MHz.
- 100 Watts - 100 Watts PEP.
- 15 KHz or 5 KHz - Squelch width.
- 15 KHz or 5 KHz - Squelch width.
- 15 KHz or 5 KHz - Squelch width.
- 15 KHz or 5 KHz - Squelch width.
- 15 KHz or 5 KHz - Squelch width.
- 15 KHz or 5 KHz - Squelch width.



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# QST

April 1982 *Volume LXVI Number 4*

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Second-class postage paid at Hartford, CT and at additional mailing offices. Postmaster: Form 3579 requested.

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QST is available to blind and physically handicapped individuals on flexible discs from the Library of Congress, National Library Service for the Blind & Physically Handicapped, Washington, DC 20542.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No. Z1-9421. Microform editions available from Xerox University Microfilms, Ann Arbor, MI 48106.



**THE COVER**

Are we kidding? No, this is our safety lesson for this month. . . this is the way *not* to do it. (Photo courtesy of N4XMM/W4BCV)



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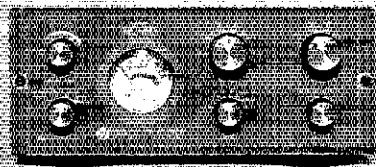
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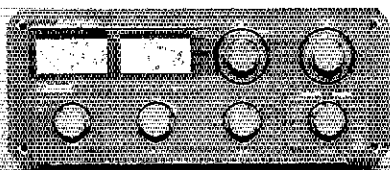
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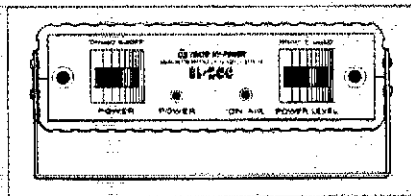
**HL-82V** — 10W to 80W 2 mtr power amp with 12db gain MOS-FET Rx preamp. Selectable output power levels and a precision output power meter. SSB or FM/CW operation. \$159.95 Suggested Retail.



**HC-150** — Our most popular antenna coupler. Handles 150W output transceivers from 3.5 to 30 MHz WARC bands, 10 ohms, to 250 ohms & accurate SWR & power meter ( $\pm 10\%$ ). Coupler or direct function. Ceramic coils. Quality throughout. \$99.95 Suggested Retail.



**HC-2000** — The ultimate in quality transmatch design and construction. Takes a full 2 kW output at peak on most bands. Accurate VSWR and separate FWD metering. 3 coax & 2 wire antennas and dummy port, plus bypass. One box, coax switch, power meter, antenna tuner: what could be more convenient! \$349.95 Suggested Retail.

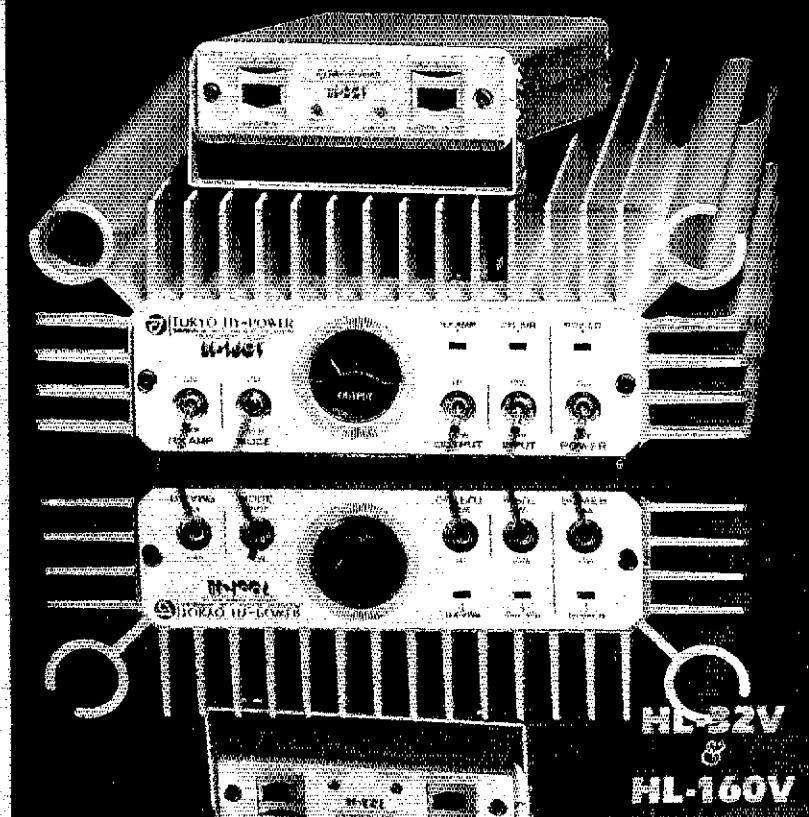


**HL-200 New Product Preview.** The HL-200 UHF amplifier, 20W compact, is a basic amp for UHF handhelds and can accept input levels from 200mW to 3W, to produce a big 20W UHF signal. Price and availability to be announced.

#### TOKYO HY-POWER LABS, INC.

Long the quality leader among fine Japanese communications equipment manufacturers, TOKYO HY-POWER LABS now makes these outstanding units available to you through American dealers. Now you can get our advanced features and quality at your kind of prices.

## Little Beauty & The Beast



Suggested Retail: HL-32V \$89.95; HL-160V \$349.95.

In our last issue we found Little Beauty getting rave reviews from all her admirers, as they took her into their homes and cars to boost the signals from their handheld transceivers. Today we find her in the company of a large (output power) character with big ears (internal preamp), known as The Beast. Weighing in at 160W output from 3W drive, this 2 meter amplifier can be heard from the wilderness when others can't. With built-in preamp, it brings sensitive hearing as well as big signal to the ordinary radio. The Beast, AKA "Boss Hawg", has been known to carry FM, SSB, CW and even AM signals; however, keeping track of his activities is easy with front panel LED's, switches and accurate RF wattmeter. If you need some help in carrying the mail back to town, get the Beast. You'll say it's beautiful!

### TOKYO HY-POWER LABS, INC.

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For your home QTH, DX-pedition, field day, or contest select a high performance Cushcraft antenna available through dealers worldwide.

**A3**  
Broadband, excellent gain and f/b ratio, 2 kw power rating direct 50  $\Omega$  feed, Boom 14 ft., 4.26 m., longest element 28 ft., 8.5 m., weight 27 lbs., 12.9 kg., turn radius 15.5 ft., 4.7 m., mast dia. 1 1/4 in. to 2 in., 3.18 cm. to 5.08 cm., material 6063-T832 seamless aluminum.

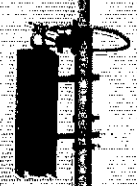
**A4**  
Broadband, excellent gain and f/b ratio, 2 kw power rating, direct 50  $\Omega$  feed, boom 18 ft., 5.48 m., longest element 32 ft., 9.7 m., weight 37 lbs., 16.8 kg., turn radius 18 ft., 5.48 m., mast dia. 1 1/4" to 2 in., 3.18 to 5.08 cm., material 6063-T832 seamless aluminum.



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# Dyna "mite."



Photo shown is TR-7730 in 16-key autopatch UP/DOWN microphone version.

## Miniaturized, 5 memories, memory/band scan

### TR-7730

The TR-7730 is an incredibly compact, reasonably priced, 25-watt, 2-meter FM mobile transceiver with five memories, memory scan, automatic band scan, and other convenient operating features. The TR-7730 is available in two variations: a 16-key autopatch UP/DOWN microphone (MC-46) version, and a basic UP/DOWN microphone version.

#### TR-7730 FEATURES:

- **Smallest ever Kenwood mobile**  
Measures only 5-3/4 inches wide, 2 inches high, and 7-3/4 inches deep, and weighs only 3.3 pounds. Mounts even in the smallest subcompact car, and is an ideal combination with the equally compact TR-8400 synthesized 70-cm FM mobile transceiver.
- **25 watts RF output power**  
HI/LOW power switch selects 25-W or 5-W output.
- **Five memories**  
May be operated in simplex mode or repeater mode with the transmit frequency offset  $\pm 600$  kHz. The fifth memory stores both receive and transmit frequency independently, to allow operation on repeaters with nonstandard splits. Memory backup terminal on rear panel.
- **Memory scan**  
Automatically locks on busy memory channel and resumes when signal disappears or when SCAN switch is pushed. Scan HOLD or microphone PTT switch cancels scan.
- **Automatic band scan**  
Scans entire band in 5-kHz or 10-kHz steps and locks on busy channel. Scan resumes when signal disappears or when SCAN switch is pushed. Scan HOLD or microphone PTT switch cancels scan.
- **Extended frequency coverage**  
Covers 143.900-148.995 MHz in switchable 5-kHz or 10-kHz steps.
- **UP/DOWN frequency control from microphone**  
Manual UP/DOWN scan of entire band in

5 kHz or 10 kHz steps is possible when using either autopatch or basic UP/DOWN microphone versions.

- **Offset switch**  
Allows VFO and four of five memory frequencies to be offset  $\pm 600$  kHz for repeater access or simplex.
- **Four-digit LED frequency display**  
Indicates receive and transmit frequency.
- **S/R/F bar meter and LED indicators**  
Bar meter of multicolor LEDs shows S/R/F levels. Other LEDs indicate BUSY, ON AIR, and REPEATER offset.
- **Tone switch**

#### Optional accessories:

- MC-46 16-key autopatch UP/DOWN microphone
- SP-40 compact mobile speaker
- KPS-7 fixed-station power supply

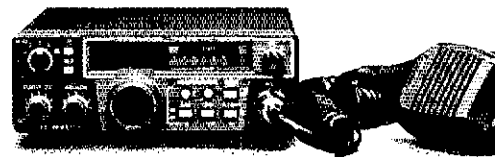
More information on the TR-7730 and TR-8400 is available from all authorized dealers of Trio-Kenwood Communications 1111 West Walnut Street Compton, California 90220

## Synthesized 70-cm FM mobile rig

### TR-8400

- **Synthesized coverage of 440-450 MHz**  
Covers upper 10 MHz of 70-cm band in 25-kHz steps, with two VFOs.
- **Offset switch**  
For  $\pm 5$  MHz transmit offset on both VFOs and four of five memories, as well as simplex operation. Fifth memory allows any other offset by memorizing receive and transmit frequencies independently.
- **DTMF autopatch terminal**  
On rear panel, for connecting DTMF (dual-tone multifrequency) touch pad (for accessing autopatches) or other tone-signaling device.
- **HI/LOW RF output power switch**  
Selects 10 watts or 1 watt output.
- **Virtually same size as TR-7730**  
Perfect companion for TR-7730 in a compact mobile arrangement.
- **Other features similar to TR-7730**  
Five memories, memory scan, automatic band scan (in 25-kHz steps), UP/DOWN manual scan, four-digit LED receive frequency display (also shows transmit frequency in memory 5), S/R/F bar meter and LED indicators, tone switch, and same optional accessories.

**KENWOOD**  
...pacesetter in amateur radio



Specifications and prices are subject to change without notice or obligation.



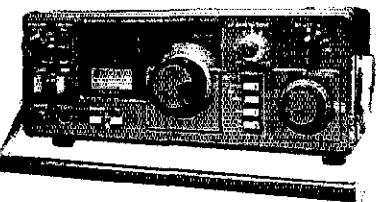


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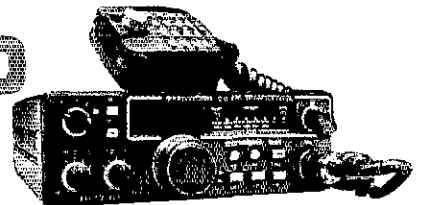
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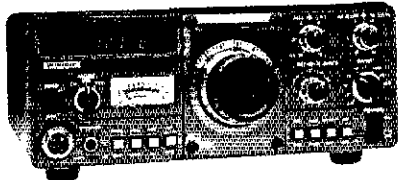
ASK YOUR DEALER FOR DETAILS



**R-1000**  
**\$30.00 OFF**



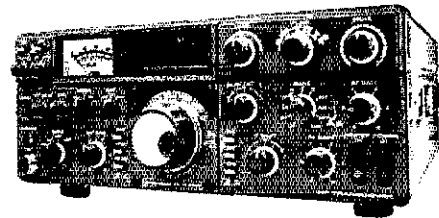
**TR-7730**  
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WITH OR WITHOUT  
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**TR-8400**  
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**TS-530S**  
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Electronics Center  
Dallas, TX 75201  
(214) 526-2023  
Hardin Electronics  
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(817) 429-9761  
Madison Electronics  
Houston, TX 77010  
(713) 658-0268  
Kennedy Associates  
San Antonio, TX 78222  
(512) 333-6110
- WASHINGTON**  
A-B-C Communications  
Seattle, WA 98155  
(206) 364-8300  
Amateur Radio Supply Co.  
Seattle, WA 98108  
(206) 767-3222
- C-COMM\***  
Seattle, WA 98107  
(206) 784-7337
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Model Purchased		Date Purchased	
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Dealer Name: _____			
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# "It Seems to Us . . ."

## A New Era for IARU?

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

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

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

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

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

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\*Executive Committee Member

The International Amateur Radio Union (IARU) was founded in April 1925, at a meeting in Paris, France. Twenty-three nations were represented, and the goal was to promote and coordinate two-way radio communication among the amateurs of the world. ARRL's Hiram Percy Maxim was elected president, and Kenneth B. Warner, General Manager of ARRL, was chosen secretary. Vice President of the new Union was Gerald Marcuse, of England, while the two remaining members of the Executive Committee were Mr. Jean Mezger of France and Mr. Frank Bell of New Zealand. It is interesting to note that in the subsequent history of IARU these same countries have continued to play dominant roles and, of course, so have many other countries and many other Amateur Radio societies.

It is a fact, however, that for much of its history, until the 1950s, IARU was to a large extent a paper organization. ARRL continued to serve as the Hq. Society of IARU, and the officers of ARRL automatically became the officers of IARU. A twice-yearly Calendar or newsletter disseminated organizational news of Amateur Radio, and a page of IARU news appeared sporadically in *QST*. There was no coordinated effort on the part of IARU to prepare Amateur Radio on a worldwide basis for the infrequent telecommunications conferences that occurred.

World War II, however, soon changed all that, following a major ITU allocations conference in Atlantic City in 1947. Although Amateur Radio was ably represented by the Radio Society of Great Britain and ARRL, there was no preconference coordinated effort, and there was little IARU teamwork at the conference.

Recognizing that IARU needed to become a stronger organization than so far had been the case, amateur societies in Region 1 of the International Telecommunication Union (essentially, Europe and Africa) banded together to form an IARU Region 1 organization. This new group felt that it could provide a more dynamic leadership in the area than was being provided by IARU Hq., particularly in coordinating amateur operating and regulatory matters in Region 1, and in representing amateurs at ITU Hq. in Geneva. Formed in the early 1950s, the Region 1 IARU organization prospered and eventually provided the model or the impetus for the formation of similar IARU regional organizations in Region 2 (North and South America) and in Region 3 (Australia, New Zealand, Japan, and the Far East).

In 1964 Herbert Hoover, Jr., W6ZH, serving as president of ARRL and of IARU, recognized that a major allocations conference was ahead of us and that if Amateur Radio were to successfully defend itself at that conference, a major task of preparation needed to be undertaken. Under his guidance, officers and staff of IARU Hq. began traveling throughout the world, urging IARU member societies to take steps to establish closer relations with their governments, in order that there would be better likelihood of favorable support at the up-

coming conference. In countries where there was no amateur society, IARU representatives talked directly with government authorities, extolling the values of the amateur service and why it should be supported at a conference.

In 1972, some studies in the United States determined that there was a reasonable basis on which to ask for increased amateur allocations at the conference, and a plan for justifying such increases was developed and circulated to the IARU regional organizations and to the individual IARU member societies. In short order this unified plan was adopted by all three IARU regions, who then proceeded to urge its adoption by each member society. The end result of all of this activity was that a number of administrations incorporated the IARU plan in their official conference proposals and, for the first time ever, Amateur Radio went to a telecommunications conference speaking with a single voice, seeking common goals. It was a combination that promised success, and success came.

At the WARC-79 conference, Amateur Radio was represented by an IARU team of 12 amateurs from all over the world. In addition, there were upwards of 150 radio amateurs on the various official delegations. The result was that there was gathered in Geneva during WARC-79 a group of influential amateurs who were vitally concerned with the well-being of Amateur Radio.

Although there was no question but what the amateur preparation for and participation in WARC-79 was well planned and well executed, nevertheless there were a number of IARU societies which felt that it would have been better if a larger and more representative group had been responsible for developing the plan. There was beginning to develop a sentiment for some restructuring of the IARU which would spread the authority and responsibility among a larger group of people, and a sentiment that perhaps the officers of IARU should be chosen on a different basis.

The president of IARU took advantage of WARC-79 to hold meetings to explore these questions, and subsequently formed a worldwide restructuring committee consisting of the executive committees of each region. That restructuring committee has been meeting by mail and at regional conferences these past two years, exchanging thoughts on how the IARU might be improved. Its work is almost done, although there is not yet a complete unanimity on what the solution might be. Later this year, in a meeting to be held in Geneva, Switzerland, a group of representatives from each region, plus the present IARU Hq. officers, will meet to hammer out a single set of restructuring proposals which can then be presented to the IARU membership for approval or disapproval.

The challenges facing IARU in the next decade will be coming at a faster pace than in the past. One of the results of WARC-79 was an increased number of specialized telecommunications conferences, another one almost every year. A number of these will affect Amateur Radio in some fashion, and we will

have to be prepared. It is the intent of all of those who feel a responsibility for the Amateur Radio service that we *will* be prepared. Restructuring is one way to improve the strength of IARU to accomplish the goal of adequate preparation.

From the very beginning of IARU's 57-year history, ARRL has provided support — support in the form of routine administration, support in the form of the dedication of its of-

ficers, support in the form of financial contributions. The ARRL Board has repeatedly reaffirmed its formal support of IARU. As an affirmation of its support, for the past 10 years ARRL's president has routinely designated another ARRL official to serve as IARU president, in order that there would be no dilution of effort. And as yet another affirmation of support of IARU and international Amateur Radio matters, two years ago ARRL created

the post of Vice President for International Affairs.

With this support of IARU, and with a revitalized IARU structure which will encourage the active participation of many more societies and individuals in the formation of its policies, and with the many challenges that face us in the decade ahead, it is easy to see that there is indeed a new era ahead for IARU.  
— Richard L. Baldwin, W1RU

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## League Lines...

Special Grace period for expired club and military recreation stations! If your club or military base had a station license that expired between March 11, 1977 and July 14, 1980, and it was lost because the one-year grace period for renewal has expired, the FCC will grant an application for renewal. This FCC offer is for a limited time only! The renewal application must be received by the Commission on or before June 1, 1982. The Commission established this special grace period at the request of ARRL after concluding that misunderstandings occurred during the intermediate steps in Docket 21135, taken to restructure the call-sign assignment system. Spread the word.

ARRL's petition for rulemaking to prohibit cable television companies from using channels E and K has been assigned the designator RM-4040. Last month's "Happenings," page 58, gave details about this petition. CATV channel E uses frequencies in the 144-MHz band and CATV channel K uses frequencies in the 220-MHz band.

In other action, the FCC has considered and denied the following petitions: RM-3459, which requested additional phone frequencies on the hf bands for Advanced and General class licensees; RM-3867, which requested a decrease in privileges for General class licensees and an increase in Extra Class privileges to promote greater incentive for upgrading; and RM-3977, which requested that Technicians and Novices be granted cw privileges in the lower part of the 10-meter band to "discourage the current influx of illegal operations." The Commission also denied RM-3137, which requested that amateurs be authorized higher power for moonbounce on the 144- and 432-MHz bands, and RM-3181, which requested that operations using A1 emission on amateur bands between 3 and 30 MHz be limited to 250 watts. None of these petitions were filed by ARRL.

Canada has a new reciprocal licensing agreement with Jamaica.

Transcontinental packet-radio QSO demonstrates the feasibility of interconnecting vhf local-area packet radio networks by hf radio. Details on the League-sponsored test appear on page 32 in this issue.

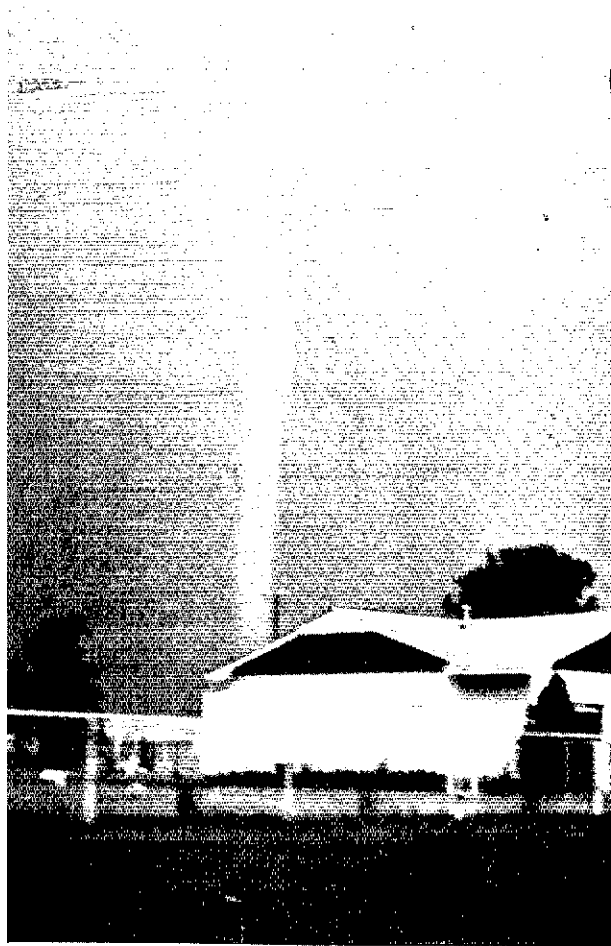
Amateurs in West Virginia and Ohio have reported thefts of repeaters! If your repeater is located at a remote, unattended site, you had better double-check your security measures. If someone offers you a deal on a slightly used repeater that sounds too good to be true, it probably is. Caveat emptor!

In the FCC staff report on radio-frequency interference, released with its Further Notice of Inquiry in Docket 78-369, television receiver front-end overload was estimated as being the sole or partial source of approximately 25 percent of all interference complaints received by the FCC. A footnote attempted to explain the derivation of this percentage, although a typographical error clouded the explanation. Interference complaint statistics for fiscal year 1980 were broken down as follows: Total number of complaints --80,244; number of CB/TV complaints --45,369. In other words, approximately 56.5% of all interference complaints received were Citizens Band/television in nature. Since the Commission estimates that overload was involved in 45% of CB/TV complaints, it estimates that receiver overload accounts for about 25% of all interference complaints.

# A Happy Marriage: Amateur Radio and the National Weather Service

Next time your home is threatened by severe weather, you'll be thankful for the hams who volunteer for the NWS. Why not join them?

By Larry E. Mooney,\* WB5PWY



*CENTRAL TEXAS HILL COUNTRY (Early August 1978) — Tropical Storm "Amelia" dumps 30 inches of rain in one night 50 miles northwest of San Antonio. With normal communications out, Amateur Radio operators work their way into the flood-stricken area to collect river-stage and rainfall readings, which the National Weather Service needs desperately to calculate the volume of water heading toward downstream cities. Members of the San Antonio Repeater Organization man the SKYWARN net control station at the NWS Forecast Office for 36 hours as mobile amateurs remain in their cars overnight to watch river stages and observe rainfall.*

*WICHITA FALLS, TEXAS (April 10, 1979) — Just before 6 P.M., NWS radar indicates a possible tornado southwest of the city. An Amateur Radio storm spotter reports a tornado just to the southwest of Memorial Stadium. This report is received by the amateur station at the NWS office, and a warning goes out. Although nearly 18,000 people are in or near the tornado's path, fewer than 50 people are killed.*

*FORT WORTH, TEXAS (May 8, 1981) — A huge, severe thunderstorm produces winds of 120 to 130 miles an hour in western Tarrant County. In eastern Fort Worth, softball-size hail penetrates some roofs and causes what is called the worst hailstorm in U.S. history. While the county is hit with \$110 million in damage, only a few injuries occur — largely due to the advance warning based on reports from RACES spotters who speed information to amateur stations at the NWS office, civil defense and a major TV station.*

A funnel cloud approaches Union City, Oklahoma. Amateur Radio operators trained as storm spotters often warn the National Weather Service of an oncoming storm before it shows up on radar. (photo by Alan Moller, NWS)

**T**hese examples show graphically how trained Amateur Radio operators have saved lives and untold misery. More such volunteers are needed, anyplace there is a National Weather Service office.

A number of *QST* articles have described the activities of various amateur groups that provide assistance to the National Weather Service (NWS). While these articles have been extremely worthwhile, they've described this important public service from the viewpoint of

the provider rather than that of the recipient of the aid. While most amateurs may be aware of the importance of their contributions to their local NWS office, few are in a position to appreciate the scope of this assistance on a national basis. In fact, the value of amateur assistance to the NWS is so extensive and significant that it is probably impossible to do justice to the subject in a single article. Nevertheless, the need exists to document some of the major contributions of the amateur community from the NWS perspective.

## The Storm Spotter Program

While radar is a valuable tool, trained spotters are the backbone of an effective

severe weather warning system. Traditionally, spotter networks have consisted of private citizens in rural areas who report by telephone. Such "networks" are supplemented by involving emergency service agencies such as police, fire and civil defense personnel. While this approach can sometimes be adequate, additional assistance is usually required where there is much severe weather. What is needed is a well-organized and highly-motivated group with reliable fixed and mobile communications.

Amateur assistance to the NWS is not new. In some areas, amateurs have participated in the spotter program for several decades. Only recently, however, has this effort been expanded nationwide.

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To a large degree, this was the fault of the NWS, as we sometimes failed to recognize the advantages that amateur assistance offered. In some cases, NWS station managers even turned down offers of help because they confused Amateur Radio with less effective organizations. Fortunately for the NWS, a few managers in key positions recognized the importance of amateur involvement and began a program to educate NWS personnel about the advantages of amateur assistance.

The real credit for the expansion of amateur participation belongs almost exclusively to the amateur community, however. Many of the more successful networks have developed through the sponsorship of local Amateur Radio clubs. Others were established through the RACES structure. RACES nets have proven especially effective in major metropolitan areas, where a more formal structure may be needed. ARES groups have also proven to be very effective. Unlike RACES, ARES does not depend on the existence of an organized civil defense group for sponsorship. Furthermore, ARES has the necessary organizational structure to conduct a coordinated program. In some locations, amateur spotters are civil defense volunteers with no other affiliation.

Two basic principles are fundamental to the amateur spotter program. First, the operation and management of the networks must remain in the hands of the amateurs. NWS involvement should be limited to support functions, such as providing training. Beyond activities such as requesting activation and soliciting

reports, the NWS should have no operational role in actual network management. Equally important, the network should be organized to provide information and assistance to all interested parties. The NWS encourages all emergency-service agencies and the news media to support and participate in the amateur networks. The ideal situation is to have amateurs located at all key emergency operating centers and news media outlets in addition to the NWS office.

#### *Amateurs' Spotter Abilities*

In addition to the obvious communication capabilities, amateurs have demonstrated some special attributes that have made them the elite among storm spotters:

1) *Reportability* — Reports must be received in a timely and efficient manner. Amateur Radio has the excellent "airways discipline" that is essential for ensuring that significant reports are not delayed or missed because of idle chatter on the frequencies. This has been a major liability with some of the other volunteer organizations.

2) *Mobility* — Flexibility in positioning spotters is a key element of a successful network. Not only does mobility increase the likelihood of a spotter being in the best possible position to observe storm features, but it also reduces the number of spotters needed to cover a storm. Unlike many police and fire units, amateurs are not restricted to jurisdictional boundaries.

3) *Availability* — Spotters must be available for assistance with very little

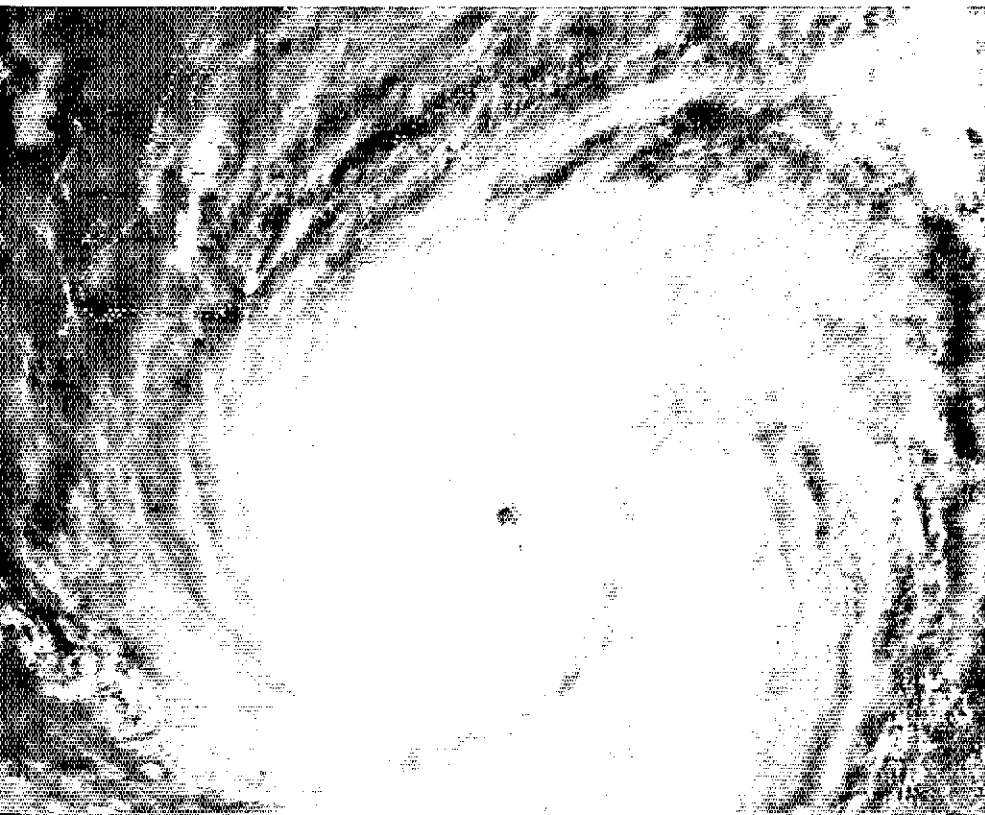
notice. Likewise, NWS forecasters must be able to activate their procedures as rapidly as possible. Activation of a multi-county amateur network is often possible with only one phone call by the NWS forecaster. In contrast, dozens of calls might be needed to alert all the emergency service agencies in the same area.

4) *Reliability* — In addition to being available on a 24-hour basis, spotters must be able and willing to perform their services for extended periods. It is not unusual for amateurs to leave their jobs or to get up at all times of the night to provide spotter assistance. Once activated, they may stay involved in a net for hours at a time, or even days at a time during hurricane threats.

5) *Capability* — This is probably the most significant attribute of the amateur community. An effective spotter must not only know the cloud patterns associated with severe weather, but must also understand the physical processes involved. This is necessary to interpret properly what is actually occurring, as this will not always fit the classic models taught in the classroom. Furthermore, the spotter must be able to learn and retain information quickly, as the time for training is often limited. Because of the amateur's technical background and learning skills, it is much easier for the NWS to provide the detailed training required for quality reports. Experience has shown that frequent, repetitive training is needed for most spotters, both as a refresher and to impart new knowledge about storm structure and reporting procedures. More than any other group amateurs have shown the willingness to devote the necessary time to such a training effort.

#### *Amateurs in the NWS Office*

Where severe weather and hurricane are a frequent problem, many of our offices have made arrangements to have amateur stations operate right in the NWS office. Forecasters are often required to make what may turn out to be a life-or-death decision with very limited or conflicting information available. As a result, tension is often high, with heavy demands on the entire staff. Meshing amateurs into our operations under these conditions requires considerable tact and judgement on the part of both the amateurs and the NWS staff. In many ways, the demands on the amateurs in our offices are greater than those on the spotter in the field. The NWS has been fortunate to have high-caliber volunteers operate amateur stations in our offices. Their willingness to contribute time and equipment has provided signifi-



A spectacular portrait of a killer storm, Hurricane Allen, as it gathered strength in the Gulf of Mexico before hitting the Texas coast in August 1980. (photo courtesy National Weather Service)

cant benefits to the NWS and the public.

We receive reports faster and with greater detail if Amateur Radio is a part of our operation. The importance of speed is illustrated by events such as the Wichita Falls, Texas, tornado of 1979, where the timeliness of amateur reports meant the difference between life and death for many people. At times, negative reports are also extremely important. For example, when a forecaster receives a public report of a tornado in a populated area, he or she has to react quickly and has little time to verify the report. The result is that such reports, from the untrained public, contribute significantly to overwarning. By having amateurs in the NWS office, the forecaster is in a better position to verify or discredit such reports quickly. I reviewed the severe weather logs of our Fort Worth Forecast Office for a three-year period and could not find a single public report that had not either been reported previously or discredited quickly by members of the RACES groups in Tarrant and Dallas Counties.

Closer working relationships develop by having the amateurs in the NWS office. It enables the amateurs to understand both how we operate, and our capabilities and limitations. This places the amateurs in a better position to identify areas where amateur assistance can be of help. Furthermore, the forecasters gain a better understanding of network capabilities and more confidence in the reports.

Through amateur networks, the NWS has been able to increase the dissemination of warning and radar information to emergency service agencies. In many communities, emergency operating centers lack a reliable means of receiving such vital information except via Amateur Radio. In addition, this same critical information can be passed or relayed to distant spotter groups. By having amateurs at the NWS office and at television stations with radar, it is possible to compare and exchange valuable radar data.

The NWS warning system depends almost totally on telephone lines for communications. While line failures are not common, they do seem to occur more frequently during adverse weather. Even if NWS communications remain operational, failures at key media outlets or emergency operating centers can seriously degrade the warning process.

The value of backup communications assistance is well illustrated by an event that occurred during a severe weather day at Oklahoma City. With a large portion of the city without telephone service, all but one television station was knocked off the air. During this brief but critical period, ARES operators were able to maintain the flow of information between the NWS office and the one operational television station.

In addition to providing backup com-

munications to the media and other agencies, amateurs are assisting with internal backup communications between NWS offices. During Hurricane Allen, amateurs at the Brownsville, Texas, NWS office demonstrated the potential value of this type of aid by establishing a link with amateurs at the National Hurricane Center at Miami.

#### **Additional Amateur Assistance**

While I have highlighted the severe-local-storm-spotter program, it is by no means the only NWS program benefiting from amateur assistance. Indeed, nearly all NWS warning and forecast programs receive amateur help in one form or another. Perhaps the oldest form of assistance is in the area of data collection. Temperatures, precipitation and other meteorological data are collected daily by regional, statewide and local weather nets. Such information helps to fill in the gaps between official surface reporting stations. While this data may appear to be of local interest, some of it receives nationwide distribution. For example, reports from the Colorado Amateur Radio Weather Net are used throughout the U.S. to brief travelers to Colorado ski areas. At times, such supplemental data can be very helpful in locating the position of fronts or other weather features that are located between official reporting stations. The additional "resolution" can often mean the difference between a correct forecast or a total bust.

Moreover, the collection of supplemental data is extremely helpful during significant weather events such as winter storms and hurricanes. Reports from amateurs throughout the Caribbean and along the U.S. coasts have become a traditional part of the hurricane program. While winter storms often cover large areas, their effect on any particular community may be localized. Supplemental reports are essential under these circumstances.

In recent years, flooding has become the number one weather hazard in many parts of the U.S. Regardless of the type of flooding, a key element of a successful flood warning system is timely rainfall reports from critical locations. Often, these key locations are in remote areas where telephone service is subject to failure. The amateur community is again helping with this problem. For example, amateurs in South Texas routinely report rainfall totals to an amateur station in San Antonio. These reports are formatted on a home computer and sent via radioteletype to a printer in the NWS San Antonio Forecast Office. All the equipment is furnished and maintained by the amateurs. As a result of this effort, critical rainfall reports are available even when normal communications are disrupted.

Amateur assistance has not been limited to strictly operational problems. Post-

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#### **Getting Involved**

The scope and type of assistance needed varies among NWS offices. Local factors, such as frequency and types of weather hazards, the existing communications system and the capabilities of local warning systems, must be taken into consideration. At a number of locations, informal letters of cooperation have been used to define specific areas of cooperation between the amateurs and the NWS. Suggestions for organizing a weather net or spotter group appear in an article by Brian Peters, WD4EPR, in April 1977 QST, page 53.

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storm documentation of severe weather events and public awareness projects have also been facilitated because of amateur involvement. Amateurs have played an important role in the NOAA (National Oceanographic and Atmospheric Administration) Weather Radio (NWR) program. At several locations, amateurs have actually built and maintained the NWR transmitter. This initiative made the service available in their communities sooner than it would have been otherwise. The NWR transmitter at Orlando, Florida, is still owned and maintained by local amateurs. Because of their technical and public service backgrounds, amateurs have been much quicker than the average citizen to recognize the importance of the NWR system. As a result, many amateurs have played lead roles in promoting and even purchasing NWR receivers for their places of business and schools.

#### **Future Cooperation**

While the amateur community is well known for its post-disaster communication assistance, contributions of equal or greater magnitude are being made in the area of pre-disaster communications. The increase of amateur participation in the severe-storm spotter program has been called the most significant improvement in the nation's natural disaster warning system since the addition of weather radar. In some ways, amateur assistance has been of more importance to the NWS than many technological advances. Since World War II, the NWS has continued to shrink in size while providing more and more services. Because this trend is likely to continue and even accelerate, the continuation and expansion of amateur assistance will be essential if the NWS is going to meet its obligations to the public. At the same time, the continuation of support to the NWS offers the amateur community a significant opportunity to demonstrate the importance of the Amateur Radio Service to the public welfare. Furthermore, it serves as a means of increasing amateur expertise and experience in the important function of emergency communications. Of course, the true beneficiary of continued cooperation is the public.

The future holds many opportunities for additional cooperation. The NWS is in the process of developing a highly advanced weather radar system that is far more sophisticated than any radar now available. As important as this system will be to the warning system, its maximum benefit will not be obtained without the development of highly mobile and well-trained spotters. It is obvious to many of us in the NWS that Amateur Radio

operators are well on their way to fulfilling this requirement for a new breed of storm spotters. We are faced with serious problems in the hurricane program. For some coastal communities, the amount of advance warning we can provide is less time than is required to complete an orderly evacuation. As the urbanization process continues, and homes are built on flood plains, the devastation from floods is sure to increase.

It is obvious that we must solidify and expand our current levels of cooperation. While the various forms of assistance that I have discussed are not applicable to all locations, there are certainly other opportunities for cooperation. If your amateur organization does not presently participate in any of these efforts, I encourage you to contact your nearest NWS office to explore the need for assistance. □

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## New Books

□ *Intuitive IC Electronics*, by Thomas M. Frederiksen, First Edition. Published by McGraw-Hill Book Co., Suite 26-1, 1221 Avenue of Americas, New York, NY 10020. Hardcover, 6-1/4 × 9-1/4 inches, 182 pages, \$18.50. (Orders may be placed directly with McGraw-Hill by giving book number ISBN0-07-021923-0. You will be billed later.)

Amateurs will be happy to discover a new book that introduces and explains all the significant semiconductor devices in a manner that anyone can comprehend. Assuming that readers have no prior knowledge of semiconductors, the author begins with basic electrical concepts and then applies them in building the PN junction diode, which in turn becomes the key building block toward understanding all other modern semiconductor devices, including MOS.

As the explanations are intended to be informative, not rigorous, the treatment keeps mathematics to an absolute minimum, stressing the basic physical mechanisms. Many illustrations are used to illuminate important semiconductor principles and mechanisms. Coverage includes all types of forward and reverse breakdown diodes, bipolar transistors, optoelectronic devices, JFETs, MOSFETs and many more. With emphasis on IC electronics, these devices are then used to describe the menagerie of process technologies including, but not limited to, bipolar, super beta, I<sup>2</sup>L, CMOS, Bi-FET, PMOS, NMOS, DMOS and VMOS. How these technologies spawn product families such as ROMs, RAMs and EPROMs is disclosed by explaining important circuit blocks and process advantages. The book is balanced in the treatment of analog and digital areas, while also revealing why MOS technology is the backbone of digital products and has important ramifications in traditional analog areas as well.

The author, Tom Frederiksen, is well known in the IC field as circuit designer, innovator and lecturer. His intuitive explanations of sophisticated and complex subject matter may well be the best reason to own this book. Whether grounded in calculus or arithmetic, the reader will attain a deeper understanding and appreciation of IC electronics. The author's numerous anecdotes from his inside experience in the field, and his generally friendly and communicative writing style, make for enjoyable reading. I heartily recommend this book as both a reference (the index is excellent) and a text for any ham who is curious about semiconductor technology and who wishes to achieve a working understanding of the new silicon world. — *Dennis Monticelli, AE6C*

□ *ZAP — Impedance and Power Potential*, by Charles F. Ryan, VE7BFT. Published by RYCO Enterprises Ltd., 764 Lilly Ave., Victoria, BC V8X 3R6. Softcover, 60 pages, \$6.95 (\$6.80 in Canada).

In the cover letter attached to the review copy, author Ryan states that the purpose of the booklet is "to present an overview of good radio station grounding . . . along with a progressive outlook towards radio station safety." On the other hand, the preface states: "Chas. Ryan has gathered practical ideas and hints and kinks which will have direct benefit to you and your station." Before opening to the body of the book I was confused about the content.

After reading through it, I feel that neither of the stated objectives had been effectively completed. The organization of material is difficult to follow. The first chapter is on antenna radiation resistance, followed by chapters on ground systems, transmission lines, more on antennas, and then a section on interference. Much of the book is cluttered with useless or incorrect information. To point out a few

examples: In the section on grounding systems the author provides detailed physical properties of aluminum, which are of no interest to the average ham installing a ground system! In the section on antennas, author Ryan has a chart on "Isolated resonant antennas" (?) giving the radiation resistance and gain over a half-wave dipole. The first entry in the chart states that a length of wire one-half wave long will have a gain of 1 dB over a half-wave dipole! These are just a few of many errors found in the text. In one area only did the book reflect a superb job — the subject of grounding antennas and lowering soil resistance. This information is of practical value to the active hf operator.

What the author has compiled, instead of a useful booklet on antenna grounding systems and safety, is a mixed bag of hints and kinks related to antennas and ground systems. There are good sections in the book, but the reader must dig through the "pile-up" of useless material to find it. — *Gerry Hull, VE1CER*

□ *Simple, Low Cost WIRE ANTENNAS For Radio Amateurs*, By William I. Orr, W6SAI, and Stuart D. Cowan, W2LX. Published by Radio Publications, Inc., Wilton, Connecticut. Second edition, 1972. Softcover, 5-1/2 × 8 inches, 181 pages, \$6.95.

When preparing antenna articles for publication, most authors and editors assume the reader has a basic understanding of simple antenna principles. Unfortunately, that may not be the case for newcomers and inactive amateurs. *WIRE ANTENNAS* provides an introduction to antenna basics. Because it contains detailed information on hidden and disguise antennas, amateurs living in apartments and condominiums may also find it useful. The second edition has been revised to include data for constructing



antennas for the WARC bands.

The title of the first chapter, "Sugar-Coated Antenna Fundamentals," provides a strong clue to the tone of the volume. Antenna theory and design concepts are presented in a lively, light-hearted style that makes for easy reading. Jokes and gags are judiciously sprinkled throughout.

Practical construction information is provided for dipole, random-length wire, vertical and wire beam antennas. Several antenna-matching networks are detailed also. A chapter is devoted to the plight of the apartment dweller; it covers the grounding problem as well as antenna construction. Another chapter covers SWR meters and how to use them, while

one provides detailed instructions for installing coaxial connectors.

If you are new to Amateur Radio, or if you find yourself confused by most antenna articles, *WIRE ANTENNAS* may be for you. If you have some antenna experience under your belt, you may find *WIRE ANTENNAS* too elementary. — *Peter O'Dell, KB1N*

## Strays

### MOVING? UPGRADING?

□ When you change your address or call sign, be sure to notify the Circulation Department at ARRL Hq. Enclose a recent address label from a *QST* wrapper if at all possible. Address your letter to Circulation Department, ARRL, 225 Main St., Newington, CT 06111. Please allow six weeks for the change to take effect. Once we have the information, we'll make sure your records are kept up-to-date so you'll be sure to receive *QST* without interruption. If you're writing to Hq. about something else, please use a separate piece of paper for each request.

### SCHOLARSHIPS OFFERED

□ Are you a licensed Amateur Radio operator and a graduating high school senior who is entering an accredited college or university in the fall of 1982? If so, you may qualify for one of three \$500 scholarships to be awarded this year by the Atlanta Radio Club. You better hurry, though. Entries must be postmarked no later than July 1, 1982. For details and an application form, write Phil Latta, W4GTS, Sec'y., Atlanta Radio Club Scholarship Committee, 259 Weatherstone Pkwy., Marietta, GA 30067.

### ANTENNA ATOP RABBIT BRINGS LIGHT SENTENCE

□ When Eric Scace, K3NA, of Frederick, Maryland, was stopped by a traffic cop there late last year, he was told that he was violating a state law by carrying an amateur antenna that extended about a foot and a half beyond the frame of his VW Rabbit. As readers of the *Washington Post* learned, Scace was found guilty and sentenced to two months of probation, and to find 25 licensed drivers and tell each of them about the obscure law (which makes it illegal to carry anything on the roof of a car that extends beyond the car's frame on the driver's side). The judge added his own

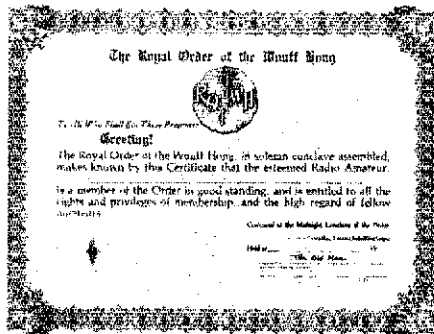
name to the list, as he apparently hadn't heard of the law either! — *information courtesy Al Brogdon, K3KMO*

### WOUFF HONG INITIATION

□ You have read about the Wouff Hong and its origin in the editorial of the January 1982 issue of *QST* and the brief mention therein of the Royal Order of the Wouff Hong, the amateur secret society of ARRL convention.

Now, you have some questions: What is this secret society? When does it meet? How can I join?

The Royal Order is a secret brotherhood of radio amateurs who are members of the ARRL. The first meeting of this Order was held at the Second Annual Michigan ARRL Convention at Flint, at midnight on February 11, 1923. The Order of the Wouff Hong can be conferred only at a National, Division, State or Section Convention of the ARRL. Each candidate, upon induction, receives a certificate of membership to be displayed prominently in his or her shack.



The ceremony is not conducted at every League convention, so you'll have to watch the convention writeups in *QST* or publicity mailings to determine whether it is one of the scheduled events at a convention in your area. Then, with proof of League membership in hand, register to be one of the inductees into the great secret fraternity of Amateur Radio, the

Royal Order of the Wouff Hong. — *Marge Tenney, WB1FSN*

### CARSONOMICS

□ As its contribution to the fight against inflation, the Cranford Amateur Radio Society of Cranford, New Jersey, has decided not to require its members to pay any dues for 1982. Also, there will be no entry fees or admission charge to the CARS's public exhibit, "Vintage Wireless to Modern Radio Equipment," which is to be shown in the Community Room of the Cranford Municipal Building on May 13. — *Kenneth McGrath, W2CMK*

### MORE VACUUM TUBE ATTRITION

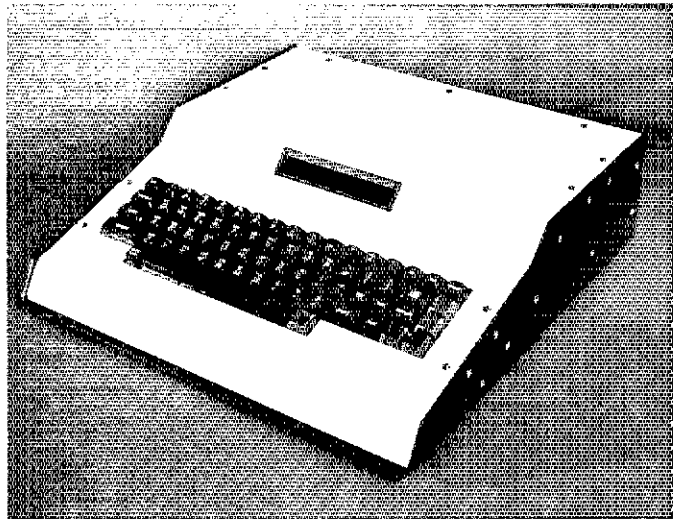
□ Tubes are being unseated (or unsocketed) steadily by semiconductors. This has compounded the woes of many amateurs who, when they could locate replacement tubes, had to pay sky-high prices to obtain spares. Well, the supply-and-demand syndrome has created still more vacuum-tube casualties. *Electronic Buyers News* for February 15, 1982 stated that RCA will discontinue the manufacture of the following glass tubes: 2E26, 5563A, 828, 813 (ouch!), 7094 and 810. Also listed were the 2X2A (rare DX call?), 3E29, 811A (ouch again!), 829B, 6293 and, note this — 807!

For some hams, this constitutes a "read 'em and weep" item. Even this writer must take a nostalgic backward glance, for nearly all of the foregoing "valves" found service in his early-day, homemade amateur gear. Weren't those the days? When we proudly displayed our 6-foot racks of transmitting gear to our peers and relatives? Oh well, maybe they'll be just as impressed with our homemade solid-state gear that fits in the palm of one's hand! But there was always a warm feeling that accompanied the glow of orange filaments. Guess we'll have to settle for the touch of a warm heat sink. — *Doug DeMaw, W1FB*

# A Microprocessor-Controlled Contest Accessory

What's your desire — RTTY, ASCII, cw? With the aid of this unit, you have them all, including a built-in display and dupe-checking capabilities.

By Brian Wood,\* WØDZ



The potential of a computer for contest use as a “dupe” (duplication) checker and cw keyboard with stored message exchanges is obvious. However, computers can be awkward things to lug around on Field Day, and floppy disks do not adapt well to dusty, mosquito-infested environments. Clearly, there is a need for small, portable, rugged units dedicated to amateur use. The HAL CT2100, Microlog ATR-6800 and Robot 800 are such devices. They do, however, lack dupe-checking capability as standard features. Here is a description of a microprocessor-controlled unit you can build that will perform dupe checking, will transmit and receive cw and RTTY, and has other features as well.

## General Description

**Physical:** The chassis of the unit shown in the photographs is professionally made, and has a black anodized bottom and a painted top. A commercially available power supply is used and a line filter has been added to reduce conducted interference. The main controller is attached to the chassis bottom with threaded standoffs. All analog circuits are constructed on plug-in boards that connect them to the controller. This is desirable from the standpoint of serviceability and future expansion. A standard ASCII-encoded keyboard is used.

**The Processor:** An 8085 microprocessor ( $\mu P$ ) was chosen for the controller because it has extensive interrupt capability, requires a single voltage source and is low in

cost. In addition, support ICs are readily available. Many home computers use a Z-80  $\mu P$ , for which the 8080 and 8085 are software-compatible. This allows the use of a cross-assembler running on a home computer to generate the program, which can be dumped into PROMs. Fig. 1 is a block diagram of the system. For a good description of the operation of the 8085, see the article “Designing a Microprocessor-based RTTY Speed and Code Converter” in the January and February 1982 issues of *QST*.

To handle RTTY transmission and reception, two 8251A USARTs are used. The processor can easily program these devices for ASCII or Baudot codes. One USART allows switching (for afsk) and another provides an RS-232C level port, permitting interconnection of printers, modems, etc.

To provide a clock for the USARTs, an 8253 counter/timer is used. The 8253 has three different divide-by-N counters in it. Two provide the transmit and receive clock pulses for the two USARTs. The third counter serves as a Real Time Clock for the  $\mu P$ . This pulse occurs every 5 ms, causing the processor to stop what it is doing and go do something else. In this case, the “something else” is updating the date and time, seeing if a Morse or RTTY character needs outputting from the buffer (into which characters have been entered from the keyboard), and so on.

**Read-Out:** A video interface can occasionally be more of a hindrance than a help. A TV monitor consumes a fair amount of power, takes up a lot of space, and is one more thing to carry around.

For these reasons, and because of the ease of interfacing it to the 8085, a single-line display consisting of 16 alphanumeric characters was chosen. The display uses an 8279 programmable keyboard/display interface IC. As shown in Fig. 2, the ASCII subset coming out of the 8279 drives an 18-segment decoder/driver that provides segment data to all 16 display characters. Meanwhile, four lines of the 8279 are used to select one of the 16 characters. The scanning rate is set high enough that the eye perceives no flicker. The 8279 also detects the presence of an ASCII character from the keyboard. It then provides an interrupt to the microprocessor that reads the ASCII and does any necessary conversion (e.g., to Baudot or cw) by means of a lookup table.

**Memory:** The program is permanently stored in three 2732 EPROMs. Although the program occupies only about 10k bytes (about 6000 lines of program code), 16k bytes were allowed for. Some read/write memory (RAM) is also needed. Since a transmit buffer of 512 characters and eight general-purpose buffers of 64 characters each were desired, 1k bytes of RAM are required. To allow room for variables and stack, 2k bytes were chosen during design. Dupe checking also requires RAM, but it must be nonvolatile — memory that “remembers” even when the power is turned off. A lot of RAM is required because a single amateur call sign can use as many as 6 bytes (not including suffixes used to indicate portable operation). CMOS RAM was chosen because of low power requirements, permitting

\*1505 Dover Ave., Loveland, CO 80537

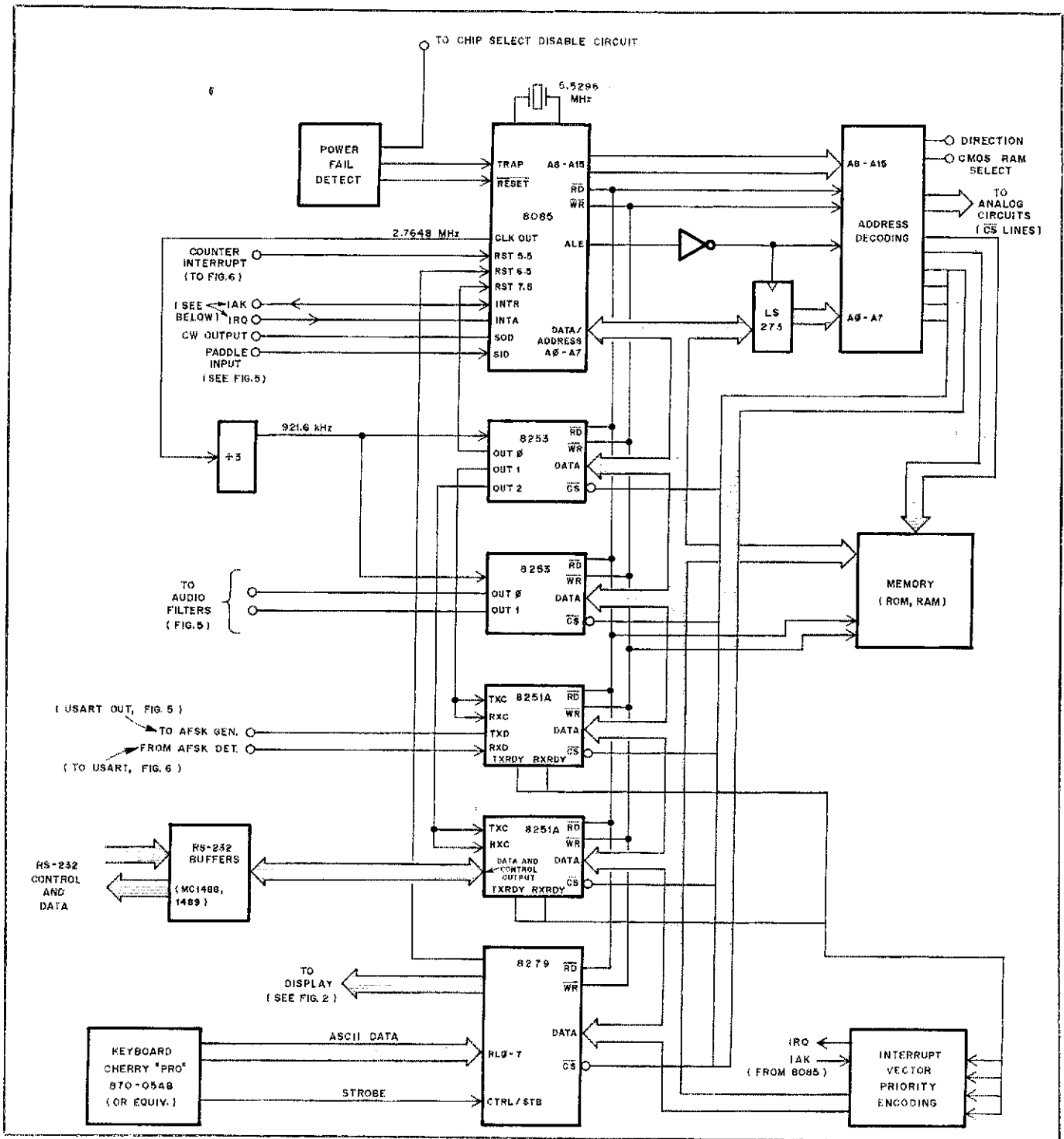


Fig. 1 — Block diagram of the Microprocessor-Controlled Contest Accessory.

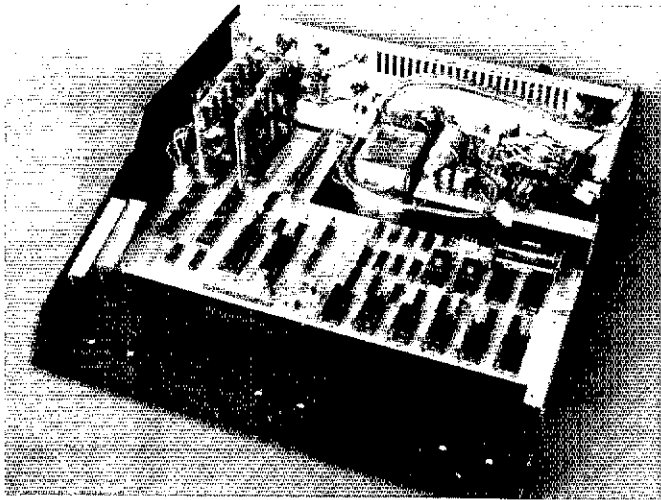
battery operation. The Hitachi 6116LP (2k × 8 static RAM) is used, since it can retain data with a potential as low as 2 volts applied. By using six of these ICs, a storage capacity of 12k bytes is obtained. This offers the capability of storing up to 1500 calls of six letters each, more than enough for many contests.

Fig. 3 diagrams the CMOS RAM interface to the  $\mu$ P and battery backup. NiCad batteries were chosen because of long life, rechargeability and terminal voltage. When the normal supply goes down, the diodes provide a smooth transition to the

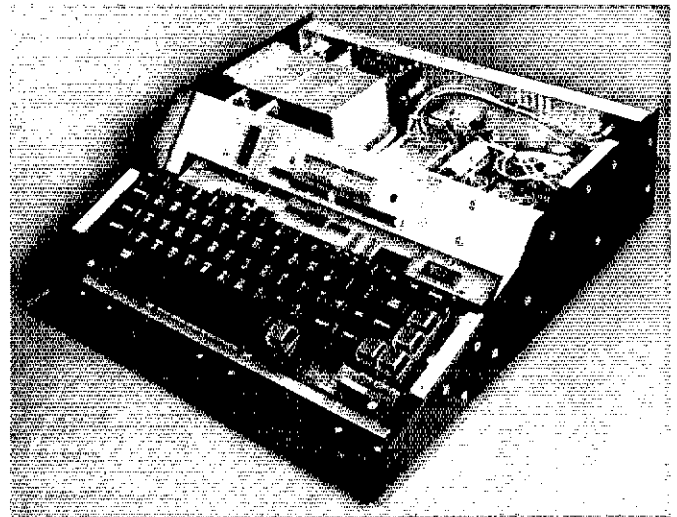
battery, and vice versa, when the power comes back on. The 2.7 volts supplied by the NiCads is reduced to about 2.3 volts after the diode. It takes about 40 hours for the battery backup to drop to 2 volts, at which point the memory starts "forgetting" data. For the 6116LP to retain data without drawing normal operating current (12 mA),  $V_{CC}$  must be greater than 2 volts, and all address, data and control lines at greater than  $V_{CC} - 0.2$  volts or less than 0.2 volt above ground. This is accomplished easily by pulling all those lines up to  $V_{CC}$  with resistors. The resistor

values must be large enough that the resultant current does not overload the stage connected to the RAM when the lines are low, but low enough that the signal rise time is not lengthened appreciably. For the data bus, 4.7-k $\Omega$  resistors are okay, but the address bus needs 1-k $\Omega$  resistors because of the high output capacitance of the 74LS05 drivers.

Note that the 74LS05 is an inverter, not a buffer. It may not be immediately obvious why the address lines can be inverted. The answer is that the memory is totally random access, and it is not used



Front view of the chassis with the top cover, keyboard and display removed. All the logic is located on the main controller board, which is fastened to the case bottom. The two vertically mounted boards to the left contain all the audio circuits.



Front view of the unit with the top cover removed. The display and keyboard assemblies are now in place. A retaining bracket (left rear of the chassis) secures the plug-in audio boards.

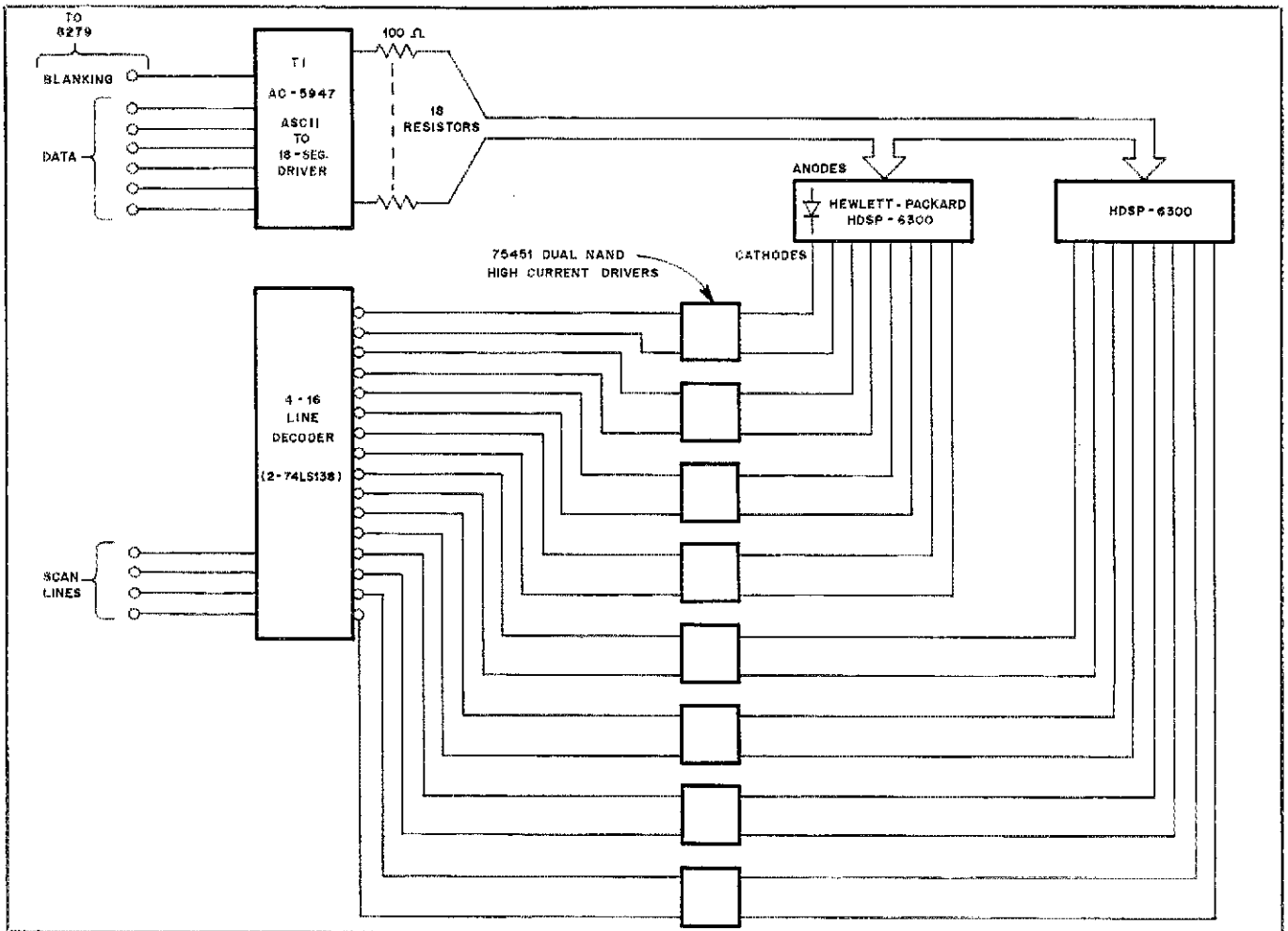


Fig. 2 -- Block diagram of the display drivers.

for program storage. Thus, the data need not be stored in any particular address locations. Since it is desirable to isolate these lines from the TTL and NMOS circuit parts, devices with open-collector outputs are an obvious choice. This allows

the lines to be pulled up to the  $V_{BB}$  battery-backup voltage, which is a requirement for data retention when the power supply is off, and avoids latch-up when power is applied or removed.

Fig. 3 also shows transistors being used

to drive the chip enable ( $\overline{CE}$ ), output enable ( $\overline{OE}$ ), and read/write ( $\overline{WR}$ ) lines. This was done to isolate these critical lines from the TTL and NMOS ICs in the circuit. In the case of the chip enable, it was also done to allow a power fail detection

circuit to disable the memory as the power is applied or removed. Not any transistor can be used here. A good quality, high-speed switching transistor is an absolute must. The timing of the chip select and read/write pulses is on the order of 1 microsecond, and transistor storage times greater than about 60 nanoseconds cannot be tolerated or timing problems will develop between the data and the write signals. The transistor of choice for this application is the 2N3646, which has a storage time specification of about 35 nanoseconds.

### Power-Failure Detection

A novel power-failure detection circuit is shown in Fig. 4. The LM10 is an ultra-low power op-amp that operates from a supply as low as 1 volt, while drawing only 270  $\mu$ A! This means that it can be powered from the battery. It also contains a 0.2-V reference, which is multiplied by 7.81 to provide the other op-amp in the LM10 with a reference voltage of 1.56 volts. This second op-amp is run open loop as a comparator, getting some hysteresis from the 1-M $\Omega$  feedback resistor. The inverting input to the comparator is set to one-third of the power supply voltage, nominally 1.67 volts. This situation causes the output to remain low until the power supply potential drops to about 4.9 volts. At this point, the comparator trips, causing a Power-Failure (PF) interrupt to be signaled to the  $\mu$ P, which can then cleanly stop whatever it was doing. A delay circuit then causes point PF to go high about 2 ms later, disabling the CMOS RAM before the supply goes below 4.75 volts, the minimum voltage at which the processor circuit is specified to operate. The same delay circuit provides an output to the processor reset line so that when power is restored, the reset line will be activated about 30 or 40 ms after the supply has reached 4.75 volts. (The 8085 requires that reset be activated at least 10 ms after the supply has reached 4.75 volts and the clock is running.) This circuit assumes that the power-supply voltage decreases exponentially with a time constant of about 150 ms.

### Analog Circuitry

Okay, so we have a  $\mu$ P capable of doing all sorts of wonderful things. How do you get from the digital world to the analog world? It's really pretty easy. The microprocessor provides signals that can be used to latch data from an 8-bit data bus into many flip-flops. These can be used to turn relays on and off, operate CMOS switches, enable sidetone amplifiers, and so on. The same signals allow data to be fed onto the data bus by means of tri-state buffers so that they can be read by the  $\mu$ P.

Greg McIntire showed how square-wave signals can be converted to sine waves by simply passing them through a

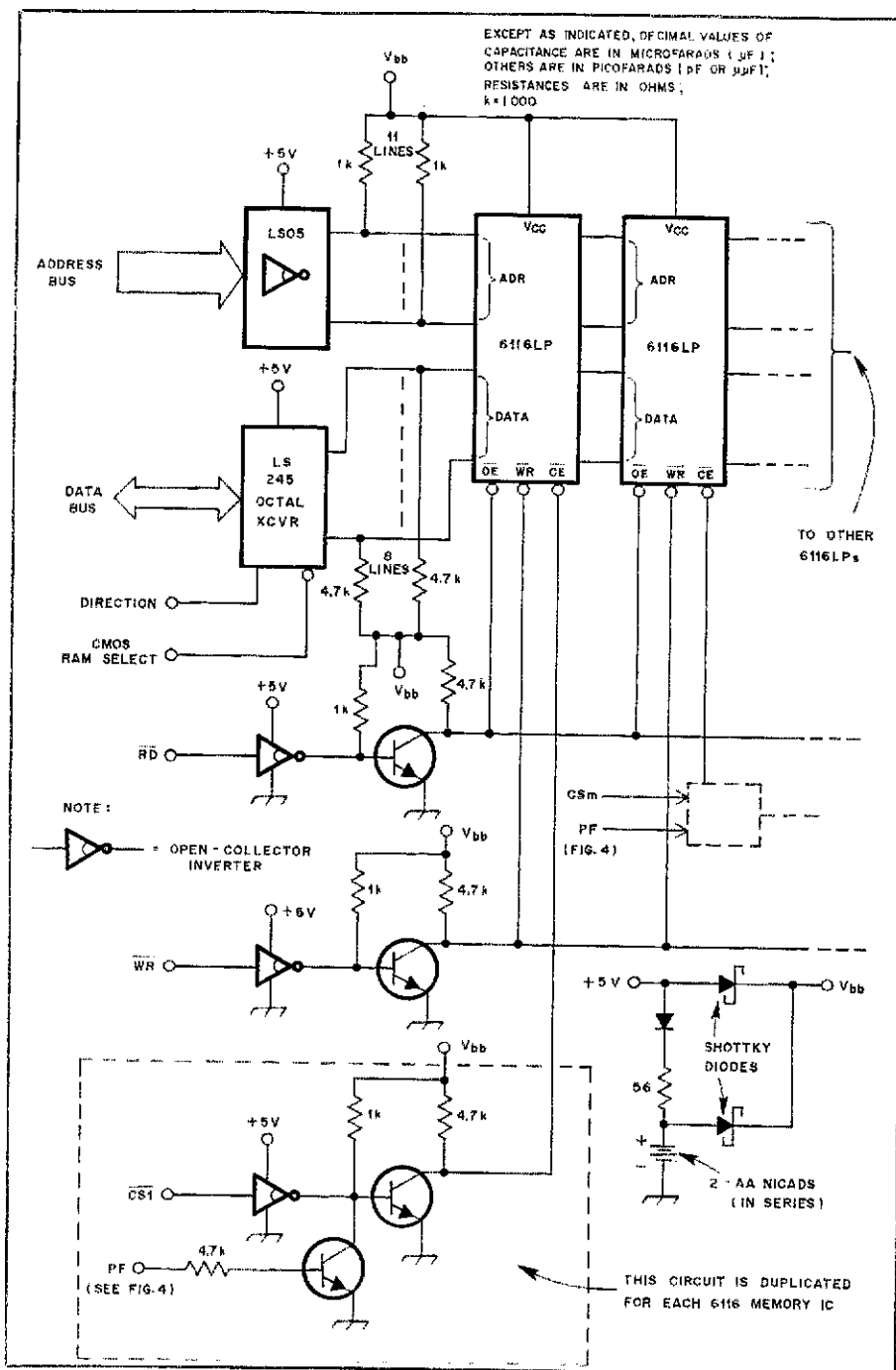
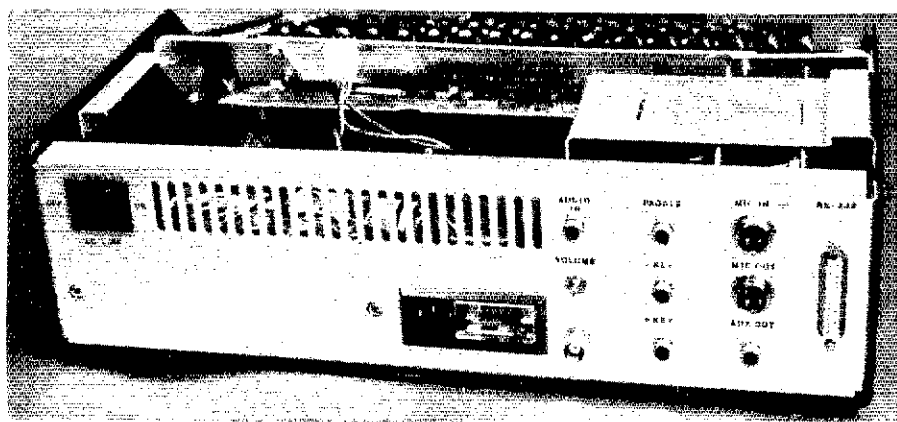


Fig. 3 — CMOS memory interface and battery-charging circuit diagrams.



Rear view of the unit. Ventilation holes are above the power supply.

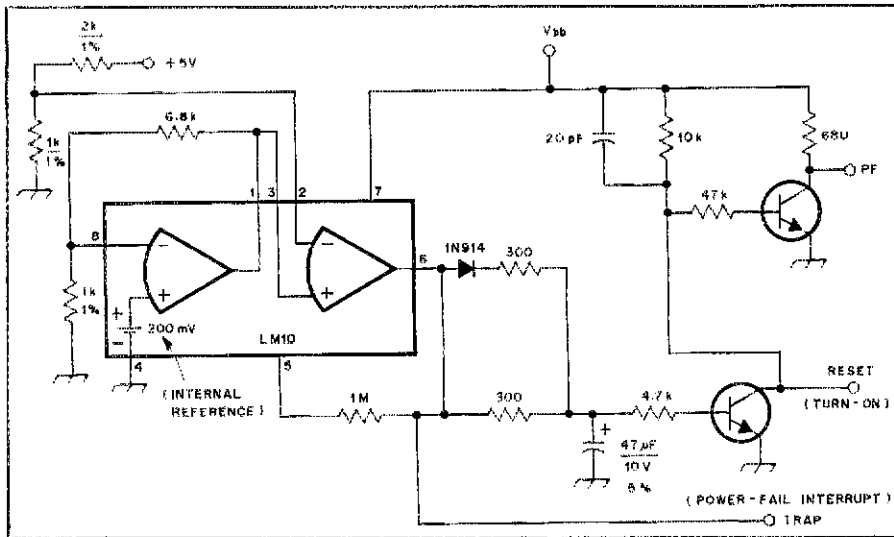


Fig. 4 — Schematic diagram of the power-on reset and power-fail detection circuits.

multipole low-pass filter.<sup>1</sup> I've carried the concept to a logical conclusion (see Fig. 5) by adding switchable breakpoints (by means of CMOS switching) and deriving the inputs from the programmable counter outputs, thereby achieving the ability to generate any combination of tones from about 500 to 3000 Hz. By allowing two tones to be on at once, Touch-Tone frequencies can also be created.

The output of the final filter stage is passed through CD4053 CMOS switches, which can be turned on and off independently by the  $\mu$ P programming, or they can be enabled alternately by the USART output, thus providing mark and space tones. These signals, along with the switched output of a microphone preamplifier, are then fed into an audio

<sup>1</sup>Notes appear on page 21.

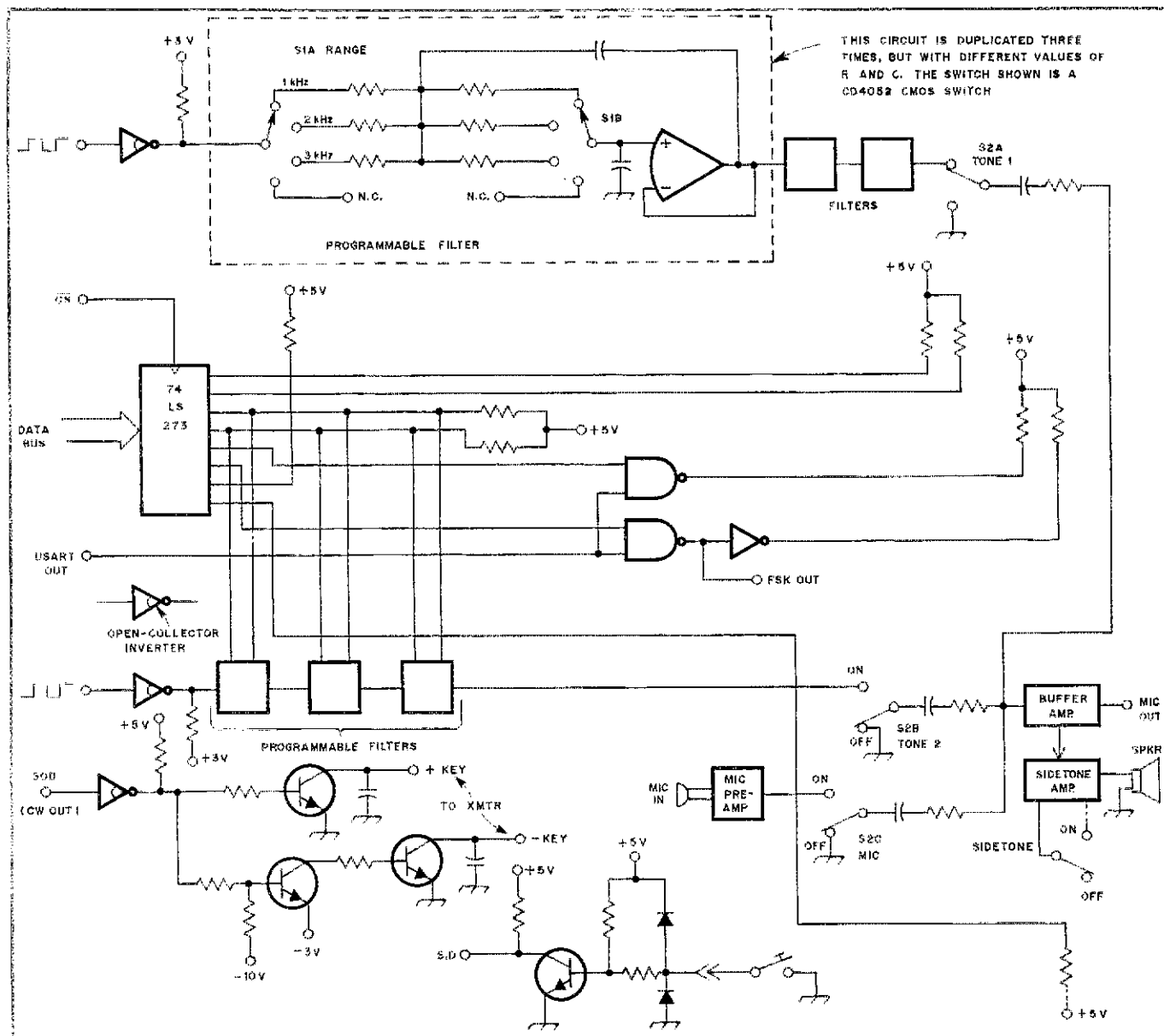


Fig. 5 — Block diagram of the tone output, sidetone, microphone, positive and negative keying lines and paddle-input circuits. S1 and S2 are CMOS switches. The programmable filter shown at the upper left of the diagram is duplicated three times in each channel.

mixer amplifier. This permits the microphone to be switched in when the tones are not used, and vice versa. The sidetone amplifier is driven from the mixer output so that cw, RTTY and Touch-Tones can be monitored. A small fringe benefit is that if the sidetone amplifier is turned on and the microphone enabled, a crude P.A. system evolves!

Cw output is produced easily by taking the SOD (Serial Output Data) line from the 8085 and driving a keying transistor directly; both plus and minus keying line polarities are accommodated. The software then turns that bit on and off, performing all the timing based on the 5 ms Real Time Clock interrupts.

### Input Circuits

Receiving cw and RTTY requires more effort on the part of the programmer than does transmitting. The signal, once decoded, must be read by the  $\mu$ P, placed in a buffer and displayed in a timely fashion. For cw, the character must also be decoded in software, while RTTY characters can be decoded by the USART. There is much literature concerning which hardware techniques work best. A recent *QST* article contains a good circuit based on the use of an XR-2211 PLL.<sup>2</sup> Some experimenting showed that two '2211s could be used even more effectively, one being used for the mark frequency and another for the space frequency, with only one being used for cw. See Fig. 6. By setting the capture range to about 100 Hz, and then tying the Q output of one decoder to the  $\bar{Q}$  output of the other, the PLLs work together, acting as an audio filter TU having very high values of Q.

In order to program the desired frequency,  $\mu$ P-controlled DACs (Digital-to-Analog Converters) are used. To compensate for drift, the PLL outputs can be fed into a counter and the counter set to cause an interrupt every 16 counts. In this manner, the center frequency of the PLLs can be computed, then corrected if in error. The PLLs have to be connected in a certain way to do this. CMOS switches allow the PLL reference to be fed back to the input, causing the lock-detect output to oscillate at the center frequency. Another switch allows one and then the other PLL output to be fed into the frequency counter for measurement.

For cw reception the output of one of the PLLs is fed directly to an input port. The Real Time Clock interrupt samples the bit every 5 ms and creates a count of marks and spaces. These counts represent the length of time that a tone was present or absent. The last 16 numbers are then averaged. Since the numbers include dots and dashes, and spaces between dots and dashes (a space being the same length as a dot between parts of a character or a dash length for spaces between characters), this average conveniently falls about halfway between a dot and dash length. This can

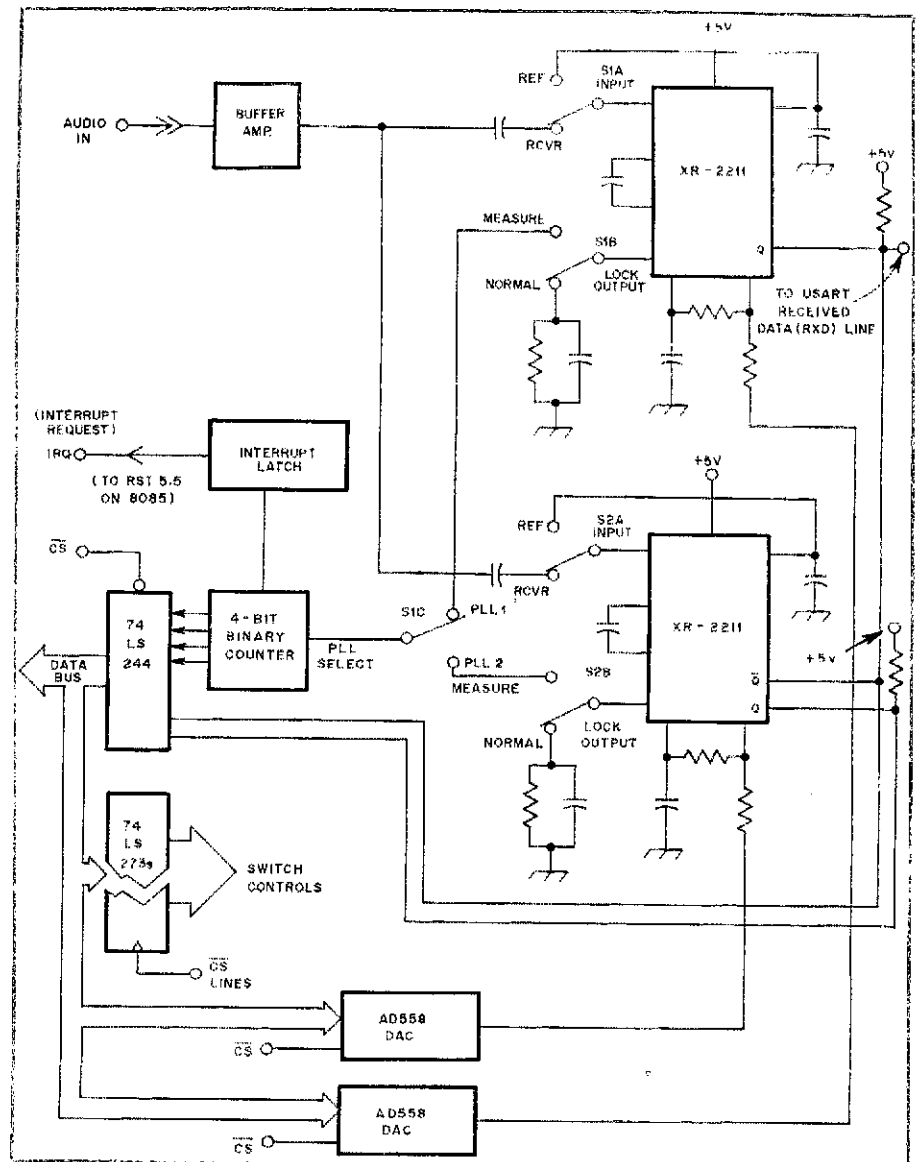


Fig. 6 — Separate PLLs are used for demodulating the mark and space signals. The action of this circuit is like that of an audio filter terminal unit having high Q values.


be used as a criterion for determining what is a dot or dash in future incoming characters. This means the algorithm is constantly adjusting itself to the speed of the data being received.

Another feature of the algorithm is that once a space has been received, the current character (or space between words) can be displayed. It has always annoyed me that many algorithms wait for a character to start before displaying the last one received.

### Software and Summary

One of the biggest hurdles in developing a device such as the one described here is writing the software to control it. I used a Heath H89 computer connected through an RS-232C link to a commercially available PROM programmer. It is impractical for me to provide listings of the program, since it is so long. However, individuals constructing this unit are

welcome to contact me for programming advice.

It should be possible to buy all the necessary parts for this project (not including the chassis, keyboard, power supply or empty pc boards) for about \$600. Space restrictions preclude presenting the entire schematic here, but a complete set of schematics is available from the author for \$10. A set of empty, double-sided boards with plated-through holes, soldermask and silk-screened component designators (with schematics) is available for \$250. The chassis shown in the photographs is priced at \$175. A complete set of programmed ROMs is \$100. Other parts and additional information are available from the author. 

### Notes

- <sup>1</sup>G. McIntire, "A Crystal-Controlled AFSK Generator," *QST*, December 1980, p. 27.
  - <sup>2</sup>M. Di Julio, "A State-of-the-Art Terminal Unit for RTTY," *QST*, December 1980, p. 20.
- <sup>3</sup>The ARRL and *QST* in no way warrant these offers.

# A 432-MHz Yagi for \$9

This 22-element Yagi was designed with OSCAR Phase III in mind. Use of readily available materials makes it an attractive project.

By David O. Guimont, Jr.,\* WB6LLO

Access to inexpensive but efficient equipment is a *must* if new technology is to remain within reach of the average amateur. Without returning to the oatmeal box and "cat's whisker," there are ways to keep our hobby an affordable one. This antenna is a step in that direction.

If all new material must be purchased, the cost of building this 22-element antenna should be about \$9. (A complete list of necessary materials is presented in Table 1.) It is simple to build, weighs only 21 ounces,<sup>1</sup> and rolls into a compact package for storage or transport. A simple and inexpensive means may be employed to change polarization. The estimated antenna gain is 14.5 dB.

## Construction

Refer to Figs. 1 and 2 and the photographs. Antenna element lengths and spacings given in Table 2 were selected from information in the 1982 *Handbook*.<sup>2</sup> Gamma matching is used for easy adjustment. The gamma-matching capacitor I used is a tubular ceramic type that is easy to weatherproof with a silicone sealant after matching adjustments are completed. Using copper wire for the driven element and gamma rod allows the use of solder during assembly.

All directors are made from no. 9 aluminum wire and are slightly flattened at a point 2-1/2 inches each side of center. Holes are drilled through the elements at these points to pass the 50-lb nylon fishing line that is used as a boom.

Cut the element spacers to provide the proper spacing as given in Table 2. Two scrap plastic spreaders are cut to a length

of about 7 inches and drilled to pass the nylon line. One spreader is used at each end of the antenna. The insulated spacers and antenna elements are placed on the nylon boom as you would beads on a string.

The PVC pipe and T are assembled as shown in Fig. 1. This boom supports the copper wire driven element and single reflector, the latter of which is made of no. 9 aluminum wire. The assembly is fastened behind the first director as

**Table 1**  
Materials List

19 ft — no. 9 aluminum wire (clothesline wire).
13 in. — no. 8 copper wire.
6 in. — no. 14 copper wire.
28 ft — insulating spacers (insulation stripped from no. 14 wire or equivalent).
21 in. — 1/2-in. schedule 40 PVC pipe.
1 — 1/2-in. schedule 40 PVC T.
40 ft — 50-lb-test monofilament nylon fishing line.
2 — snap swivels.
1 — SO-239 chassis connector.
2 — plastic spreaders, 6 × 3/8 × 3/16 in.

**Table 2**  
Antenna Element Lengths

Element	Length
Reflector	13-3/32 in.
Driven	12-23/32 in.
1st director	11-27/32 in.
2nd director	11-5/8 in.
3rd director	11-1/4 in.
4th director	11 in.
5th director	10-29/32 in.
6th director	10-13/16 in.
7th to 20th director	10-11/16 in.

Note: The reflector to driven element spacing is 5-1/2 in. Spacing between all directors is 8-7/16 in.

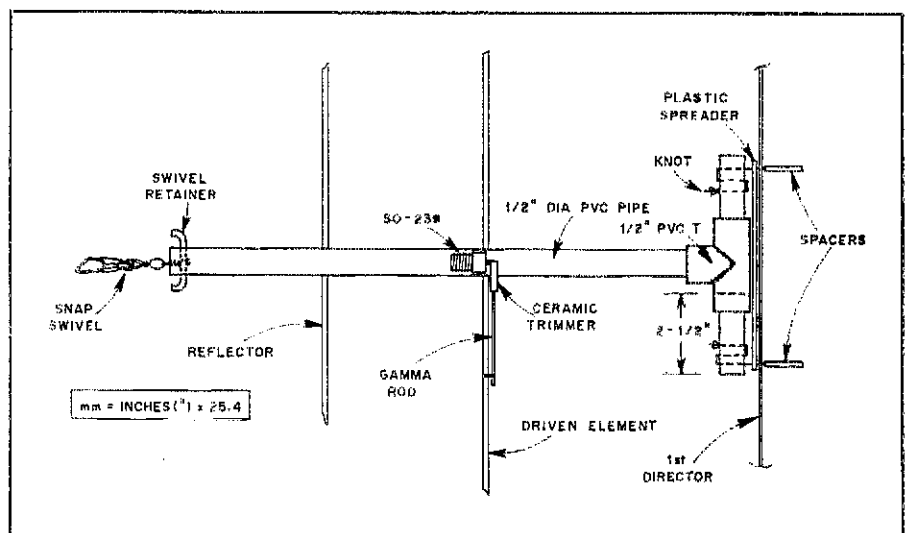
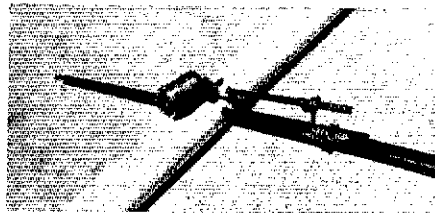


Fig. 1 — Mechanical assembly details of the PVC boom.

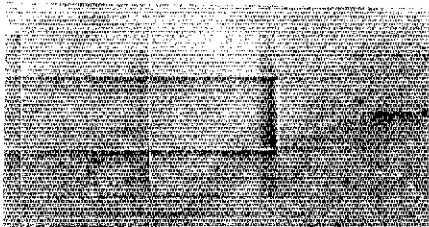
<sup>1</sup>Notes appear on page 23.

\*5030 July St., San Diego, CA 92110

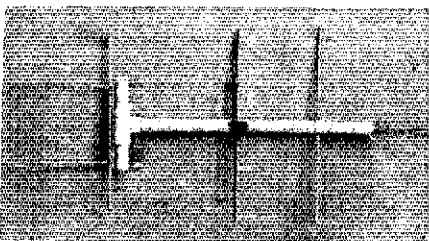




Close-up view of the gamma matching section and driven element. Use of copper wire makes the assembly easy.



This shows the arrangement of the last three directors on the nylon fishing-line boom. The elements are separated by spacers fashioned from pieces of insulation removed from lengths of no. 14 wire. One of the plastic spreaders is next to the last director.



A short PVC boom supports the reflector and driven element. The PVC T at the left provides a means of attachment to the rest of the antenna.

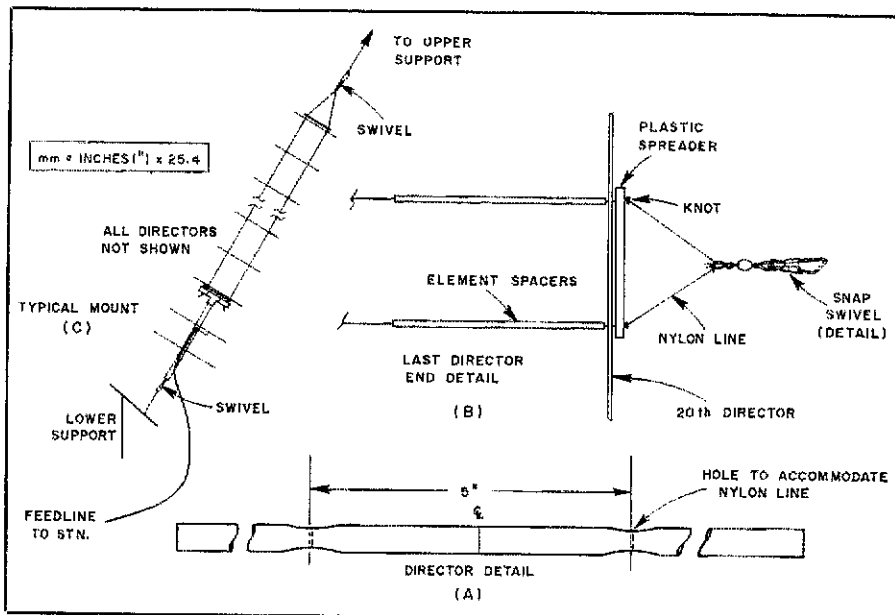


Fig. 2 — At A, the method used to fashion the director elements. A detail of the assembly at the 20th director is shown at B, while a typical method of installation is depicted at C.

shown. An S turn of nylon line at each attachment point is used for tension adjustments. Snap swivels at the antenna ends permit it to be rotated easily to change polarization. The lower end of the antenna can be positioned to adjust antenna elevation and azimuth.

### Results

All antenna testing was done using Mode J (2-meter uplink and 70-cm downlink) receive. In every case, the home-made antenna outperformed an 11-element Yagi with a preamplifier mounted on the boom. (Without the

preamplifier, the 11-element Yagi produced signals that were barely discernible. Use of the preamplifier provided readable signals.) For both horizontal and vertical polarization of the antenna, the indicated beamwidths are 30°.

Now that you've got a simple and inexpensive way to build a gain antenna, why wait any longer? Let's hear you through OSCAR!

### Notes

<sup>1</sup>g = oz × 28.35; mm = in × 25.4; kg = lb × 0.454.  
<sup>2</sup>Element lengths were derived from Table 4, p. 21-5 and element spacings from Fig. 4, p. 21-4.

## Strays



### MARCONI ANNIVERSARY DEMONSTRATION A SUCCESS

□ With Guglielmo Marconi's daughter among the 500 at Columbia University in New York City waiting patiently, the crackling sound came through loud and clear: a long tone, followed by three short ones. The group, which had just heard Mrs. Gioia Marconi Braga finish an address, was commemorating the 80th anniversary of the first transatlantic radio communication.

The re-creation of the Morse code signals that originated from Cornwall, England, was organized by G3ZPW in England, VO1HP in Newfoundland and a group of amateurs in New York. The New

York hams linked a local hf station with a Metroplex 2-meter repeater to broadcast the signals to the audience at Columbia. — John Smale, K2IZ, SCM NY-LI



Following the successful demonstration of how Marconi heard the first transatlantic radio communication, members of a group that arranged to broadcast the signals to an audience commemorating the event were all smiles. From the left: WA2LVY, KH6IQD, Mrs. Braga, K2IZ and WA2OVG.

### ROANOKE DIVISION PLANS PLANNING SESSION

□ This year's Roanoke Division League Planning Meeting will cover all phases of Amateur Radio. Under the joint sponsorship of the Raleigh and Cary (North Carolina) ARCs, it will be held May 22 and 23 at the Crabtree Sheraton Motor Inn, Raleigh. Information and pre-registration information is available from Sherman Starnes, W4TZU, Rte. 1, Box 99, Franklinton, NC 27525. — Gay Milius, W4UG, and Chuck Littlewood, K4HF

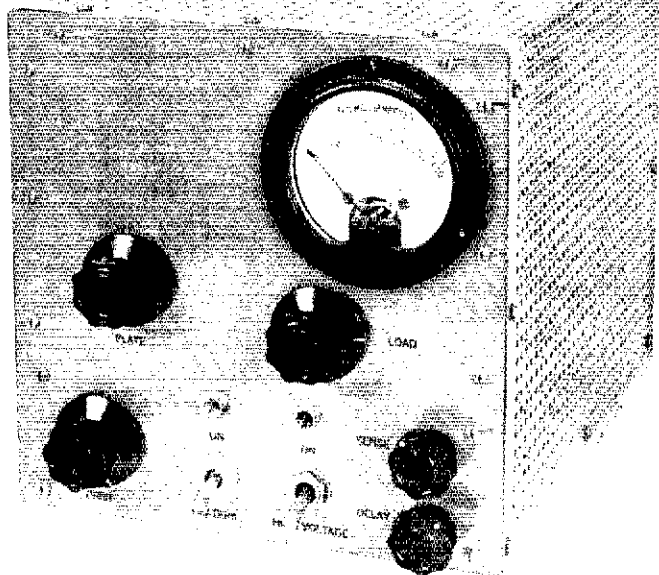
I would like to get in touch with . . .

□ other Vibroplex key owners who can provide information on the relationship between serial number and date of manufacture. Richard W. Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

# Build A 6-Meter "Mini-Lini"

Tired of being a QRP station? Boost your low-level signal with a pair of sweep tubes.

By Wilson Hoag,\* WA5OLT



Is low power enough for equality on 6 meters? Perhaps, but it has long been my contention that some stations are more equal than others! One of the great features of 6 meters is the ability to make contacts with just a few watts when the band is open. As solar activity begins to decline, band openings will be shorter and less frequent. This amplifier will add punch to your QRP signal.

The current offerings of solid-state 6-meter transceivers and transverters provide operating ease and good signal quality, but at the expense of rf power output. This, coupled with the paucity of linear amplifiers, resulting from the infamous amplifier ban, has caused an overall reduction in the average power output on 6 meters.

When I acquired my first solid-state rig (an IC-551) some time back, my tendency was to use its scan feature to locate a signal and then work the station with a 240-watt tube-type rig. A minor panic occurred when the tube rig "rolled over and died" midway through the '79-'80 F2 season. The Mini-Lini resulted from that panic.

## Design Approach

The amplifier was designed to be compatible with common power supplies, use a readily available tube, provide push-to-talk operation with the IC-551 and have approximately the same rf output as most tube-type transceivers. Fortunately, a design incorporating most of these features had been developed by Ed White, WA5RIA.<sup>1</sup> The major changes I made

were in the methods of switching and bias adjustment. The tube used is the 6JB6, which is inexpensive, available and "happy" at 50 MHz. The biasing arrangement, an idea borrowed from Doug DeMaw,<sup>2,3</sup> allows the tubes to be matched for safe parallel operation. This amplifier provides about 50 watts of output when driven by a 10-watt exciter. More than one year of almost daily use has been trouble free and productive (42 states, including KH6 and KL7, plus JA and several Europeans).

## Circuit Details

The circuit is conventional and typical of many low-band amplifiers. The original design used a capacitive input, but I thought that the parallel-tuned input method shown in Fig. 1 would provide more output when used with other QRP drivers. This was proven in practice: The amplifier delivers about 20 watts of output when driven by an IC-502. The potential problem of operating unmatched tubes in parallel has been avoided by biasing each tube individually. Component values shown will allow coverage of the entire 6-meter band.

The output network will not reject harmonic energy, and the second harmonic, as measured in the ARRL lab, was less than 40 dB below the fundamental (Fig. 2). This works out to a healthy 5 mW at 100 MHz. Most fm receivers in the neighborhood will detect this easily. FCC requirements for a commercial amplifier at this frequency are to have all spurious radiation at least 60 dB below the fundamental.

To meet this requirement (and to prevent a lot of RFI complaints) a 7-pole Chebyshev low-pass filter was built from

data given in the 1982 *Radio Amateur's Handbook*, pages 6-11 and -12. Details of a filter with 0.01-dB of ripple and a 60-MHz cutoff frequency are given in Fig. 3. The coils can be wound on toroids, or be air-core types. Amidon T44-10 (or larger) cores should be adequate. The number of turns required will depend on core size or coil diameter, and can be calculated from data given on pages 2-12 and 2-30 of the *Handbook*. This filter reduced the second harmonic output to more than 65 dB below the fundamental (completely gone for all practical purposes). See Fig. 4.

## Construction

It should be possible to duplicate this amplifier for \$40 or less, depending on the status of your junkbox. Oddly enough, the tube sockets proved to be the most difficult component to locate, since they are not a common catalog item. The 6JB6 uses a 9-pin NOVAR socket, and the best source turned out to be a shop that specialized in TV replacement parts. Tuning capacitor C4 is a junkbox item of questionable parentage. Any spacing greater than about 0.060 inch (mm = inches  $\times$  25.4) should be okay. RADIOKIT of Greenville, New Hampshire would be a good source for all of the variable capacitors.

My amplifier is constructed on an 8  $\times$  10  $\times$  2-1/2 inch chassis (BUD AC-1418) for a base, with 8  $\times$  8-inch end panels. The panels were flanged with 1/2  $\times$  1/2-inch aluminum channel for attachment of a cane-metal cover for safety and TVI protection. Component placement is not critical, but all component leads should be as short as possible. The

<sup>1</sup>Notes appear on page 26.

\*1704 Venetian Circle, Arlington, TX 76013

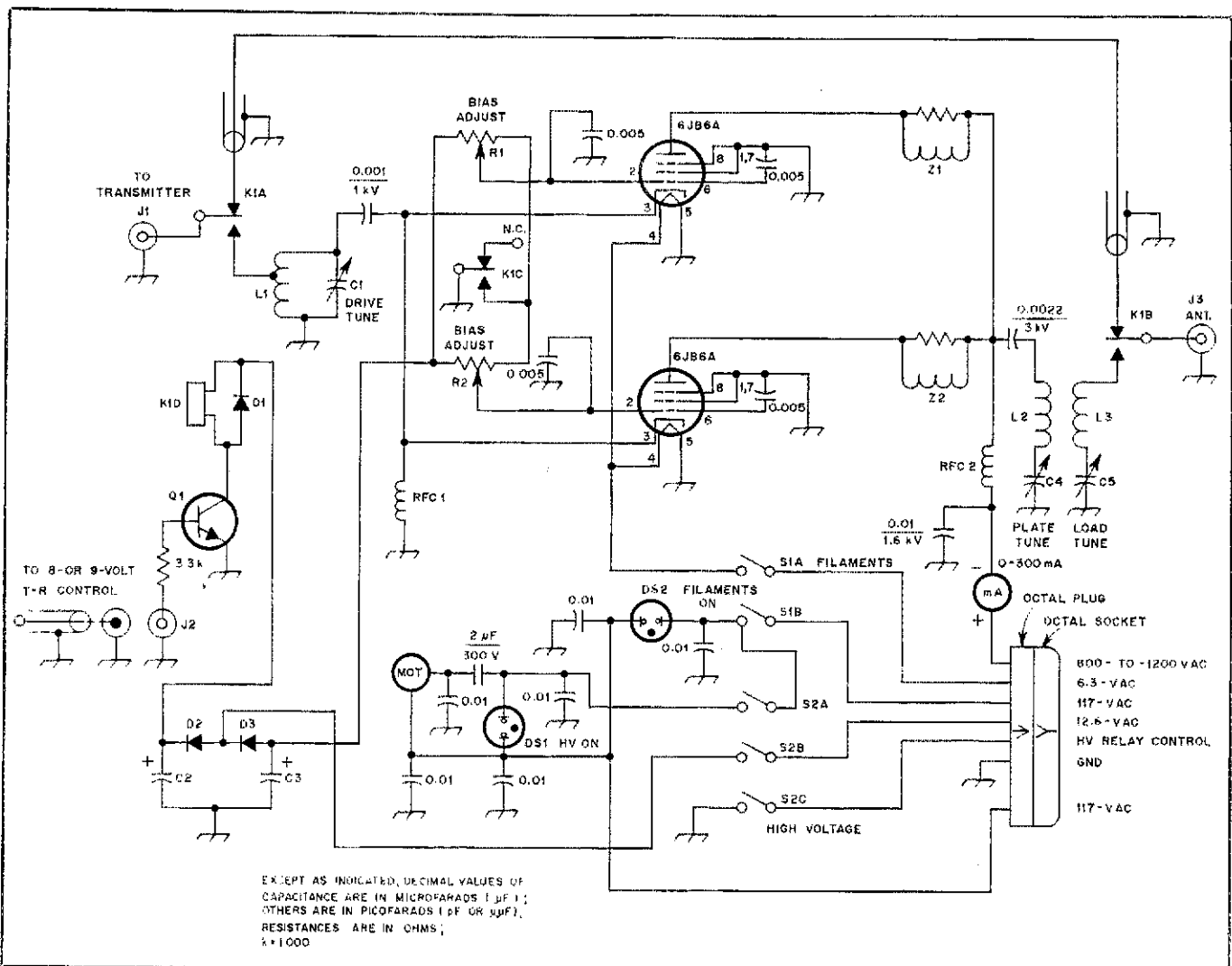


Fig. 1 — Schematic diagram of the 6-meter linear amplifier. The tube filaments can be wired in series, eliminating the need for a separate 6.3-V supply.

C1 — 50-pF miniature air variable, Cardwell 148-4 or equiv.  
 C2, C3 — 220-µF electrolytic, 50 V.  
 C4 — 25-pF air-variable, wide-spaced. Hammarlund HF30X or equiv.  
 C5 — 100-pF air variable, Johnson 149-5 or equiv.  
 D1 — 1N914.  
 D2, D3 — 1 A, 50 V.  
 J1, J3 — SO-239.  
 J2 — Phono jack.

K1 — 3pdt 12-V dc coil, rf type preferred, or KRP14DG.  
 L1 — 6 turns no. 14 enameled wire, 1/2-inch ID x 1-inch long, tapped at approximately 1-1/2 turns.  
 L2 — 5 turns no. 12 enameled wire, 1-1/2 inch ID x 2-1/2 inches long.  
 L3 — 2 turns no. 12 enameled wire, 1-1/2 inch ID x 1/2-inch long.  
 mA — 0-300 mA dc meter.  
 MOT — 117-V fan motor.

P1 — Chassis-mount octal plug.  
 Q1 — NPN power transistor, TIP31 or equivalent, (RS no. 276-2017).  
 R1, R2 — 10-kΩ, 2-W potentiometer.  
 RFC1 — 300-µH choke with ferrite bead on the ground lead.  
 RFC2 — 83 turns no. 28 enameled wire on a 1/2-inch diameter ceramic form. The coil is 2 inches long.  
 Z1, Z2 — 1 turn no. 16 enameled wire on 47-Ω, 2-W resistor.

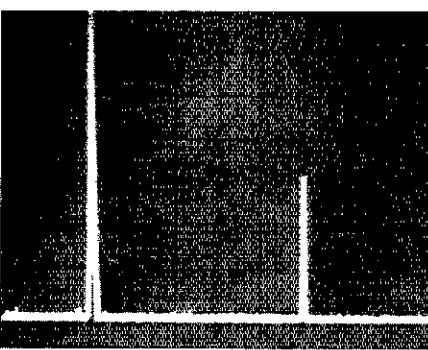


Fig. 2 — Spectral display of the amplifier output. Vertical divisions are each 10 dB, and horizontal divisions are each 10 MHz.

resulting layout was determined largely by some mid-project design changes aimed at making the unit compatible with a newly acquired IC-502. Visible on the lower-right front panel are potentiometers that were reserved for control of a planned rf-operated T-R relay.<sup>4</sup>

The tube sockets are modified slightly to ground the necessary tube elements. Copper washers, cut from flashing copper, fit inside the pins on the underside of the sockets. Pins 1, 4, 7, 8 and 9 are bent over and soldered to the washer. The washers are grounded to the chassis with short pieces of no. 14 wire on opposite sides of the socket. Pins 2 and 6 of both

tubes are bypassed to ground by connecting 0.005-µF disc-ceramic capacitors from these pins to the copper washers (Fig. 5). The control grids are raised above dc ground while providing a path for rf return. It also permits us to apply a dc bias to the control grid. This will establish the class of operation and cut the tubes off during receive, if desired.

Coils L1, L2 and L3 are wound with solid TW-insulated house wire from the local hardware store. I stripped the insulation from the wire before winding L1 and L2, but left it on L3 to prevent accidental contact with L2. The inside diameters shown are more the result of

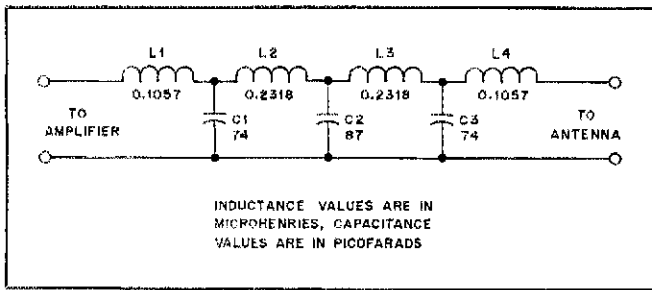


Fig. 3 — Schematic diagram of a 7-pole Chebyshev low-pass filter. Capacitors are silver-mica units, combined in parallel or series to obtain the design values. The text has information about winding the inductors.

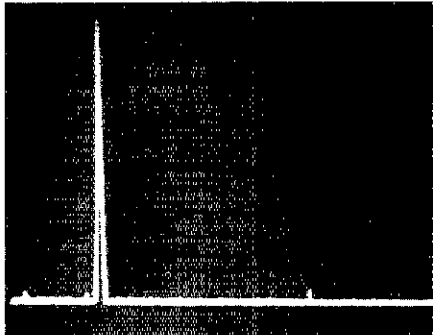


Fig. 4 — Spectral display of the amplifier output with a 7-pole Chebyshev filter. Vertical divisions are each 10 dB, and horizontal divisions are each 10 MHz.

available cylindrical shapes than any electrical calculation. Coil spacing was adjusted, with the tubes in place, using a dip meter to ensure resonance at the proper frequency.

Heat-dissipating plate caps and a small fan provide cooling for the tubes. See Fig. 6. No thermal distress has been evident under any operating condition. The fan can be wired through S1 or S2, depending on whether cooling is desired during standby operation. Power connections to the fan should be isolated from the chassis.

A possible modification, shown on the schematic diagram, involves the use of a 3pdt relay for K1. The ground legs of R1 and R2 can be wired through one of the normally open contacts. This lifts the potentiometers above ground in the receive mode, applying full bias voltage and cutting off the tubes.

The bias voltage source and relay driver are "hard wired" on a small piece of perf board. The signal for T-R switching is applied to J2. This +8-V signal is obtained from pin 6 of the IC-551 accessory socket. For use with other rigs, a 9-V battery, wired through a foot switch, works well. Current drain on this battery is low. An rf-operated T-R relay could be used in place of the directly keyed one described in this article. S2 disables the relay driver by removing the 12.6-V ac source in the standby position to permit straight-through operation.

### Tune-Up and Operation

Initial tune-up is simple and ordinary. Connect a dummy load and the power supply to the appropriate jacks. Any high-voltage power supply that has an output of 750- to 1200-V dc should be satisfactory. Turn on S1 and allow the heaters to warm up for a minute or more. Switch S2 to turn on the other voltages. Actuate K1 to ground the bias resistors, R1 and R2. Adjust R1 and R2 to obtain 15 mA of idling current for each tube (30 mA total).

Connect the exciter to the amplifier through an SWR indicator. Actuate K1 and apply a small amount of drive. Adjust the position of the tap on L1 for minimum SWR. Be sure to remove all voltages each time you move the tap position!

Next, apply drive to the amplifier and adjust C1, C4 and C5

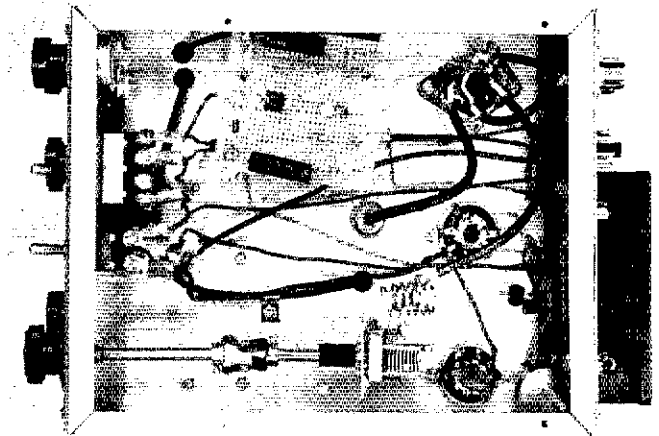


Fig. 5 — Bottom view of the amplifier chassis. Note the washers on the tube sockets, used to provide a ground connection for the appropriate pins.

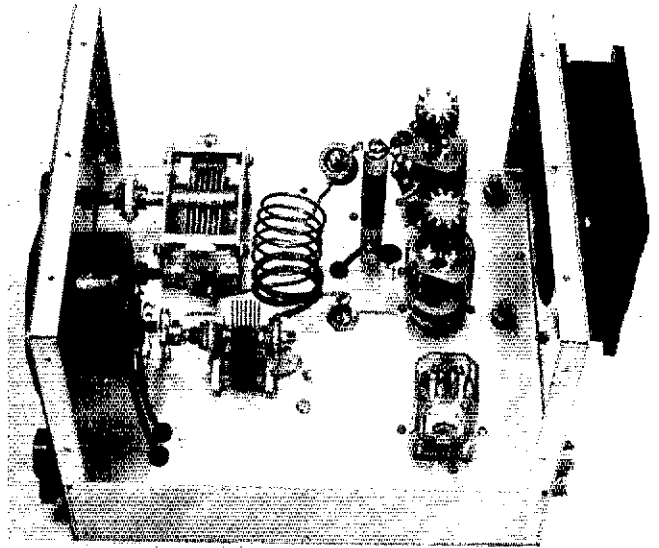


Fig. 6 — Top view of the Mini-Lini chassis. Large heat-dissipating plate caps and a fan help maintain cool operation of the tubes.

for maximum power output. For those lacking a wattmeter, an SWR indicator set in the FORWARD position can be used in the line between the amplifier and the dummy load.

### Conclusion

The Mini-Lini should be ideal for those looking for more output from their solid-state rigs. Typical operating parameters are 50 watts out for 10 watts of drive, with 1050-V dc on the plates. Reports of signal quality have been complimentary. Enhance your "equality" and come join the fun on 6! I would be happy to answer any questions about the amplifier — enclose an s.a.s.e., please.

### Notes

1. The design was taken from personal correspondence with Ed White, WA5RIA.
2. D. DeMaw, "Some Ground Rules for Sweep-Tube Linear-Amplifier Design," *QST*, July 1968, p. 30.
3. D. DeMaw, "Some Thoughts About TV Sweep Tubes," *QST*, Feb. 1980, p. 11.
4. D. DeMaw and J. Rusgrove, "An RF-Sensed Antenna Change-over Relay," *QST*, Aug. 1976, p. 21.

# Noise-Mode Communications

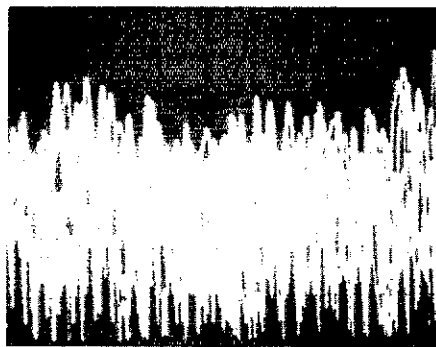
Noise has always been considered the enemy of DX (weak-signal) communication. But not now — not when it can work *for you!*

By A. R. Eskay,\* W6WQC

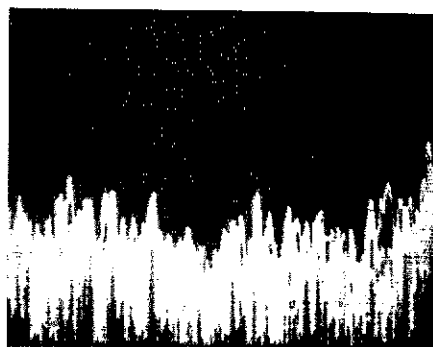
In 1948 Claude Shannon, the brilliant Bell Labs scientist, published his famous treatise, "A Mathematical Theory of Communications," in which he showed that communications is corrupted by noise. Notwithstanding the profound and far-reaching impact this had in academic circles, it is hardly the sort of statement that excites the amateur fraternity.

As hams, we are doomed to live in a world of perpetual and insufferable noise. This causes us to go to extraordinary pains to lessen the devastating effect noise interference imposes on our efforts to communicate with each other. Consider that the more resourceful and enterprising in our ranks expend a great deal of time, money and effort to reduce noise interference. We seek a quiet location, erect enormous and elaborate antenna arrays, and invest in sophisticated and expensive receiving equipment. Moreover, most of us devote a substantial amount of time developing the ability to copy through noise.

Not long ago, while struggling to fathom the subtle intricacies of Shannon's abstractions, I began to think about ways hams deal with the noise problem in order to make the best of a bad situation. I recalled a statement made by Professor G. Garson Darby, inventor of the correlated vertical phase filter, in one of his lectures: "Do not attempt to eliminate system anomalies until you are sure that they can't be made to work for you." It's a fact that noise is always louder by several orders of magnitude than the signal we wish to copy, and it occurred to me that if we can *use* noise, we are better off with it than without it. Subsequent investiga-



(A)



(B)

Fig. 1 — "Off-the-air (spectrogram) of noise under varying conditions. Scale: 1 cm = 0.01 sec., BW = 2.45 kHz. (A) Typical sample when noise level isn't important. (B) Normal 20-dB degradation of S/N during important communication. Compare with A and note difficulty of copy. (Experimental noise-mode communication photos courtesy NMC Corporation.)

tions, based on the feasibility of using noise to convey intelligence, proved to be theoretically sound. I realized that everything we have been doing for the past 70 years was all wrong.

On strictly logical principles nothing compels us to reject noise as being inherently incapable of serving a useful purpose. In the beginning we made a choice to use generated carriers — we simply made the wrong choice and have been stuck with it ever since. Of course this is contrary to the traditionally accepted way of viewing the phenomena of electrical communication, and it takes a little getting used to.

In engineering terminology the word "noise" does not necessarily refer to static. "Noise" is any unwanted disturbance within the useful frequency band. It is also defined as anything that interferes with transmission or that does not carry relevant information. From these definitions it follows that we can regard carrier

signals as the unwanted component, and static as the desired component, in the transmission circuit. I have named this new concept "Noise Mode Communication" (which demonstrates that creativity in one area can lead to lack of imagination in another).

In cw we key our transmitters on and off. On the other hand, Noise Mode Communication requires that we key our transmitters off and on, so that intelligence is conveyed during the key-down, transmitter-off intervals. In its practical application, this requirement is ridiculously simple. All that is required is a single inverter in the keying lead. If you are using a keyer with relay output, you need only reverse the interface with the transmitter key input. This modification results in maximum noise during key-down transmitter-off conditions.

Wishing to verify the practicability of the idea, I conducted a series of classical A-B type comparisons. First, I would con-

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tact a weak DX station and ask for a signal report. Invariably and after several repeats the answer was always UR DOWN IN THE NOISE OM, PSE RPT. I would then ask the DX op to convert to noise keying and QRS to 3 wpm. The reason to QRS will be explained shortly. When this was accomplished I was copying noise at 40 dB over S9! (The ambient noise level at my QTH is +40 dB.) This was a mind-boggling experience, to say the least.

Then I would switch over to noise keying and ask the DX op to concentrate on the noise. He (or she) experienced equally astounding results. Ample documentation to this exists in the form of hundreds of QSLs with noisy reports on my walls.

Those who take pride in their ability to copy conventional code at elevated speeds are in for a surprise when attempting to copy noise code. When I first tried it I was shocked to discover that my code speed had dropped from 45 wpm down to 2 or 3 wpm. After several weeks my speed was up to 13 wpm, where I languished a while at the 13-wpm plateau. However, diligent practice and perseverance resulted in a gradual and steady increase, until now I am up to about 20 wpm comfortable copy. This interesting and unforeseen turn of events appears to involve psychophysiological considerations that I have not yet had time to investigate. I suspect that it is more psycho than physio, because we have to retrain ourselves to copy noise while disregarding carrier signals. This is compounded by the fact that sending remains conventional. I must warn you that the mental effort to do this is formidable, but it can be done. In this respect things are opposite to that which we are accustomed. For example, CQ sounds like a noisy dididit dididit.

After further reflection on the matter, I began to suspect that there should be no need for carrier signals at all because they are now the disturbing influence. Theoretically, carriers could be eliminated entirely, just as with conventional signaling, where we desire to eliminate noise static altogether. To put this theory to the test, I devised a series of experiments to verify the hypothesis. One evening I snagged a weak ZS on the low end of 40 meters. He was QRP with 2 watts. I asked him to reduce his power gradually and, as he did so, I was able to copy more and more of the noise until finally, at maximum noise, I asked what his power input was. To this he replied that his transmitter was turned off!!! Before I could recover my wits and continue the experiment, a W5 plopped down on the frequency, began calling CQ and completely obliterated the QSO. I suspect the experience completely unhinged the ZS, since he has not made a reappearance on the band.

Those of us who are already blessed with high ambient noise levels are ideally

situated to take advantage of noise mode communications, but there are several things the rest of you can do to enhance the receiving environment. First, move into a noisy location. A location near or adjacent to high-tension lines is perfect. Second, erect a simple nondirectional antenna, preferably a vertical with no ground system. Third, discard your expensive receiver and procure a broadband job. Almost anything will do. The idea is to pick up as much noise as possible. Remember — *the noise is the signal*.

It is interesting to note that all future would-be hams have an enormous advantage over the rest of us. They can start copying noise right off. Furthermore, they are not likely to have foolishly invested in low-noise receiving setups or to have squandered their budgets on directional gain antennas.

### Telephony

Now a word to you ssb phone adherents. As you are no doubt aware, new but yet-to-be-realized 'phone communication schemes utilize digitally synthesized voice techniques. In a sense, this is nothing more than an imaginative form or adaptation of cw, which uses only the dits and not the dahs. Begin to see the picture? Practical experiments along those lines have not yet been implemented, however, and this topic will have to await a future report.

If you are to take full advantage of the fantastic results noise-mode communications has to offer, it is absolutely essential that you understand the basic concepts. A few well-meaning but misinformed critics insist that the key-up transmitter carrier must not only still exist but must necessarily be of sufficient strength to break up the noise into discernible dots and dashes. This is utter nonsense. It is just as preposterous as saying that noise static is required to separate conventional signaling into recognizable dots and dashes. This, of course, is absurd.

Other experimenters who have likewise failed to grasp the essence of noise-mode communication have attempted to modulate their rigs with noise generators. I'm sure you have heard these intrepid souls many times in DX pile-ups. Again, this will not work because it is primarily the ambient noise at the receiving end that is heard by the receptee. In fact, to maximize the noise at the receiving end we must radiate the least amount of power necessary to maintain the contact. This point is one which has been stressed repeatedly in the ham literature for as long as any of us can remember.

### Proof

For engineer types, mathematically rigorous proof can be demonstrated by the following process. Let the "goodness of copy" (defined as the Readability Quotient, RQ) be equal and directly propor-

tional to the signal-to-noise ratio. Thus,

$$RQ = \frac{S}{N} \quad (\text{Eq. 1})$$

where


RQ = readability quotient  
S = signal (noise)  
N = noise (carriers)

Clearing fractions,  
 $NRQ = S$  (Eq. 2)

Finally, transposing terms but maintaining the identity,  
 $S = QRN$  (Eq. 3)

Since QRN is the Q code for noise, this proves our basic premise.<sup>1</sup>

The only drawback to noise-mode communication is that it doesn't sound good. No, it does not. But that is the price we have to pay for vastly increased communications efficiency. If this proves to be an insurmountable obstacle there are a few things you can try. After all, onions are not everybody's cup of tea. You can add a narrow flat-topped, steep-skirted filter to the receiver to cut out most of the noise. Fortunately, noise information content is not band limited, owing to its non-recurrent nature. Next, install a multielement directive antenna high up and in the clear. The noise-to-signal ratio will be drastically reduced immediately. As a last resort, convert to carrier signaling. Lo and behold, you will find the signal-to-noise ratio has increased dramatically. A random sampling of hams using these techniques revealed a unanimous consensus that the higher the signal-to-noise ratio the better the sound. If this sounds too easy, be forewarned that you must now relearn the code. For example, CQ will now sound like dahdidahdit-dahdahdidah! Finally, you must make a conscious effort to disregard the noise.

There you have it. All the information you need to make the best choice between two possible worlds. See you on the low end. 

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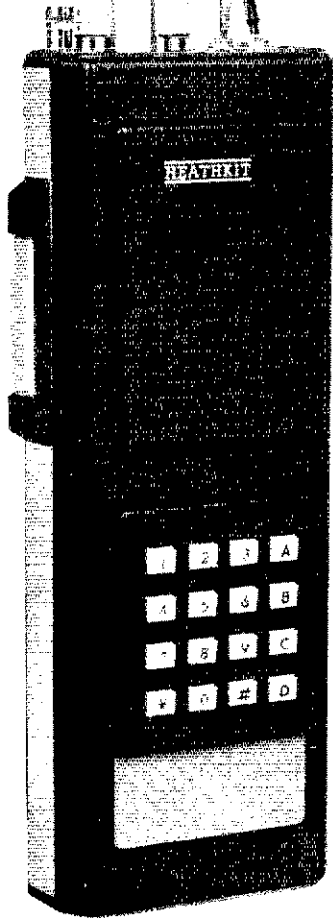
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<sup>1</sup>An alternative derivation has been developed by my friend Gideon Fanshaw using the Method of Least Squares. It lacks the elegant simplicity of the proof presented here.

# A Modern Synthesizer for Portable VHF Transceivers

Build this synthesizer and you'll never be "rockbound" again!

By Al Helfrick,\* K2BLA



It wasn't too many years ago that the synthesized amateur transceiver was regarded as a modern triumph that allowed extreme versatility of vhf operation. Today, the ultimate in vhf fm equipment is the synthesized hand-held transceiver, which provides the same versatility in a pocket-sized package. Generally, the synthesizers used in these hand-held units are well-packaged versions of those used in mobile transceivers. Most portable synthesizers use a crystal offset oscillator to lower the frequency from the VCO to a range suitable for the programmable divider. Use of an offset oscillator not only lowers the VCO frequency from the vhf range but also allows some frequency manipulation. The major disadvantages of the offset oscillator, aside from the required additional hardware, is the possibility of generating spurious signals and the need to accurately control the offset oscillator frequency.

A synthesizer design, superior in many areas, is the dual-modulus programmable divider in a single loop. This design has the advantage that only one IC need operate at the vhf range, while the majority of the digital logic operates at a much lower speed. For a complete discussion of the dual-modulus programmable divider as

applied to vhf synthesis see Ref. 1 and 2.

The vhf dual-modulus programmable divider requires one ECL integrated circuit. Unfortunately, ECL ICs are notorious for high supply currents and most ECL dual-modulus prescalers are not suited for portable equipment. Recently, some manufacturers have been developing lower-power ECL dual-modulus prescalers for use in portable communications equipment. An advantage of the dual-modulus synthesizer is that it is completely digital and therefore can be compressed to fit into small equipment.

Another recent development, making possible the use of the all-digital synthesizer in portable equipment, is the development of CMOS LSI synthesizer chips made especially for the dual-modulus prescaler. There have been, for several years, LSI synthesizer chips that were developed for citizens band transceivers, entertainment receivers and other applications. Synthesizers using these chips required an offset oscillator to reduce the VCO frequency and suffered other disadvantages with programming. A dual-modulus prescaler used with a CMOS LSI logic chip is the basis for the synthesizer described here.

Unfortunately, even the CMOS chip has a disadvantage. The programming for the LSI chip is in the form of pure binary.

Even worse, the data is fed into the chip in a serial format. This is done to reduce the number of pins required on the IC. If the programming data were fed into the IC in parallel form, the IC would be in a 28-pin package and would, therefore, be much larger. The synthesizer chip is intended to be used with a microcomputer where the proper serial data can be generated within the computer. The microcomputer in portable equipment poses a serious problem. Most microcomputer chips are made with either PMOS or NMOS technologies and require more power than can be safely provided by a battery supply. Although CMOS microcomputers exist, programmable ROMs are not generally available in CMOS. Therefore, in this design the binary serial data is generated with conventional CMOS logic circuits from a keyboard entry. Although quite a few ICs are required, the total power requirement is only a few microwatts.

The synthesizer is designed to operate with transceivers that require only one crystal per channel. This eliminates the requirement to rechannel the synthesizer between transmit and receive, and eliminates the need to tailor the synthesizer for a specific i-f. There are several transceivers using a single crystal, including the Heath VF-2031, which I chose for modification.

The synthesizer (Fig. 1), excluding the programming logic, is extremely simple.

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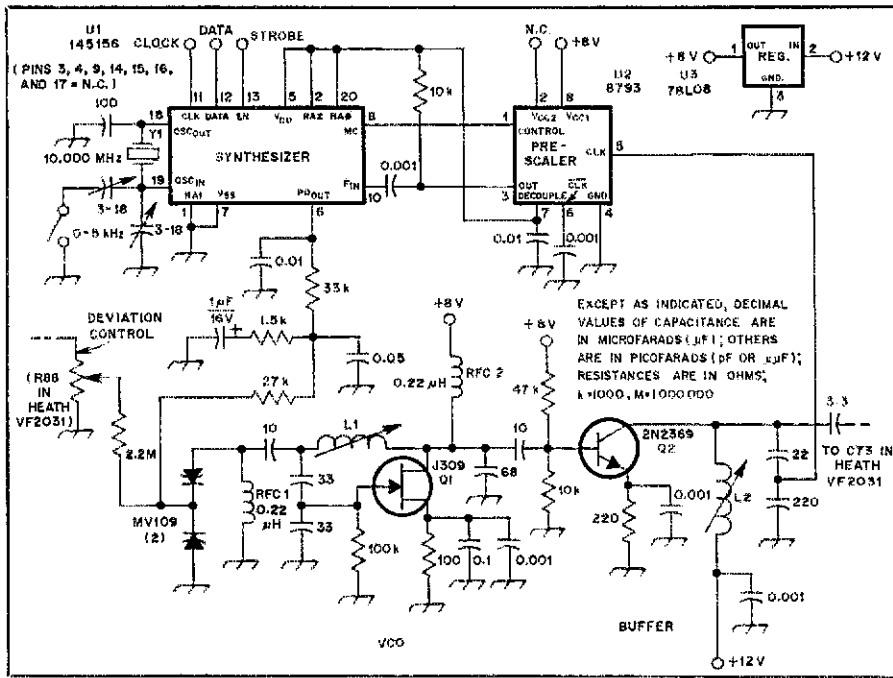


Fig. 1 — Schematic diagram of the frequency synthesizer. All resistors are 1/4-W, 5% carbon-film or composition types.

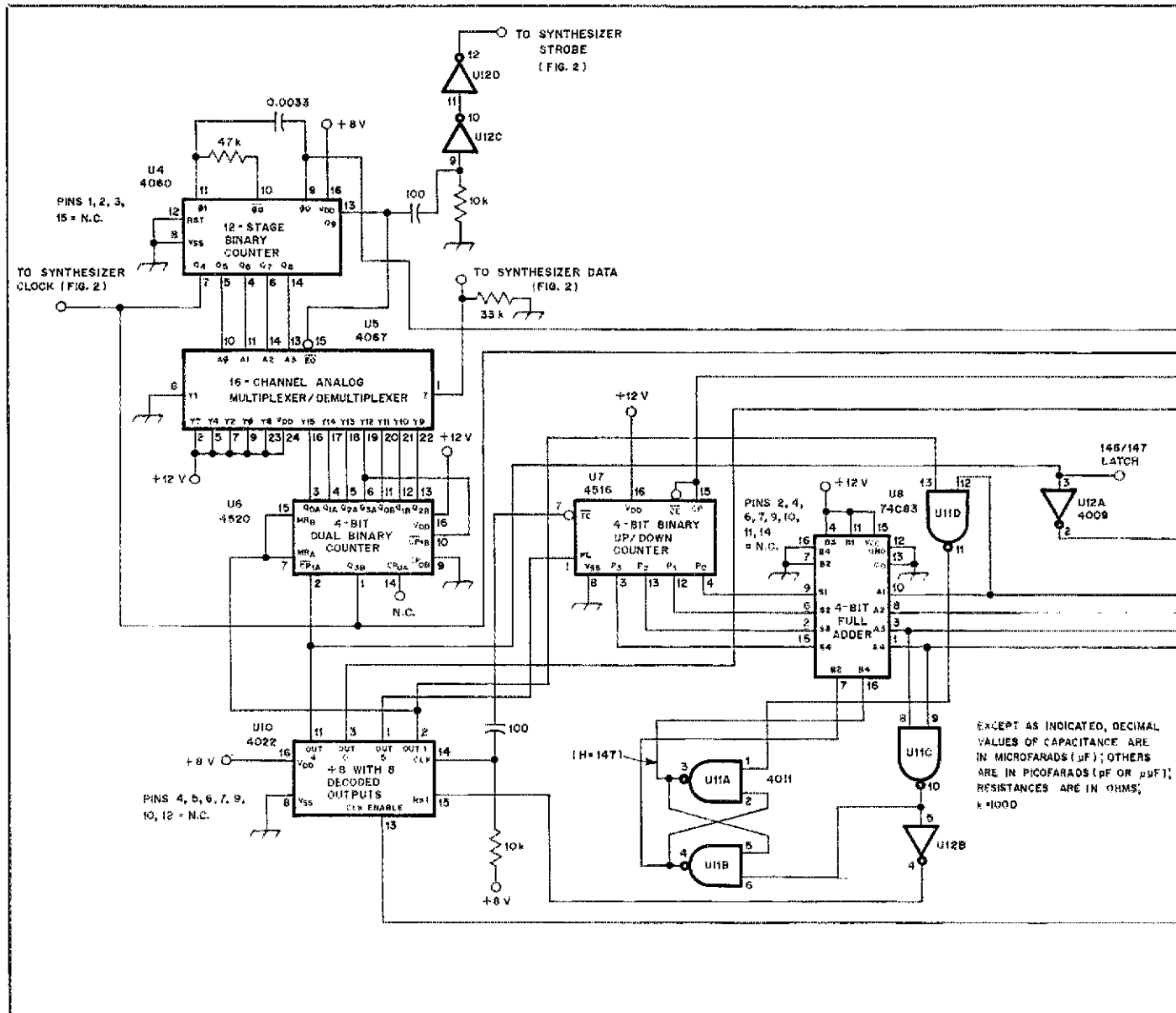
L1, L2 — 3 turns of no. 28 enamel wire on a 1/4-inch (6.4-mm) slug-tuned form (brass core).

U1 — Motorola MC145156 CMOS serial-input frequency synthesizer.

U2 — Plessey SP8793 200-MHz low-power, two-modulus prescaler (divide by 40/41).

The VCO is followed by a single buffer stage, which drives the dual-modulus prescaler and external circuits. The remainder of the circuit is the LSI synthesizer chip, which contains the reference oscillator and dividers, the programmable divider and the phase detector. No loop amplifier is used, and a simple loop filter closes the loop.

The programming circuits (Fig. 2) consist of 10 CMOS ICs. These are mounted on a separate board located behind the front-panel keyboard. The 5-kHz offset is programmed with a toggle switch



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





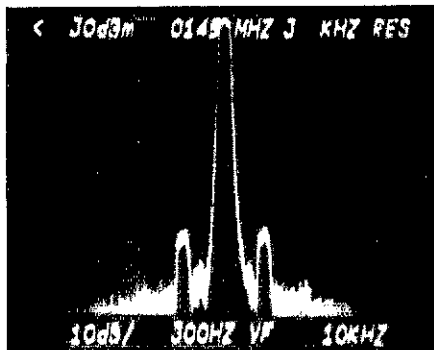


Fig. 4 — Close-in spectrum showing the 10-kHz reference sidebands approximately 54 dB below the carrier.

using the +600 kHz offset and entering frequencies above 147.395 MHz, out-of-band operation will result. This could be desirable for MARS operators, but those not authorized should take precautions against illegal operation.

To enter frequencies into the synthesizer, first clear the synthesizer by pressing the "A" button, usually located at the upper-right-hand corner of the keyboard, then press the MHz, 100s kHz, 10s kHz and the zero or 5 kHz digits of the receive frequency. As an example, to enter a receive frequency of 146.985 MHz you press "A" (clear), 6, 9, 8, 5. Pressing the last digit, either a zero or five, does not actually enter that number into the synthesizer. The last digit is more of an "enter" function. It is easier to punch 6, 9, 8, 5, and set the offset switch, than to punch 6, 9, 8, "enter," and then set the offset switch.

There is no indication of the operating frequency once the data has been entered from the keyboard. Therefore, if there is any doubt about the frequency of the synthesizer, re-enter the desired frequency, rather than take a chance of operating on an unauthorized frequency.

#### Spectral Purity

Every effort was taken to keep the synthesizer as small as possible so that it could be installed in a hand-held transceiver. Therefore, the minimum of buffer amplifiers are used between the VCO and the dual-modulus prescaler. The minimum buffering allows the generation of reference sidebands. The sidebands, which are present to some extent in every PLL synthesizer, are between 50 and 60 dB below the carrier, depending on the frequency of the synthesizer. For amateur use, a spurious signal is defined by the FCC as a signal outside of the amateur band in use. A reference sideband will be outside of the 2-meter amateur band, and will thus be a spurious signal, when the synthesizer is operating at 147.990 MHz or higher. To check the level of the reference sideband at this frequency, the rf output was measured during transmit

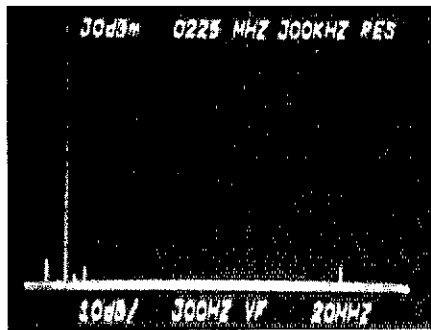


Fig. 5 — Wideband spectral display of the synthesized transceiver output. Harmonics and other spurious signals are all less than -60 dB relative to the carrier.

with a spectrum analyzer. The result is shown in Fig. 4. The reference sideband is 54 dB down compared to the carrier. The requirement for vhf transmitters of less than 25 watts output is 40 dB down with a maximum of 25 microwatts. The legal limit would not be exceeded until the transmitter power were raised above 6.4 watts. Other spurious signals, such as harmonics and the local oscillator feed-through, are more than 65 dB down as shown in Fig. 5. Of course this is a function of the transceiver and not the synthesizer. Therefore, the power output of the unit can be amplified to any power level and used on any frequency except 147.990 MHz and above. If the output is amplified to 6.4 watts or less, any frequency can be used.

#### Other Applications

This basic synthesizer can be used in practically any communications system application by simply changing the VCO range, the reference frequency and the programming information. If the application is not a portable system, the CMOS logic circuits could be replaced with a microcomputer.

This synthesizer, without any modifications, may be used in transceivers other than portable equipment. It is especially suited for application in a remote mounted mobile transceiver. The programming circuits may be mounted at the control location and the data sent serially to the transceiver.

The development work on this synthesizer took place before the repeater sub-band was expanded. There are no inherent limitations of the synthesizer that would prevent operation below 146.3 MHz. In order to lower the frequency of the synthesizer, the number entered into the main counter will have to be lowered.

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## Strays

### FIRST TRANSCONTINENTAL PACKET-RADIO QSO

On February 7, 1982, Howard Nurse, W6LLO, in Palo Alto, California, and Ed Kalin, K1RT, in West Hartford, Connecticut, completed what is believed to be the first transcontinental hf packet-radio QSO. Hams are using packet-radio techniques experimentally to provide computer-to-computer communication over amateur frequencies (see "The Making of an Amateur Packet-Radio Network" by Borden and Rinaldo, October 1981 *QST*, page 28). The QSO took place in the 20-meter band using RTTY-standard 170-Hz shift fsk signals with a data rate of 75 bits per second (bps).

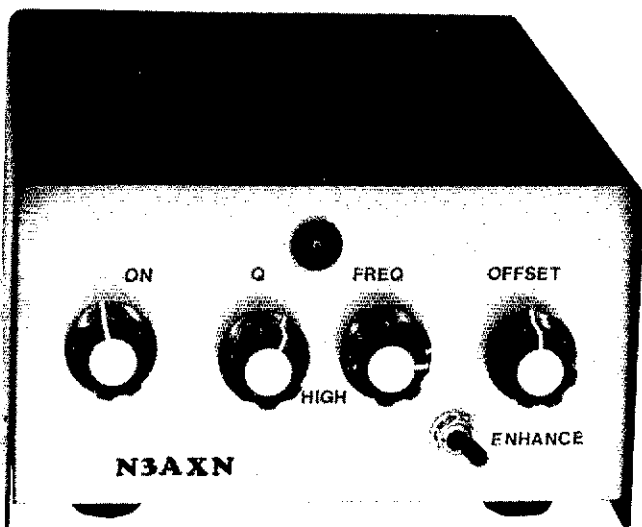
The objective of the QSO was to demonstrate the feasibility of using hf to link together geographically dispersed vhf local area packet-radio networks. Band conditions at the time limited the exchange to call signs, short control signals, and tests of the ability of one station's equipment to contact the other station automatically. Future tests will help to determine optimal packet lengths and signaling speeds in the presence of QRM, QRN and multipath propagation typically encountered in hf work.

The equipment in use by K1RT included a Terminal Node Controller (TNC) designed by the Vancouver Amateur Digital Communications Group (VADCG). The TNC was built by members of AMRAD, who donated it to ARRL for use by WIAW in such experiments. The Connecticut end of the QSO was conducted from the station of WAIGDX in nearby West Hartford to prevent the possibility of interference from the WIAW bulletin and code practice transmissions. The other equipment used by K1RT included a TRS-80 microcomputer, HAL ST-6 RTTY demodulator, Collins KWM-380 transceiver, ETO Alpha 76 amplifier, and a Telrex TB-6EM antenna at 60 feet. Equipment in use at W6LLO was similar — a Vancouver TNC, HAL ST-6000 demodulator, KWM-380, a computer terminal and a low, 20-meter dipole. — Ed Kalin, K1RT

### CALL FOR VHF CONFERENCE PAPERS

□ Papers are solicited for the Western Michigan University 28th annual VHF Conference, to be held October 23 at WMU, Kalamazoo. Paper synopses are due for selection by June 30, and final papers are due October 1. The conference is designed for vhf radio amateurs interested in design, construction and testing. — Glade Wilcox, W9UHF, Kalamazoo, Michigan

# Concept and Construction of a CW Filter and Enhancer



Do QRM and QRN "bug" you? This circuit can help kill those problems dead.

By Tom Cook,\* N3AXN

The active audio filter has been around for several years. It is relatively simple to design and build, is inexpensive, and requires little effort to install. It is normally inserted between the receiver audio output and the headphones. With careful design and choice of parts, very high Q is possible and the center frequency can be made adjustable. That makes this type of filter a versatile addition to the ham shack.

The only serious drawbacks to active audio filters are increased noise level at high Q and their limited ability to handle interference. A marginally weak signal received with heavy QRN is difficult to filter. High Q tends to make noise and signal sound alike, since a bandwidth of less than about 100 Hz will not give the ear enough frequency spectrum to evaluate the sound it is receiving. In addition, the recent influx of ssb onto frequencies previously reserved for cw has created new QRM problems that even high-Q audio filters are ill equipped to handle. Voice frequency signals can bounce in and out of the filter passband, making noises that sound suspiciously like cw.

Any attempt to improve the active audio filter must deal with two problems: noise and non-cw QRM. Most noise and some types of interference are broadband. Their energy is, for the most part, equally distributed both inside and outside the filter passband. That fact suggests one method of improving filter performance. If the energy outside the passband could be subtracted from the energy inside the passband, it would leave only the desired signal unattenuated. That would help

alleviate copy problems caused by noise and interference.

## Theory of Operation

Fig. 1 is a block diagram of a filter enhancing system that uses this approach. Audio signals from the band-pass filter input and output are fed to the rectifier circuits, where their energy content is translated into dc levels. These levels are applied to the input of the differential amplifier (diff. amp.). A greater energy

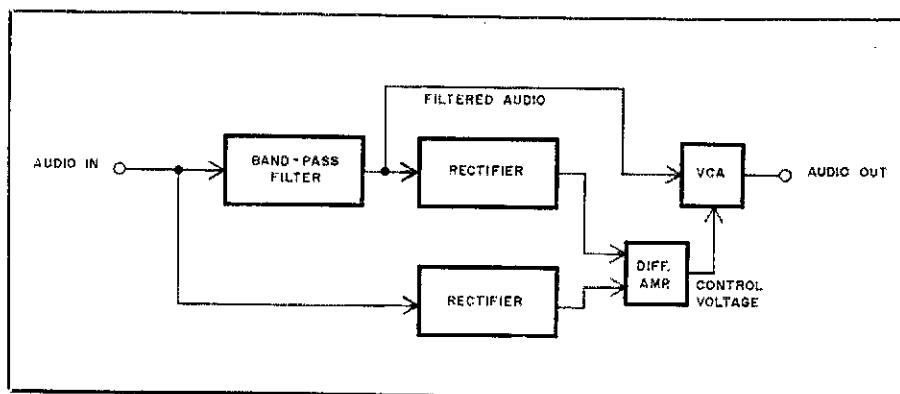
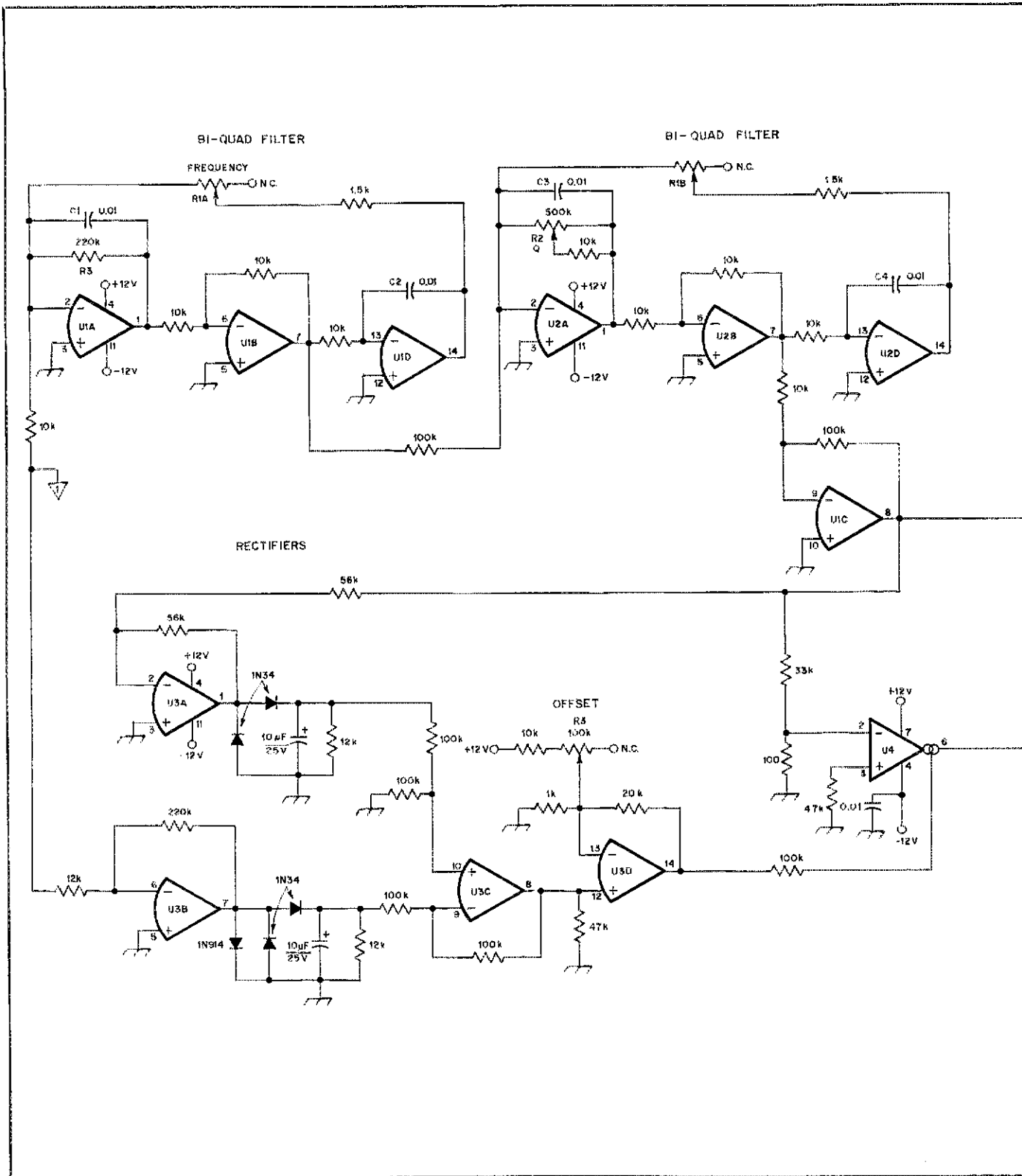


Fig. 1 — In the enhancer, filtered and nonfiltered audio is rectified and fed to a differential amplifier. The difference signal controls the gain of a voltage controlled amplifier (VCA), thus cancelling noise and broadband interference.



level at the filter output causes the diff. amp. output to go positive. The diff. amp. controls the gain of the voltage controlled amplifier (VCA). A positive control voltage increases gain in the VCA. When the audio input is only noise, the outputs of the rectifier circuits will balance. The diff. amp. output will

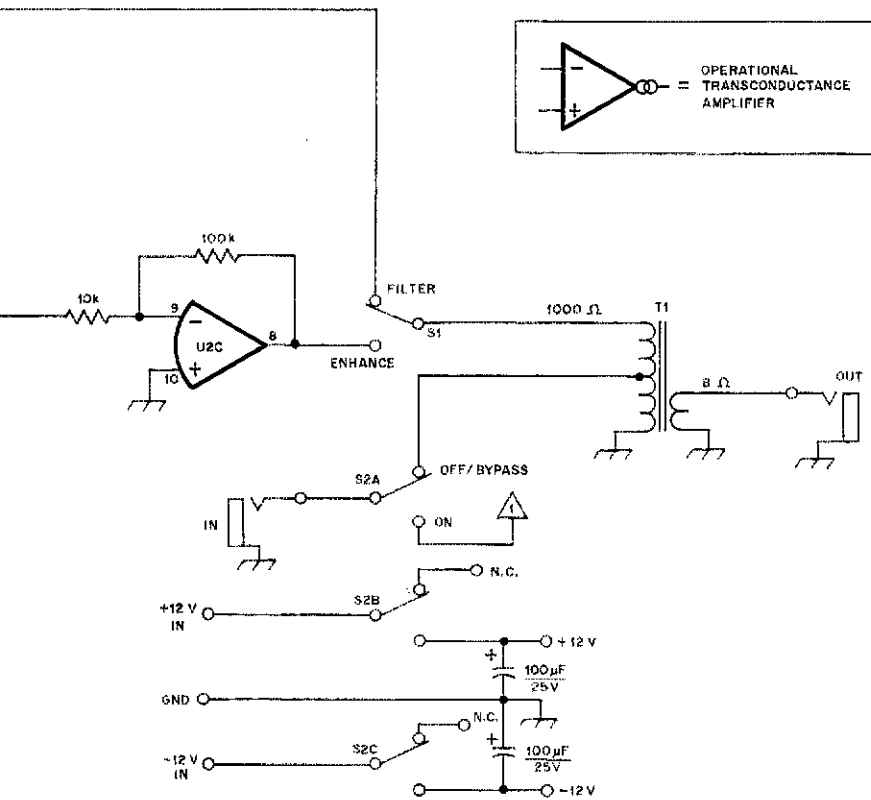
therefore be zero. This causes the VCA to shut off. When a cw signal is centered in the filter passband it upsets this balance and the control voltage goes positive. This increases the gain in the VCA and the desired cw signal is heard clearly at the output.

This design concept was implemented

according to the schematic diagram in Fig. 2. The band-pass filter consists of two bi-quad filters cascaded for high Q without ringing. There is considerable gain at resonance in this filter design. That means that the filter will not only attenuate signals outside the passband but also amplify signals within the passband. This

Fig. 2 — Schematic diagram of the cw filter and enhancer. An external  $\pm 12$  volt power supply is required. Capacitance values are in microfarads ( $\mu\text{F}$ ). Resistances are in ohms,  $k = 1000$ . Fixed-value resistors are 5%, 1/4-watt metal film.

C1-C4, incl. — 0.01  $\mu\text{F}$  close tolerance.  
 R1 — Dual potentiometer, audio taper.  
 T1 — Audio transformer, 1000  $\Omega$  ct/8  $\Omega$ .  
 U1, U2 — TL084 quad bi-fet op amp.  
 U3 — LM324 quad op amp.  
 U4 — CA3080 operational transconductance amplifier.



gain is affected by the Q control. R1 is a dual 100-k $\Omega$  audio taper potentiometer. It controls the center frequency and is reverse wired so that maximum frequency is at the extreme counterclockwise position. C1 through C4 determine the center frequency and should be close tolerance types. R2 controls the Q and gain of the

second stage (the Q of the first stage is set by R3).

Full-wave rectifiers provide a varying dc voltage that matches the envelope of the incoming ac signals. One rectifier responds to the filter output, while the other responds to the original nonfiltered audio signal. The 1N914 diode assures

that excessively strong unwanted signals will not shut down the VCA completely. Filter capacitor and bleeder resistor values were chosen to give best response to the steep slopes of cw envelopes. U3D amplifies the varying dc voltage from the diff. amp. The offset potentiometer, R4, acts as a gain control for the VCA. When a strong signal is being enhanced this control may be rotated toward the +12 volt side to more fully attenuate background noise. Weaker signals will not permit as much offset so the unit enhances the signal of interest without completely attenuating unwanted noise.

The VCA is built around an RCA CA3080 operational transconductance amplifier (OTA). This device has the ability to increase or decrease amplification of a signal in response to a voltage applied via a current-limiting resistor to pin 5. By properly applying the output of the diff. amp. to the VCA, I was able to vary the audio output of the filter. What I heard was a series of dots and dashes louder than the noise, even when using the highest Q settings and under the heaviest QRN and QRM conditions.

An output transformer allows the use of low-impedance headphones. The output devices, U1C and U2C, should not be used with a load of less than about 2 k $\Omega$ . I chose a transformer that would match my 8- $\Omega$  headphones to either the filter, enhancer or the 500- $\Omega$  output of my Heath transceiver. You may wish to use a different configuration. Input impedance matching is noncritical.

### Construction and Use

The components of this unit are inexpensive and tolerant of abuse, and this particular circuit is not the only possible implementation of the design concept. Therefore, experimentation is encouraged. Changes in a few component values, particularly in the rectification circuits, will drastically alter the performance characteristics of the enhancer. Enhancer action can be tailored easily to suit individual preference. The only component that should not be changed is R5; decreasing this value will lead to overheating and possible destruction of the CA3080.

Construction of the unit is straightforward. I tried several printed-circuit-board arrangements with equally good results.<sup>1</sup> Fig. 3 is a photo of the unit currently in use at N3AXN. All parts are available from Radio Shack except the CA3080; it is available from Jameco Electronics<sup>2</sup> and other distributors.

Optimum use of the enhancer involves proper adjustment of three parameters: the amount of signal and noise entering the system (controlled by the transceiver gain control), the amount of filtered signal (controlled by the Q control) and

<sup>1</sup>Notes appear on page 36.

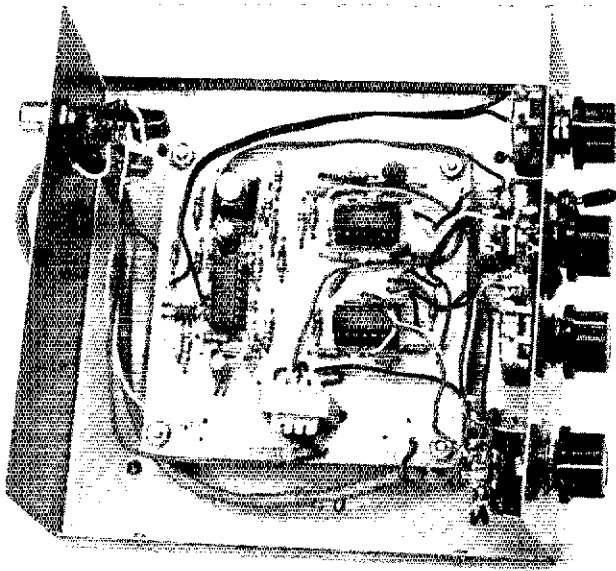


Fig. 3 — An inside view of the cw filter and enhancer. Close-tolerance capacitors have replaced those in the bi-quad filter sections, and additional decoupling has been added, since the photo was taken.

the minimum amplifier level (adjusted by the OFFSET control). The following sequence is recommended for those who are unfamiliar with the controls. Start with the unit switched off, Q at minimum, OFFSET at maximum (full clockwise), and S1 switched to FILTER. Adjust the receiver for comfortable listening and turn the unit on. Adjust the filter center frequency until it matches the signal of interest, then advance the Q control toward maximum. (Be careful; strong signals will be very loud. Decrease the receiver gain if necessary.) Next switch S1 to ENHANCE and decrease the offset until the background noise is minimized.

I've used the cw filter and enhancer system successfully under a variety of conditions: (1) the "insanity" of the 40-meter Novice band, (2) while sorting cw signals out of foreign ssb on the low end of 40 m, (3) during summer static conditions on 80 m, (4) while experiencing severe QSB on 15 m, and (5) during an attack of the "woodpecker." It is not a cure for all problems, but it has saved a lot of QSOs from oblivion. I find those QSOs that don't need saving more relaxed because of the reduction in noise.

#### Notes

<sup>1</sup>Circuit boards, negatives and parts kits are available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.  
<sup>2</sup>Jameco Electronics, 1355 Shoreway Rd., Belmont, CA 94002.

## Strays

### QRPer LIKES "UGLY" CONSTRUCTION

Projects need not be exact duplicates of those shown in *QST*. Parts substitutions (made with care!) and alternative construction techniques open the door to innovation and cost shaving when building homemade gear. Wes and Roger Hayward (W7ZOI and KA7EXM) illustrated in their 1981 *QST* article, "The Ugly Weekender," how an amateur can avoid the implied (however subtle) rule that the builder duplicate exactly the magazine project of his or her interest.

One amateur who believes in doing things his way is John Billones, WD6GGC. The accompanying photographs show his versions of the *QST* "YY Special" beginner's receiver and the "Universal QRP Transmitter" from September 1981 *QST*. Neither project resembles the original, but John reports excellent performance for both circuits. It is worth noting that his cw key is also homemade.

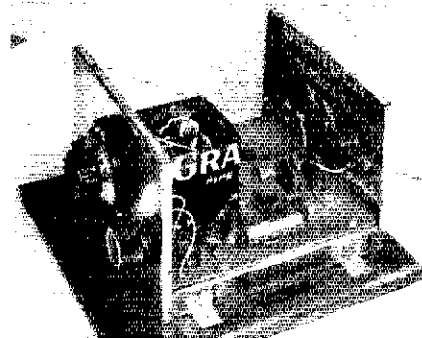
Parts substitutions include a coil form made from a rolled 3 × 5-inch file card in place of the toroid core, a miniature bc-band type of variable capacitor instead of a standard trimmer capacitor, and a toothpaste cap for the tuning knob. John also used resistors in parallel or in series to obtain the specified resistance values in the circuit. A wooden base was built for

the transmitter, and pipe-tobacco cans were cut and formed to provide a VFO shield and end panels for the receiver. It was then affixed to a wooden base plate, as shown.

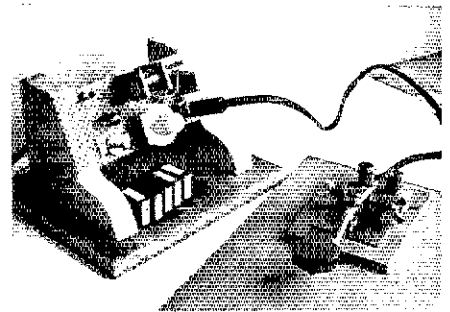
John claims no DX records with his "fly power", but says he has no trouble working stations over a 200-mile radius during the day on 40 meters. Reports range from RST 224 to 599. He goes on to say that he doesn't do much better under those conditions with his commercial 100-watt transceiver. The antenna is less than ideal — a random-length wire,

matched to the rig by means of a homemade QRP Transmatch. John says the station works very well, but feels "power mad" when he uses his Heath HW-8 for QRP work!

The WD6GGC philosophy is, "With regard to home brewing (others may or may not agree), I believe that the equipment should look homemade — not sloppy, but showing at least a modicum of craftsmanship. To me, working cw with home-brew equipment is still the nitty-gritty of Amateur Radio." — Doug DeMaw, W1FB



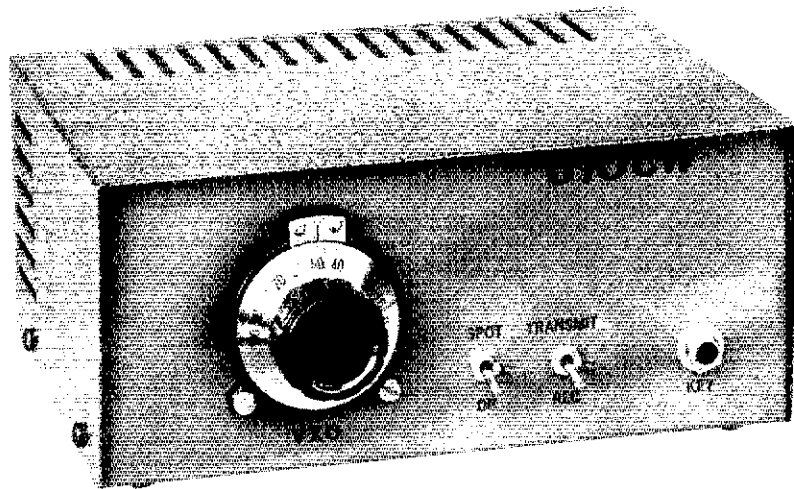
The WD6GGC version of the "YY Special" receiver from the popular *QST* article of the same title.



A wooden base and perf board serve as the main frame for the WD6GGC "Universal QRP Transmitter" (a W7ZOI design). A homemade straight key is in the foreground.



# Getting Started on VHF: A 6-Meter Transmitter You Can Build



**Part 1:** Constructing simple vhf gear will give you hours of workshop and operating enjoyment.

By George Collins,\* KC1V

**G**etting started at vhf (very high frequency) need not be difficult or expensive. Building this 6-meter transmitter is a good low-cost way for the newcomer (and some old timers, too!) to begin enjoying the uncrowded world above 50 MHz. For many reasons the 6-meter, or 50-MHz, band is the best place to begin our vhf activities. Relatively simple equipment can be used with good results: The techniques and components required are similar to those used at lower frequencies.

This transmitter includes several features that will make your operating hours more pleasurable. It has variable-frequency control and an output power of 10 W. Under favorable conditions you should be able to work stations hundreds

of miles away, using only a simple homemade antenna.

## Circuit Highlights

A VXO (variable crystal oscillator) is used to provide variable frequency control. This circuit (Fig. 1) differs from a normal fixed-frequency crystal oscillator in that an LC (inductance/capacitance) circuit is placed in series with the crystal. By varying the series capacitance (C1), the oscillator frequency can be changed, or pulled, approximately 12 kHz. If the crystal frequency is pulled too far, unstable operation can result, so a limit-set capacitor (C2) has been included in the circuit. Following the oscillator is a buffer amplifier, Q2. It isolates the oscillator and provides the signal level necessary to drive the frequency-multiplier chain.

As the VXO operates in the 12.5-MHz range, the frequency must be multiplied by four to reach the 50-MHz band. This is

done by using two diode-frequency doublers. Each doubler contains a pair of diodes fed from a trifilar transformer. This balanced configuration reduces the level of undesired signals (such as three times the input frequency) at the doubler output. By keeping the undesired frequencies at a low level to start with, much less filtering is needed to ensure a clean output signal. To further reduce spurious signal levels, each doubler is followed by a tuned circuit. The inductors for these LC circuits are wound on powdered-iron toroids. Links, wound over the main winding, are used to couple to the tuned circuit. A stage of amplification is used after each doubler to provide the correct signal level to the following stages. The 50-MHz signal from the frequency-multiplier chain is passed through a two-pole band-pass filter and amplified before leaving the driver board.

The circuit of the final-amplifier board,

\*Assistant Technical Editor

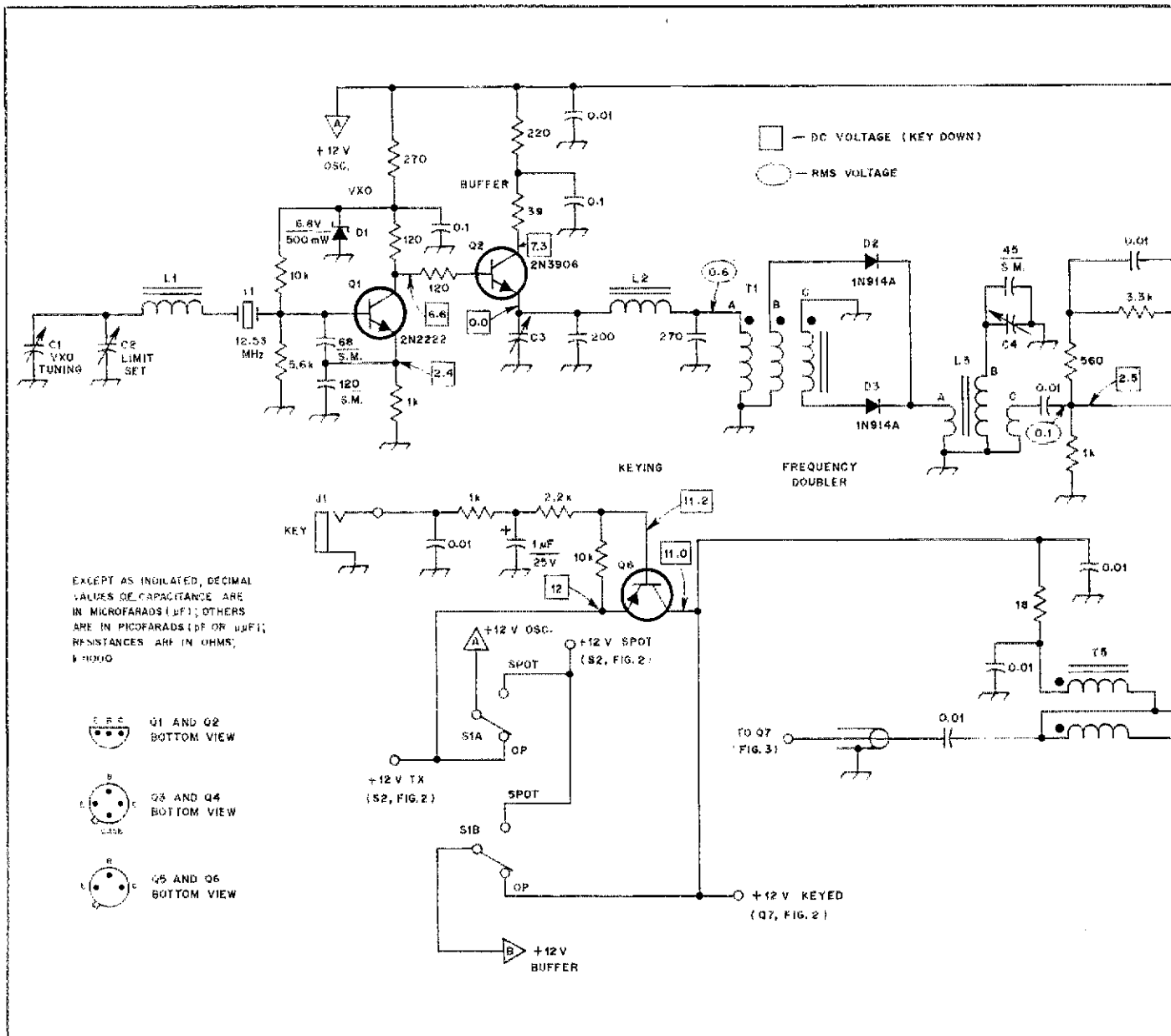


Fig. 1 — Schematic diagram of the low-level, or driver, stages of the 8-meter transmitter. The letters A, B and C above T1 and T3 are keyed to the parts-placement diagram (Fig. 5A). All resistors are 1/4-W, 5% carbon types. Unless specified otherwise, capacitors are disc ceramic.

C1 — Air variable capacitor, 75- to 100-pF maximum capacitance.

C2-C7, incl. — 3- to 68-pF miniature trimmer.

D1 — 6.8-V, 1/2-W Zener diode.

D2-D5 — 1N914A silicon switching diode.

J1 — 1/4-inch phone jack.

L1 — 35 ts. of no. 28 enameled wire on an Amidon or Palomar T50-2 (red) toroidal core.

L2 — 15 ts. of no. 26 enameled wire on a T37-6 (yellow) toroidal core.

L3 — 11 ts. of no. 26 enameled wire on a T37-6 (yellow) toroidal core. Input and output links are each 3 ts. of no. 28 enameled wire wound over the ground end (low-impedance end) of L3.

L4 — 11 ts. of no. 26 enameled wire on a T37-12 (green and white) toroidal core. Input and output links are each 3 ts. of no. 28 enameled wire wound over ground end of L4.

L5, L6 — 8 ts. of no. 28 enameled wire on a T37-6 (yellow) toroidal core.

S1 — Two pole, two-position toggle switch. Radio Shack 275-663 or equiv.

T1, T3 — 6 trifilar ts. of no. 28 enameled wire on an FT37-43 toroidal core. See text and Fig. 4.

T2, T4, T5 — 6 bifilar ts. of no. 28 enameled wire on an FT37-43 toroidal core. See text and Fig. 4.

shown in Fig. 2, contains two stages. In the first, a 2N4427 (Q7) is used to provide approximately 0.7 W of drive to the output stage. Q7 is operated with a small amount of forward bias; this improves the keying characteristics and increases the stage gain slightly. The output stage is a Class C MRF479. A seven-pole low-pass filter is used to provide the necessary harmonic suppression. A spectrum analyzer

display of the transmitter output is shown in Fig. 3.

### Construction and Testing

There are two sections to the transmitter circuit, with the components of each section mounted on separate printed-circuit boards.<sup>1</sup> Each board measures

2-1/4 × 5-1/2 inches.<sup>2</sup> The driver board contains the VXO, doublers, amplifiers and band-pass filter. This board is double-sided (copper clad on both sides), with the unetched component side serving as a ground plane. The driver stage (Q7), final amplifier and low-pass filter are mounted on the second board. A single-sided board is used here, with all components soldered to large pads on the foil

<sup>1</sup>Notes appear on page 42





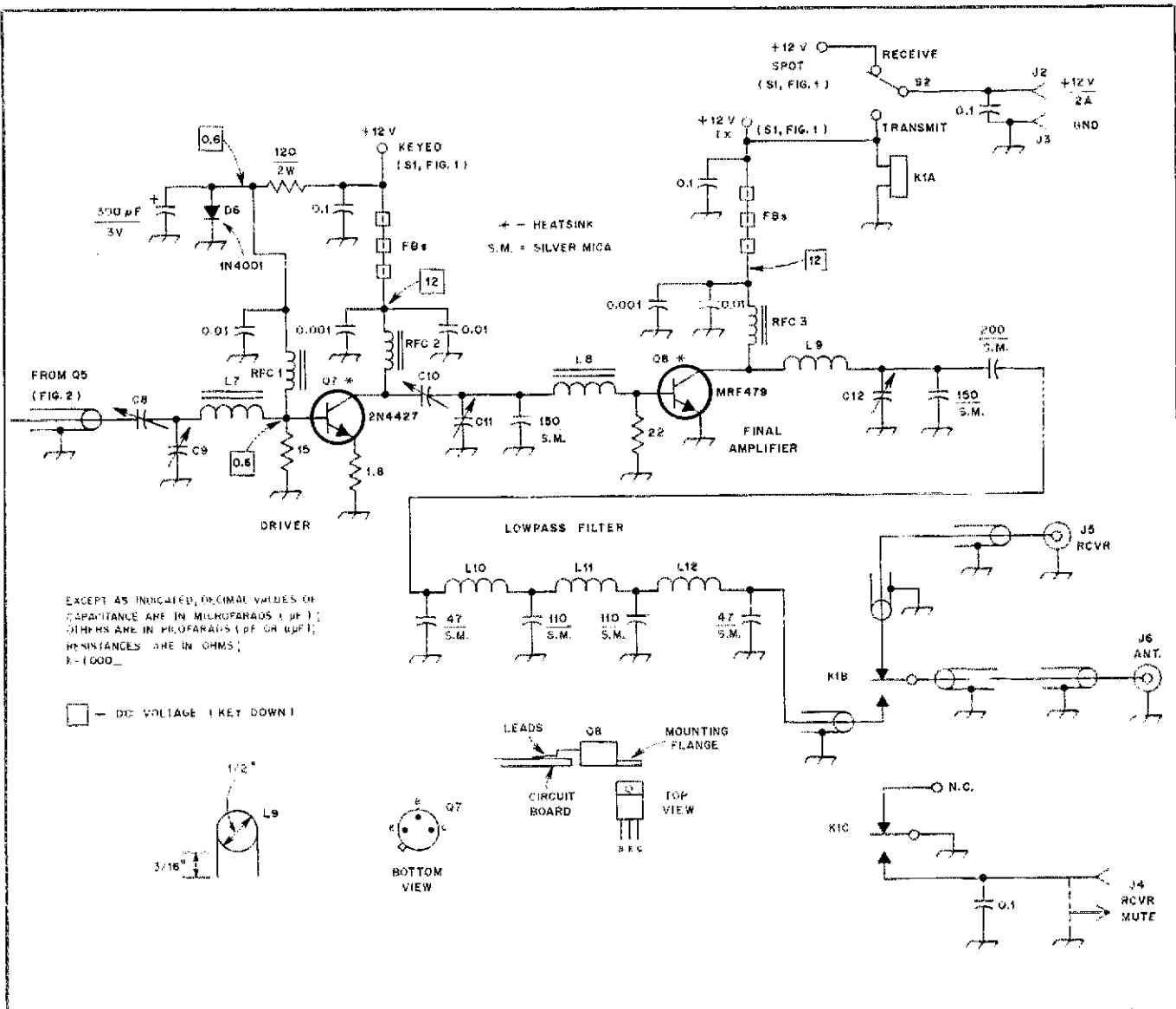


Fig. 2 — Schematic diagram of the final-amplifier board. Unless specified otherwise, resistors are 1/4-W, 5% carbon types and capacitors are disc ceramic.

C8-C12 — 3- to 68-pF miniature trimmer.  
 D6 — 1-A, 50-V silicon diode, 1N4001 or equiv.  
 FB — Ferrite bead, Amidon FB101-43 or equiv.  
 J2, J3 — Binding post. Radio Shack 274-661 or equiv.  
 J4 — RCA style phono jack. Radio Shack 274-346 or equiv.  
 J5, J6 — Coaxial connector to match those used in station. SO-239 type suitable. Radio Shack 278-201 or equiv.

K1 — Two-pole, two-position relay with 12-V coil. Radio Shack 275-221 or equiv.  
 L7 — 8 ts. of no. 26 enameled wire on a T37-6 (yellow) toroidal core.  
 L8 — 4 ts. of no. 26 enameled wire on a T37-12 (green and white) toroidal core.  
 L9 — 1-1/2 ts. of no. 16 enameled wire. 1/2-inch ID, spaced one wire diameter with 3/16-inch leads. See text.  
 L10, L12 — 8 ts. of no. 24 enameled wire. 5/16-inch ID, 7/16-inch long. See text.

L11 — 8 ts. of no. 24 enameled wire. 5/16-inch ID, 1/2-inch long. See text.  
 RFC1 — 16 ts. of no. 28 enameled wire on an FT23-43 toroidal core.  
 RFC2 — 11 ts. of no. 26 enameled wire on an FT23-43 toroidal core.  
 RFC3 — 5 ts. of no. 24 enameled wire on an FT37-43 toroidal core.  
 S2 — Single-pole, two-position toggle switch. Radio Shack 275-662 or equiv.

to be assembled is the keying circuit, Q6.

### Final-Amplifier Board Assembly

Construction of the final-amplifier board is straightforward. Simply place the component leads on the circuit board and solder. Wire and test the driver (Q7) and the final amplifier (Q8) as a unit.

Mount Q8 on the board first. Bend the transistor leads so that they contact the circuit board along the full length of the

narrow part of the lead (see Fig. 2). Be careful not to allow the emitter or collector lead to contact the ground foil just in front of the transistor body. Bend the leads of Q7 so the bottom of the transistor case is no more than 1/8 inch above the board. Attach the heat sink to Q7 before you solder it to the circuit board.

You will find it helpful to tin the related foil area before attaching the lead. Use the parts-placement diagrams (Fig. 5) to

determine component orientation. Keep all lead lengths to a minimum.

The final amplifier circuit has four air-wound inductors. The shape of these coils is shown in Fig. 2. The easiest way to make L10, L11 and L12 is to use a 3/8 × 16 machine bolt as a winding form. If the wire is wound tightly in the threads, when the bolt is unscrewed from the winding, the coil will have the correct diameter and turns spacing.

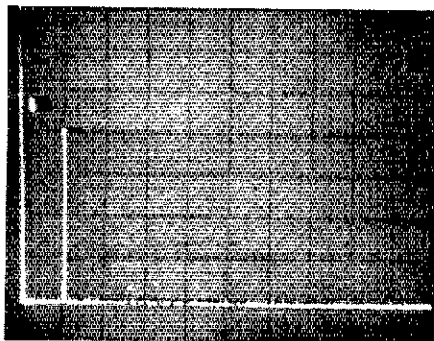


Fig. 3 — Spectral display of the transmitter output. Each horizontal division represents 50 MHz. The large pip at the left of the display is the zero frequency reference generated by the spectrum analyzer. Each vertical division represents 10 dB. In this display, the carrier has been attenuated by means of a notch filter to prevent overloading the analyzer. Effectively, the carrier is at full height. All harmonic and spurious signals are 60 dB or more below the carrier power, thereby complying with FCC regulations for commercial gear.

Complete the construction by mounting the circuit boards in the cabinet. Then wire the control switches and antenna relay. Check the TRANSMIT/RECEIVE (S1) and SPOT (S2) switch wiring carefully. With the crystal removed, measure the dc voltages under key-up, key-down and spot conditions. The correct values at various points in the circuit are shown in Table 1.

Turn off the dc power, replace the crystal and connect J6 to a 50-Ω dummy load. If a wattmeter or other power indicator is available, place it in the transmission line between J6 and the dummy load. Set capacitors C8 through C12 to the middle of the capacitance range. Apply power and, with S1 in the transmit position, close the key. With your rf probe at the base of Q8, adjust C8 through C11 for maximum output voltage. Now move the probe to J6 and adjust C12 for maximum output. Because the adjustments interact somewhat, you should repeat the alignment. Always tune for maximum output power. At the 10-W output level, the total supply current will be approximately 1.5 A.

To complete the alignment, adjust the tuning-limit capacitor (C2). Set the VXO tuning capacitor (C1) at minimum capacitance and adjust C2 for maximum capacitance. While monitoring the output power, adjust C2 toward minimum capacitance. The output should remain fairly constant until a point is reached at which it falls off rapidly. Increase C2 until normal output is obtained.

**Operation**

As on any band, the better your antenna the better your results will be. This does not mean that you need a 6-element beam at 70 feet to get good results. A 2- or

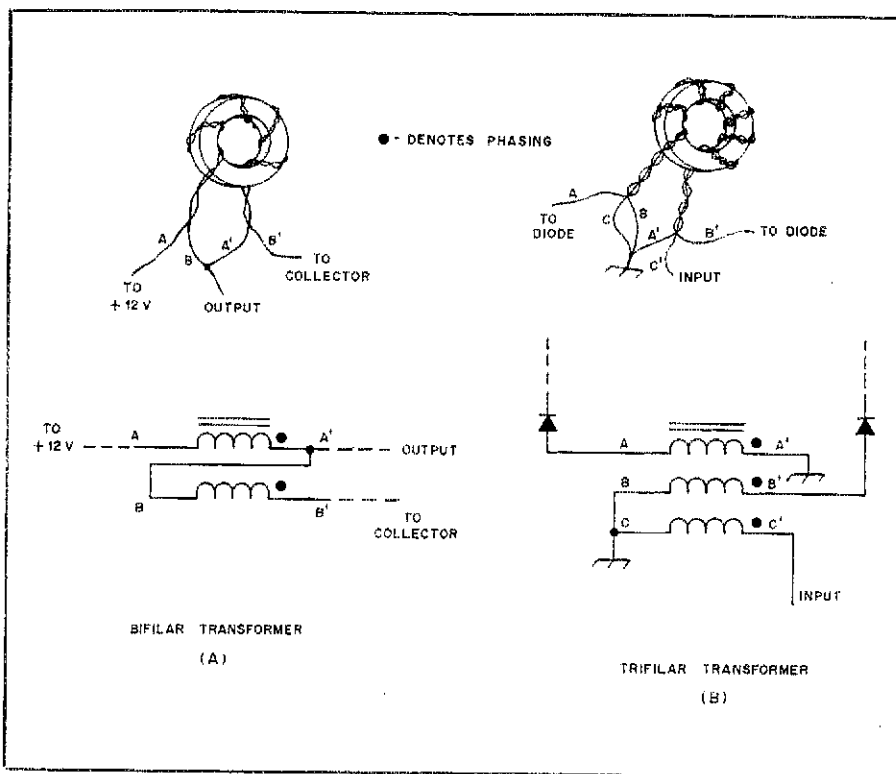
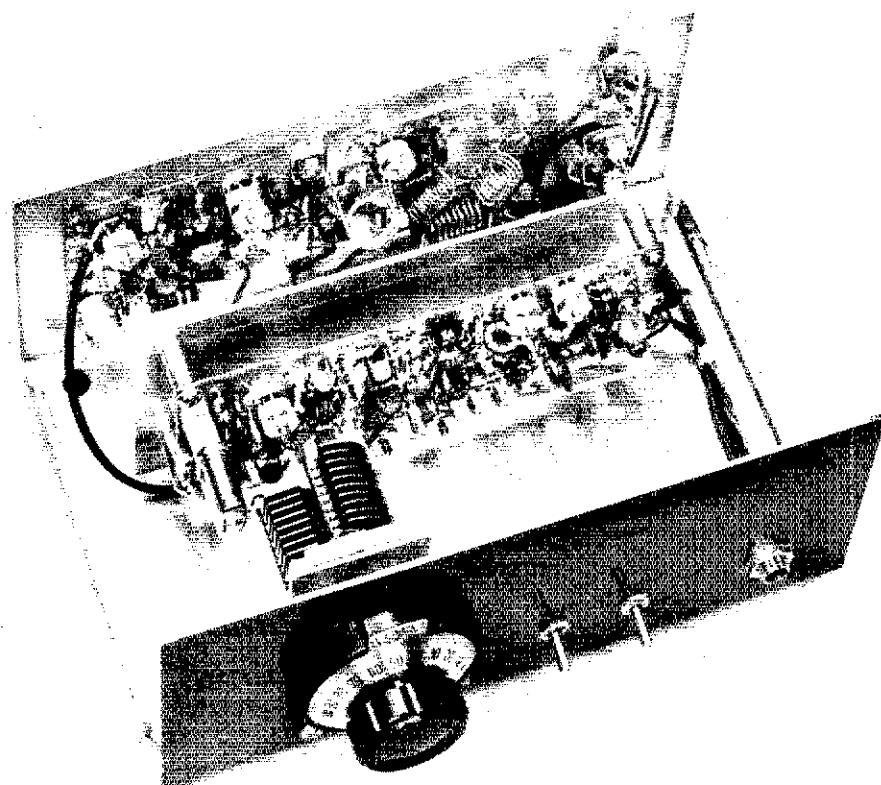


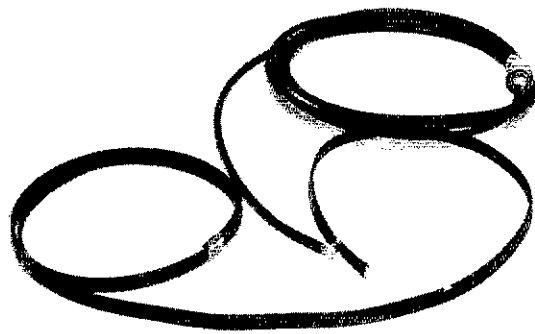
Fig. 4 — Several bifilar and trifilar transformers are used in this transmitter. The bifilar type is wound as shown at A, while the trifilar type is shown at B.



The transmitter is housed in a 3-1/2 x 7-7/8 x 5-11/16 inch metal cabinet. Any metal enclosure large enough to contain the two circuit boards and the relay can be used. Small aluminum brackets are used to mount the tuning capacitor and relay. Be sure to ground the shield braids at both ends of each coaxial cable used to connect the transmitter, relay and jacks.



# The 300-Ohm Ribbon J Antenna for 2 Meters: A Critical Analysis



Whip your rubber duck with a  $3/4\text{-}\lambda$  ribbon. This aerial will provide up to 20 dB of gain over a flex antenna.

By John S. Belrose,\* VE2CV

The vertical J antenna is an end-fed half-wave radiator. It is fed and matched by means of a quarter-wave line. Vertical half-wave antennas are particularly suitable for portable application since no ground plane is needed, and the radiation pattern is a maximum on the horizon.

A current-fed antenna, such as a  $1/4\text{-}\lambda$  or  $5/8\text{-}\lambda$  radiator, requires a ground plane. Such antennas, when operated over ground planes of finite size, frequently have radiation patterns that are tilted up.<sup>1</sup> These antennas can be designed to provide a maximum radiation on the horizon, but the patterns vary markedly with element length changes and the degree to which radiating currents may be kept off the outside of the coaxial-cable braid.<sup>2</sup> Fig. 1 shows how a quarter-wave coaxial choke, open at the top, can be used for this purpose. The  $1/4\text{-}\lambda$  radials also act somewhat like a choke to feed-line currents. Compared with the performance of a half-wave radiator, the gain of such a ground-plane antenna is  $-1.55$  dB. The input impedance is also low, less than half the impedance of a center-fed dipole. This is an advantage, however, since for the same power the current is higher. With proper design, the ground-plane antenna can be matched to a 50-ohm feed line. For example, if the antenna is resonant, the feed point can be moved up the vertical element until a matched condition is reached, without affecting the pattern.

Some insight can be gained concerning the differences between a half-wave radiator and a ground-plane antenna by considering the current distributions (Fig. 2). The  $1/2\text{-}\lambda$  radiator carries a symmetrical, in-phase current over its length,

with maximum current at the center of the radiator. Hence, the radiation pattern will be a maximum on the horizon. On the other hand, the current distribution on the ground-plane antenna is certainly not symmetrical, and current on the rods contributes to the pattern.

A quarter-wave antenna with no ground rods will exhibit a null on the horizon, even if feed-line currents are choked off. A  $1/4\text{-}\lambda$  or rubber-flex antenna on a hand-held transceiver is not the same as a monopole with no ground plane, because the chassis will act in part like the lower half of the antenna. There may not be a null on the horizon, but the radiation pattern is probably far from ideal. Besides, the radiation efficiency of a rubber-flex antenna is poor (the gain is said to be  $-6$  dBd).

Vertical J antennas employing sec-

tionized or telescopic elements have been designed for portable application.<sup>3</sup> This article concerns a roll-up and put-in-your-pocket J, which is rather convenient for portable applications. It is made from 300-ohm twin-lead.

## Theory of Operation

A 300-ohm ribbon J antenna is illustrated in Fig. 3. The quarter-wave matching stub and half-wave radiator are constructed from 300-ohm twin-lead. The stub length will be a free-space quarter wavelength times the twin-lead velocity factor (0.83). Currents on each half of the stub are  $180^\circ$  out-of-phase, and approximately equal in amplitude; hence, stub radiation is kept to a minimum. For the  $1/2\text{-}\lambda$  radiator the floating wire is closely coupled to the driven wire and carries in-phase current. The velocity factor for the ribbon is unimportant, but the antenna is shortened by the usual antenna factor (0.965). Find the free-space wavelength by using the equation

$$\lambda = \frac{300}{f(\text{MHz})} \text{ (m) or } \lambda = \frac{11,811}{f(\text{MHz})} \text{ (in.)} \quad (\text{Eq. 1})$$

The 50-ohm coaxial cable is tapped onto the line at an appropriate point to provide the required match. For portable use the antenna will operate satisfactorily without choking off current flow on the outside of the feed line, but if a long feed line is employed, as for example if the J antenna were used as a base-station antenna, a quarter-wave coaxial choke should be placed over the outside sheath of the cable. The  $1/4\text{-}\lambda$  choke will be open at the top and closed (connected to the cable sheath) at the bottom. For portable use, the electrical length of the feed cable should be an integral multiple of a half wavelength, so that if the J antenna is

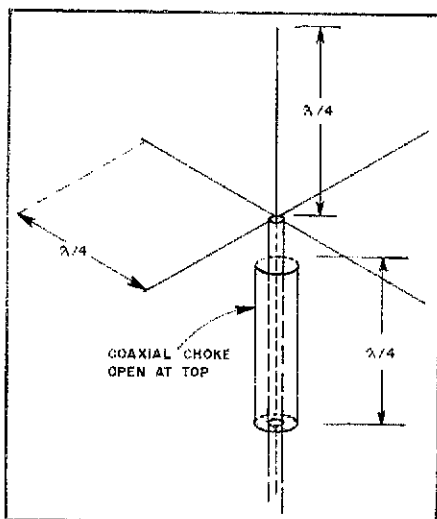


Fig. 1 — Diagram of a  $1/4\text{-}\lambda$  ground-plane antenna.

<sup>1</sup>Notes appear on page 45.

\*3 Tadoussac Dr., Aylmer, PQ J9J 1G1

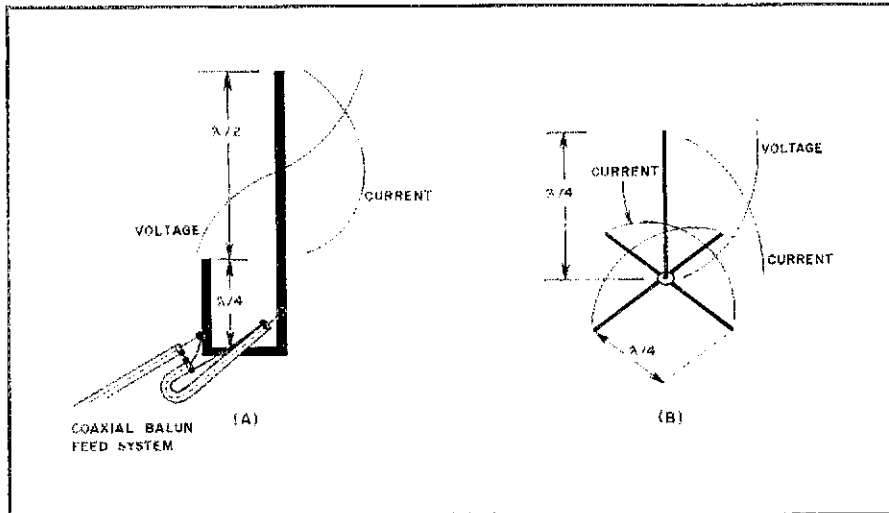


Fig. 2 — The voltage and current distribution on a J antenna is shown at A. The distribution on a ground-plane antenna is shown at B for comparison.

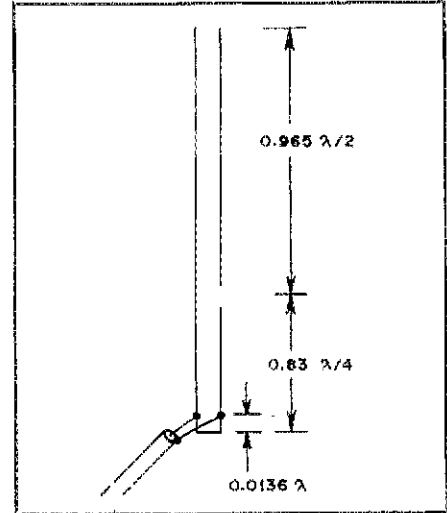


Fig. 3 — The construction details of a J antenna.

detuned because of its close proximity to metal objects, the feed line will not add additional reactance to the radiating system.

### Design of the Ribbon-J Antenna

In my initial design, I used a velocity factor of 0.8 in calculating the length of the  $1/4\text{-}\lambda$  stub. Belden 8230 ribbon was used. This resulted in an antenna that was resonant *above* the design frequency. An antenna cut for 147 MHz resonated at 152 MHz. While the antenna impedance could be changed by varying the length of the half-wave radiator, the resonant frequency of the coupled system, comprised of the radiator, the quarter-wave stub and the balun (or  $1/4\text{-}\lambda$  choke) could not be decreased to 147 MHz. The length of the stub exhibited a dominating influence over the resonant frequency of the antenna. The only frequency for which exact resonance could be achieved was 152 MHz. Clearly the stub length was too short.

By employing an effective velocity factor of 0.83, the antenna could be resonated at the design frequency. The impedance was measured with a Hewlett-Packard rf impedance analyzer, Model 4191A, and the impedance ( $Z$ ) and phase angle ( $\theta$ ) were machine plotted (Fig. 4). Note that at resonance ( $f = 147$  MHz), the input impedance is approximately 50 ohms, and that the impedance is higher and lower than this value for frequencies below and above resonance. The reactance is inductive on both sides of resonance (positive phase angle), and near  $0^\circ$  at resonance.

This variation of reactance is typical for a J antenna. For a conventional  $1/2\text{-}\lambda$  end-fed radiator, the antenna will exhibit an inductive reactance below and a capacitive reactance above resonance.

Dimensions for a design frequency of 147 MHz are given in Table 1. The tap point, measured from the shorted end of the  $1/4\text{-}\lambda$  stub, corresponds to  $0.0136\lambda$  (or 5 electrical degrees).

The graph of Fig. 4 also shows the voltage-reflection coefficient  $|\Gamma|$ , which is near zero at resonance. Since

$$SWR = \frac{1 + |\Gamma|}{1 - |\Gamma|} \quad (\text{Eq. 2})$$

the bandwidth defined by an  $SWR < 2$  can be read from the graph. For  $|\Gamma| < 1/3$ , this bandwidth is 4 MHz ( $\pm 1.4\%$ ). For the design dimensions given in Table 1 the  $SWR$  will be less than 1.5 ( $|\Gamma| < 0.2$ ) from 146 to 148 MHz.

### Performance

For 2-meter operation this antenna will significantly increase

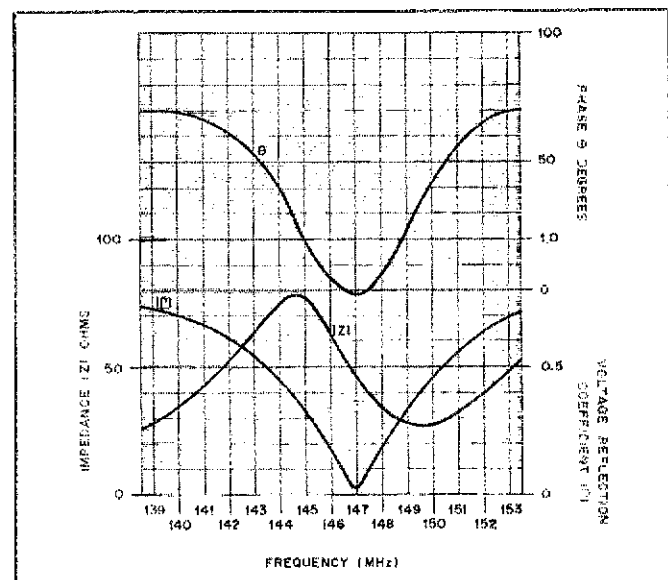


Fig. 4 — A graph of phase angle ( $\theta$ ), impedance ( $Z$ ) and voltage-reflection coefficient ( $|\Gamma|$ ) vs. frequency from a J antenna designed for 147 MHz.

Table 1  
Design Dimensions of a 300-Ohm Ribbon-J Antenna for 2 Meters

Design Frequency (MHz)	Length of $1/4\text{-}\lambda$ stub (inches)	Length of radiator (inches)	Tap Distance (inches)	Gap Distance (inches)
147	16-39/64	38-25/32	1-3/32	15/64

mm = inches  $\times$  25.4


the range of your portable rig. A half-wave antenna is the type most suitable for use with a hand-held transceiver where there is no ground plane. In the forest, the antenna can be hung from the branch of a tree, providing an effective gain of up to 20 dB over a rubber flex antenna at ground level. For the hiker, it can be supported by a lightweight bamboo rod attached to your pack board. In this application, the J antenna will provide a gain of 6 dB or more over a rubber flex antenna. Indoors

you might hang the J antenna from the drapery rod in front of a window — but beware. The aluminum frame surrounding some windows can be resonant at about 2 meters, and this resonance will detune your antenna and alter the pattern.

Some amateurs have constructed ribbon-J antennas for use in a base-station application. In such a situation the antenna could be installed inside a PVC-plastic tube. The 300-ohm ribbon will fit nicely inside a 5/8-inch white plastic water pipe, and an end cap can be fitted to provide a waterproof radome. If you construct such an antenna, the freespace dimensions should be reduced (multiply

by 0.95), since the dielectric constant of the tube reduces the resonant frequency of the antenna. The J antenna should not be used without a balun for base-station application, where the feed line is long. A quarter-wave choke could also be used to minimize feed-line currents.

While a J antenna can be operated without a ground plane, this is not to say that it cannot be used with advantage above a large flat conducting surface, such as a car roof. The half-wave radiator and its image in the ground plane are separated by one wavelength (center to center) when the shorted stub is placed flush to the roof. This is the optimum

separation for collinear  $1/2\lambda$  elements, and the theoretical maximum gain is 3.27 dBd. Try tying your ribbon-J antenna to a bamboo rod lashed to the luggage rack on the roof of your vehicle. 

#### Notes

<sup>1</sup>O. R. Foster and T. Miller, "Radiation Patterns of a Quarter-Wave Monopole over a Finite Ground Plane," IEE Conference Pub. No. 195, 1981, *Antennas and Propagation*, Pt. 1, Antennas, pp. 451-455.

<sup>2</sup>W. V. Tilston and A. H. Secord, "The Radiation Patterns of Ground Rod Antennas," *Electronics and Communications*, August 1967, pp. 27-30.

<sup>3</sup>J. S. Belrose, "Vertical J Antenna for 2 Metres," *TCA*, July/August 1979, pp. 23-26.

## New Books

□ *Morse Code, Baudot and ASCII Radioteletype Programming for the TRS-80 Models I and Models III*, by Bob Richardson, W4UCH. Published by Richcraft Engineering Ltd., No. 1 Wahmeda Industrial Park, Chautauqua, NY 14722. First edition, 1981, spiral-bound, 8-1/2 × 11 inches, 276 pages, \$18 plus \$2 shipping.

Here is a book written for the radio amateur or computer hobbyist that will "turn the hair white" of those firms that have been selling Morse code and radioteletype assembly language programs in the \$149 and up (mostly up) category. At a bookstore price of \$18, here is what you will receive:

Chapter 1 — 8-800 (wpm) transmit programs; chapter 2 — Adding type ahead capabilities; chapter 3 — Morse receive decoding program; chapter 4 — Merging above programs - 12 prepared messages; chapter 5 — Baudot transmit program 60, 66, 65 and 100 wpm; chapter 6 — Baudot receive program (for above speeds); chapter 7 — Merging above programs - 22 prepared messages; chapter 8 — ASCII transmit program 110 baud (300 optional); chapter 9 — ASCII receive decoding program; chapter 10 — Merging above programs - 22 prepared messages; appendix 1 — LPRINT 64 characters/line using the EDTASM; appendix 2 — Model I to Model III I/O interface adaptor; appendix 3 — RTTY frequency diversity — the SELCOMP system; appendix 4 — Begin LPRINT assembled object code at any line; appendix 5 — Software generation of 2125/2295 audio tones; appendix 6 — RTTY speed tester — 60, 66, 75, 100, 110, 300; appendix 7 — Modifying the Flesher TU-170 for 300-baud ASCII.

As a modestly experienced assembly language programmer, I found the expanded commentary in each chapter and the full-printed-out OBJECT CODE and SOURCE CODE with comments for each program extremely helpful in under-

standing the program logic and flow. These programs are definitely *not* for the beginning assembly language programmer, who must at least learn the difference between a JR and JP instruction.

The author has simplified the program flow by using only the minimum JUMPS necessary. Programs have been designed so that once loaded from cassette/disk, the radio amateur unfamiliar with the TRS-80 can master their operation with minimal practice.

Chapters 1-4 describe how to generate perfectly timed Morse code. For transmit speed, one simply inputs the words per minute desired. For receive speed, the operator is asked to input *two* numbers that correspond to dot length and typical space length.

Chapters 5-7 are worth five times the price of the entire book. Having been a radioteletype buff for many years, I've finally "found a home." Gone are the whirring and clanking machines of times past. All the operator need do is tell the program the equivalent Baudot speed desired, and most everything else is automatic. The CLEAR key on the keyboard is the T-R switch.

Chapters 8-10 are similar to chapters 5-7 *except* for 110 baud, 8-bit, ASCII code instead of 5-bit Baudot code. If you study and ENTER the programs in chapters 1-10, you will have mastered a number of very difficult subjects. None of the programs in the volume requires the RS-232C interface unit to be installed in the Model I or the Model III because they generate their own UART in software (serial-to-parallel and parallel-to-serial conversion). And, for the programs in chapters 5-10, a digital port interface (such as the Design Solution AN-511, Telesis VAR/80 or Alpha Product Interfacer 2) is required. All will work with or without the expansion interface on the Model I, and *all* work with the adapter on the Model III. Appendices 1-7 cover:

1) *EDTASM* grabs most all MEM available. This program details an interesting approach to writing a mini-program in low MEM. Your line printer

prints out 64 characters and/or spaces per line.

2) Covers an adaptor to allow the use of most any Model I ancillary-port-operated device (40-pin connector) with the Model III TRS-80 (50-pin connector).

3) Is a modification of the unique SELCOMP (selective compensation) RTTY decoder that allows selective fading of either the MARK or SPACE signal *without* losing received data.


4) Ever wish you could start LPRINTING an EDTASM program being assembled at any line *without* starting at the beginning? This simple 39-cent modification may be installed in about 10 minutes.

5) This demonstration program allows you to generate the 2125-Hz radioteletype MARK tones and 2295-Hz SPACE tones with software rather than a terminal unit (TU).

6) Here is a short program that prints out the speed in equivalent wpm of any Baudot radioteletype signal being received — 60, 66, 75 or 100 speed. It also tests for 110- or 300-baud ASCII RTTY.

All programs are divided into individual TRANSMIT, RECEIVE and COMBINED chapters to allow the reader the opportunity to assimilate the concepts being presented in reasonably sized bites. The programs may be used as is, by inserting only your call sign, name and address in the appropriate prepared message locations with the Radio Shack Editor/Assembler.

All three transmit/receive programs are available on two 35-track disks, though this book is also required for operating instructions. On special order, Richcraft will insert your call, name and address in the proper locations of all three transmit/receive programs for Morse, Baudot and ASCII RTTY.

The appendices are extremely useful. Volume 4 deserves an excellent rating and should be invaluable to any microcomputerist who wishes to understand the concepts of code conversion and use the versatile TRS-80 in the expanding field of modern telecommunications. — *William M. Laird, W2CIX/3* 

# Technical Correspondence

Conducted By  
Peter O'Dell,\* KB1N

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

## TIPS ON THE F6CER I-F STRIP

□ I'd like to make a number of comments regarding the August 1981 *QST* article, "A Universal MOSFET I-F Amplifier." One comment is on the adjustment of  $I_{dss}$  for the three MOSFET devices. This appears to be either a typographical error, on a translation error, since  $I_{dss}$  is a characteristic of a particular MOSFET and not something to be adjusted. What was meant was  $I_D$ , drain current, should be adjusted. I strongly disagree with the current levels of 10 mA to 12 mA stated in the article. The RCA data on the 40673 shows a typical  $I_{dss}$  of 15 mA. For maximum dynamic range the amplifiers should be biased at a little less than half  $I_{dss}$ . A convenient operating point for the 40673 is a drain current of 5 mA with a gate 1-to-source voltage of  $-0.7$  V dc. In the i-f amplifiers this could be accomplished by changing the 47-k $\Omega$  resistors in the gate-1 circuits to 20 k $\Omega$ . Lowering the quiescent drain currents also will help if the MOSFETs used are not "typical" and have  $I_{dss}$  values lower than 15 mA. The only drawbacks of rebiasing the amplifiers in this way is that the lower drain current will decrease  $g_m$  from 12 mS to 10 mS, and the signal load will decrease. Both will cause the gain of the i-f strip to decrease slightly.

The agc-bus circuit could be simplified by eliminating networks. These serve no purpose, since gate 2 of each MOSFET has a 2.2 k $\Omega$ /0.01- $\mu$ F decoupling network, which should be entirely adequate. Adding a small 100-pF capacitor to the three gate 2s should be done to provide a good bypass in the upper vhf and lower uhf ranges. At these frequencies the 0.01- $\mu$ F capacitors are beyond their self-resonance, and with the MOSFETs having a gain beyond 400 MHz, a good bypass to ground is needed. The smaller-value capacitor in parallel with the larger 0.01- $\mu$ F unit will provide the stability needed. Other methods mentioned in *Solid State Design for the Radio Amateur* include putting a ferrite bead on the gate-2 lead of the MOSFET to prevent instability in the vhf or uhf regions. Eliminating the 100  $\Omega$ /0.01  $\mu$ F decoupling network on the output of U2 eliminates the possibility of the capacitance causing the operational amplifier to oscillate. The 100- $\Omega$  resistor will help isolate the capacitive load from the amplifier output, but it may not be enough for all 741s.

Some typographical errors should also be noted. The resistor used to provide the source voltage of Q1 in conjunction with D1 should be 2.2 k $\Omega$ , not 220  $\Omega$ . The description of the agc operation was reversed. The output of U2 will be 0 V at full receiver input level, and 8 V with no signal input, and not the reverse as stated in the article. The adjustment of the agc characteristics can be done by adjusting R3 and R5, not R3 and R4 as stated in the alignment section.

The last comment about the article would be that it did not emphasize how critical the shielding is to proper operation, and the filter

feedthrough capacitors shown in the photographs. With the circuit having a gain of 110 dB, the shielding between input and output should be at least 120 dB. The construction and integrity of the shielding and grounding must be very good to obtain this figure when all the gain is on one relatively small printed-wiring board. While the box is shielded, three signals pass through. The two S-meter lines and the 12-V supply are brought through the enclosure shield via filter feedthrough capacitors. These components have built-in ceramic capacitors that provide excellent bypassing of signals up through the microwave range. With all the gain in the i-f amplifiers, this bypassing of input and output leads is absolutely necessary. Imagine how little BFO signal energy would be needed on the power bus to cause the i-f amplifier to go into age! The feedthrough capacitor performance could be improved by using inductors in the three signal lines to provide decoupling action rather than just bypassing. Another technique would be to run the BFO on a different supply than the i-f strip. This would help prevent leakage from getting in through the power bus.

Going over the foregoing comments caused me to read Wes Hayward's original description of "A Competition Grade CW Receiver" in the March and April 1974 issues of *QST*. Two more comments are in order. The first is to provide a signal return for the drain load of Q4. A 0.1- $\mu$ F capacitor from the supply side of the 470- $\Omega$  resistor should be satisfactory. The second is that Q5 in combination with U2 *do not* form the familiar control circuit used by W7ZO1 and W1FB. The circuit in the high-performance receivers uses the FET source follower as a unity-gain buffer to the non-inverting input of the operational amplifier. The inverting input is used to set the amplifier gain and provide a manual i-f gain control. The F6CER circuit uses the noninverting operational amplifier input to set the i-f output signal level. The output impedance of the source follower sets the gain of U2, which makes the gain dependent on the  $g_m$  of the FET. These differences should be considered when integrating the i-f strip into a receiver.

The comments should help make the construction, testing and operation of the i-f strip easier for those getting into hardware building.  
— Mal Crawford, K1MC, Lexington, Massachusetts

## DECOUPLE VHF VERTICALS

□ Improper decoupling of transmission lines from vertical antennas mounted above ground can destroy the predicted radiation patterns. I built W1FB's 5/8-wave antenna (June 1979 *QST*) for 2-meter fm service and erected it a few feet above my roof. The performance did not meet my expectations — it was scarcely better than a quarter-wave ground-plane.<sup>1</sup>

<sup>1</sup>The W1FB design was developed for mobile use, which provided a ground plane by virtue of the car body. The feed line was therefore contained within the ground system.

After researching the subject, I concluded that current was flowing on the outer conductor of the coaxial feed line. This current produced fields that interacted with the antenna fields, resulting in an upward deflection of the radiation lobe, which meant degraded performance.

I built the decoupling network shown in Fig. 1 and added it to the original antenna. Now the feed line goes through the TV mast and attaches to the bottom of the antenna. It is essential that a good mechanical and electrical connection be made between the braid (antenna ground) and mast top. Instead of attaching the radials to the loading coil base, I mounted them on the mast with a hose clamp at a point 5/8-wavelength below the loading coil. In a similar fashion, I affixed a second set 1/4-wavelength below the first.

Although I expected some improvement in performance, I was pleasantly surprised at the difference in received signal strength. A station located approximately 10 miles (16 km) away acts as a control for a MARS net on 143.99 MHz (simplex). Before adding the decoupling circuit, I could barely copy him. After the addition, his signal consistently fully quiets the receiver and pins the S meter on my Heath VF-7401. He reports a similar improvement in my transmitted signal strength.

In the present configuration, the antenna would be described as an extended double Zepp. The name is not important, but improved performance is. Because the fields pro-

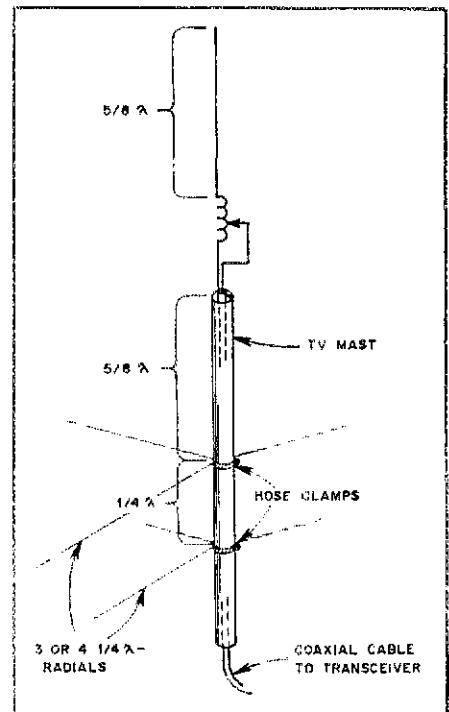


Fig. 1 — The supporting mast becomes part of the decoupling network.



duced by feed-line radiation vary from one installation to another, the amount of improvement after decoupling will also vary. If you are not getting the performance from your vhf vertical that you expect, you may want to add a decoupling system. The improvement may surprise you. — Peter O'Dell, KBIN

## THOUGHTS ABOUT THE WA2ANU SWR INDICATOR

□ Dave Geiser's "Human Engineering the SWR Indicator" (Technical Correspondence, *QST*, June 1981, page 38) covered some interesting approaches to reading convenience. However, there is a 1-meter circuit which is not only more economical than the 2-meter version, but which makes tune-up virtually error-free for maximum power transfer and minimum SWR.

The circuit, for which I claim no originality, is shown in Fig. 2. As compared with the conventional SWR meter, it requires only two additional resistors and a three-position, instead of a two-position, switch. When the switch is in either the FWD or REFL position, the meter will provide the conventional indication of forward or reflected power, respectively, proportional to the voltage drop across R1 or R2. When the switch is set to DIFF (differential), the meter reading is proportional to the differential voltage across R1 and R2 in series.

If an infinite SWR is assumed, along with matched diodes in the SWR bridge, and matched resistors (R1 and R2), the reflected power will be equal to the forward power. Therefore, the voltage drops across R1 and R2 will be equal, resulting in zero meter current. If the SWR is unity, there will be no reflected power, so that the voltage drop across R2 will be zero and the meter reading will be proportional to the forward power. At any SWR between unity and infinity, the meter reading will be proportional to the forward power minus the reflected power.

Even if the diodes and/or resistors are not perfectly matched (resulting in some error), adjustment of an antenna or matching unit is simplified to a procedure that yields maximum meter current when the switch is set to the DIFF position. Maximum power transfer into the load is also indicated by maximum meter current. — Robert S. Stein, W6NBI

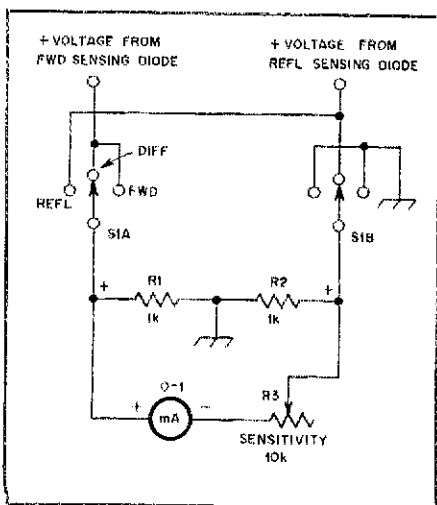


Fig. 2 — Schematic diagram of the SWR Indicator.

## POWER VERSUS ENERGY

□ The letter in December 1980 *QST*, page 56, from Mr. J. T. Kroenert, responding to "The Imperfect Antenna System and How it Works," takes issue with the author's statement, "In reality, power does not travel down the line." I feel that Mr. Kroenert and the article author are using different definitions for the word "power," and each is correct in his respective understanding of the word.

In everyday conversation we use the word "power" in statements like: "A power plant generates power and supplies it to the power line. My transmitter supplies power to the transmission line. The power travels down the line to my antenna."

In each of these statements the speaker is talking about something he calls "power" being generated, transferred, traveling and being used. The listener, upon hearing these statements, visualizes something being generated, transferred, traveling and being used, and this is as it should be, because the speaker intended him to visualize this. From the physics-book standpoint, however, the word "power" should not have been used in these statements. More correctly the speaker should have said: "A power plant generates electrical energy. My transmitter supplies electrical energy to the transmission line. The electrical energy travels down the line to my antenna."

The physics book defines "power" as the rate of doing work. In electricity and electronics, this work is done when a transition of electrical energy takes place. When electrical energy is being translated into heat energy in a resistor, tube or transistor, "work" is being done, and the rate at which it is being done can be expressed as so many watts of power. Thus, power is not something that can move around, but is just a statement of how fast something (the electrical energy) is changing.

Since the word "power" expresses a rate of transition of energy, it would seem quite appropriate to refer to the rate of movement of energy down a transmission line as power. Thus we could say that "the electrical energy is flowing down my transmission line at the rate of 50 watts. It is being radiated by my antenna at the rate of 40 watts," or whatever. When we say that the forward power and the reflected power are so much, we are actually talking about the rate of flow of the forward and reflected electrical energy; however if, in our everyday conversation, we visualize the "power" as being the electrical energy, we are using our everyday definition of the word "power."

To say that "50 watts is moving down my transmission line" is like saying that "50 miles per hour is moving down the highway." Actually it is my automobile that is moving down the highway at the rate of 50 miles per hour!

I see nothing wrong with using the word "power" to mean electrical energy, as long as we understand it that way and recognize the difference when someone uses it according to the physics book, as did Mr. Gibilisco in his article. — Charles W. Simonds, W5NEN, Norman, Oklahoma

## NOTES ON TOWER-ERECTION PHYSICS

□ In July 1981 *QST*, Peter O'Dell, KBIN, in his article "The Ups and Downs of Towers," states that "walking up" hinged towers should

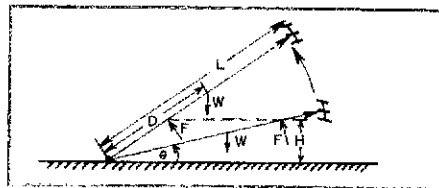


Fig. 3 — Pertinent factors related to "walking up" a hinged tower.

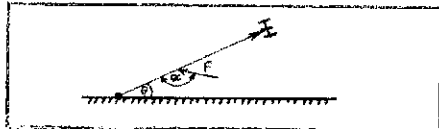


Fig. 4 — Illustration of the application of factor F in tower erection.

be avoided unless one has a good grasp of the physics involved. I would like to support this statement by presenting a simple derivation of the forces involved in walking up a hinged tower. Consider a hinged tower of length L and weight W and whose center of gravity is located a distance (D) from the base, as shown in Fig. 3.

Suppose that a force (F) is applied perpendicular to the length of the tower at a constant distance (H) from the ground, which would be the case in walking up a tower from a horizontal to a vertical position. Let  $\theta$  be the angle the tower makes with the horizontal. Applying the concept of torque for any angle  $\theta$  we have:

$$WD \cos \theta = FH / \sin \theta, \text{ which may be written}$$

$$F = WD \sin 2\theta / 2H$$

Therefore, for any angle  $\theta$  between arc sin (H/L) and  $90^\circ$  the force required is given by

$$F = WD \sin 2\theta / 2H$$

This equation clearly shows the difficulty in walking up a hinged tower, because the force becomes a maximum at an angle of  $45^\circ$ . For example, if a 50-foot tower, weighing 200 lb and having its center of gravity located 27 feet from the base, is pushed up from a point 6 feet above the ground, then at  $45^\circ$  the force required will be 450 lb, which is more than twice the weight of the tower! The horizontal and vertical components of the force that the hinge exerts on the tower are given by  $F \sin \theta$  and  $W - F \cos \theta$ , respectively. The total force that the hinge bolts have to exert is given by

$$\sqrt{F^2 + W^2 - 2FW \cos \theta}$$

If F is applied to the tower at any angle  $\alpha$ , as shown in the Fig. 4, the equation for the required force becomes

$$F = WD \sin 2\theta / 2H \sin \alpha$$

which shows that, at an angle of  $90^\circ$  or normal to the tower, the force is most effective in producing rotation about the hinge. However, walking up a tower in practice usually means that angle cannot normally be held at  $90^\circ$ , which compounds the difficulty. For a given tower the force (F) can be minimized only by increasing H, the distance from the ground to the point of application of the force.

Therefore, from the physics of the problem, I can only reiterate Mr. O'Dell's words of caution before erecting a hinged tower. — Robert Larson, KA0GQV, Fenton, Missouri

## Robot 800 Specialty Mode Terminal

"Silent RTTY" is well entrenched and growing every day. If you've never experienced this exciting mode of communication, you're missing a lot of fun. With a unit such as the Robot 800 and a video monitor, you can open a new range of communications experiences to yourself. RTTY (Baudot), ASCII, cw and SSTV character generation are at your fingertips.

The Robot 800 is designed to send and receive 850- and 170-Hz shift RTTY at speeds of 60, 66, 75, 100 and 132 wpm, Morse at 1 to 99 wpm, and ASCII at 110 baud. It also acts as a character generator for SSTV, but a unit such as the Robot 400 is required for complete SSTV operation. A video monitor (not available from Robot) is required to complete the system.

### Physical Sketch

The 4 × 15.5 × 10.25-inch<sup>3</sup> (HWD) unit weighs 10 pounds. A rugged, two-piece, two-toned (dark gray and white) sloping keyboard cabinet houses the Robot 800 electronics, which are mounted on a neatly arranged, double-sided, glass-epoxy circuit board. The unit certainly appears to have been built to last, providing years of trouble-free service.

Interface between man and machine is by means of a rear-panel mounted ON/OFF switch, SIDETONE and afsk OUTPUT level controls, a top-mounted input level control, and the 55-key keyboard. All control functions, alphanumeric and special character generation are implemented from the keyboard, which has a touch I found quite comfortable.

Machine-to-machine connections are made from the rear panel. Each Robot 800 is supplied with four cable assemblies to permit quick and easy equipment interconnection. Two three-circuit jacks provide CW KEYING and TO XMITR (afsk) outputs to the transmitter. Phono jacks are used for fsk output keying (TTY LOOP), receiver audio input (FROM RCVR), and SCOPE MARK and SPACE outputs that may be connected to a scope used as a tuning indicator. A female BNC (TO MONITOR) connector links a video monitor to the '800. The AUX OUT jack is used with the Robot 400 SSTV scan converter. A ground terminal, ac line cord and fuse holder are also located at the rear of the unit.

### Electronics

The Robot 800 is a "dedicated computer"; a microcomputer that is designed for a specific application. For those "into computers," the '800 uses an 8085A  $\mu$ P, supported by 6144 bytes of ROM and 2560 bytes of RAM. An 8251 USART is used for serial I/O and 8155s for parallel I/O and keyboard interfacing.

The built-in TU (terminal unit) employs active filters. These are constructed using low-cost 1458 dual op amps. Following the input



level control is a high-pass/low-pass filter combination. Only the high-pass filter section is used during 850-Hz shift RTTY reception. A limiter, separate mark/space discriminators for 850- and 170-Hz shift, full-wave rectifiers, tuning indicator, low-pass filter, ATC (Automatic Threshold Computer) and slicer sections follow. A sidetone oscillator for monitoring and certain signaling applications and a sine-wave synthesizer for afsk generation are also included.

### In Operation

As is typical of many Amateur Radio stations today, a transceiver is used at N1FB. Baudot (using afsk and fsk), cw and ASCII were employed, Baudot quickly becoming a favorite mode.

### CW

I haven't used a machine yet that could match the human ear/brain combination for copying cw under all operating conditions. The Robot 800 was no exception. When copying machine-sent cw with good reception conditions, the '800 performed well, but for the most part, I relied on "head copy" while using the keyboard for transmitting.

The RTTY mark channel filter (1275 Hz) is used by the Robot 800 when copying cw, and though the passband is narrow (about 70 Hz), the transceiver must be operated with the MODE switch in the LSB or USB position. Because the ssb filter must be in the i-f chain in order to

pass the 1275-Hz tone required by the '800, it compromises the station operation in a couple of ways. First, while the narrow passband of the mark channel audio filter can protect the '800 from unwanted audio frequencies, the bandwidth of the ssb filter is about four times as great as that of the cw filter (500-Hz cw filter being used). This allows unwanted signals to get to the i-f stages of the receiver section and degrade overall receiver performance. Second, some transceivers automatically insert the cw filter when the transceiver MODE switch is in the CW position; there is no narrow/wide selection switch. This means that the operator must continually switch between the CW and USB MODE switch positions when going between transmit and receive because the transmitter cw keying circuit is deactivated in the ssb mode.

Another anomaly noted was the extended word spacing that occurs when an end of line is reached. A carriage return/line feed is automatically generated by the microcomputer, and this causes a slightly exaggerated word space at that point. But the CR/LF is a necessity for machine-to-machine copy and shouldn't unduly upset an operator copying by ear.

### ASCII

Few ASCII stations were noted on the air. Some that were heard couldn't be copied because their transmission speed exceeded the 110 baud rate of the '800. Copying ASCII is fun — the characters stream from left to right

<sup>1</sup>mm = in. × 25.4; kg = lb × 0.454

\*Assistant Technical Editor

across the screen quickly and smoothly. It's another story when it comes to transmitting, however! Unless you're a terrific typist, the 511-character transmit buffer will empty before you know it and you're back to transmitting at whatever speed your typing skill permits. For me, that's about 50 wpm. And since I had no specific reason to use ASCII, I "QSYd" to RTTY, where the predominantly used speed of 60 wpm more closely matched my typing speed.

#### RTTY

Some transceiver models permit switching between fsk and afsk transmission with a flick of the mode switch. I set my unit up that way, preferring to use afsk because of the MONITOR feature my transceiver employs. This enables me to keep a constant check of the output tone quality while monitoring the transmitted waveform on an SB-610 scope. The FSK position of the transceiver was used only when QRM was rough and the narrower passband of the cw filter was desired.

I felt (as did some other Robot owners to whom I spoke) that a transmit buffer capacity of double that available (511 characters) would be most welcome. However, there is also a tie-in with the video display, which will show only 11 lines of transmit text, no matter how full the buffer is. The same memory is used for the screen display and transmit buffer. If the screen is called to present all received text, any information that may have been stored in the transmit buffer is erased.

Another instance in which the buffer is erased is when any transition is made from receive to transmit and back to receive again *without transmitting the text* (two ESCAPE key depressions). The '800 is fooled into thinking that the transmit buffer has been called to empty, when in actuality nothing has been transmitted.

Tuning in an RTTY signal is simple. You merely adjust the receiver/transceiver tuning control for maximum deflection of a bar in the upper left-hand corner of the screen. No external tuning scope is required although mark and space channel outputs are provided for that purpose on the rear panel.

I never ceased to be amazed at the ability of the Robot TU to copy RTTY signals that I could hardly discern by ear! Rapid QSB was the greatest enemy of perfect reception, otherwise it appeared as though little could deter the Robot from the assigned task of copying a desired incoming signal. On many occasions, very strong adjacent signals would literally "bury" the desired signal, but the Robot kept on printing to the screen as if nothing had changed.

Two 64-character message memories make a convenient place to store short, oft-repeated messages such as your call sign, name and location for inclusion in a CQ. A separate i-d message memory can be called to identify the station, but the transmission speed of the cw i-d during RTTY operation cannot be altered; it is fixed at about 16 wpm.

#### General

The instruction manual that accompanies the Robot 800 is a vinyl-clad loose-leaf three-ring binder. It is well written and includes schematic diagrams of the unit. Some resistor values used in the TU were not noted on the diagram, perhaps because they are used for trimming the discriminators. Parts lists, a quick reference guide for the keystrokes required to make the

'800 perform (too many to list here), and an addendum that notes the parts value differences between the low-tone model 800 and high-tone model 800H are included. Block diagrams and a complete technical description of the terminal unit aid the owner in understanding the operation of the Robot 800.

The low-tone model 800 uses 1275-Hz mark and 1445-Hz space tones for 170-Hz shift, and a 2125-Hz space tone for 850-Hz shift on RTTY. An 800H high-tone pair model is available that uses tone frequencies of 2125 Hz for mark and 2295 Hz for space with 170-Hz shift, with a 2975-Hz space frequency for 850-Hz shift.

There are more features to list than space allows, but some of these are: A Morse trainer that sends random 5-letter groups at selected speeds from 1 to 99 wpm, keyboard-operated transmitter control (KOX), on-screen status and tuning indicators, unshift on space, automatic carriage return/line feed, "RY" and "Quick Brown Fox" test messages, and 8-character programmable WRU (Who aRe yoU) and SELCAL (SElective CALLing) codes. Using the continuous line or word transmit modes and the editing feature can make your transmissions smooth and errorless.

Each display line contains 72 characters, with 11 lines devoted to received text and 11 lines to transmit text when using the split-screen mode. In the full-screen mode (deleting the status indicator and divider lines), 24 lines of text are presented. Word wrap-around prevents the awkward splitting of words at the end of a line.

Early models of the Robot 800 did not have the split-screen feature. If you own one of those units, you'll be pleased to know that it may be retrofitted at the factory for \$40 plus shipping charges.

#### Summary

If you've never used a terminal like the Robot 800 or have never operated RTTY or ASCII, I'd recommend a little off-the-air practice beforehand — if not for your sake, for the other guy's! Try to eliminate as much of the "cockpit error" as you can before generating any rf energy. The quick-reference keystroke guide can be removed from the instruction manual and placed conveniently nearby to help you.

I thoroughly enjoyed using the '800. It provided me with hours of trouble-free enjoyment. Not once did it glitch, even when an unenclosed 1-kW amplifier was being used. If you want more information, contact Robot Research Inc., 7591 Convoy Ct., San Diego, CA 92111. Price class: \$800. — Paul K. Pagel, N1FB

#### WILSON SYSTEMS, INC. SYSTEM 40 TRIBANDER

□ Within the past few years, several antenna manufacturers have introduced large tribanders. The Wilson System 40, with 10 elements, the longest of which is 36 ft,<sup>2</sup> certainly ranks as one of the most imposing! The antenna arrived packed in two long, heavyweight shipping cartons, and ideas of "instant Yagi" were speedily revised! Twenty-three hours later, after following the instructions in Wilson's thorough assembly manual, the System 40 was ready to go aloft at AC1Y. It

is worth noting that much of that time was spent in inventorying the hundreds of bolts, nuts and washers that hold the antenna clamps together. The extra effort was worthwhile, permitting smooth assembly.

#### Mechanical and Electrical Details

The System 40 is not a typical tribander. Rather it may be described as two antennas interlaced on a common boom. The first antenna is a full-sized, 4-element, 20-meter monobander; the second antenna is a 6-element trap duobander for 15 and 10 meters. There are four active elements on 15 and five on 10. The feed system is formed by a beta match driving the 20-meter and 15/10-meter driven elements in parallel. An rf choke, supplied by Wilson, is a coil of RG-8/X coaxial cable encased in a heavy plastic tube.

The antenna element sections have slots for ease of assembly, and sturdy compression clamps secure the telescoped sections. Polypropylene rope supplied in the kit is not for use with a gin pole! Appropriate lengths of the rope are cut for each untrapped element half and inserted therein during assembly. The rope within the elements serves to damp wind-induced vibration, and helps to prevent premature weakening and structural breakdown of the aluminum. A large plastic envelope containing conductive grease was supplied with the antenna to facilitate assembly and to ensure future electrical continuity. This compound is very often missing from antenna kits; it definitely prolongs the useful life of the antenna.

Wilson rates the System 40 at 12.1 sq. ft of surface area with a finished weight of approximately 75 lb. Power handling capability is 2 kW PEP input. A Yagi of this size requires both a secure tower installation and a hefty rotator. I have utilized a CDE Ham III and an Alliance HD-73 with excellent results. However, it is worth noting that I provided for adequate torque stress relief in the rotor system by mounting the rotor approximately 8 ft below the tower thrust bearing.

The System 40 did not, at first test, yield VSWR curves on 10 and 15 meters within the range suggested by the manufacturer. Two factors were found responsible: My tower installation included uninsulated guys as well as a number of wire antennas suspended within several feet of the System 40. In addition, during discussion of the VSWR problem with the factory, I learned that the design was prototyped atop a 60-ft freestanding tower with no adjustment provided for problems with resonant guy wires. Wilson agreed that their design parameters might not be electrically compatible with some individual installations. The manufacturer advised me that they were sending new traps to those System 40 owners experiencing VSWR problems. (These traps lower the resonant frequency of the antenna on 10 and 15 meters.) The new traps arrived soon afterward, at which time I proceeded to insert insulators in the top set of guys. The new traps were installed, and new VSWR curves were taken; these are shown in Fig. 1. They represent the broadband nature of the System 40 design, which should present a reasonable match for modern solid-state transceivers. Experience shows that VSWR curves are representative in an antenna manufacturer's literature, and will likely vary between individual installations.

In well over a year of operation at AC1Y, the System 40 has given good front-to-back and

<sup>1</sup>m = feet × 3.28; m<sup>2</sup> = ft<sup>2</sup> × 0.0929;  
kg = lb × 0.454.

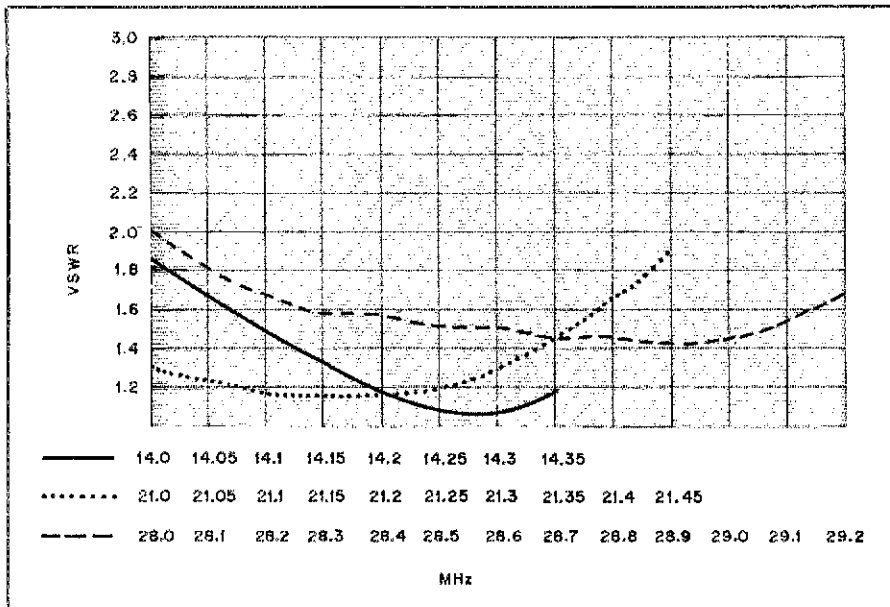


Fig. 1 — SWR curve of the Wilson SY-40 tribander.

front-to-side ratios; performance on all three bands yield consistent results in this category. Forward gain, too, appears to be excellent, judging from signal reports received. Overall, the System 40 has performed very well mechanically, having withstood some nasty Connecticut winter weather this past year, including two ice storms! Recent inspection of the antenna shows it to be in fine shape.

The System 40 is well designed. Although it has a great many small parts in the bolt and nut category, everything together makes for a sound Yagi. The amount of assembly time required is worthwhile, considering the durability the antenna provides. The aluminum and associated hardware is of excellent quality, and the instructions are thorough. The System 40 is manufactured by Wilson Systems, Inc., 4286 S. Polaris Ave., Las Vegas NV 89103. Price class is \$395. — *Sandy Gerli, AC1Y*

### FOX-TANGO YF-90H1.8 CRYSTAL FILTER

□ An essential trait of a communications receiver is good adjacent-channel selectivity. In a modern superheterodyne receiver, this quality is determined by the i-f filter and associated circuit. In a filter type ssb voice transmitter, the filter defines the audio fidelity and establishes adequate opposite sideband (and sometimes carrier) suppression. Transceive applications require filters having all of these characteristics; in short, the i-f filter is the heart of a superheterodyne communications transceiver.

When the i-f is in the hf range, quartz crystals are usually employed in the filter. *QST* has offered articles on home construction of crystal filters, but the process can be tedious, and the design is not easy. Today most builders design their radio circuits around commercially manufactured filters of known performance. I opted for this "systems engineering" approach when roughing out the design for the hybrid speech processor featured in the 1982 *Handbook*. Milt Lowens, N4ML of Fox-Tango Cor-

poration, recommended the YF-90H1.8 crystal filter for my application and supplied a pair of these units for evaluation. The YF-90H1.8 is a 1.8-kHz bandwidth, eight-pole<sup>1</sup> filter designed for plug-in replacement service in the Yaesu FT-301 and FT-7B transceivers. The Fox-Tango literature gives complete specifications for the filter, but because they were destined for unusual service, some tests and measurements were necessary before I could finalize my design.

The specifications are summarized in the table, but as with most measurements, there's a story behind the numbers. A 2500-3000 Hz bandwidth is accepted as standard for a voice channel, so if you think a bandwidth of 1800 Hz is a bit sharp, you're right. The 3000-Hz requirement is for intelligibility and recog-

<sup>1</sup>The term "pole" is often tossed about by amateurs without thorough understanding. When pressed for an explanation, most hams (including this one) are inclined to stutter. The concepts of "poles" and "zeros" are based on some fairly sophisticated mathematics, including root locus and complex variables. At the risk of oversimplification, a pole is a parallel-resonant circuit, and a zero is a series-resonant circuit. Unless it's necessary to discuss the fine details of filter design theory, perhaps it's safer (and more useful) to describe the product being reviewed as an "eight-crystal filter," "eight-resonator filter" or "eight-element filter."

### Fox-Tango YF-90H1.8 Crystal Filter

#### Manufacturer's Claimed Specifications

Center frequency: 9,000 MHz.  
6-dB bandwidth: 1800 (± 100) Hz.  
insertion loss: 6 dB.  
Terminating impedance: 500 ohms, resistive.  
Case dimensions: (HWD) 18 × 18 × 50 mm.

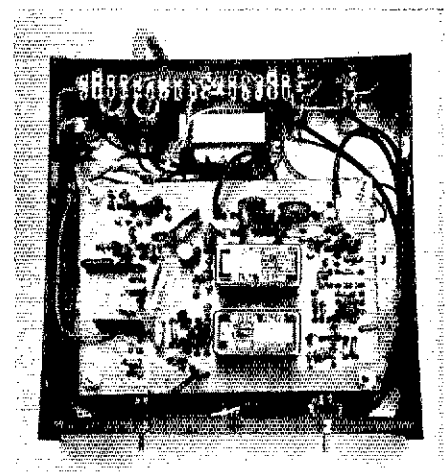
#### Measured in ARRL Lab

As specified.  
1700 Hz.  
3 dB.

As specified.

nizability. With only 1800 Hz to work with, we have to be satisfied with intelligibility. But to get that intelligibility, we must select the *proper* 1800-Hz bandwidth. The optimum slice will vary from voice to voice, but it's safe to say that 0-1800 Hz is not optimum. Many voice devices have an upper frequency 3-dB rolloff of 2500 Hz. When the upper -3 dB response of the YF-90H1.8 is set at 2500 Hz, the specified -6 dB response is at 2950 Hz. The corresponding lower -3 dB and -6 dB responses fall at 1350 Hz and 1150 Hz, respectively. The half-power bandwidth of the YF-90H1.8, then, is 1600 Hz. For voice modulation or demodulation, the carrier oscillator should be set to 8.99795 MHz or 9.00205 MHz to center the filter passband on the 1350-2500 Hz range. This is the second formant of the speech spectrum. The articulation is contained in this formant.

In the *Handbook* speech processor, the second-formant signal is heterodyned up to 9 MHz, where it is filtered, clipped, filtered again and finally demodulated as recovered audio. A single carrier oscillator serves for both the modulation and demodulation processes, so the output frequency is the same as the input frequency. The carrier oscillator frequency is important, but only in selecting the proper audio passband. In a receiver or transmitter, however, the carrier oscillator frequency is critical, not only for passband selection, but also for accurate demodulation. With "normal" communications bandwidths of 2400 Hz, the receiver can be mistuned a couple of hundred hertz, and an experienced operator can still understand the "gravelly" or "Donald



Two Fox-Tango YF-90H1.8 crystal filters are used in the hybrid speech processor featured in the 1982 *Handbook*.

Duck-y" speech. Not so with the narrow bandwidth offered by the YF-90H1.8 — because there is less information for the ear/brain combination to process, the frequency accuracy must be significantly greater. This imposes tighter stability and backlash constraints on "conventional" receivers and requires synthesized receivers to have finer resolution.

Don't use a YF-90H1.8 for i-f tail ending — the combined passband will be too narrow for effective voice work. Instead, use a 2.4-kHz-bandwidth unit for the post i-f filter. So how did I get away with using a pair of YF-90H1.8s in the *Handbook* speech processor? First, a clipping stage follows the first filter. The amplitude vs. frequency characteristic of the clipper output is flat for all signals above the clipping threshold. If the stage is adjusted for 10 dB of clipping, the output is uniform over the 10-dB bandwidth of the filter. This is just over 1800 Hz for the unit measured, so the ultimate selectivity is defined by the post-clipper filter. Second, audio fidelity is further enhanced by injecting the separately processed first-formant (300-600 Hz) audio in the output stage.

The manufacturer's specifications and the measured response curve (Fig. 2) show the YF-90H1.8 to be a high-performance filter. In the ARRL laboratory, we tracked the skirt response down to the -90 dB point, the dynamic range limit of our test set-up (Fig. 3). From the -6 dB and -60 dB bandwidth figures, we can compute a claimed maximum shape factor of skirt ratio of 1.82. Our measurement was even better: 1.53. Some designers attach more significance to the 3-dB and 30-dB bandwidths. The skirt ratio using these figures measured 1.41. Particularly impressive are the passband smoothness and skirt symmetry.

A logical question might be, "Can I duplicate the laboratory results with my transceiver?" The answer is a qualified yes — if the circuit layout is clean and the terminal impedances are correct. The test fixture diagrammed in Fig. 3 has the filter mounted in a double-sided pc board with a shield partition between the terminals and the unit completely enclosed. BNC fittings couple the fixture to the test set-up. The impedance-matching resistors are mounted on short leads between the filter and connectors. Padding the system with these resistors ensures that the signal generator and spectrum analyzer "see" 50-ohm resistive terminations, and that the filter "sees" 500-ohm resistive terminations. Swamping the system this way sacrifices some dynamic measurement range, but the frequency independence gained enhances the accuracy over the dynamic range that remains. In practice, the filter would most likely be terminated in tuned circuits. At 9 MHz, such circuits are usually broad enough not to influence the passband or near-stopband performance. While testing the YF-90H1.8, we swished the signal generator 1 MHz either side of the center frequency without detecting any spurious stopband responses.

Filter effectiveness is degraded if signals can leak around it. Close proximity of input and output traces and long ground leads contribute to leakage. Where several filters are used, the switching system can encourage leakage. If you're installing a YF-90H1.8 in an attempt to upgrade a commercial transceiver, you may be stuck with a poor layout unless you're willing to perform some surgery (or butchery, depending on your outlook and craftsmanship). In home-built gear you can extract maximum

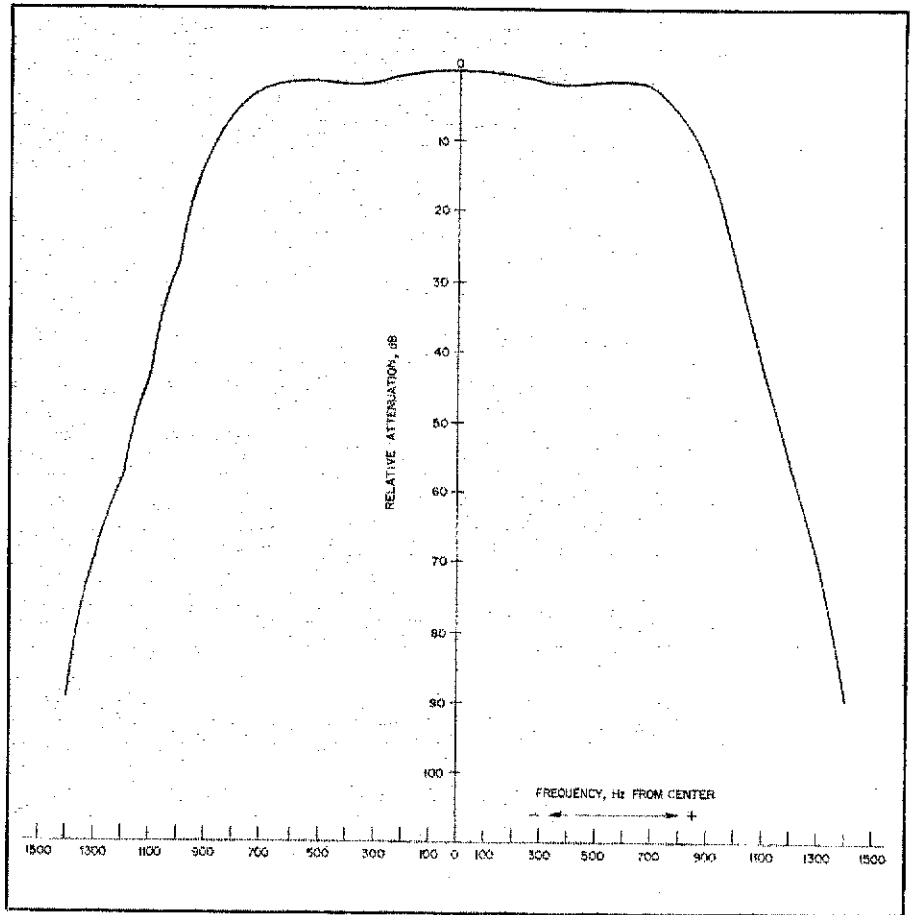


Fig. 2 — Frequency vs. amplitude characteristic of YF-90H1.8 filter, serial no. 059, as plotted in the ARRL laboratory. The center frequency is 9 MHz.

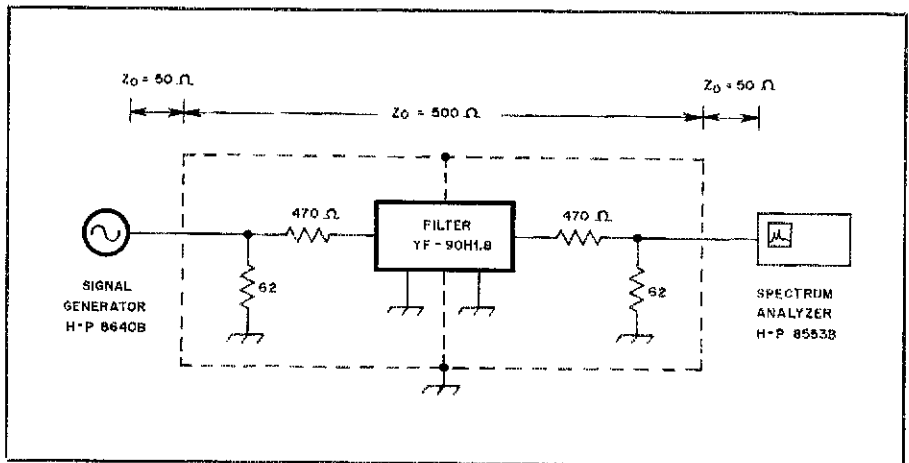


Fig. 3 — Test set-up used to plot the curve shown in Fig. 2. To measure the center-frequency insertion loss, a reference level is recorded with the filter in place. Then, the filter is removed and replaced with a wire jumper. The difference between the two levels is the insertion loss.

i-f system performance by switching i-f strips rather than filters. The parts cost is insignificant compared with that of the filters, and you can tailor the gains for the various bandwidths.

One more point should be made: If you can afford only one filter and you operate both ssb and cw, the best i-f bandwidth to use within the constraints discussed earlier may be 1800 Hz.

The reduction of ssb "monkey chatter" is truly remarkable, and you can eliminate one channel of cw QRM that would pass through a 2400-Hz bandwidth filter. The YF-90H1.8 and other filters are marketed by Fox-Tango Corporation, P.O. Box 15944, West Palm Beach, FL 33406. Price of the YF-90H1.8 is \$55. — George Woodward, W1RN

# Hints and Kinks

Conducted By Larry D. Wolfgang,\* WA3VIL

## BRAKE PROTECTION FOR THE CDE HAM IV ROTATOR

LI The Ham-series rotators have been used in directional antenna systems for years. They have a potential problem, common to all CDE rotators having a brake wedge that is disengaged by the application of an ac voltage from the control box. (CDE TV- and CB-type rotators do not have this feature.) The problem occurs if your finger slips off the BRAKE RELEASE switch while the rotator is turning. The antenna inertia can cause severe torsional stress to the supporting structure, damage to the brake assembly or possibly jamming of the rotator mechanism. The manufacturer's instructions caution users always to let the motor coast to a stop before permitting the brake solenoid to release the wedge, engaging the brake.

The suggestion given here will positively prevent brake engagement until 2 to 3 seconds after removing power to the motor. This provides ample time for the rotator to coast to a stop. An additional advantage is that the BRAKE RELEASE switch can be released immediately after the motor starts, without any danger to the structure.

All modifications are done on the underside of the chassis, in the control box. You may have the required parts in your junk box. I cemented the relay to the underside of the chassis with epoxy glue and wired the other parts point to point (Fig. 1).

When the cw or ccw switch is operated after

BRAKE RELEASE is pressed, D1 or D2 will charge C1 through R1. The relay will prevent the brake from being engaged until C1 discharges sufficiently to permit K1 to drop. It would be wise to check the release time of the relay and change the value of C1 to ensure a lag of 2 to 3 seconds. — *John Reinke, AB6I, Casselberry, Florida*

## CABLE ENTRANCE FOR THE SHACK

□ Getting the coaxial cable and rotator control leads into my new ham "shack" was a job that I dreaded. How could I make a hole in the house that would be weatherproof and would not be ugly? The answer was simple.

I bought an aluminum clothes-dryer vent and installed it on the side of the house. The feed lines and control cables enter through the vent. A piece of fiberglass insulation is used to weatherproof the vent. (I filled the inside and wrapped the outside of the vent with insulation to keep the cold air and critters out.)

Wire-reinforced plastic dryer-vent hose can be used to keep the cables out of sight from the vent to the operating position. Connect one end of a length of hose to the cable-entrance vent, and place the other end near the rig. — *C. L. "Chuck" Hutchinson, K8CH, ARRL Hq.*

## ENCLOSING CABLES IN CLOTHES-DRYER TUBING STOPS TVI

□ I have found that by using flexible duct tubing made for clothes-dryer exhausts, I have been able to contain rf fields associated with my transmission lines, which had been respon-

sible for TVI. The cables are placed inside the tubing, a type made with a spiral wire from one end to the other. This coil is grounded at the transmitter end. Because my equipment is in the basement, the transmission lines extend upward from the operating position. By enclosing the cables in the duct, the station appearance is improved. After installing the tubing, I no longer have TVI affecting my inexpensive TV set, less than 15 feet away. — *Earl P. Anderson, WD9DID, Milwaukee, Wisconsin*

## REMOTE TUNING WITH A VARACTOR

□ I was using an old WW 2 radio that was too big and bulky to place near my desk. I needed some method of remote tuning, so I used the varactor-diode circuit shown in Fig. 2.

A varactor will act as a variable capacitor if reverse bias is applied. The control voltage can be positive, as shown, or it can be negative if the diode is reversed.

I used an RCA SK3327, which has a minimum capacitance of 3.2 pF and a maximum capacitance of 33 pF. If this pulls your crystal or VFO too much you can reduce the swing by changing the value of C1. A 33-pF fixed-value capacitor will yield a total of half the varactor value, about 16.5 pF. If you need the full change in capacitance, use a larger value at C1, about 0.001  $\mu$ F.

The variable resistor should be one with a smooth resistance change. I used an Allen/Bradley potentiometer, which has a thick coating of resistance material. It might be a good idea to apply some graphite (mixed with a light grade of oil) on the control shaft to en-

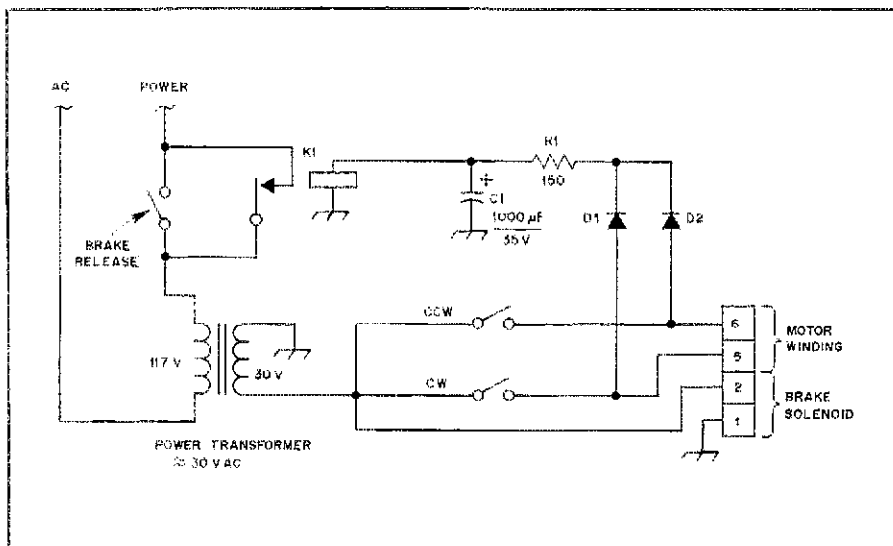


Fig. 1 — An automatic break-release circuit for the CDE Ham-IV rotator.

K1 — Relay, 24-V dc, 600-ohm coil (P&B KHP-17D).

D1, D2 — Diodes, 750 mA, 600 V (1N4001).

R1 — 150 ohm, 1/2 W.

C1 — 1000  $\mu$ F, 35 V electrolytic capacitor.

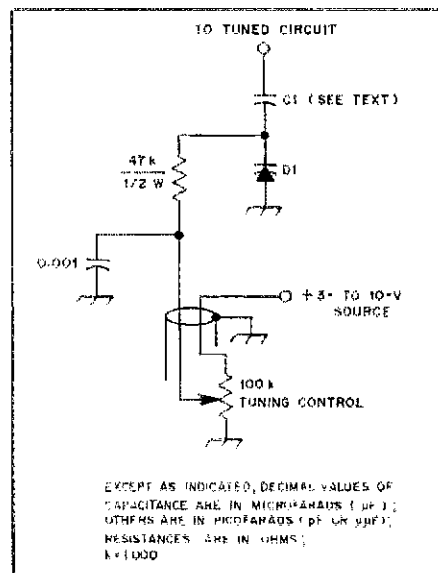


Fig. 2 — This schematic diagram shows how a varactor diode can be used to tune a circuit remotely.

sure a smoother action. You can use a vernier knob if you want better control.

By adjusting the values of C1 and the variable resistor, the frequency swing can be tailored to suit your needs. The leads should be shielded to prevent rf from getting into the diode. An rf choke of about 750  $\mu$ H can be substituted for the 47-k $\Omega$  resistor. There is no current through this resistor because the diode is reverse biased, so no voltage drop exists.

This method can be used for a VFO, BFO, crystal oscillator or other circuits where you want to vary a frequency without using mechanical means. — *Joe Rice, W4RHZ, Covington, Kentucky*

## RFI AND THE MAGIC GARAGE DOOR

After having a Genie garage-door opener installed I found that the door would open occasionally when I was operating on 40 meters while using my amplifier (about 600 watts output). I tried shielding, ground straps and bypass capacitors, all to no avail.

One day I noticed the twisted pair of wires coming from the wall switch to the receiver on the door opener. My suspicion was aroused and I grabbed a tape measure. The wires were 32 feet long, almost a perfect quarter wavelength on 40 meters!

I rerouted the wire and was able to shorten the twisted pair to 24 feet. This solved the problem completely: My XYL no longer plays Russian roulette when she drives under the garage door while I am operating the radio.

[For the successful solution to another garage-door opener problem see January 1981 *QST*, p. 49. — Ed.] — *Wayne Mitchell, K6VFN, San Bruno, California*

## ELECTRONIC BIAS SWITCHING CIRCUIT

I have been interested in articles on electronic bias switching. I use a variation of the circuit given by Hank Garretson, W6SX, in March 1981 *QST*, p. 52. My amplifier is homemade. It contains 572B tubes. The cathode circuit is keyed with the electronic bias circuit shown in Fig. 3. The transistor switch

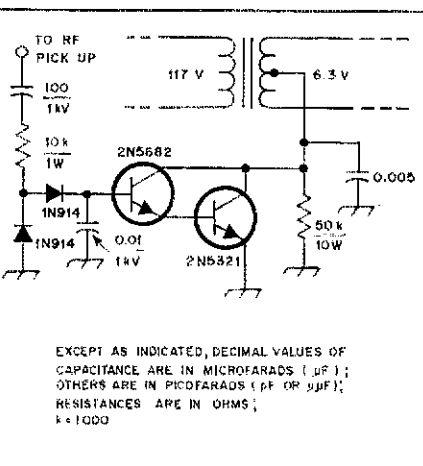


Fig. 3 — Schematic diagram of the electronic bias switching circuit used at W6IPL.

1m = feet  $\times$  0.3048

shorts out the 50-k $\Omega$  cathode resistor. This eliminates the need for a separate bias supply, but cuts off the plate current during key-up intervals. This circuit should work well with any amplifier that uses a cathode resistor for tube cutoff: It eliminates the relay contacts needed to short out the resistor. — *Dick Barnes, W6IPL, Fortuna, California*

## VARIABLE-BANDWIDTH CONTROL FOR THE HW-8

I replaced the two-position selectivity switch on my HW-8 with a variable resistor, as shown in Fig. 4. This provides a variable-bandwidth control, with any degree of selectivity between the original WIDE and NARROW positions. — *Bill Ames, KA1EXB, Sandy Hook, Connecticut*

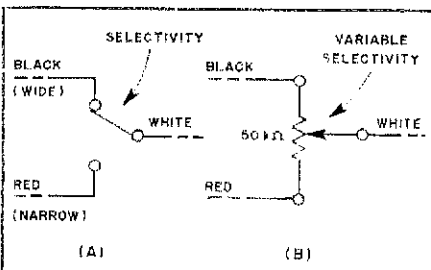


Fig. 4 — At A, the original selectivity switch in the HW-8. At B, the switch is replaced with a variable resistor.

## PC-BOARD PATTERNS THE EASY WAY

Paul Pagel's (N1FB) product review of the GC Electronics Lift-It Transfer Sheets in September 1981 *QST* (page 49) reminded me of a trick I learned in my instructional media class in college. Transparent self-adhesive plastic (such as Con-Tact,® manufactured by United Merchants and Manufacturers, Inc.) can be used to make a positive from a printed pc-board pattern. Cut out the pattern, place a similar-size piece of the plastic (backing removed) on it and rub the plastic side with a blunt object to ensure complete adhesion. Place the pattern in warm, soapy water for 15 to 20 minutes, and rub the paper off with your fingers. Be sure to remove all of the paper. You don't have to put the adhesive backing on a piece of Mylar,® but doing so will prevent dirt from collecting on the sticky surface (if you plan to save the pattern).

I found that a photocopy produced a much darker positive than an actual *QST* page could. This saves cutting precious magazines. It should also be possible to draw your own pattern, photocopy it and produce a positive or negative for exposing a board. Some photocopy machines may not produce a print that works as well as the one I used, however.

You should be able to find transparent self-adhesive plastic at a local department store. I found some that was 18 inches wide and cost about 80 cents for 3 feet. — *Larry Wolfgang, WA3VIL, ARRL Hq.*

## FADING AUDIO FROM THE HEATH MICODER II

When I began receiving reports of fading

1mm = inches  $\times$  25.4

audio on the repeaters, I replaced the 9-volt battery in my Heath Micoder II. This solved the problem temporarily, but after about a month the problem returned. This time I monitored the voltage of the new battery, with the mike keyed, and found that after about 30 to 40 seconds the voltage began to sag toward 8 volts. The culprit was isolated to a leaking 1- $\mu$ F tantalum capacitor (C103). This was replaced with a capacitor of a higher voltage rating, and the Micoder has been okay since. — *Saul Dinman, K1PDX, Wayland, Massachusetts*

## CHECKING RECEIVER SENSITIVITY

Here is an idea that will help to determine whether the sensitivity of your receiver or transceiver is as good as it has been in the past. This method is entirely independent of the antenna or band conditions, and will be most effective if the calibrator signal in your receiver is injected at the antenna input.

I made a table of frequencies at a certain point in each band, for example, at 3.7 MHz, 7.2 MHz, etc. I record the S-meter reading from the crystal calibrator at each frequency (antenna disconnected). At a later date, if reception seems poor, I compare the present S-meter reading from the calibrator for that band. If the readings are the same the receiver is doing as well as before, and the poor reception is caused by something other than the receiver.

My original measurements were made in November 1978. Recently the 15- and 20-meter bands seemed very quiet. When I compared S-meter readings on these bands I found that they were less than half the original values. My receiver was not as sensitive as it had been. I traced the problem to dirty contacts in the band switch. After a good cleaning, the bands opened up again! — *Robert E. Troy, Jr., W4AHP, Montgomery, Alabama*

## OLD TIMERS NOTEBOOK

### Emergency Solder

Before setting out on Field Day or a long trip in the mobile station, prepare a few pieces of emergency solder. Melt some solder on a soldering iron and then flick the iron to throw the solder off. Catch the melted solder on a flat surface, such as a sheet of aluminum, and then peel it off. The resulting solder is extremely thin and will easily flow under the flame of a match. To solder a joint in an emergency where no iron is available, apply flux, wrap the thin solder around the joint and then heat with a match or lighter. The result is a good electrical connection made without benefit of a soldering iron. — *Bill Phillips, K8EJL, March 1961 QST*

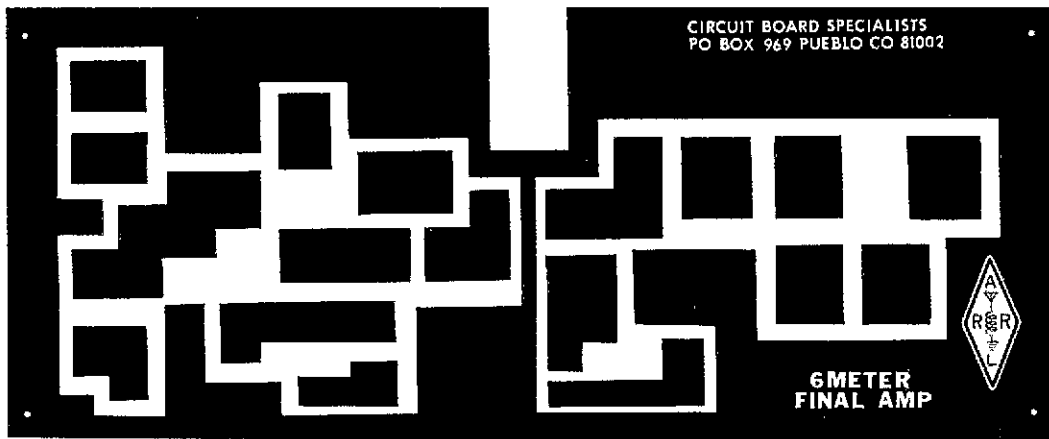
### De-Soldering Tip

The melted solder that accumulates when you are unsoldering connections may be quickly and easily removed by brushing with a paint brush. Use a small 1/2- to 3/4-inch natural bristle brush. If it is made from synthetic fibers, small balls will form on the end of each bristle because of the heat, but this will not affect the effectiveness of the brush. It is an easy job to remove excess solder from the holes in soldering lugs, tube pins, etc. The brushing may produce small quantities of splattered solder but these can usually be removed without much difficulty. — *George P. Firmin, July 1961 QST*

□



(A)




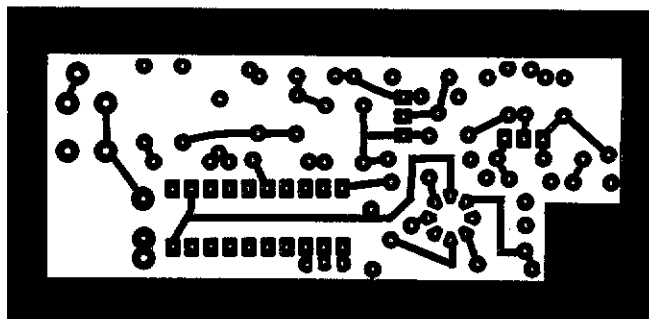
(B)

Etching patterns for the driver board (A) and the final amplifier board (B) used in the 6-meter transmitter. Black areas represent unetched copper, viewed from the etched side of the board. Parts-placement diagrams appear on p. 42.

## Feedback

□ The FCC has asked that we correct a misstatement in March Technical Correspondence concerning Part 68 of the Commission's rules. Title 47, Code of Federal Regulations (parts 20-69), is not available from the FCC. Rather, it may be obtained from the U.S. Government Printing Office, Washington, DC 20402, at \$8.50 per copy. Phone 202-783-3238 for information on Vol. 10 of these regulations. Or visit any law library that has material on communications.

□ In Fig. 10B of "A Progressive Communications Receiver," November 1981 *QST*, C25 should be shown as a variable capacitor. Revised template sheets are available from the ARRL for an s.a.s.e. 



Etching pattern for the vhf synthesizer circuit board. Black areas represent unetched copper viewed from the etched side of the board. Parts-placement diagram appears on p. 31.



# 1982 ARRL National Convention, Cedar Rapids, Iowa

Bring your family and friends to the "City of Five Seasons," July 23-25, 1982, and enjoy a first-class Convention.

By Jim Maccani,\* WØHUP

In 1979, the Cedar Valley Amateur Radio Club demonstrated its convention abilities by hosting the largest and most successful Midwest Division Convention ever. If you were fortunate enough to have been our guest before, you haven't seen anything yet. The CVARC takes great pride in hosting this memorable convention, affordable to all amateurs. Make your summer vacation plans now to attend the 1982 ARRL National Convention in the Heartland of America, Cedar Rapids, Iowa, July 23-25.

Cedar Rapids is known as the "City of Five Seasons." It is a place where there is still enough time to pause occasionally to enjoy all four seasons as they pass — almost like having a fifth season — time to enjoy. The city is unique with a contrast of high-technology industries, such as Collins Division of Rockwell International, well known for high-quality amateur products, surrounded by a large agricultural industry. Cedar Rapids is within easy driving distance to all the Great River Region attractions. A wide range of activities and interests are available throughout the year, including the new Five Seasons Center, Paramount Theater for the performing arts, Community Theater, Symphony Orchestra, Art Center, Indian Creek Nature Center, Seminole Valley, Hawkeye Downs and the Seven Historic Villages of the Amana Colonies.

## Convention Activities

Registration for the convention opens at noon on Friday. Exhibits will officially open at 6 P.M. An impressive group of commercial exhibitors has committed themselves to this gala event. All first-class conventions also are accompanied by a first-class flea market. The flea market will open Saturday morning with 210 tables available. The entire flea market will be housed in a multi-level parking ramp that is completely covered and is adjacent to the main convention center for optimum accessibility.

Robert Hisamoto, KL7AM, will be the featured speaker at the Saturday evening banquet. Born in Honolulu, Bob was first licensed in 1925, and founded the Japan Amateur Radio League (JARL) in 1926. He has been continuously active in Amateur Radio, having held 15 different calls. Bob has held numerous research positions in electronic and aerospace industries, and government agencies. Since the first days of radio, Bob has been involved in many new discoveries and has achieved many "firsts." He helped establish the American Cryptogram Association in the early 1930s. He is currently retired and teaches a seminar on "Creative Thinking." Louisa, his wife, and seven of his 11 children are also hams. His rich and varied experiences form the background for an entertaining and informative address. Banquet seating is limited.

Many hours of planning have been put forth in the arranging of technical programs and forums. Saturday starts with the ARRL Forum, followed by programs on frequency synthesizers, machine cw, home-brewing amplifiers, AMSAT, microprocessors, state-of-the-art receivers, tower construction, RFI prevention and cures, RTTY basics, fm repeaters, public service, ATV techniques, hf antennas, vhf/uhf, EME, beginner/Novice, aurora borealis and FCC Forum. Keep up-to-date on the latest scoops on DX and contest happenings at the DX and contest forums. The DX program will show you some of the faraway, exotic, rare places of the world you have QSO'd lately. Also, feast your eyes on some of the prominent "big gun" stations. See how they really do it. A DXers' breakfast, featuring Bob Locher, W9KNI, as speaker, will be sponsored by the Eastern Iowa DX Association.

Saturday afternoon you will be able to tour the Collins Division of Rockwell International. The tour will include a stop at the antenna farm, a slide presentation on the history of Collins Communications Central, and a tour of the production facilities. The tour is free, but pre-registration is required and limited to 500 people.

There will be special tours and forums for

the ladies while hubby does his thing. Saturday is a busy day, starting with a tour to West Branch, Iowa, a National Historic Site featuring the log cabin childhood home, schoolhouse and Presidential Library of our 31st president, Herbert Hoover. On the way back, stop in Iowa City, home of the University of Iowa and site of the first state capitol. "Old Capitol" stands in the center of academic life. The tour will take you inside and up the grand spiral staircase of this beautifully restored landmark. A second tour will take you to the historic Amana Colonies where Old World traditions are still alive. Tour the Colonies' woolen mill, furniture shop, meat market and winery. Lunch in one of the many German restaurants with time for browsing in the many shops. The final tour will take you to the beautifully restored Paramount Theatre for the performing arts. Also, see the Grant Wood Gallery of the Art Center and the famous Grant Wood stained glass window in the city's Coliseum. Tour the grounds of one of the city's historic mansions and see where Grant Wood resided while painting several of his most famous works of art. Finally, visit Czech Village and the Czech Museum with lunch to follow. There will also be two Forums for the ladies: "Second Wind — Self Assessment" and "Women and the Law."

Campgrounds are available on a first-come, first-served basis. Parking for self-contained vehicles will be available near the Five Seasons Center; no electrical hookups are available. Large blocks of hotel and motel rooms have been reserved for those attending the convention. Special room rates are available for those who make reservations using the special reservation form available in our convention brochure. Because of the large number of inquiries already coming in, those not receiving a direct mail brochure should write or call as soon as possible. Housing may be hard to find if you wait to the last minute. Dealers interested in exhibit booths can also contact Cedar Valley Amateur Radio Club, Box 994, Cedar Rapids, IA 52406, or phone Convention Chairman Dick Isard, WBØVVZ, at 319-364-0855 (home) or 365-7551 (office). ☐

\*1440 Blairsferry Rd. C-12, Hiawatha, IA 52233

# Just Hafta Get Myself a Hobby . . .

In Cyborg, Morty had finally found the ultimate station accessory.

By John A. Hansen,\* WAØPTV

Being basically a nuts-and-bolts type of ham, I've always been amazed by Morty, KØQRM, who lives around the corner. I'm sure everybody's met a Morty at one time or another. He's the sort of guy who has to have every new gadget as soon as it hits the market. You know the kind. In 1968 he paid \$130 for a pocket calculator that could only add and subtract. A few years later he paid \$300 for an LED digital watch.

This insatiable hunger for the novel followed Morty into Amateur Radio in the mid-'60s. He immediately bought himself a complete S-line, but soon lost interest in it when Signal/One introduced its transceiver that required no tune-up. He must have bought 15 keyers in the last 15 years, as iambic keying, memory capacity, speed readouts, and so on, were introduced. Finally he gave up on keyers altogether and bought a microcomputer and interface for his rig. Money was no object to Morty; if the gizmo did something new, that was enough; he had to have at least a pair of 'em.

I hadn't heard Morty on the bands for several months. This is often a bad sign — generally it coincides with the installation of a major new piece of gear. Finally, my curiosity got the best of me and I decided to stroll around the block to see what he was up to. From the outside of his house everything looked perfectly normal. His 180-foot, crank-up, fold-over, broadcast tower was there just as always, with its stacked Yagi monobanders and 4-element 40-meter quad. It didn't look like he was planning another enlargement of the 24-foot EME dish, either. No; whatever it was that was keeping him off the air must be inside the house.

I rang the bell, and it was a good 15 minutes before I got an answer (I've come to expect this). Eventually Morty appeared. Was he ever excited!

"Hey, OM, it's been quite a while. You're just in time to help me try out my

new Cyborg 300 Universal Ham Interface! Come on down to the shack."

I learned a long time ago that with Morty an invitation like this was not to be turned down. So I followed Morty into the suite of radio rooms. When we reached the primary shack, he pointed to a large green and gray box with one switch. It appeared to be hooked up to everything in the room, including the transceivers, the microcomputer, the Teletype, the TV equipment and all their control devices.

"This is the Cyborg 3000 Universal Ham Interface," Morty announced. "It controls all of the station's operations with the flick of a switch. You merely program it once through the microcomputer, and you never have to go into the shack again."

"Really?" I must have seemed a bit skeptical.

"Absolutely," Morty replied. "It scans the bands, makes contacts, logs them and, when my automatic postage meter arrives next month, it'll automatically send out QSL cards."

"But don't people resent having QSOs with a machine?"

"That's the beautiful part," he said. "No one ever knows. QSOs these days have become so standardized that it's a very simple matter to program in a relatively few instructions to handle every contingency. For example, if someone says he or she is using an old Galaxy V transceiver, the Cyborg comments on what a good receiver it had for that vintage, and what a shame it is that Galaxy went out of business. Cyborg then offers to send a few useful circuit modifications."

"Amazing, but doesn't this put a certain distance between you and your equipment?"

"Well," Morty confided, "to be honest, I was somewhat concerned about that. So I called the manufacturer and asked for a Cyborg in kit form. They told me that they'd originally offered the interface as a kit, but, every time they mailed

one out, it had assembled itself in the shipping crate by the time it reached its new owner."

He flipped the switch, and the whole room came to life as the machine scanned the bands, made contacts and logged all the pertinent information. Morty and I went out for a few beers.

As the weeks passed, it became clear that Cyborg was indeed working just as Morty said it would. KØQRM was on the air almost 24 hours a day. Whenever rare DX showed up, Morty (that is, Cyborg) was always right there to bag it. Morty won the ARRL CW DX Contest from his home QTH while he was on a vacation in the Bahamas.

What was more impressive, though, was that everyone said Morty had suddenly become a more interesting conversationalist on the air. It seems he'd leased an AP Teletype line and had run it into the Cyborg as well. The machine would cull the headlines to be on top of any topic that might be mentioned during a QSO. Morty easily earned the Rag Chewers Club Award, a distinction that had eluded him throughout his previous 15 years as a ham.

A few weeks later, when I was on the air with my home-built, 10-watt peanut whistle, I heard a knock on the door. I signed off and found Morty standing on my doorstep.

"How's it going?" I asked.

"Oh, okay, I guess," he replied.

"Okay nothing! You're working an AC4 right now that I've been after for the last month!"

"Yeah, Cyborg does a heck of a job. Only trouble is, I've got so much free time now. . . I'm just gonna hafta get myself a hobby!"

□

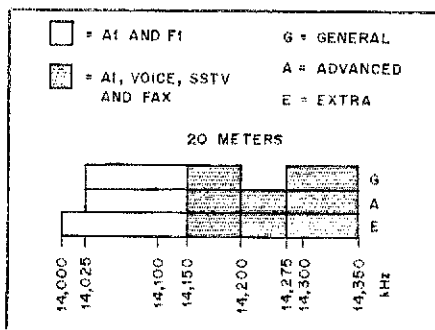
*The author, an economist, is a research associate at the Center for Policy Alternatives, Massachusetts Institute of Technology. A ham for the past 15 years, Dr. Hansen spends most of his time on the air DXing and ragchewing.*

\*38 Orkney Rd., No. 6, Brighton, MA 02146

## 14.150-14.200 MHz Proposed for General, Advanced and Extra Phone

The Federal Communications Commission has proposed to expand the 14-MHz amateur phone sub-band by adding the frequencies 14.150-14.200 MHz to the currently congested 14.200-14.350 MHz phone frequencies. According to an FCC news release, the proposed expansion is a compromise. It should provide substantial relief from the existing congestion, it said, but should also create minimal disturbance to U.S. and foreign amateurs engaged in international communication. Foreign operators have objected to phone sub-band expansion in the past on grounds that they may be overrun and overwhelmed by powerful U.S. stations. However, the Commission said the increasing sophistication of equipment in both foreign and domestic use should prevent undue interference and minimize other difficulties.

The proposal would also permit use of slow-scan television and facsimile in the expanded telephony sub-band, in keeping with the Commission's recent action generally allowing those uses on the phone frequencies. (See March 1982 *QST*, page 59.) According to the news release, the FCC is proposing to make the additional phone frequencies on the 14-MHz band available to Amateur Extra, Advanced and General class operators to provide the greatest relief to operators in the congested sub-band. See the accompanying chart. The



Proposed expansion of 20-meter phone subband.

text of the NPRM, however, states, "We invite comments as to whether it would be desirable to delete from General class operators the privileges between 14,150 and 14,200 kHz and instead add privileges between 14,225 and 14,275 kHz to those authorized for General class operators. In this way the telephony subbands available to General class operators will be contiguous."

The Notice of Proposed Rulemaking has been assigned PR Docket No. 82-83. Interested parties are invited to file comments on the pro-

lications with an environmental statement if the proposed operation would violate exposure standards for rf radiation adopted for workers by the Occupational Safety and Health Administration (OSHA) or for the general public by the Environmental Protection Agency (EPA). In the absence of a federal standard for exposure of the general population, the Commission's "environmental processing rules" would apply if the proposed operation would result in exposure of the general public to levels of rf radiation higher than those permitted by OSHA for exposure of workers. The ARRL Committee on the Biological Effects of RF Energy had not yet had time to study the proposal at press time, but the Hq. staff's preliminary view is that the new rules, if adopted, would affect few, if any, radio amateurs. Most would continue to answer "no" to question 10 on the FCC application Form 610, "Would a Commission grant of your application be a major action as defined by Section 1.1305 of the Commission's Rules?"

The present OSHA standard permits a

\*The current OSHA exposure limit is 10 milliwatts per square centimeter (mW/cm<sup>2</sup>) or the mean-squared electric field strength and mean-squared magnetic field strength equivalents of 40,000 volts<sup>2</sup>/meter<sup>2</sup> (V<sup>2</sup>/m<sup>2</sup>) or 0.25 amperes<sup>2</sup>/meter<sup>2</sup> (A<sup>2</sup>/m<sup>2</sup>), respectively, averaged over any six-minute period. In terms of field strength, the OSHA standards translates to 200 V/m and 0.5 A/m, respectively. The current OSHA standard applies to electromagnetic frequencies between 10 MHz and 100 GHz.

posal by sending an original and five copies to The Secretary, Federal Communications Commission, Washington, DC 20554. Comments are due July 1 and replies to comments are due August 2.

The Commission has also adopted a Notice of Inquiry (NOI) in PR Docket 82-83 to collect data and comments on the possible expansion of other phone sub-bands between 3.5 and 29.7 MHz. An NOI proceeding, unlike an NPRM, does not make specific proposals for rule changes. According to the Commission's news release, the issues involved in authorizing phone expansion in these other sub-bands are not defined adequately to support a proposal. However, the FCC asks interested parties to make recommendations as to best-suited frequencies for phone and to make other comments that will, perhaps, lead to a future proposal. Persons wishing to address the NOI part of the proceedings in PR Docket 82-83 must do so in the same manner and within the deadlines applicable to the NPRM part of the proceeding dealing with the 14-MHz-band expansion proposal.

The NPRM and NOI are in response to several petitions filed to deregulate present sub-band allocations. For background on the League's petition to expand the 14-MHz phone band, see April 1981 *QST*, page 67.

maximum radiofrequency radiation intensity of 10 mW/cm<sup>2</sup>. Details of this present standard are found in note 2. The commission also made reference to new standards being considered by the National Institute for Occupational Safety and Health (NIOSH) and the American National Standards Institute (ANSI) that would establish recommended permissible exposure levels above 10 mW/cm<sup>2</sup> for some frequencies and lower the recommended permissible levels below 10 mW/cm<sup>2</sup> at other frequencies. According to the Commission, "Although these proposed standards would not be binding, they could be subsequently adopted by agencies such as OSHA. Therefore, RF spectrum users should be aware of the possibility that the standards may be revised in the near future."

The NPRM is the result of earlier action by the FCC when it adopted a Notice of Inquiry (NOI) regarding the responsibility of the Commission to consider the biological effects of radiofrequency radiation when authorizing the use of radiofrequency devices. (See September 1979 *QST*, page 68.) Twenty-six parties, including the ARRL, filed comments in this earlier proceeding. (See December 1979 *QST*, page 78 and March 1980 *QST*, page 72.) All interested persons may file comments in the present NPRM on or before June 18, 1982. Reply comments are due on or before August 18. ARRL members wishing to receive a copy of the Notice should send a large, self-addressed, stamped envelope with \$1.22 postage. Address your request to ARRL Membership Services Department, NPRM 79-144, 225 Main St., Newington, CT 06111.

### BIOLOGICAL EFFECTS OF RADIOFREQUENCY

Based on the obligations imposed by the National Environmental Policy Act (NEPA),<sup>1</sup> the FCC has proposed to amend Section 1.1305 of its rules to clarify its responsibilities for potential hazards from radiofrequency (rf) and microwave radiation. According to the Commission, "Any transmitting facility or radio equipment which is in compliance with federal health and safety standards for RF radiation would not ordinarily have a significant effect on the environment and thus would not fall within NEPA analytical processes, at least with regard to RF radiation. On the other hand, facilities or equipment that are not in compliance with federal health and safety standards for RF radiation may require a more thorough analysis of their environmental impact."

The proposal is a Notice of Proposed Rulemaking (NPRM) in General Docket 79-144. The new rule, if adopted, will require applicants for equipment authorizations to accompany such applications with a narrative environmental statement if the equipment would exceed relevant health and safety standards for emission of radiofrequency radiation. The new rule would also require applicants for construction permits or licenses to accompany such ap-

<sup>1</sup>42 U.S.C. §§4321-4347 (1976); 47 C.F.R. §§1.1301-1.1319.

\*Deputy Manager, Membership Services, ARRL

## ARRL PROPOSAL TO RESTRUCTURE FCC EXAMINATION PROCEDURES

The current trend of budgetary restraint by the Federal Government has already resulted in cutbacks of the FCC testing program for Amateur Radio licensees. FCC field offices have reduced the number of days on which Amateur exams are given (see March 1982 *QST*, page 60), and the Commission has also severely curtailed travel of its personnel to hamfests and conventions to administer tests. The situation is likely to grow worse with further reductions in FCC personnel, travel authorizations and scheduled exam times.

In response to this trend, ARRL Hq. staff recently had informal discussions with FCC staff about ways to involve volunteers in the testing program. The FCC's present statutory authority does not provide for the use of volunteers, but legislation pending in Congress would change that, allowing the Commission to use amateurs as volunteers to assist in preparing and administering amateur examinations. The Commission and ARRL staff discussions were held with the understanding that no volunteer program could get off the ground without passage of this legislation.

During these informal discussions, ARRL proposed a certification program in which the FCC would authorize organizations meeting certain criteria to establish corps of volunteer examiners and instructors who will in turn be authorized to perform most of the administration of testing. The ARRL plan would, however, call on the FCC to screen and certify qualified organizations, approve large pools of questions for each license exam level submitted by the certified organizations, and issue licenses based on the instructors' or examiners' certification that the candidate has successfully demonstrated competence in all areas outlined by the appropriate FCC Study Guide.

At the Novice level, ARRL's plan would have the FCC certify nonprofit and accredited educational institutions, and authorize those institutions in turn to certify instructors to teach an approved course of study that would culminate in the Novice exam. To earn certification, an organization must have a network of instructors who are 18 years or older, General class or higher, are not related to candidates in their classes, and who have taught successful Novice licensing courses or who have been trained by the certified organization.

After discussions of what would be required for an organization to be certified, ARRL Hq. staff continued with a description of how the licensing procedure, once in place, would operate. An instructor would certify each student who passed the Morse code 5-words-per-minute requirement and then administer a written test of at least 20 questions from a large pool of questions generated by the instructor's certified organization and approved by the FCC. All grading would be done by the instructor; the FCC would only review applications and issue licenses.

The League's plan also takes into consideration those candidates for Novice who would not participate in formal Novice Training Courses. The FCC could continue its present Novice Volunteer Examiner Program, the demands on which would be substantially lessened by the proposed Organization Certification Program. Or, the FCC could refer all direct applicants to certified organizations that would in turn supply a certified instructor to

administer individual code and written tests.

The League's Hq. staff also presented ideas for volunteers administering the testing program for Technician, General, Advanced and Extra Class licenses. The proposed program for these levels would also depend on the FCC's certifying nonprofit organizations or accredited educational institutions in accordance with predetermined standards. To increase the security and integrity of the written exams at license levels above Novice, every certified organization would submit to the FCC a large number of questions and answers based on the categories listed in the FCC Study Guides. The FCC would then approve a pool of at least 500 questions for each written exam license level and release this pool to each certified organization. The organization would then create a large number of tests using different combinations of these approved questions, ensuring that all areas of the FCC Study Guides are covered in the Commission-specified ratio. ARRL staff also emphasized that the integrity of the Morse code tests at 13 and 20 words per minute is equally important.

The actual administration of the higher-level examinations would be conducted under "high-security" conditions. According to the ARRL's plan, the certified organization would locate *three* certified examiners in each area to be served and cooperatively determine dates and times that exams will be scheduled for that area. Each examiner must be at least 18 years of age and hold an Amateur Extra Class license. *Three* certified examiners would be required to be present during any examination for license classes above Novice. Exams would be graded at the site and all three examiners would certify on each applicant's FCC Form 610 or equivalent form that the candidate had passed. Random, unannounced monitoring of examination sites by the FCC would also be part of the plan.

Should a given examiner violate his or her agreement to follow the procedure or in any way demonstrate by misconduct that he or she should not remain certified, the certified organization would have the authority and responsibility to decertify that examiner. Similarly, should the FCC determine that a given certified organization has violated its responsibilities under the agreement, it would decertify the organization.

ARRL staff emphasized that its proposal would not exclude from the program any nonprofit organization that is willing to make the commitment necessary to maintain a credible, effective program. Nor does this proposal affect any of the excellent ongoing training programs at any level. If anything, these instructors will find more convenient opportunities for their students to be examined. This proposal does offer an opportunity to improve the service to the Amateur Radio community and restore the integrity of the amateur licensing program.

Next month's "In Training" column in *QST* will give a more detailed report on ARRL's plan to introduce certified organizations and volunteers into the FCC testing program. For further information, comment or discussion, ARRL members may contact Stephen Pink, KFIY, Training Program Manager, American Radio Relay League, 225 Main St., Newington, CT 06111 (tel.) 203-666-1541.

## W3HUM AND WA3YQC LICENSES REVOKED

FCC Administrative Law Judge Joseph P.

Gonzalez has revoked the licenses of W. Reed Everhart, Wood, Pennsylvania, for Amateur Radio Station W3HUM, and of James T. O'Rourke, Everett, Pennsylvania, for Amateur Radio Station WA3YQC. Judge Gonzalez also affirmed suspension of both men's Amateur Advanced Class Radio Operator Licenses for the remainder of their terms.

The judge made his findings in response to motions by the Private Radio Bureau for summary decisions. The purpose of a summary decision is to avoid a useless hearing where no issues of fact remain to be resolved.

The Bureau contended that the facts in both cases clearly indicated that Everhart and O'Rourke obtained Amateur licenses by fraudulent means with the assistance of Robert W. Kirkham, in willful violation of FCC rules.

It added that Everhart compounded his culpability by referring to Kirkham other individuals who had been unsuccessful in passing the required qualifying examination, and that such actions subvert the FCC's entire Amateur licensing program and clearly warrant license revocation and suspension. Everhart did not take issue with the Bureau's summary of the facts in the case or its request for revocation and suspension of his license.

The Bureau said that although O'Rourke withdrew his request for Kirkham's assistance, it stated that there was no indication that O'Rourke brought the fraudulent scheme to the FCC's attention. Therefore, the Bureau stated that revocation of O'Rourke's Amateur Radio station license and suspension of the Advanced Class operator license were warranted.

Judge Gonzalez stated that the undisputed facts indicate that Kirkham offered to assist Everhart in obtaining a preferred call sign, that Everhart gave Kirkham a signed FCC application form which Kirkham mailed directly to Richard C. Ziegler, then FCC Supervisor for the FCC's Gettysburg licensing facility. At Kirkham's request and as a favor to him, Ziegler completed Everhart's application indicating that Everhart had passed the required examination, even though he had not taken it.

Judge Gonzalez stated that Everhart knew when he received his Advanced license that he had not taken the requisite qualifying examination, even though he alleged that it was Kirkham who actually requested the upgrading. By accepting the license instead of reporting Kirkham and Ziegler to the Commission, the judge said Everhart clearly endorsed their actions on his behalf. He added that Everhart compounded his initial culpability by referring other individuals to Kirkham and by so doing helped to perpetrate the fraudulent scheme.

Therefore, Judge Gonzalez concluded that Everhart demonstrated that he lacked the requisite qualifications to remain a Commission licensee.

Although the Bureau acknowledged O'Rourke's claim that he withdrew his request for Kirkham's assistance, it stated that there was no indication that O'Rourke brought the fraudulent scheme to the FCC's attention. Furthermore, the Bureau contended that O'Rourke's acknowledgment of wrongdoing, after the facts became known to the Commission, was outweighed by his fraudulent behavior. Judge Gonzalez said that by attempting to circumvent the FCC's requirements and by failing to bring the fraudulent scheme to the Commission's attention O'Rourke demonstrated that he lacks the

necessary qualifications to remain a Commission licensee.

Thus, Judge Gonzalez granted the requests for summary decisions, and resolved the issues against Everhart and O'Rourke in the Bureau's favor.

The summary decisions become effective 50 days after their release unless exceptions are filed within 30 days or the Commission orders review within that time. — *FCC News Release*

## **CORDLESS TELEPHONES, GARAGE DOOR OPENERS AND BURGLAR ALARMS SUBJECTS OF ARRL ACTIONS**

Several manufacturers of cordless telephones have petitioned the FCC to permit more liberal operating conditions for these devices. Cordless telephones operate in the frequency range of approximately 1.6 to 2.0 MHz (base-to-portable unit) and approximately 49.0-49.9 MHz (portable unit to base). The manufacturers have requested that the base units be permitted to operate in the 1.6- to 2.0-MHz frequency range with up to 500 milliwatts. At ARRL's request, action on the petitions has been delayed until tests being conducted at the League's laboratories in Newington are completed. ARRL has obtained cordless telephone units and is testing their interference potential to the amateur 160-meter band.

In February 1982 *QST* "Happenings," page 60, we reported ARRL's petition to reverse the FCC decision allowing new, unlicensed radio-control devices in the bands 144-148, 220-225 and 420-450 MHz. Since that filing, manufacturers of radio-control burglar alarms, garage door openers, and other devices have come forward and opposed the League's petition. Mura Corporation and the Central Station Electrical Protection Association (CSEPA), for example, have objected to the League's petition to keep remote, radio-control security devices to be used in residences off the amateur frequency bands. ARRL has answered each of these filings with a "Reply to Opposition" petition. The League has also sought a stay of the FCC's decision, asking that use of the amateur bands for these purposes *not* be allowed while ARRL's petition is under consideration.

## **ATTENTION STUDENTS! SCHOLARSHIPS AVAILABLE**

The Foundation for Amateur Radio, Inc., a nonprofit organization with headquarters in Washington, DC, plans to award nine scholarships for the academic year 1982-1983. The Foundation, composed of 50 local area Amateur Radio clubs, fully funds two of these scholarships from the proceeds of the Gaithersburg (Maryland) Hamfest. It administers, without cost to the donors, two scholarships for the Quarter Century Wireless Association and one each for the Richard G. Chichester Memorial, the Radio Club of America, the Young Ladies' Radio League, the Edmund B. Redington Memorial and the Amateur Radio News Service. The last-named award is new this year.

Radio amateurs holding at least an FCC General class license or equivalent may compete for one or more of these awards if they plan to pursue a full-time course of studies beyond high school and are enrolled or have been accepted for enrollment in an accredited university, college or technical school. The scholarship awards range from \$300 to \$900, with preference given in some of them to

residents of specific geographical areas or the pursuit of certain study programs.

Additional information and an application form can be requested by a letter or QSL/postcard, postmarked prior to May 31, 1982 from Hugh A. Turnbull, W3ABC, 6903 Rhode Island Ave., College Park, MD 20740.

The Foundation is devoted exclusively to promoting the interests of Amateur Radio and to the scientific, literary and educational pursuits that advance the purposes of the Amateur Radio Service. — *Foundation for Amateur Radio*

## **YLRL SCHOLARSHIP**

The YLRL Scholarship pays \$300 to a YL who is studying for a degree in electronics, communications or related science. Preference is given to handicapped persons, but need and potential are also major considerations. Applications will be accepted during the month of May. Send inquiries to: Foundation for Amateur Radio Scholarships, 6903 Rhode Island Ave., College Park, MD 20740.

## **KA3ARF REVOKED FOR MALICIOUS INTERFERENCE**

The Private Radio Bureau of the FCC has revoked the Amateur Radio station license (KA3ARF) of Marc A. Chappelle, of Baltimore, Maryland, for malicious interference and other rule violations in the Amateur Radio Service.

The Bureau ordered the revocation October 7, 1981. Chappelle's General Class operator license had been suspended on August 14, 1981. Both actions were based on evidence collected by engineers from the FCC's Baltimore District Office which showed that KA3ARF had deliberately interfered with other amateur communications and transmitted obscene and profane language, one-way broadcasts, music, false messages and unidentified communications. Chappelle had also refused to cooperate with the engineers while they were inspecting his station.

The FCC had first detected the interference by monitoring an Amateur Radio maritime net on 14.313 MHz. The Baltimore Office traced the transmissions to Chappelle's station, inspected it, and later sent him an Official Notice of Violation detailing the offenses.

In its Order of Revocation the Bureau stated that "jamming or interfering with another amateur's transmissions cannot be tolerated . . . Even a single instance would warrant revocation." — *FCC News Release*

## **FUTURE PRIVATE LAND-MOBILE REQUIREMENTS IS SUBJECT OF NOI**

The Federal Communications Commission has initiated a Notice of Inquiry in PR Docket 82-10 to obtain information for determining the best overall strategy for meeting the future communications requirements of the private land-mobile user. Private land mobile radio is used extensively by doctors, police, firefighters, utility crews, truck drivers, ambulances, taxis, railroads, newspapers, foresters, repair personnel, manufacturers, roadbuilders and countless others, according to the FCC. Its use has grown tremendously in recent years, and is expected to continue to grow as fuel, labor and vehicle costs increase relative to communication costs. For example, a report submitted to the World Administrative Radio Conference in 1979 projected at least a seven-

fold increase in the numbers of private land mobile radio systems from 1975 to the year 2000.

One objective of the NOI is to solicit comments from the private land mobile user community on anticipated spectrum requirements. The second major area of the NOI concerns possible sources of spectrum to meet future private land-mobile communication requirements. According to the Commission, increased communications requirements can be met in a number of ways: additional spectrum, narrower channels, sharing with other services and technological innovations that allow increased communications capacity within a given amount of spectrum. Commenters are encouraged to provide detailed information about the future requirements for private land-mobile communications and the availability of suitable radio spectrum so that the Commission staff can evaluate all possible regulatory alternatives.

Interested parties may file comments on or before June 9, 1982, and reply comments or before July 7. Formal participants should file an original and five copies of their comments and other materials by sending them to The Secretary, Federal Communications Commission, Washington, DC 20554.

## **FCC POLICIES CONCERNING RADIO OPERATOR EXAMINATIONS**

The Commission frequently receives inquiries as to when the radio operator license examinations will be updated and what study materials to use. Some of the license examinations are relatively simple, and many individuals could pass them with a few hours of study. Others are more difficult and require a knowledge of electronics.

Applicants must generally determine for themselves how to best prepare for the examinations. Many acquire the necessary knowledge through engineering schools, trade schools, correspondence courses, self-study and/or military or company training programs.

The FCC does publish examination study guides for several of the more in-demand licenses. These guides outline the topics covered by the examinations. They are available from FCC field offices or from FCC, Washington, DC 20554.

The FCC does not certify schools or review study manuals; consequently, the FCC will not recommend a particular school or publication. However, adequate study manuals can usually be found in bookstores and public libraries.

There are a number of books available from private publishers which were written to teach the material necessary to pass the FCC examinations. Some of them are "Question and Answer" manuals containing questions similar to those on the actual FCC examinations. While most of these publications include explanatory text which is designed to educate the reader, there are a few which emphasize rote memorization to specific questions and answers. The goal of such "memory texts" is to enable unqualified individuals to pass the examinations without having to learn the subject material.

Therefore, in order to maintain the integrity of the examinations, the FCC changes the questions periodically without notice. The best way to assure a passing score is to develop a thorough understanding of the subjects involved. — *FCC News Release*

# Canadian NewsFronts

Conducted By Harry MacLean,\* VE3GR0



CRRL Officers and Directors

**President:** A. Mitch Powell, VE3OT  
**Honorary Vice President:** Noel B. Eaton, VE3CJ  
**Secretary:** Thomas B. J. Atkins, VE3CDM

**Directors:** Albert G. Daemen, VE2IJ  
Raymond W. Perrin, VE3FN  
A. George Spencer, VE6AW

**Counsel:** B. Robert Benson, Q.C., VE2VW

CRRL, Box 7009, Station E, London, ON N5Y 4J9

## Sweeping Clean in VY1

For several years now we've had a plan for cleaning up in November Sweepstakes. Everyone knows that VE8/VY1 is the hardest section to get. Not everyone knows that all the islands in Hudson Bay and James Bay are in the Northwest Territories. If you could run a portable operation from an island in James Bay, you'd not only be VE8; you'd also still be far enough south to get a clear shot at every other ARRL section. You'd sweep clean.

When the urge to go north is particularly strong, we buy top maps, check out Ontario Northland Railway schedules, and wonder who gives people permission to land bush planes on islands. But then we ask ourselves, "Who really needs to be on a barren, windswept island, in the middle of James Bay, in the middle of November?" It's not as if you lived in Utah and had a similar urge. Then you'd just head up the Alaska Highway to the Yukon. We'll let Larry Strain, N7DF, tell his story.

"On November 14, my brother, KØHGW, and I arrived in Whitehorse after some really harrowing driving over icy roads between Watson Lake and Whitehorse. We had decided to go on from our proposed operating site near Watson Lake, since the road to the Pine Lake airstrip was not open and we didn't feel like

plowing through a 2-km stretch of deep snow to get there. We considered the Squanga airstrip as an operating site, but after we got to Whitehorse, we found a much better place.

"In Whitehorse, we were welcomed by the whole bunch of VY1 fellows, including VY1AD, AL, BE, BQ, CC, CJ and DD. They helped us get settled in the Taku Hotel, where we stayed for four nights before moving into Frank, VY1DD's camper-trailer for the contest operation. On the Thursday before the contest, Ron, VY1AD, arranged an interview with the CBC about our trip and the contest. That afternoon, Frank took the trailer to a DOT airway beacon site north of Takhini, which Ron had gotten us permission to use. It was an ideal location, with tower mounts and ground radials already in place.

"We set up the tower and assembled the antenna on Thursday afternoon. On Thursday night, we were wakened by the RCMP who thought that we had stolen Frank's trailer! They called him at 4 in the morning to confirm that it was all right to have it there! On Saturday, we made final preparations and took pictures.

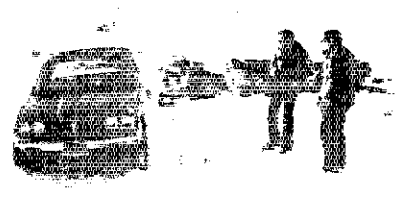
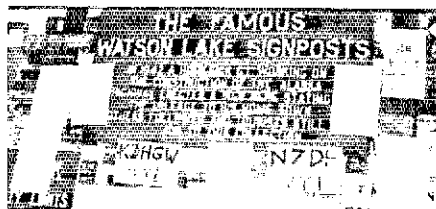
"We were in the contest right from the start. We quickly learned that we were not loud enough stateside to create a pileup, so we

started tuning and calling. Kirk, VY1CC, and Peter, VY1CJ, were both in the contest as single-operator stations. We ran just a little ahead of them for the first two hours. Then, they both shut down and came to our site to operate for a while. Later, they returned to their homes, and Peter set a new single-operator record for VY1.

"We finished with just over 900 QSOs before dupes and got the first-ever clean sweep from the Yukon. Many, many stations told us that we had given them their first-ever clean sweep, so we felt that we had really accomplished our purpose.

"On Monday morning, we left Whitehorse. We had been on the road for only three and a half hours when our truck skidded. It went down a 15-foot embankment and rolled several times. Neither my brother nor I was hurt, but the truck was totalled. We set up the hf station at the accident site to call for help. The fellows from Whitehorse showed up promptly to rescue us. They helped us salvage the radio equipment and they packed it up for shipment home. We returned home — by airplane!

"Both KØHGW and I will always have fond memories of a great bunch of guys, and their YLs, from the Yukon." — *Larry Strain, N7DF*



Left: The famous Watson Lake signpost, as modified by KØHGW and N7DF. Centre: N7DF operates in November Sweepstakes from Whitehorse, Yukon Territory, while VY1DD makes certain of compliance with DOC regulations. VY1DD is the local DOC inspector! Right: End of the road for KØHGW's 1978 Toyota pickup that skidded on the ice and rolled over several times (N7DF photos)

## DOC NEWS

Through clubs, Canadian amateurs have now received reprints of the *Canada Gazette* in which DOC gave notice that it intends to amend several regulations affecting the Amateur Service. If adopted without change, (1) 1.8-1.9 MHz will be restored to full use. In many regions of Canada, day/night power restrictions will continue to apply to 1.9-2.0 MHz. In some regions of Canada no operation will be permitted on this half of the 160-meter band. (2) DOC will designate emissions using the new system required by IFRB, the International Frequency Registration Board. (3) Section 50, having to do with foreign amateurs operating in Canada under reciprocal agreements, will remain unchanged except that such amateurs will have full access to the 144-148 MHz band. (4) 6-MHz bandwidth will be permitted for standard television, IFRB emission type C3F. Slow-scan television, IFRB emission type F3E, will be permitted on all hf bands. (5) The

rule that the carrier of a transmitter must be suppressed during periods of reception when the transmitter operates below 51 MHz will not apply to 29.5-29.7 MHz. This will permit repeater operation on 10 meters. The *Gazette* notice was dated December 26, 1981. Amateurs and others were given 90 days in which to make comment. CRRL would appreciate receiving copies of comments forwarded to DOC.

DOC continued to accept comment on its corrected proposal for a new TRC-24, the syllabus for all Amateur Radio examinations, until April 1. If the proposal is adopted, a new TRC-24 should appear this summer. Implementation will likely take another year. DOC wants to give amateurs and amateur organizations time to revise their licencing materials — a wise and much-appreciated move.

## CRRL NEWS

Mark your calendars and plan to attend the ARRL-CRRL Midwest Convention, to be held in Saskatoon, Saskatchewan, July 1, 2 and 3 of this year. The program will feature top Canadian amateurs speaking on a host of technical topics. League Headquarters will

be represented by Club and Training Manager Steve Place, WB1EYI, and Gerry Hull, VE1CER, who works in the League's Technical Department. For more information on the program, and information on where to stay, contact Wally Andrews, VE5IX, 1485 East Heights, Saskatoon, SK S7J 3B2.

Amateurs in British Columbia and Nova Scotia have written to CRRL about cable television interference to 2-meter operation. Cable television channel E operates in the lower half of our 2-meter band. On certain cable systems, channel E radiation is able to desense 2-meter fm receivers operating several hundred feet away. For more background on this problem, read the article in February *QST*. If you have experienced this kind of problem, contact CRRL. The information you submit will be used as documentation for a brief being prepared for DOC.

CRRL representatives met with DOC in Ottawa late in February. Topics discussed included DOC's proposed amendments to regulations affecting the Amateur Service, reciprocal licencing privileges for foreign amateurs, and the new syllabus for Amateur Radio examinations. We'll have more details next month.

\*163 Merldene C. W., London, ON N5X 1G3

# International News

Conducted By Richard L. Baldwin,\* W1RU

## BURMA

The following letter has been received from the Posts and Telecommunications Department, Ministry of Transport and Communications, Socialist Republic of the Union of Burma, addressed to the chairman of the International Amateur Radio Union. Subject, Closure of Amateur Radio License and Amateur Radio Communications.

Dear Sir,

Please be notified that this administration objects to radio communications from Radio Amateurs all over the world to any Radio Station within the Socialist Republic of the Union of Burma as no Amateur Radio License has been issued to any radio station in the country and that Amateur Radio Communications to and from the country is strictly prohibited.

The undersigned would therefore be very grateful if you would please circulate this information to all Radio Amateurs of the International Amateur Radio Union for their kind cooperation in accordance with Article 41 para 1560-1 of the Radio Regulations (1979).

Yours faithfully,  
/s/ Commander Lin Thain Moug  
Director-General

14 December 1981

This letter demonstrates that Amateur Radio is not currently authorized by recognized Burmese authorities, and that the attitude of the Burmese government towards radio amateurs is surely the least supportive at the present time of any administration. IARU will maintain contact with Commander Lin in an effort to establish a more supportive stance.

## BAHRAIN

Effective March 1, 1982, all Bahrain call signs were modified to replace the first letter "X" after the prefix of A9 to the figure 2. Thus, the call sign A9XDD has become A92DD.

Incidentally, the gentleman who is the Minister of Information for Bahrain and is in charge of the Licensing Administration also serves as the president of the Amateur Radio Association Bahrain. That's close liaison!

\*Secretary, IARU

## REGIONAL IARU SECRETARIES

The world has been divided into three regions for telecommunications purposes, and so we have the three regions of the International Telecommunication Union (ITU) and the International Amateur Radio Union (IARU). If you have news and other information about Amateur Radio in your region, please share it with your IARU regional secretary. Region 1 (Europe, USSR, Africa) — Eric Godsmark, G5CO, c/o Region 1 Secretariat, 1 Priory Court, Barley Lane, Goodmayes, Essex, England IG3 8XN. Region 2 (North and South America) — Pedro Seidemann, YV5BPG, P.O. Box 2253, Caracas 1010A, Venezuela. Region 3 (the Far East, Australia, New Zealand) — David Rankin, 9VIRH, P.O. Box 14, Pasir Panjang, Singapore 9111, Republic of Singapore.

## CHINA

Interest in what is happening or what will happen in China continues to be reflected in much of the mail at IARU Hq. An editorial in the January 1982 issue of "Wuxiadian," a monthly radio magazine published in Beijing, by-lined by Mr. Cheng Ping, secretary-general of the Radio Sport Association of China, will be of interest to our readers. (We are much obliged to JA1AN and KM2X for this translation.)

### Development of Amateur Radio Activities Authorized

Cheng Ping  
China Radio Sport Association

Thanks to the support given by all leading bodies concerned and through the active preparation made by departments involved, the Supreme Executive Council of China has officially approved the re-opening and development of the long-awaited activities of Amateur Radio in China.

Amateur Radio stations to be established shall be organized on club system basis with a leader in charge.

First station to open will be in Beijing where conditions are already met for operation, then followed by other stations to be installed in provinces, regions and cities.

After operating for some time, all experiences accrued from these activities will be put together

by gradual steps in order to facilitate the extension of the scope of activities as well as to perfect the system and method of management.

Possible sites envisaged for establishing Amateur Radio stations are: various military physical educational schools, universities, colleges, youth culture centers and science and technical institutions that will meet the objective requirements.

Persons participating in Amateur Radio activities should support the guiding principle of the Chinese Communist Party, devote themselves to the socialistic motherland and obey the national laws and governing regulations of radio communication. Also, they should cherish the idea of internationalism and humanism, have lofty character and respect culture and manners. In addition, they must actively pursue their work and endeavor to raise technical standards, thus devoting to the progress of society and bringing peace to mankind.

Each of the club stations should file application for opening of a radio station and acquire a license. For the time being, no permit will be issued to stations on an individual basis. Those wishing to take in Amateur Radio must first receive training in this art, pass the examination and acquire certification for operation before participating in the activities of the designated club stations.

Use of frequencies, extent of communication and activities will be, in general, along the lines established in the international Amateur Radio regulations.

The development of Amateur Radio activities will not only be instrumental in training persons with talent in the radio telecommunications and electronic fields, but also provide ground for study and experiments of scientific techniques to many of the Amateur Radio enthusiasts. Furthermore, it will be able to promote technical exchanges with ham enthusiasts both in China and foreign countries as well as to enhance the friendship between them.

In particular, the youth can greatly benefit from this development in that it will enlarge their mental vision and raise their desire of taking part in this activity. It will also enrich their scientific knowledge and greatly develop their talent in this field. It will go a long way in making an all-around development of intelligence, virtue, the body and, as a link of four modernization programs, train potential technical personnel in radio telecommunication technology.

Presently, the China Radio Sport Association is actively making preparation for this program and it will not be too long before BY1PK will be on the air.

Again, we urge all amateurs to exercise patience and restraint. Amateur Radio is on the verge of returning to China, but an unauthorized operation, a too-eager approach by a visiting amateur, might jeopardize the process. Cool it!



## Strays

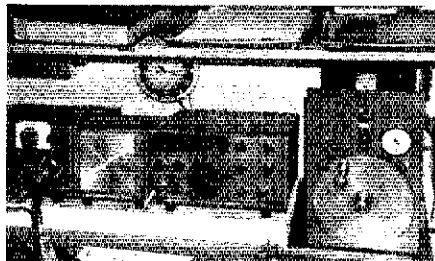


### HYDRAULIC ROTATOR: A BETTER IDEA?

Forty-two years ago, Vic Lotter, W9DRI, designed and built a remote-controlled, simple and unique hydraulic rotator and indicator. Basically, it's a hydraulically driven piston located near the top of the tower, remotely operated from a shack console, which raises a shaft at the top of the tower about 12 inches. The shaft, to which the beam antenna is at-

tached, has a longitudinal spiral groove with a pitch of one turn in 12 inches that rides in a threaded nut (with the same pitch) fixed to the tower. As the threaded shaft is raised, it makes one affixed antenna 360 degrees. By actuating the hand-controlled wheel on the console (bottom right in the photo), the hydraulic pressure is relieved and the threaded shaft lowers by itself through the weight of the beam antenna assembly. In so doing, the beam is turned back to its original position. A direction indicator in the shack console is included. It is mechanically actuated by the same hydraulic action.

Yep, 42 years ago and it's still doing its job. No electrical wiring, no motors, no pots! Congratulations, Vic, on a nice piece of work. — Andrew Pfeiffer, ARRL TA



After coming up with the idea 42 years ago, Vic Lotter, W9DRI, of Seymour, Wisconsin, provides details of his hydraulic tower rotator. It is remotely controlled from his shack by means of the wheel at the lower right side of the photo.

# Moved and Seconded

## MINUTES OF EXECUTIVE COMMITTEE MEETING NO. 397 FEBRUARY 6, 1982

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 8:31 A.M. on Saturday, February 6, 1982, at the Airport Ramada Inn, Miami, Florida.

Present were President Harry J. Dannals, W2HD, in the Chair, First Vice President Carl L. Smith, W0BWJ; Directors Gar Anderson, K0GA, Mitch Powell, VE3OT, William J. Stevens, W6ZM, and Stan Zak, K2SJ0; and General Manager Richard L. Baldwin, W1RU. Also present for various portions of the meeting were Vice Presidents Larry E. Price, W4RA, and Max Arnold, W4WHN; Directors Jesse Bieberman, W3KT, Frank M. Butler, W4RH, Lys Carey, K0PGM, Paul Grauer, W0FIR, Jay Holladay, W6EJJ, Clyde Hurlbert, W5CH, Mary Lewis, W7QGP, Edmond Metzger, W9PRN, Gay Milius, W4UG, Leonard Nathanson, W8RC, John Sullivan, W1HHR, and Raymond Wangler, W5EDZ; Honorary Vice President Victor C. Clark, W4KFC; Vice Director John Kanode, N4MM; Assistant General Manager David Sumner, K1ZZ; and Chris Imlay, N3AKD, of the General Counsel's office.

On motion of Mr. Zak, the Committee recognized the names of 58 individuals who had recently been elected to Life Membership, and directed the General Manager to list their names in QST.

On motion of Mr. Stevens, the Committee approved the affiliation of the following clubs: Albuquerque Amateur Radio Club, Albuquerque, NM; Clear Creek Middle School ARC, Buffalo, WY; Cochise Amateur Radio Assn., Sierra Vista, AZ; Flambeau Amateur Radio Club, Phillips, WI; Gila Amateur Radio Society, Silver City, NM; Grand Strand Amateur Radio Club, North Myrtle Beach, SC; Greater Pee Dee Radio Society, Marion, SC; Green Mountain Wireless Society, Rutland, VT; Hiawatha Valley ARC, Red Wing, MN; Highland Amateur Radio Assn., Hillsboro, OH; Kansas DX Association, Salina, KS; Northland Amateur Radio Club, Washburn, WI; Rappahannock Amateur Radio Assn., Dunnsville, VA; River City Contesters, Carmichael, CA; Shelby County ARC, Pelham, AL; and Southwest Missouri Hams Club, Joplin, MO.

(With the above action we now have 1728 Category I clubs, 9 Category II clubs, and 226 Category III clubs, for a total of 1963.)

On motion of Mr. Anderson, approval was granted for the holding of the following ARRL conventions: Arkansas State\*, April 3-4, 1982, Little Rock, AR; Great Lakes Division, April 17, 1982, Muskegon, MI; Texas State, June 4-6, 1982, Dallas, TX; Oklahoma State, July 23-25, 1982, Oklahoma City, OK; Midwest

Division, April 15-16, 1983, So. Sioux City, NE; Northwestern Division, July 8-10, 1983, Spokane, WA.

\*Arkansas State has been upgraded from an ARRL Approved Hamfest by Director Hurlbert.

In accordance with Standing Order #59, the General Manager reviewed the status of various Board directives. A copy of that review is attached. In addition, the pamphlet guide for solving antenna zoning problems which was originally mandated by the Board at Minute 31 of the July 1977 meeting and a draft of which remained in the hands of legal counsel for much of the ensuing time, has been completed and is now being printed. Copies will be distributed to directors prior to the Board Meeting.

On motion of Mr. Stevens, the Committee voted approval of a 1981 deficiency appropriation for the CRRRL Hq. account in the amount of \$3000.

On motion of Mr. Anderson, approval was granted for a filing with the FCC of ARRL comments in opposition to the use of cordless telephone in the 160-meter amateur band.

On motion of Mr. Zak, approval was granted for a filing with FCC relating to the Regulatory Flexibility Act and its provisions concerning the ban on 10-meter linear amplifiers.

After discussion, on motion of Mr. Anderson, the Committee voted to reduce the amount of funding previously reported for Attorney Lawson from \$5000 to \$2500, in view of the settlement of the Karagozian case.

After extended discussion, on motion of Mr. Stevens the Committee voted not to supply funding for the Cron covenant case, because of the limited chance of pursuing the case through to a successful conclusion.

The Committee reviewed the request for funding in the case of Harvey S. Ellis, W8B8CM, and found that all of the information required of applicants for League funding had not been supplied. The committee therefore declined to take further action at this time.

On motion of Mr. Powell, the Committee voted approval of the application of the Bangladesh Amateur Radio League for membership in IARU.

On motion of Mr. Powell, the Committee voted approval of the Hamilton Technical College Amateur Radio Club.

The Committee reviewed the nominations of two candidates for Honorary Vice President and found that in one instance the candidate lacked the required years of service as required by the Standing Orders, and that in the other case the letter of nomination did not substantiate the criteria established by the Standing Orders.

On motion of Mr. Stevens, the Committee approved the Radio Club Group Liability Insurance Pro-

gram presented by Director Wangler, Chairman of the Management and Finance Committee.

During the course of the meeting the Committee discussed, without formal action, the following matters: the ARRL legal kit, additional microphones for use at the March Board Meeting, the National Convention program and associated activities, the status of an ARRL slide show, fiscal responsibility, the status of ARRL's petition for an expansion of the 20-meter phone band, beacons in the amateur bands, an orientation program for new directors, and the status of the search for a new general manager.

The next meeting of the Executive Committee is scheduled for 9:00 A.M. on Wednesday, March 17, 1982, at the Hq. offices in Newington.

Respectfully submitted,  
Richard L. Baldwin, W1RU  
Secretary

## LIFE MEMBER APPLICANTS FEBRUARY 6, 1982

Richard T. Ayers, KA8DSD; Michael D. Borton, KA2AFE; Edward Carway, WA2MIF; Carol L. Colvin, AJ2I; Robert M. Cook, N2SB; Charles H. Cullum, N3CHN; Darrel Daley, KL7DN; Joe Davidson, WB1DHJ; Herman N. Davidson, WB5RSH; Andrew J. Deskur, KA1M; John T. Desmond, K0TG; John Devoldere, ON4UN; William M. Dockstader, W7LSK; Glenn T. Duncan, WA4JXI; Edward S. Eby, KF1B; David W. Eckert, KB8V; Joseph E. Ferrero, N1BHC; Allen R. Friedman, K6YRA; J. Fugate, AG4F; Theodore A. Geyler, KA7DLX; Martin E. Goldhaber, W3KBZ; Ronald B. Greene, N6IB; Kenneth R. Harrigan, KB2LT; Royce J. Harrod, WA5QPW; John M. Hoffman, WB4GJZ; David W. Hughes, KD4BW; Sylvester P. Janczak, WD9JKZ; Dale G. Jones, N7CPI; Craig R. Jungers, K7EXJ; Otto A. Kohl, Jr., K6IO; Dennis LeBlanc, WB9OKD; Bobby D. Leathers, WD5GLP; John Leverton, WA1TMA; Warren G. Long, WD5GKT; Eric Lund, EA8TY; Robert P. Marlice, WA7WIE; John A. Masterson, N7CKQ; Robert C. Mershon, WD9BFK; James W. M. Monde, W1OKG; Steve Morgan, WB4NHO; Paul K. Pagel, N1FB; Mike Piller; Darryl J. Roberts, WA6OOO; Donald G. Roberts, KB8VXX; Russell R. Roberts, Jr., KH6JRM; Robert J. Schenck, Jr., KA9JMG; Larry R. Shore, WB6SRM; Della A. Short, WB7NDD; Paul E. Stonaker, WB3JRD; Richard A. Suhar, KB8WHA; Richard D. Thomas, WA7VKE; A. E. Tilley; E. L. Ulrey, K5HZR; Perry Westrope, WA6LLB; Gary Norman Whiting, W7MGG; Gary L. Wodtke, N8BTK; Stephen W. Wolf, WB8IKO; William B. Zachary, N6OP.

## 50 Years Ago

### April 1932

□ In his editorial, K. B. Warner points out that the five-meter band is at a stage about where 200 meters was during the spark days — essentially a short-range operation. He thinks there is an excellent opportunity for development work and suggests that more hams "give it a go." Crystal-controlled rigs and better antennas are just a couple of the obvious fields.

□ "Fundamental Crystal Control for Ultra-High Frequencies," by Harold Staubel, the cover story, is a translation by G6PP of the original German article. It is a report on the German work with oscillating tourmaline crystals at wavelengths as low as 1.2 meters. Ordinary vacuum tubes worked as low as 2 meters, but a special tube was required for the 1.2 record.

□ Technical Editor James Lamb discusses "Stabilizing Superheterodyne Performance," pointing out that much attention is paid to transmitter (frequency) stability but little or none to that of the receiver. He gives practical circuits for utilizing the Cmdr. Dow "electron-coupled oscillator" principle to superhet receivers.

□ Assistant Communications Manager Ev Batteny describes "The December Transcons" in a 9-page story. Held on two weekends in December, the

12-hour tests were to see how quickly messages could be relayed from one coast to the other and back again. The 160-meter weekend wasn't quite as successful as the 80-meter one, as might be expected. Best time on 160 was 2 hours 10 minutes (9 relays), and 16 minutes on 80 (W6AM-W5VQ-W2AUS-W5VQ-W6AM).

□ "Simplified Remote Control for Amateur Transmitters," by Henry Hayden Jr., W2FO, tells how the apartment dweller or other cramped-for-space ham can locate the transmitter in some convenient niche and control it remotely. A time-delay relay for the power supply and a keying relay do the trick.

□ "The Economical Design of Smoothing Filters," by Dellenbaugh and Quimby, the last of the three-part series, rounds out this classic with eight pages of design charts and formulas. Mention is made of resonance in incorrectly-proportioned filter sections.

Hammarlund Manufacturing advertises the "Comet 'Pro' " 8-tube superheterodyne, . . . which will do all that the professional operator demands between 14 and 200 meters."

## 25 Years Ago

### April 1957

□ David Muir, W9DZY, describes his "Grounded-

Grid Tetrode Kilowatt," a neat and efficient looking pair of 4-400As. Negative bias is used on the control grids and positive on the screens, thus keeping the elements within their ratings.

□ The "Three-Band Cubical Quad System" of Glen Leach, W4NNQ, uses the same (wavelength) spacing on each band, along with separate feed lines. The 40-lb. homemade "spider" assembly is mounted on a section of 1-inch pipe.

□ Using a different approach, the "Compact All-Band Antenna," by Larsen E. Rapp, employs a ferrite core and copper tubing to realize the title. A single feed line of RG-8/U is all that is required, and the system shows great promise according to the author.

□ Walter Bain, W4LTU, recounts some of his experiences and observations in "V.H.F. Meteor Scatter Propagation." His 5-page article includes a table of meteor-shower data for v.h.f. use.

□ The second part of Technical Editor George Grammer's series on "Simplified Design of Impedance-Matching Networks" treats pi and T networks. It includes examples of typical applications.

□ The Fifth Edison Radio Amateur Award for public service, sponsored by the General Electric Co., was awarded to Mrs. Mary Burke, W3CUL, for her outstanding traffic work. The presentation of the gold cup (and \$500 check) was made at a ceremony in Washington, D.C., where Rear Admiral H. C. Bruton, USN, Director of Naval Communications, was the principal speaker. — Byron Goodman, W1DX



## Where Do The Rules Come From? — Part 2

Somewhat less exhilarating, perhaps, than the stalking and capturing of a VKØ beast on Macquarie Island, is the active role amateurs play in the rule making procedures of the Federal Communications Commission. However, the role is important — the rules are at the very core of Amateur Radio, and deserve the awareness of every radio amateur. This month we complete our discussion of rule making procedures with a look at Reports and Orders, Petitions for Reconsideration, Court Appeals and other courses of rule making actions.

### The Report and Order

Last month we examined the Notice of Inquiry and Notice of Proposed Rule Making as stages in the process toward possible rule making. The means by which amateurs may comment and reply to Commission proposals were presented. These comments and replies to a notice are reviewed by the office that prepared the notice. In amateur matters, the responsible office is usually the Personal Radio Branch of the Private Radio Bureau's Rules Division. A draft Report and Order will be prepared by that branch and submitted to the chief of the Private Radio Bureau. A draft Report and Order must be approved at each level within the Bureau, and then coordinated with each other interested bureau or office before being presented to the Commissioners for their consideration and approval. Revision of the Report and Order may take place at any stage. Finally, the matter will be considered by the seven (or a quorum of) FCC Commissioners at a meeting usually open to the public. The Commissioners usually request discussion by staff members most familiar with the subject at hand. The Commission may adopt the Report and Order with its rule amendments, may order revisions in the document, or may terminate the NPRM without amending any rules.

Contrary to widespread belief, the rule finally adopted need not be identical to the proposal. In numerous appeals, the United States Courts of Appeals have held that there need be only some relationship between the proposal and the rule finally adopted. The Commission, however, must incorporate in the rules adopted a concise general statement of their basis and purpose.

### Petitions for Reconsideration

Section 405 of the Communications Act of 1934, as amended, affords any "person aggrieved or whose interests are adversely affected" by an order (a new or amended rule) the right to petition the Commission for reconsideration. The petitioner shall state with particularity the respects in which the petitioner believes the action taken by the Commission should be changed. A Petition for Reconsideration *must be filed within 30 days* of the date of public notice of the final Commission action (Sec. 1.429). For documents in notice and comment rule making proceedings that date is the date of publication in the *Federal*

### ARRL Rule Making Actions

The League continuously monitors FCC Amateur Radio regulatory proceedings, and participates formally in the majority with comments and replies to Commission proposals. Members have an important say in the manner in which ARRL responds. News of significant proceedings are carried in such QST forums as "Happenings" and "League Lines." If you feel strongly about a certain rule-making matter, voice your opinions to your ARRL Division Director (name and address appears on page 8 of every QST). It is the League's Board of Directors that effects ARRL policy, and it is your elected representative on this Board that assures that your voice will be heard.

*Register* (see Sec. 1.4 for the date of public notice of other types of documents).

A Petition for Reconsideration usually is referred to the same Bureau that prepared the original Report and Order. From a practical standpoint it is virtually impossible to obtain favorable action on a Petition for Reconsideration if no new facts are presented. Occasionally, however, if the petitioner shows good cause, the Commission may grant the Petition for Reconsideration and modify the earlier order.

The physical requirements for petitions and comments are the same for Petitions for Reconsideration. Additionally, it must not exceed 25 double-spaced typewritten pages. Oppositions to Petitions for Reconsideration must not exceed this length as well. Replies to oppositions are limited to 10 double-spaced typewritten pages (Sec. 1.429). An original and 11 copies must be filed (Sec. 1.429).

The effective date of a new or amended rule is not automatically postponed by the filing of a Petition for Reconsideration. If a stay of the effective date of the rule amendment is desired, the petitioner must specifically request it and must show good cause why the rule should not go into effect.

### Court Appeals

Court review may be sought under Section 402(a) of the Communications Act. The Court may either affirm the action of the Commission, reverse it or remand it to the Commission for further consideration. A Court would set aside a rule making action of the Commission if the Commission exceeded the authority delegated to it by Congress, or if there was some prejudicial error. The Court traditionally has followed the policy of not substituting its judgment for that of the Commission because of the Commission's expertise in the field of radio communications.

If the Court remands a rule-making matter back to the Commission, usually it will be handled by the same bureau that handled it originally.

If the Court affirms the Commission, a petition for writ of certiorari may be filed with the Supreme Court of the United States.

### Other Courses of Action

It is clear from the foregoing discussion that

### Major Pending Dockets Affecting Amateur Radio

Docket	Subject(s)
20654*	An inquiry into interference from spark-type ignition systems in motor vehicles. Reviewed in 1980, continued without action.
20990**	Allow security and remote control devices in the amateur bands above 220 MHz on a shared basis. (see February 1982 QST "Happenings".)
78-307*	NOI on investigating a consumer-oriented grading system for TV receivers.
78-369*	RFI Docket; Further NOI released. (See September 1981 QST, pp. 9 and 58, and December 1981 QST, pp. 70-71.)
79-144*	NOI to solicit comment on effects of rf exposure standards on radio services and equipment; and whether FCC should adopt interim regulations to protect health of employees exposed to radiation in excess of national standards. (See "Happenings," March and August 1980 QST.)
80-135*	NPRM proposing inland expansion of 420-450 MHz Radlolocation. (See "Happenings," September 1981 and December 1981 QST.)
80-739*	Inquiry into implementation of 1979 WARC Final Acts. (See April, July, August, September, October, November 1981 QST and January 1982 QST.)
81-414	NOI/NPRM to allow use of spread-spectrum in amateur bands. (See "Happenings," September and December 1981 QST.) Replies due by April 15, 1982.
81-699*	NPRM to allow additional digital codes in amateur bands. (See December 1981 QST, "Happenings".)
81-823	NPRM to allow automatic control for beacon stations. (See February 1982 QST "Happenings.") Reply comments by April 15, 1982.
82-83	NOI/NPRM for phone sub-band expansion. (See "Happenings," p. 57.)

\*Filing deadlines for comments passed. Awaiting Commission action.

\*\*Adopted; awaiting Commission action on petitions for reconsideration.

Petitions for Reconsideration and appeals to the Courts are not guaranteed to bring about changes in rules adopted by rule making. Thus, the most practical course is to file a new petition for rule making after experience has been gained with the new or amended rules and it can be demonstrated that the rule, as amended, is not in the best interest of the amateur community.

### Have a Question?

For information concerning pending Amateur Radio rule making matters, write the conductor, Richard Palm, K1CE, 225 Main St., Newington, CT 06111.

\*Assistant Manager, Membership Services, ARRL

# Correspondence

Conducted By Bruce R. Kampe,\* WA1POI

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

## CABLE: THE INS AND OUTS

□ I feel responsible to respond to an article on page 9 of the February issue of QST. The article is "A New Strain of RFI Virus" by Mr. Richard Palm. These comments are my own and do not necessarily reflect the position or philosophy of the company by which I am employed.

I am the technical (engineering) manager of a large cable television (CATV) system being constructed in the Midwest and have been in cable TV engineering management for 10 years and in CATV since 1961. I believe this industry is a stable, progressive, growing industry which has contributed to the economic growth of this country by providing good jobs for thousands of electronic technicians and engineers, a significant number of which are highly skilled and respected Amateur Radio enthusiasts.

I must generally agree with a majority of Mr. Palm's allegations. His concerns are valid and indeed they deserve to be expressed. In a constructive manner, however, I would propose some alternatives concerning solutions.

While economics certainly does influence the positioning of programming on the several channels, cable system video carriers are required by law to have a frequency tolerance of  $\pm 25$  kHz. This is indeed monitored by the FCC on a regular basis and definitely not with "minimal government intervention." Our systems have normally been checked in some manner by the FCC nearly annually, and we do our own complete proof-of-performance testing on a semi-annual basis, exceeding FCC requirements by a rather comfortable margin.

One of the highest priority items facing CATV systems today is detection and control of ingress and egress of rf energy into and out of the theoretically "isolated" system. Those older cable systems which continue to have radiation problems are being forced to "clean up" as egress of rf energy means ingress also and the corresponding interference on the cable system by devices of totally legal origin. This, of course, causes dissatisfaction by paying customers which is money out of the operators pocket.

Newer systems normally run a continuous monitoring of radiation with special devices to avoid, detect and/or locate any cause of radiation. All of our systems are required by policy to do this, and we appreciate information received from hams (or anyone else) on potential ingress and egress problems. We prefer this method to running to the FCC for more regulations or abandonment of income-producing frequencies.

An inference was made that is painfully truthful. It is that cable systems have at times flippantly placed blame for interference complaints on "ham radio." The statement was

made that "cable companies promulgate the myth that the amateur is at fault." I must admit that all too often this does occur. However, I have had this brought to my attention by an extremely polite amateur group in one of my systems. We listened, and reacted promptly and positively! We immediately removed all such references from our printed material and instructed our personnel to cease any such general references.

My point is this. Before proposing government intervention, please make an attempt to discuss these problems with the technical staff of the involved systems on a local and if necessary, corporate technical level. I believe the CATV industry is anxious to have the opportunity to do as excellent a job of self-policing itself in these matters as Amateur Radio has done. If I am wrong and that doesn't work (it will in systems in which I have responsibility), then government intervention may become necessary.

I would hope that the statement "Amateur Radio needs your help" could be replaced by "Cable systems will cooperate, with your assistance". Contact your local CATV technical staff and ask for their cooperation. There are national cable television organizations which I feel would be willing to assist if they are made aware of the areas of concern.

Personally and professionally, I feel that Amateur Radio and its enthusiasts are extremely valuable friends to this industry. We understand and respect the "rights" of radio amateurs and hope for reciprocation, concerning the "rights" granted to us. A large percentage of technical staff employed by CATV consists of hams. Let me make this an offer to continue (or begin if that is appropriate) a concerted effort of cooperation and mutual assistance between our groups.

I feel the last three paragraphs of the above mentioned article indicate a general agreement with my philosophy, and I heartily concur, except that I hope that "banishment from our bands" by anyone is unnecessary. — *Par Peterson, Eden Prairie, Minnesota*

## IT REALLY LOOKS LIKE IT

□ Seeing the "weird shape" of the Wouff Hong in the January '82 "It Seems To Us" instantly reminded me of the friendly outstretched hand of my "Elmer" when we first met and he introduced me to the wonderful and exciting world of ham radio.

While he was quick to "attack and pitilessly expose poor operating practices and discipline their perpetrator," he was equally quick to extend his hand to assist with a problem or congratulate an achievement.

The significance of the Wouff Hong. See it when you next assist a would-be or fellow ham. — *Burton Armbrust, Sr., WB8EBS, Iron Mountain, Michigan*

[Editor's Note: Mr Armbruster enclosed a picture of an outstretched right hand with the palm facing left. It really looks like a Wouff Hong.]

## THERE, BUT NOT THERE

□ When I moved back to New Jersey after 3-1/2 years in North Carolina, the FCC reissued my "4 land" call to me, leaving me holding the bag.

Now, almost every contact with a DX station requires an explanation that my call is correct, even though it does not match the call-area of this state. It's gone so far that I have been chewed out by stateside hams for not signing "portable two." Let's get the facts straight.

I don't like the idea of what I believe to be a breakdown in the call-area structure within the states. A DX station worked today was quite upset with not only the disarray of call areas, but also all the new U.S. calls. He complained that calling what he thought was U.S. possession turned out to be a station that was located in California. It seems the DX stations are really the ones most affected by the fiasco. They have no idea where we are located when we call.

Granted, there are a great many new amateurs entering our ranks each month, and call signs may be at a premium. But, this idea is ridiculous! There must be call signs that have not been used or reissued in many years that could ease some of the strain. All those amateurs that have recently been issued 2x1 calls have had other calls before obtaining their new calls. Why not use those "leftover" call signs to start with?

Surely, if cooler heads put more thought into this problem, a W7 would be in "7 land" and not operating, legally licensed, from Florida! The door has been opened for many more problems to arise, which may include many DX stations turning a deaf ear to our CQs and calls. At the minimum, at least we would know which way to point our beams. — *Hank Eveland, KB4AP, Cape May, New Jersey*

□ I am not antisocial but it sure is frustrating to get WAS. What ever happened to the slant bar (/) after a call sign to help indicate the state the guy lives in when he calls CQ?

To add a little humor: I called CQ ME CQ ME CQ ME (Maine) and a UA station came back to me and wanted to know if I was calling myself.

If you need the state of DE (Delaware), don't call CQ DE CQ DE CQ DE, as this sounds like a broken record. (Aren't you ever going to sign your call?)

If you need AR (Arkansas) don't call CQ AR CQ AR CQ AR, since AR means "end of transmission." Send CQ ARK CQ ARK CQ ARK and someone will think you are calling Noah's ARK. — *George E. Forant, W1FON, Walpole, Massachusetts*

[Editor's Note: An amateur who will be moving to a new call area has two options. They are: (1) to keep the present call sign or (2) to choose to be issued a call sign that reflects the call area in which the amateur will be moving. Under Phase III of the FCC Callsign Assignment System, an amateur may renew at any time. At that time, he or she may file for a call sign that reflects the amateur's call area, if such a call sign is not already assigned. Of course, requests for specific call signs will not be honored.]

## Computer Networks

Amateur Radio communications are not limited to transmitting and receiving information over the airwaves. Ham radio periodicals, such as *QST*, provide another medium by which hams communicate with other hams. The Amateur Radio print media also includes club newsletters, DX information bulletins, and a variety of periodicals devoted to a particular mode (e.g., *RTTY Journal*) or a particular product (e.g., *FT Newsletter*).

The "eyeball QSO" provides another means of ham communication. Whether at a club meeting or at a big convention, hams always enjoy meeting other hams face-to-face, often trying to match the face with a voice or a fist.

Landlines provide yet another way that fellow hams may converse. The telephone is used to discuss matters better kept off the air, or it is used to get someone out of bed and on the radio to meet a "sked" or to work a new country.

### Phone Nets

Relatively recently, the telephone has been mated with the computer world to permit computer-to-computer communications across town and across continents. It did not take long for hams with computers to discover and take advantage of this new mode of communications. As a result, today there are a number of computer telephone "networks" throughout the U.S. that complement ham radio communications.

These networks usually consist of a central computer system that is accessed via the phone lines. Upon accessing the network, the user is able to select from a variety of operating options. These options vary from network to network; however, most of the networks offer the following modes.

Amateur Radio bulletins may be read from the network's database. These may include ARRL and AMSAT bulletins, as well as DX bulletins and ham radio news bulletins. News and information about the network itself are usually found on each system, also.

Message-sending and -retrieval is also a common operating option. You may scan the topics of the messages that have been left on the system and if you find an interesting topic, you may retrieve that message, read it and, if you desire, answer or comment on it by leaving

### PX

Field Day is coming up fast, and this installment of "PX" offers a logging program that may be helpful on that annual June event or on any day of the week in your ham shack. Tom Childers, N5GE, wrote the program in TRS-80 Level II BASIC, which is easily convertible to other BASICs. Tom says the program needs at least 16K of RAM. If you'd like a listing of Tom's logging program, send a self-addressed business envelope (no. 10) with first-class postage to PX, 72 Stiles St., Waterbury, CT 06706.

A few comments concerning "PX": All programs offered in past installments are still available and will continue to be available for the foreseeable future.

If you request more than one program, include additional postage and a larger envelope.

your own message. And if you have a question or a problem, leave a message. Most likely you will receive a flood of answers.

Computer programs are available on some networks. If your system has the capability, you may "download," that is, copy the programs from the network onto your system. And if you have written some programs that might be useful to your fellow net members, you can submit your program to the network.

Table 1 lists some of the ham-related nets that are currently active. Some of the nets are ham-oriented, while others are general purpose computer networks that have enough ham users to make it interesting for other ham check-ins. Often, these general-purpose networks set aside part of the system for ham communications.

### Requirements

To check into and use the networks, you will need a modem. This is an electronic device that interfaces a computer or terminal to a phone line to permit data communications over the telephone network to another computer or terminal. Most public-access networks operate at 300 baud, so you will need a modem that operates at that speed (all "103-type" modems will meet this requirement). Usually, you will be dialing into the network; that is, you will be originating the call, so you will need an "originate-only" or "answer/originate"

modem. (Most of the modems marketed for the computer hobbyist and small businessman are "answer/originate" modems. However, some modems on the surplus market may be "answer-only" modems; these would be useless to you if you tried to call a network.)

Most modems interface to computers and terminals via the EIA RS-232-C standard for modem-to-computer/terminal interconnections that specifies the interface signals and their electrical characteristics as recommended by the Electronic Industries Association. What this means is if your modem has an EIA RS-232-C interface, your computer or terminal must have an RS-232-C interface. Many computers and most terminals already have RS-232-C; however it is optional on some computers and terminals.

Finally, you will need a terminal or a computer with terminal software; that is, software that will allow your computer to emulate a terminal. The simplest and least expensive terminal software will allow you to check into and communicate with a network; however, if you wish to download or have access to other terminal options, more sophisticated and more expensive terminal software will be required.

### WAILOU On Hamnet

I am a regular check-in on CompuServe's Hamnet (at least once per week). If you want to send a message to WAILOU, my user identification number is 70645,247. Electronic correspondence is much quicker than what the U.S. Postal Service offers.

### Radio Nets

A number of on-the-air nets are dedicated to disseminating information about computers. Most of these nets revolve around a particular computer (e.g. Apple, TRS-80), while a few deal with computers in general. These nets are a source for valuable information and a good place to check if you have a particular question about your system and you can't get the answer in your owner's manual. You'll also discover how other hams are using their computers in conjunction with Amateur Radio.

In the first installment of this column, I solicited information about on-the-air computer nets; Table 2 is the result of that solicitation. Check into the net of your choosing; the knowledge you are seeking may be found there.

**Table 1**  
**Landline Nets**

Name	Location	Telephone
AMRAD	Washington, DC	703-734-1387
CBBS	Pittsburgh, PA	412-822-7176
Communitree	San Francisco, CA	415-928-0641
DX Trading Post (K1VYQ)	Danbury, CT	203-438-3117
Forum-80	Albany, NY	518-355-1826
Hamnet	Columbus, OH	via CompuServe
Remote CPM/Los Angeles	Los Angeles, CA	213-541-2503
So Cal Am Rad Computer Club	San Diego, CA	714-534-1547

**Table 2**  
**Radio Nets**

Name	Freq. (MHz)	Days	Time	Mgr.
Apple Computer Net	14.329	M	0100	WB7TRQ
East Coast Apple Net	7.260	Sa	1400	W1UKZ
Hamnet	14.300	Su	2100	W8GRT
So Cal Am Radio Computer Net	144.76/5.36	T	0200	WA6WZO
TRS-80 Users Net-Central	7.293	Su	2100	W9LFO
TRS-80 Users Net-E. Coast	14.342	Su	2200	N1ACA
TRS-80 Users Net-W. Coast	14.060	Su	0100	VE6AMW
TRS-80 Users Net-W. Coast	14.342	Su	1900	WA6YKH
West Coast Apple Net	7.230	Sa	1700	

Sources: Bullet-80 BBS, DX Trading Post, Dave Ginsberg, Hamnet, Net Directory (ARRL), WA6WZO.

# YL News and Views

Conducted By Jean Peacor,\* K1JJV

## Pleasure Cruise Becomes a Crisis

Excellent weather was forecast for the Caribbean. On October 19, 1981, Bill and Clare Braden, WD5DIN and WD5DIM, of Lubbock, Texas, were setting sail from Curacao in the Netherland Antilles for St. Croix, U.S. Virgin Islands. St. Croix is the home port for their sailboat and home, *Fortress Cove*. They expected their 440-mile cruise would take three days. Bill and Clare have years of open-ocean sailing experience behind them. Since having had the *Fortress Cove* built to their specifications, and rigged so that two people can handle it, they have lived aboard for four years. They have cruised more than 20,000 miles, first in the Pacific and, since September 1979, in the Caribbean. For them, to sail from Curacao to St. Croix was not a big deal.

The first 30 hours of this trip proved exhilarating. Clare filed their float plan with the Coast Guard Auxiliary Flotilla Commander, via a ham radio phone patch, offering their services, if needed, to anyone needing help in the area they planned to travel. Since they depend entirely on celestial navigation, Bill planned to get a sun-moon fix on the morning of October 20. He had taken a morning sight near 1000 hours, plotted a line of position, and from their average speed, determined that they had traveled about 175 miles. This placed them east of their rhumb line, and just where they wanted to be while the wind was south of east. The waning moon peeped through clouds, allowing Bill his upper-limb shot at 1139 hours. With this information, he went below to fix their position. That's when Clare called down to him: "The autopilot has quit!" Under normal conditions, the autopilot holds a fairly accurate course and the main engine or generator is run periodically to keep the batteries charged. This leaves them free to cook, eat, take turns sleeping, keep watch, and go about the business of living while sailing.

Upon checking the port battery bank (360 amp hours), which they were using, Bill found that the condition indicator read "poor -- 10 volts." He switched to the starboard bank (660 amp hours), which should have been fully charged and it, too, read 10 volts. There was not enough battery power to start either the main engine or the generator. They would simply have to sail the remainder of the journey taking turns at the helm. Much of the day Clare did the steering while Bill checked wiring in an effort to determine why the batteries had so quickly failed. He suddenly discovered something most unusual -- the bilges were filling. His search for the leak began while Clare continued to steer with one hand and work a manual bilge pump with the other. As water gained on them, they discovered that the bilge pump was faulty. The check valve had rotted away -- all of Clare's many strokes had merely sucked out air, not water. Bill started bailing with a gallon can. This meant dipping down into the narrow bilge, filling the bucket, carrying it up a giant

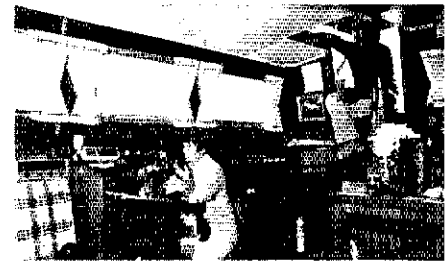
step into the passageway, up two more steps to the salon where he could reach the cockpit above shoulder level, and empty the bucket into the scupper drains. He did gain on the leak but questioned how long he could maintain this pace. He discovered that by bailing for a half hour and looking for the leak for a half hour they were staying just about even. They knew that if water rose above the level at which he then had it bailed, it would be impossible to find the leak. They realized that they would be unable to stay afloat until the next morning.

They deemed their situation serious enough to seek help -- if their battery power was sufficient to make contact. First, they called via vhf channel 16; no response. Then, they hoped for a ham contact. Clare tried several nets with no luck. Finally, on the 15-meter Inter-American Traffic Net, Merle Kuns, WA4GZB, in Cocoa Beach, Florida, answered.

Merle copied all the information correctly. He then established an emergency net for the Bradens on 15 meters. Amateur Radio operators from all over this hemisphere went into action. Kevin, KP4BVU, in Puerto Rico had the San Juan Section of the Coast Guard on landline; St. Croix Auxiliarist Lou Bean, KV4JC, gave the required descriptive information needed on the *Fortress Cove*, allowing Bill and Clare to save battery power. Curacao RCC was contacted and volunteered a spotter plane to determine their exact location. If any of the kind hams trying to help them with instructions via radio felt that Clare and Bill were slow to respond during the hours that followed, consider their predicament: darkness, stress and fatigue hampered them, the boat was being steered using a battery-operated headlight to see the compass, they were bailing and keeping in radio contact (which meant Clare ran up and down seven ladder steps from wheel to radio in the dark), the flare gun was made ready (as was the 200,000 candlepower spotlight and the hand-held strobe light), and Bill was still trying to locate the leak, all the while keeping watch for the spotter plane. Hearing became a problem. The expected quiet of sailing disappeared because of wind rustling through the sails, waves splashing against the hull and on deck, the creaking and moaning of the rigging, voices from vhf and Amateur Radio, plus shouted communications between Clare in the cockpit and Bill in the engine room.

At about 10:20 P.M. they first sighted the spotter plane. It did not see them. On a second try, the plane saw the hand-held strobe flashing on the main sail as well as two flashes from their spotlight. Their position was confirmed.

The next few hours were made easier by the kind words of encouragement from many long-time ham friends who had joined the emergency net (W6CRD, W6ELU, WA7GMP, J6LDZ and the St. Croix hams, KV4JC, KA7GAV/KV4 and KV4IJ) together with their many new ham friends, Merle, WA4GZB, who first heard their call, established the net and stayed with them for over nine hours; Stu, TI2SLC, who carried on the net as conditions changed; Don, KØINE in Florida, who had one



Clare and Bill Braden, WD5DIM and WD5DIN

of the better understandings of their situation; and KP4BVU, who kept in land-line contact with the Coast Guard through the night. It was impossible for Clare to keep a proper log so there are many who helped by relaying and keeping the frequency clear whose call signs they do not have. The Bradens have little doubt that they are alive today thanks to the combined efforts of the U.S. Coast Guard, ham radio operators and Curacao RCC.

Plans were made for a Coast Guard helicopter to drop a pump. The decks were cleared, and sails as well as the ham radio antenna were taken down, paving the way for the drop. The helicopter's drop proved successful but getting the pump into the boat was a different story. In the process, the line snapped and the pump sailed off into the darkness. Before leaving, however, the helicopter crew located another sailing vessel in the area, *Skybird*. Its radio operator maintained vhf radio contact and provided moral support for the next six hours.

The mainsail was raised around 5 A.M. the next morning to steady the boat. Bill was still bailing. At about this time, the leak seemed to subside. Bill had been tightening every bolt in sight and that seemed to have worked. At daylight on October 21 they rehoisted the jib and the ham antenna and were underway, still hoping the Coast Guard Cutter *Reliance* would arrive before real fatigue set in. Soon after the 20-meter Maritime Mobile Net on 14.313 MHz opened, they were thrilled to hear KV4IJ, St. Croix, and WIRJO, Massachusetts, who relayed Clare's messages to St. Croix. KV4IJ telephoned the Coast Guard in San Juan and provided them with the best news ever -- the *Reliance* would rendezvous with the *Fortress Cove* in just three more hours. For the first time, they now knew they would make it. How beautiful it was to see the *Reliance* come into view. Her crew worked with Clare and Bill for almost five hours before everything was righted and they could again set sail.

Clare and Bill realize that such a crisis could not occur unless mistakes are made. They have a whole new check list before cruising: their manual bilge pump will never have another rotted valve; they won't use a battery more than two years old even though the voltage reads "good"; and their mike cord will reach from the radio to the cockpit, to name just a few.

Bill and Clare became interested in Amateur Radio and live-aboard, long-distance cruising simultaneously. They received their back-to-back calls in 1976. Their account of this episode (from which this story was written) expresses their appreciation to all who assisted them. "Needless to say," they write, "don't go to sea without a ham radio and the proper FCC license to use it!"

# How's DX?



Conducted By Ellen White,\* W1YL/L4

## Catch-Up

Recent months have treated both history and DXpeditions at fairly great length. As a result, those little nuggets of information that are vital to current DX operation have had to play a waiting game. Hopefully the benevolent eyes of your vigilant Hq. editorial crew will look kindly upon our need to get current with DX news and photos. Fear not, crew, history repeats itself again at the mid-sixties point, come next issue. AS

### INTERNATIONAL DX CONVENTION, APRIL 17-18

□ It's Southern California's turn this year to host the 1982 DXtravaganza at the Holiday

Inn, Visalia. Informal activities begin Friday evening and the popular formal program will include a DX forum, a contest forum, featured DX speakers for the banquet, breakfast and Saturday afternoon sessions. There will be the famous Saturday afternoon cocktail party, and this year a special women's program will begin about noon on Saturday. Early news looked for the DX event of the year, West Coast style, to include EA8AK, K5VT and OH2BH. Time is short so late planners should contact Bill Mattil, NC6T, immediately at 9310 McFadden, Westminster, CA 93460. Hotel reservations should be made directly with the Holiday Inn, 9000 Airport Dr., Visalia, CA 93277,

209-733-9000. Be sure to mention DX Convention.

### DAYTON HAMVENTION APRIL 23-25

□ Jim Spencer, W0SR, chairman of the ARRL DX Advisory Committee; John Kanode, N4MM, ARRL Board DXAC liaison; and Don Search, W3AZD of the ARRL DXCC Desk will conduct an open DXCC/DXAC Forum at Dayton. Here is another chance for all DXers to be heard and speak their minds on any DXCC subject. Frank Schwab, W8OK, President of the SW Ohio DX Association will be the overall DX Program's moderator. It all starts that Saturday morning.

## THE CIRCUIT

□ 9U5JM operating documentation has passed the test, and cards began to be accepted for DXCC credit at the beginning of January (pre-January 1982 QSOs/QSLs are okay).

□ Former DXAC Chairman San Hutson, K5YY, had hoped to activate St. Peter and St. Paul's Rocks at the end of February. New DXAC chairman is W0SR.

□ AG4R finds 15-meter (phone) long-path consistent to VK6 and thereabouts daily around 0130Z. Observations over close to four years have proven this a good path.

□ DJ0UY/HB0 operated from Liechtenstein in the '82 DX Test. He's ready to welcome your QSLs, with s.a.s.e./IRCs to H. McKissick, KJ0UY, Vicenzstr. 25, 6238 Hofheim/Ts., West Germany.

□ Awaiting cards from YJ8DX? His address is Box 208, Ringwood, Australia 3134.

□ W7KSG is still trying to track down the late November 1957 manager for 5A2TZ. Any advice?

□ A plea from a "How's" reader and a concerned whf ham that DXpeditions take along ssb gear for 6 and 2 meters, noting that many firsts have been made recently: VP5, VP2, VP9 to "W" on 2, C5 and many others to "W" on 6, etc.

□ WA4HNL is *not* the manager for 3D6BA (he did handle QSLs for 3D6AB for two days in September of '78). Joel does, however, QSL for Mohammad, JY4MB, and has all of the logs from July of 1978. The logs are slow in arriving so patience certainly is required.

□ The November 11-13, 1981, VP5JNX operation was courtesy of W9CN. Confirmations go to John Nauman, W9CN, 420 Patrick Ave., Merritt Island, FL 32942. (S.a.s.e., of course.)

□ VP2MEV was especially active during the 1981 CQWW. QSL via the licensee, Ed Radio, AJ6V, 897 Newell Rd., Palo Alto, CA 94303.

□ Cards for VP5GCM, VP2VGF, NP2AI, NP2AF and WP2ABZ, all go to WP2ACL, Box 1003, Fairfield, CT 06430.

□ ZL0AEW/W8 and VK3DII/1/2/3/4/5 cards all go to Roy Hearsum, W8PR, Rte. 1, Box 136A, Senecaville, OH 43780.

□ VP2MM's cards now go via Rick Casey, AB1U, 85 Hacienda Circle, Plantsville, CT 06479. Rick has the logs for operations starting September 25, 1982. He reports that Alex will be active on 10/20 cw from 2000 to 2200Z, and will be looking for U.S. Novices, mostly weekends on 10 meters. TX/RX 28.125.

□ The Magnolia DX Assn. (Gulfport, Mississippi) uses yet another version of a DX printout. N51Z furnished a look-see with the different DXCC entities within the 40 zones. When things are slow this would furnish a cute gimmick for a club activity; for example, "How many band/countries can you work during a specific time period in zone 7?"

□ K1VV reports that he is *not* the manager for C31WK.

□ All USA contacts for N7DF/VY1 and K0HGW/VY1 have been confirmed with cards via USQS, Box 814, Molino, OR 97042. Be sure to send your s.a.s.e. to that address for contacts with their Whitehorse, Yukon, operation during the 1981 phone Sweepstakes. (The first time ever a clean sweep from Yukon-NWT was ever made!)

□ Re the historical information in the December issue of "How's": it is important to keep in mind that there are conflicting claims to ownership of the South Orkneys and there was no intent by this author to indicate who are the rightful owners. In fact the ARRL DXCC List itself recognizes that there is ownership dispute by showing various prefixes for South Georgia, the South Orkneys, the South Sandwich and South Shetland Islands.

□ W9ALZ has great words to say about the cw operating abilities of Antonio, M1C, worked on 21,025 kHz at around 1600Z.

□ Doug, KA5GFJ, corrects previous information by noting that KP4KK/DU2 goes via WA3HUP.

□ The Canadian DX Association's *Long Skip*, February 1982, carries a fascinating article on the Tribal Nations of South Africa, drawn mostly from a series of five articles that appeared in *The Christian Science Monitor* last September.

□ The Colvins's January Guyana operation, using Iris's call, W6QL/8RI, totaled up 9000 QSOs with hams in 144 countries; about 50-50 phone/cw, on all bands. They were particularly active on 40. Following that event, they went to Surinam, operating W6KG/PZ1. Their alternating calls on expeditions is to help the hard-working YASME QSL Managers (Yasme Foundation, Box 2025, Castro Valley, CA 94546).

□ The printed medium is proliferating at a faster rate than new prefixes! Witness the new weekly newsletter published by DXpeditions International. In addition to current and planned DXpedition information, the newsletter notes current solo activity, a brief propagation forecast, QSL "paths" and clearly noted rumors. Check a sample copy via the *DXI Newsletter*, 999 Wildwood Rd., Waycross, GA 31501.

□ KP2A has Navassa plans for 160-6 meters, for the middle of this month. The operation should afford everyone a chance for a QSO during the five-day operating period.

□ WB6GFJ reports that FO8DF has been reelected as the president of the Radio Club of Tahiti, and Wilber Trafton, FO8GW, is treasurer. The new secretary is Yves Shan, FO8DP. Prospects are good for a stateside visit this summer by FO8HL and FO8HI.

□ WA9ETR notes that he is *not* QSL Manager for HLIWD (or for anyone else!).

□ The Oak Ridge, Tennessee, DX Group will operate from St. Lucia on all bands 160-10 meters ssb/cw from April 24-28. The call may be J6LTA or their home calls/J6L. The same group will operate from

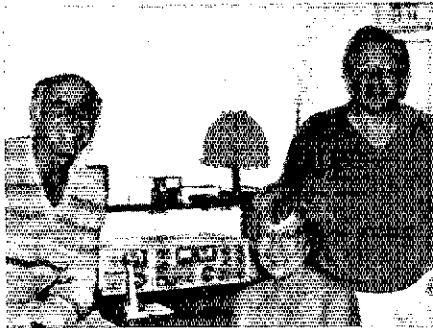
\*19620 SW 234 St., Homestead, FL 33031



Catholic Priest S83H came to Transkel from Ireland 20 years ago but has just recently discovered Amateur Radio. Look for Harry around 28,600 kHz, ± 1700Z. (He's on the lookout for award information and would welcome your input to Harry Houlihan, S83H, Box 14, Mount Ayliff, 4850 Transkel, South Africa.)



The Colvins's 9Y4KG operation last year netted 9000 QSOs in 141 countries, about 50-50 per mode. Lloyd and Iris note that their Trinidad operation confirmed what they've noticed in other countries. That is, radio conditions on the bands improve the closer you get to the equator. They're both shown here at the shack of Woody, 8P6CC, in Barbados.



WA4SKE (right) visited 7Q7LW and his stamp-collecting wife Helen last August. 7Q7LW hopes soon to use a TA-33 (from the IDXF) to enhance his signal. Last month WA4SKE hoped to operate from C9.

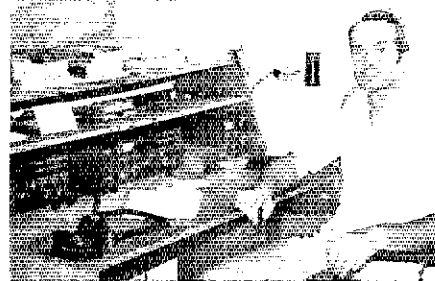
Martinique from April 29 through May 1. The operators will be Bill K4LYA/FM0GUJ, Grady KR4C/FM0GUK, Chris NR4S/FM0GUL, Russ NC4U/FM0GUI and Mickey WA4CDH/FM0GUN. From both locations K4LYA and KR4C will concentrate on the cw bands, about 5 and 30 kHz from the band edges. The sideband operators will use normal expedition frequencies. NR4S will spend some time on the Novice sub-bands and General class phone bands to help the needy. QSL to the operators via their home addresses in the 1982 *Callbook*. QSLs not containing s.a.s.c. or IRCs will be sent via the bureau.

YB5AES moved from Singapore last October to Sumatra, shutting down his 9VIUY operation and starting up at YB5AES. He expects to be at this interesting location 5-6 years. QSL via the SARTS, P.O.

Box 2728, GPO, Singapore.

The Dutch Monaco DXpedition, noted in the December issue, netted over 9000 two-ways, probably the biggest score ever made by a 3A-expedition. Joeke, PA0VDV, hopes to report similar successes for his Caribbean tour this past February.

FB8XY (QSL Manager F6CIU) notes that the European Postal Code reading machines apparently can't differentiate between the numbers 1 and 7 unless the seven has a horizontal stroke through the vertical line. Mic, XE1MD, also reports on the special 1982 prefix substitutions for Mexico, in observation of their 50 years of Amateur Radio. 6D (delta) 5 for XE1, 6E5 for XE2, 6F5 for XE3, 6G5 for XF1, 6H5 for XF2, 6I5 for XF3 and 6J5 for XF4.



Bob Parkes, VS5RP/G3REP, is now posted to Saudi Arabia with no real chance of getting on the air. He wants all his stateside friends to know he'll miss their QSOs.

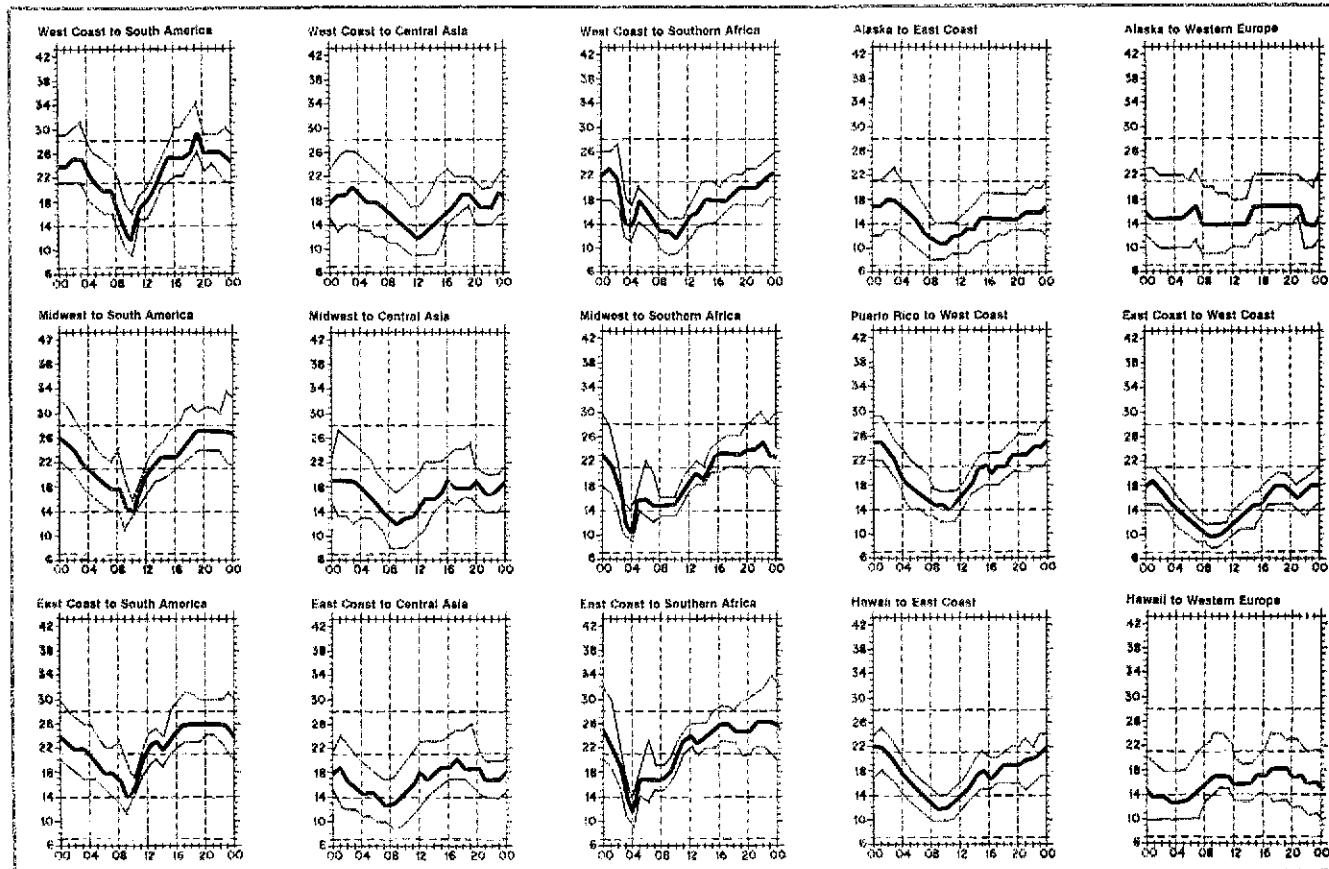


Dayton 1981, included many DX personages from around the world. Familiar faces (l-r): VE3GCO, DL7FT and the peripatetic W4BPD. Set your sights for Dayton 1982, April 23-25. (thanks VE3GCO)

KL7J (ex-KL7PI) reports that he has never been on sideband with his new call and says he is sorry if you've sent him a card and are wondering about lack of response. Joe's activity is somewhat limited these days, now that he is a radio officer on a tanker and infrequently at Homer (no mistake there; his home is Homer, Alaska!).

Garry Hammond, VE3GCO, conveys with regrets, the news that increased Canadian postal costs have led to an increase in his *Amateur Radio Awards Directory of the World* subscription to \$8 for W/VE and \$10 for others.

Since last month's Austrian Pacific DXpedition story appeared in "How's," Wolf and Ed have furnished a look-see at the super full-color QSLs in store for those who worked them at KH6, KH8, 5W1, ZK2, C21, T30 and T2. Happy news is OE2DYL's (operation QSL manager) comment of "100% QSL to all USA!" Dieter also notes the availability of *DX Nets*



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

*Around the World*, information sure to be useful. Please order with an s.a.e. to OE2DYL, Dieter Konrad, Bessarabierstr. 39, A-5020, Salzburg, Austria. (Europe 3 IRCs, others 5 IRCs.)

PY7AHJ (ex-PY7WLR) keeps SWL records to boggle the mind. At his 24 foot above sea level QTH in Recife he uses 14 receivers and 6 antennas, logging both amateur and commercial reception in excellent detail.

4X6FY "direct" cards go to WB2MCB, Box 191, Oakland, NJ 07436, or via the WB2 bureau. Do not send them to the 4X Bureau.



Last August the JA stint at CR9JA proved to be an outstanding success, with close to 12,000 contacts, including 50 countries. The unusual operation featured SSTV and RTTY, plus OSCAR, 8 meters and top band. JH4RUG (center) was the prime slow-scan operator (the first from Macau). From the left: J11CEI, JK1QHK, JH4RUG, JE2GLQ and YL JA1UPA (XYL of JA1UT). Other operators were JA1s UT IRT PCY, JH1s FVE KXJ, JF1s GKF KKT, JK1EXO, JL1UXH and JA7ARN. Their special thanks to fine cooperation by Pinto, CR9AK.

## QSL Corner

Administered by Joan Becker, KA1IFO

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 accurate. The call sign in parentheses is the QSL manager.

A4XJO (WB3JRU)  
 CE6EAT (WB2PZK)  
 CN8EA (GW3IEQ)  
 CO2CM P.O.B., 4940, Havana, Cuba  
 CO2OM (KB7SB)  
 FM7WO Morduan Laurant, P.O.B. 287, 97203 Fort de France, Cedex Martinique, FWI  
 FO0JTP (KA1GC)  
 FR0GGL Box 386, St. Pierre, Reunion.  
 FW0BK (FK8DJ)  
 HH2VP (N4XR)  
 HK0COP (W9UCW)  
 JX3VAA (LA7JO)  
 J5HTL (SM3CXS)  
 J88AQ (W2MIG)  
 LU5ZI (LU2A)  
 LU5ZR (LU2A)  
 N0TG/6Y0 (N0BZE)  
 OK5MA/HZ P.O.B. 4601 BOCC, Riyadh, Saudi Arabia  
 PY1ZFO (W9VA)  
 P29JP (WD4PEQ)  
 P41E (K4BA1)  
 T11GH (DJ5SI)  
 TU2HJ (W3HMK)  
 VP2KBS (W2GHH)  
 VP2MG (W6FDG)  
 VP2MEV (A16V)  
 VQ9AB (K0AB)  
 V2AU (OE3ALW)  
 XT2BK (W9GW)

YJ8RW (ZL1AMO)  
 ZK2TA (OE2DYL)  
 3C0BC (K4PHE)  
 5B4JE P.O.B. 173, Limassol, Cyprus  
 5H3BH Bjorn Humble, c/o TISCO, P.O.B. 2650, Dar es Salaam, Tanzania. QSL via the bureau (use home call SM0EA1).  
 5W1DG (VK9NS)  
 5Z4CS (J11VLV)  
 8P6MI (VE3JTQ)  
 Our thanks to AA4MI, OH2BN and W2QL for all the QSL information.

## QSL MANAGER VOLUNTEERS

KA0AQ5      WD4GDS      KA8BXA

### Please Note

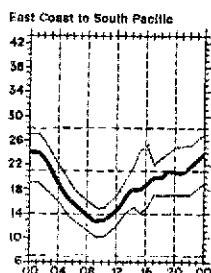
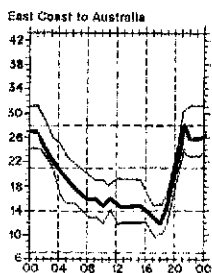
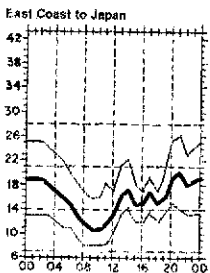
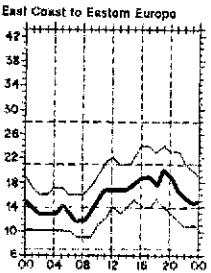
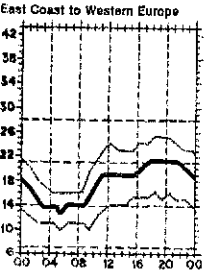
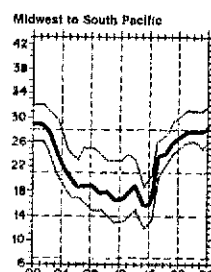
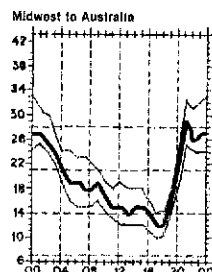
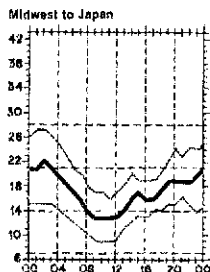
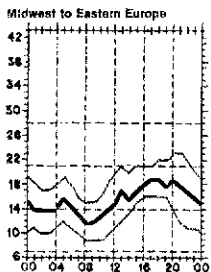
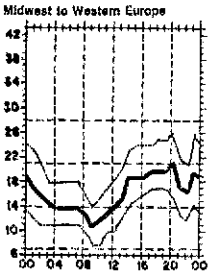
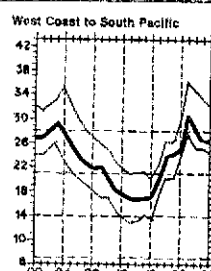
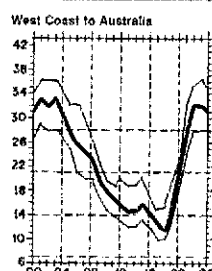
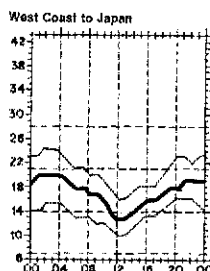
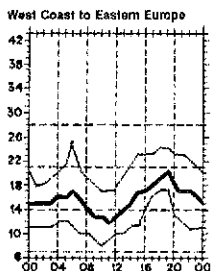
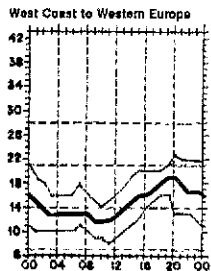
WB3JRM is not the manager for A4XJO; the correct information appears in the QSL information listing in this issue of "QSL Corner."

KB2HZ will accept cards for J6LB, Dec. 6, 1981 *only*; all other cards for J6LB should go to KO2A.

Most listings for the Radio Society of Okinawa are incorrect. Correct address is as follows: KA6, KR6, 2 x 2 *calls only*, Radio Society of Okinawa, Box 217, Torii Station, APO San Francisco, CA 96331.

Owing to a misunderstanding of the calls (thank you FCC), the Incoming Bureau for Japan's KA8s (KA8 2 x 2 *calls only*) should be sent to the following address: Ray Burns, KA8RB, PSC Box 4464, APO San Francisco, CA 96519.

March 1982 "QSL Corner" contains information on the operation of the ARRL Outgoing QSL Service. December 1981 "QSL Corner," page 84, contains information and addresses for the Incoming Bureaus. For information on bureau operations (Incoming and Outgoing) send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.



lowest curve (optimum traffic frequency, or f<sub>ot</sub>). 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, Colorado. These predictions, for April 15 to May 15, 1982, assume a sunspot number of 112, which corresponds to a 2800-MHz solar flux of 159.

# DX Century Club Awards

Administered by Don Search, W3AZD

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 25-country increments through 250, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from December 1 through December 24, 1981. 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

COSGV/100 DA1GJ/106 DF1OT/117 DF7BZ/205 DJ80T/103 DK9FN/101 DL3DK/108 DL5BAN/188 EA3CTN/110 G3RUX/314 G4D8W/112 F8EYS/167 18NHU/107 JA1AZS/106 JA1JVN/119	JA1MRM/263 JA1NAQ/229 JA1NRH/306 JA1OVF/145 JA1PCY/309 JA1PNA/314 JA1SVP/290 JG1EIQ/100 JG1IMM/200 JH1AGV/144 JH1EDB/236 JH1EDD/100 JH1NPX/218 JH1ACI/104 JH1JVN/211	JK1SAI/139 JL1JZL/115 JA2BSM/222 JA2BYW/158 JA2KFO/302 JE2BNZ/173 JH2SUV/228 JR2LFW/198 JR2LJO/211 JA3EF/128 JA3PXH/190 JH3AEF/152 JH3FYR/220 JA4ENL/306 JH4OQF/271	JA5AUC/233 JA5DQH/284 JA5HOH/283 JA5THU/256 JA6VZB/148 JH6RFT/167 JR6KJT/280 JH7GPW/104 JA8CGS/180 JA8KCM/192 JH8FCC/184 JA9BAB/184 JA9FA/258 JA9FPI/217 JA9LJS/205	JA0CAK/295 JA0DXG/284 JA0GJJ/275 JA0LXP/110 LA4VW/115 LZ2JG/115 OE5AHL/162 OZ1NF/109 PA0KJH/108 P29JS/298 SM7AZL/279 SM7ECP/122 VE3KO/115 3B8DB/123 9K2KA/107	KA1JC/102 KA1NV/106 KB1W/107 W1UA/110 WA1AYS/106 A1C/110 N2SS/325 WA2QAD/101 WA2SLK/100 WA2YMK/100 N3AKK/100 SM7AZL/279 W3PZX/102 WA5NH/107 WB3GKX/110 AA4RE/105	K4XH/318 K4Y/131 KA4BNA/179 KA4RPM/105 KC4GR/104 KC4UH/132 N4BLX/265 N4CDE/107 N4CRA/103 N4NO/322 NG4M/106 WAQBV/109 WB4UBS/101 K5EE/265	K5ID/207 KB5DQ/255 KB5LT/102 KC5IG/101 KC5P/155 N5CSW/113 WB5NMW/105 WD5AAM/254 WD5FBV/127 KC8QB/113 K8S/103 KA7AMB/171 KN7W/107 N7AJB/100	KE8K/200 WB8SGL/111 WB8ID/120 WB8JRR/155 AF9W/108 K9TWK/105 KB9UJ/107 N9AAP/233 WB9RAD/111 KA0QR/110 WA0Q/102 WA0LJO/100 WB0BZ/106 WB0DDU/100
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### Phone

AH2AC/103 CE3T/119 CT4VP/101 DA1ZE/103 DF3JO/104 DF4XE/116 DF5EO/105 DF7BZ/205 DJ4GL/116 DK8DB/232 DL5BAN/184 EA7LM/162	G4JUG/SM#105 IN3RWH/106 I9SSW/125 JA1JVN/100 JA1NAQ/224 JA1NRH/244 JA1PCY/290 JA1PNA/309 JA1SVP/290 JA1SVP/210 JF1JLW/141 JH1FIS/307	JH1QJU/275 JH1NPX/120 J11WLL/106 J11DWT/125 JK1SAI/120 JL1JZL/113 JA2BSM/217 JA2BYW/146 JA2KFO/298 JA2ODB/134 JE2BNZ/132 JH2SUV/157	JR2LFW/119 JR2UBS/107 JA3DY/285 JA3PXH/114 JA3AEF/142 JA4ENL/306 JA5THU/194 JA6HCA/212 JA8ZB/107 JH6RFT/167 JR6KJT/281 JH8GEW/122	JA9FPI/202 JA9LJS/184 JA0CAK/246 JA0DXG/122 JA0GJJ/134 JA0LXP/110 KA8GW/105 LA8CJ/291 OH2FS/180 OZ1DCN/109 OZ4MD/167	PP2ZDD/154 SM7AZL/239 KA1JC/102 KA1RE/140 WA1AYS/105 A1C/107 N4CDBN/114 WA2BGE/108 WA2EN/106 KB3OH/104 WB3HQ/100	KC4UH/117 KD4JD/100 N4NO/272 WA4SYZ/112 KB5LT/102 KC5TF/108 N5CSW/105 WB5NDP/205 WD5AAM/250 WD5FBV/103 A16Z/162	K6QB/104 W6TTK/131 WB6RSE/219 AJ7S/111 KE7A/102 KB8X/107 K8K/200 KO8T/151 NB8TT/129 WB8GUX/102 WB8SGL/111	WB8ABL/106 WB8DD/117 WB8MRC/108 WB8NMV/220 WB9UX/105 KF9L/105 N9AAP/232 WA9VU/125 WB9RAD/108 A10T/110 N0BZV/110
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### CW

DF9TG/107 DL1AM/117 DU6RH/104 E17CC/110 F6FSQ/110 G3RUX/120 JA1AAT/109 JA1AZS/103 JA1BK/212 JA1ELV/286 JA1GV/199	JA1QA/223 JA1MRM/263 JA1NRH/146 JA1OVF/138 JA1PCY/224 JA1PNA/204 JA1SVP/108 JA1SVP/170 JG1IMM/157 JH1AGV/134 JH1EDB/236	JH1EDD/100 JH1FIS/266 JH1NPX/114 JH1QJU/197 J11WLL/251 J11DWT/115 JR1FYS/270 JA2KFO/119 JA2ODB/119 JE2BNZ/111	JH2JUK/108 JH2SUV/159 JR2LFW/130 JA3AQ/265 JA3FYC/275 JA3JOR/115 JA3PXH/121 JH3FYR/199 JH3JYS/133 JH3LPT/108	JA4ESR/137 JA5LJS/230 JA5DQH/223 JA5HAJ/100 JA0DXG/153 JA0GJJ/145 K6GJIR/111 L61GB/106 OE5AHL/155 OK1DEM/104	JA8DNV/244 JH8FCC/105 JA9FA/187 J0GAK/242 JA0DXG/153 K6GJIR/111 L61GB/106 OE5AHL/155 OK1DEM/104	OH2FS/141 OZ1ABA/108 OZ7OP/143 SM6DYK/183 4Z4DX/192 W1BFT/125 AE2A/211 KB2NU/100 W2ARQ/123 W2YY/227	AA4MW/118 AE4Z/156 KA4BNA/183 SM6DYK/183 W4CZU/218 WB4ZLK/100 K5VNJ/141 N5GM/243 WB5DBV/112 AB6R/100	A16Z/143 K6BXY/102 AJ7S/117 W7JKA/152 K8JK/146 K8NW/159 KF9N/103 K9BL/103 K9A/143 WB0CV/116
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### RTTY

JA1JDD	JA1MIN								
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### 5BDXCC

JA2IVK W5AL	OH2BDP SM4CTT	KE4E WB4TIN	K8NA LU2DSL	KL7AF AA4KT	AE0K	OZ4PM	OH1LA	K5MAT
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### Endorsements

#### Mixed

DF7AU/155 DJ6OZ/261 DK9FN/250 DK9EK/186 DK9ZR/183 DL1AM/254 DU6RH/148 E0GQ/189 F2X/330 G3XT/256 G4FAM/252 G8PX/211 GM4FDM/159 HB9BZ/226 JA1CZI/240 JA1FNA/311 JA1GV/261 JA1HG/209 JA1NTK/184 JA1QX/304 JF1SLN/181 JH1QJU/288 JH1QPU/275	J11HEY/212 J11EBE/292 JA2FUJ/250 JA2IJO/228 JA2JZT/186 JA2NDQ/270 JA2ODB/201 JE2BZ/254 JE2ACK/224 JH2CJW/278 JH2JUK/240 JH2RWP/156 JR2IEG/157 JA3CSZ/298 JA3JOR/291 JF3KNO/169 JH3CXL/289 JR3GZ/226 JA4CSL/203 JA4EGR/250 JA4FRU/267 JA5ANP/301	JA5MQ/205 JH5FTY/151 JA6BEE/322 JA6PWN/339 JA6VA/310 JA6VNY/142 JH6RY/245 JA7AW/254 JA7BVA/184 JA7HMZ/276 JH7BRQ/274 JH7LMZ/264 JH7UJN/158 JA8AED/283 JA9DDM/243 JA9UX/185 JA9CIU/151 JA9GZ/304 K8BZF/284 LA2AV/200 LA2AT/204 LA4CW/152	LA5LT/173 OH1SM/186 OH2MB/157 OH3QC/225 ON8RR/178 OY7ML/305 OZ1ABA/188 OZ1Q/317 PA8INA/317 PY4BT/143 SM3EV/312 SM6DYK/200 VE3JGT/215 VE3LNW/249 VE3NI/260 YU2CAL/280 ZL2ASM/279 5Z4CW/188 AF1U/246 K1AWP/294	N1BHC/177 W1AB/336 W1BFT/274 W1NHJ/319 W1WEE/271 K2LX/277 K2PL/280 K2R/152 K2UPR/200 KF2G/200 KJ2R/169 N2AMS/174 N2AP/309 N2BJ/150 N2BQJ/281 VE3JGT/215 VE3LNW/249 VE3NI/260 YU2CAL/280 ZL2ASM/279 5Z4CW/188 AF1U/246 K1AWP/294	N3RL/300 W1AB/336 WB3BOA/177 WB3GPR/278 AA4MW/271 AA4V/308 K4FCT/300 K4Y/216 K4YX/290 KC4B/253 KC4UJ/235 N4AJZ/266 N4DPT/135 N4OT/242 N4QJ/290 W4DFU/176 W4HMK/179 W4TX/256 W4TFB/307 W4WVS/236 W4BDR/300 W4ANXG/157	WA4VCC/251 W1BSM/233 KB5EK/180 W5BIB/210 W5LW/284 W5CG/205 W5BLSJDU/278 AF6J/168 A16Z/230 A16V/254 K6AXC/310 K6BUU/250 K6TMB/201 N6QJ/290 N6MQ/297 N6OZ/290 W6ER/333 W6OMR/317 W6PLK/329 W6TM/286 W6TTK/132	WA6TLA/306 WB6RSE/294 WB6WK/226 WD6EKO/190 WD6EQP/226 AF7M/251 W5BLSJDU/278 K7S/184 K7FQ/287 K7FEN/260 K7SP/306 KC7EJ/252 N7MC/300 W7EDA/291 W7FR/307 W7KS/314 WA7JSC/207 WA7SLC/244 AD8C/150 K8AEX/233 K8JK/253 KA8ANQ/178 KO8T/207	WB8TT/130 N8ZA/288 WB8KP/335 WB8WPI/248 WB8QJ/308 WA8SA/264 WB8HW/158 K8A/180 KB9KB/296 KB9MI/175 KE9V/161 W9TY/299 W9UJW/310 W9DQG/180 W9JL/324 KB9KS/170 WB9JG/250 W9LJ/191 W9SA/223 W9ULU/280 W9TM/227 WB9AF/175
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#### Phone

DA1MP/199 DJ2TI/300 DJ2YL/285 DK8MZ/278 DK9ZR/169 DL9DY/226 EA1QF/296 E40Z/300 EA8PP/270 F2X/315 G3RAM/150 G3RUU/200 G3XT/216 GM4FDM/151 HB9CQ/229 HP1XK/310 I2HHE/283 JA1DM/322 JA1FHK/230	JA1FNA/305 JA1GV/127 JA1HG/159 JA1NTK/177 J11QPU/258 JK1JOC/230 JR1EBE/280 JA2BMJ/197 JA2FUJ/250 JA2JZT/186 JF3KNO/169 JH2CJW/278 JH2JUK/213 JH2RWP/156 JA3CSZ/256 JA3JOR/290 JF3LZ/244 JF3KNO/168 JR3CVJ/158	JA4BJO/322 JH4PBM/241 JH4PRU/262 JA5ANP/272 JH5FTY/150 JA6BEE/316 JH6RY/243 JA7AW/254 JA7HMZ/276 JA8ENI/154 JA9DDM/236 JA9UX/185 JA9GZ/298 K8BZF/284 LA3RP/133 OE1PC/280 OE3KT/280 OE3WWW/318 OE7UDH/326	OZ7OP/315 OZ9VJ/153 OZ9UJ/228 P29JS/296 PA6LE/284 PY4VX/260 PBDD/210 SM3INT/159 VE3B/180 VE3BX/319 VE3GO/151 VE3JGT/223 VE3LNW/225 VE3NI/245 VE4AT/290 VE4OX/317 VK9NS/200 VP2MS/185 ZL1ARY/322	ZL4BO/323 ZS6FJ/123 AF1U/234 AJ1L/221 N1ALR/151 W1EQD/126 WA1GSO/198 AQ2K/175 K2R/152 K2YVJ/297 KJ2R/152 N2SS/324 W2YTO/289 WB3RE/143 N3ARD/154 N3RL/293 KB3QJ/263 W3JPT/173 WB3GPR/274	AA4MW/263 K4XH/317 K4YT/309 KA4MNS/176 KB4OW/130 KF4L/180 N4BLX/265 N4VY/198 N4CSF/126 N4QJ/290 W4DFU/144 W4FOD/281 W4TFB/298 W4TXQ/203 W4ANXG/156 WB4VCC/249 W3JPT/173 WD4JMH/183	K5GZ/297 K5IH/274 K5KLA/290 K5MLG/199 K5VNJ/308 KA5DNP/154 N4AJZ/266 KB5EK/175 KC5P/155 W5EDJ/326 WB5LBJDU/278 K6AXC/309 K6TMB/191 K6BAP/130 N6BLN/191 N6MQ/288 WB4VCC/249 W3JPT/173 WD4JMH/183	W6SN/283 WD6EKO/182 AF7M/205 K7SP/302 K8VJW/138 KC7EJ/251 W7AF/251 W7FQ/271 WA7JSC/204 K8JK/216 K8AXC/309 KA8ANQ/178 K8BDB/278 K8BDE/174 WB8NQC/335 WB8QB/309 WB8DX/201 K9UAA/290	KB9KB/275 WB9MI/175 W9NWE/318 W9QCL/225 W9TEI/260 W9TY/193 WB9ZD/305 W9UJL/226 WB9FUM/213 KB9KS/167 K8MK/143 K8N/169 N8AMI/236 WB9RH/125 W9LUR/120 WA9HMK/225 WB9LMK/203 WB9AF/172
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#### CW

DJ2TI/230 DJ1TX/288 DK7DO/125 G3XT/150 G4FAM/202 HB9BZ/150 IX1MI/274 JA1CZI/210 JA1DFQ/140 JA1FNA/244	JA1UQP/234 JG1HNE/233 JH1LM/129 JH1NMO/255 JH1PBR/251 JH1QPU/246 JH1THEY/201 JR1EBE/256 JA2IU/148 JA1FNA/244	JH2CJW/231 JR2IEG/155 JA3CSZ/282 JH3CXL/277 JR3GZ/185 JA4CTL/183 JH4UVU/156 JA5ANP/192 JA5SIX/126 JA6PWN/239	JA7AWZ/152 JA7BVA/167 JA7GLB/241 JH7ARV/177 JH7BRQ/280 JH7LMZ/263 JA8AED/224 JA8CIU/151 LA2AV/161 LA2AV/151	LA5LT/156 OH2BN/271 ON8RR/127 OZ1LO/293 OZ3Y/277 SM3EV/298 SM5DQC/187 SM6EOC/188 SM8AJU/295 5Z4CW/164	W1AB/260 W1NH/269 W1ZT/154 K2LX/256 K2PL/184 KA3R/180 WB3GPR/125 K4FJ/255 K4PI/303 K4V/125	N4OT/226 N4QJ/292 W4DGJ/152 WA4ITI/260 WA4NELU/125 K5EE/238 K5FNQ/189 K5KLA/288 W5JW/272 N6FT/132	N6MQ/269 N6QJ/282 WB6NM/126 W6TMD/205 WA6TLA/296 WB6RSE/291 K7SP/137 KO8T/129 WB6CO/282 K8BG/247	K9KA/150 K9KB/280 WB9MI/126 WB9RKL/293 W9TK/128 W9TY/280 AB0X/226 AG0A/180 W9LJL/179 WB9A/198
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## DXCC NOTES

Annual List Corrections: Mixed, N9RR/276. Phone, K7IRO/302, WB0TEC/104, VE3MRS/297. March Correction: Mixed, W1ETV/270.



# The New Frontier

Conducted By Bob Atkins,\* KA1GT

## The World Above 1 Gig

### PATH LOSSES ON THE HIGHER MICROWAVE BANDS

Figs. 1A and 1B show path loss vs. distance plots for the 10, 24, 47 and 76-GHz bands. In this region of the spectrum effects of the atmosphere start to play a role in determining path loss. In addition to the free-space loss experienced at all frequencies, absorption of signals by water vapor starts to become significant. At 10 GHz the effect is quite small, but on the higher bands, as can be seen from a comparison of Figs. 1A and 1B, it can become very significant indeed. The absolute amount of water vapor in the air is the factor that determines the additional loss. Fig. 1A ("high humidity") corresponds to about 15 g of water per cubic meter of air. This would be a relative humidity of 65% at 25° C. Fig. 1B is drawn for about 8 g of water vapor per cubic meter of air, a relative humidity of 35% at 25° C. As air gets colder the amount of water vapor it can hold decreases. Thus, the ideal time to go mountain-topping on these higher bands (after the FCC opens them to amateurs) might be in the middle of winter on the coldest day you can find!

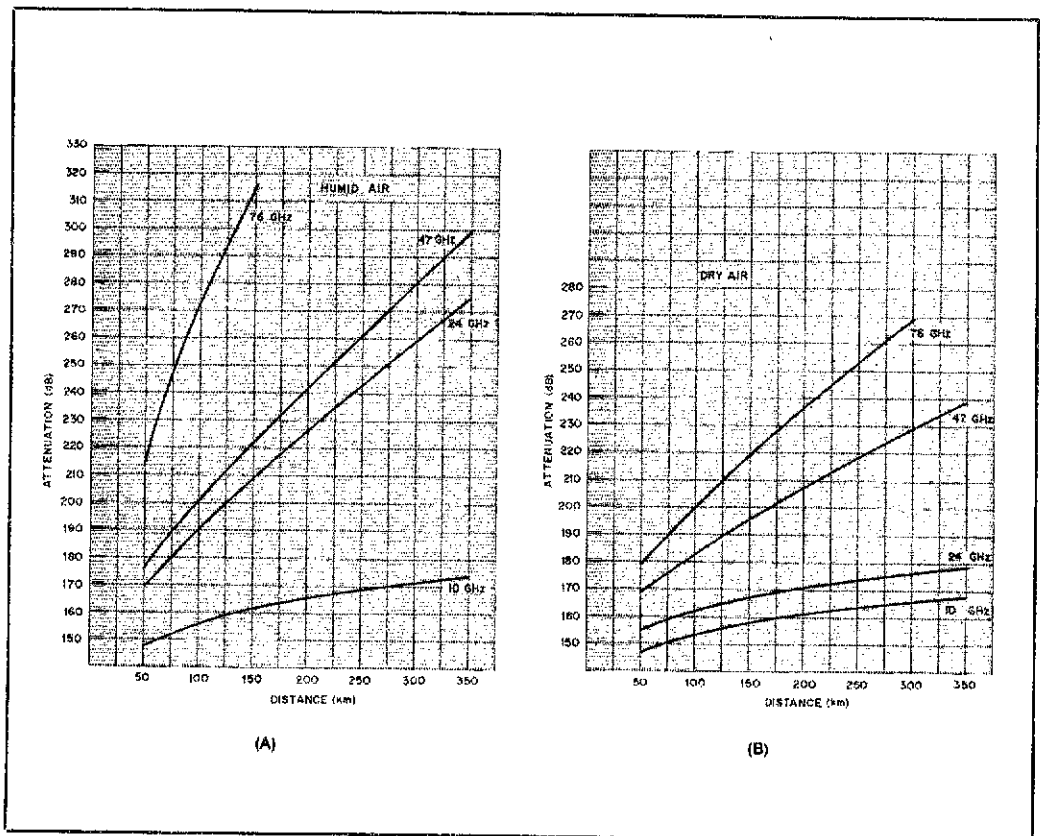


Fig. 1 — Path loss vs. distance plots for the 10, 24, 47 and 76-GHz bands. Under conditions of humid air (A) and dry air (B).

### 2.3-GHz AMPLIFIER

Motorola engineering bulletin EB-89 describes a solid-state, Class C amplifier for 2.3 GHz. Using a 24-volt supply, typical performance is given as 1.2 W out for 140 mW in, with 30% efficiency and a 1.3:1 input VSWR. The amplifier uses a single transistor, the MRF 2001, and is built using strip-line techniques on Teflon circuit board. It seems very simple and uses only five capacitors in addition to the transistor. The address for Motorola is, Motorola Semiconductor Products, Inc., Box 20912, Phoenix, AZ 85036.

### 10-GHz NEWS

WA4GHK, K4IXC and K4NTD have been doing some interesting 10-GHz work in Florida, using crystal locked Gunnplexers running nbfm (5 kHz deviation) and cw (500 Hz bandwidth). On January 16 they worked over an 83-mile path. In Jim's (WA4GHK) own words: "... early in the day cw contact was made over a 48-mile path without the benefit of

ducting. By late afternoon a duct developed enabling the path from Jetty Park just south of Cape Canaveral to Jensen Beach to be worked with signals in the neighborhood of 50 + dB above the noise to be worked on fm. Indeed, the signals were so strong that as long as one dish was correctly aimed, the other could be pointed in any direction and voice contact maintained. Both stations were at sea level with dishes mounted on 4-ft tripods. The Jetty Park station consisted of a 10-mW Gunnplexer phase-locked at 10,250 MHz and a 48-in. dish, while the Jensen Beach station consisted of a 30-in. dish and a 10-mW Gunnplexer phase-locked at 10,279.9 MHz." Jim also adds: "The path could not be worked with 2-meter fm gear carried for liaison work."

### HELP NEEDED

Dan Houlihan, N9DH, is looking for information on microwave systems (transmitters, receivers, antennas etc.), so if you live in his area perhaps you would like to get in touch. All of us in the microwave game should remember our own problems getting started and try to help newcomers. Dan's address is 443 Day St., Galesburg, IL 61401.

### 2304-MHz SATELLITE IDENTIFIED

The 2304-MHz satellite signals reported in this column in February have been identified by AMSAT, quoting a confidential domestic source, as almost certainly associated with COSMOS 1217, a Russian early-warning satellite. The catalog number of this satellite is 80-85A (85th identified launch in 1980), and its orbit is of the Molniya type (elliptical, apogee approximately 37,000 km, perigee approximately 1000 km, inclination 63°, period 9-10 hours). This signal on 2304 MHz is new, but the satellite itself has previously been reported in the AMSAT magazine *Orbit*, no. 5, Jan./Feb. 1981, p. 27. The original source of information on this satellite was Geoffrey Fallworth's *Satellite Log* published in the U.K.

### MICROSTRIP PROGRAM ADDITION

The microstrip calculation program printed in this column in December 1981 omitted two lines. The program as printed does give valid results but the inclusion of the two lines below will result in slightly improved accuracy.

25 EE = E  
225 E = EE



\*103 Division Ave., Millington, NJ 07946

# The World Above 50 MHz

Conducted By William A. Tynan,\* W3XO



## Getting Ready for Another Season

It's been a hard winter for most parts of North America, but spring is finally on the way! Now is the time, before another vhf season is upon us, to start putting the station back into shape for the DX that is certain to arrive before too many more weeks. The rough winter just passed has wreaked havoc on many antenna systems, and repairs are certainly in order before a rare contact or a new state is missed because of degraded performance.

Some damage may be obvious. That just takes work to fix, but other effects of winter's wrath, as well as possibly the results of several years of exposure to the elements, may not be quite as easy to detect. First, all connections should be checked to be certain that they are still in good shape. Look for signs of oxidation or corrosion. In any case, it wouldn't hurt to perform a general clean-up on them anyway. Then, be sure that they are well sealed again after you finish. The feed line is the next thing that should be examined, for signs of cracked insulation and other effects of exposure. A wattmeter reading taken at the antenna, compared with a measurement in the shack, may reveal quite a bit about the performance of your line. If you use coax, such as RG-8, it might be a good idea to replace it anyway if it has been up for more than about five years.

The old line should still be serviceable for some years to come on the hf bands, especially 40 meters and below. So, don't toss it out. Some of the "hard lines" may last longer before losses begin to climb. This is especially true of the gas-filled variety, to which pressure has been applied.

Naturally, towers, masts and guys should be inspected to be certain that they have not been damaged and that towers and masts are still standing straight and true. Check to see that guy anchors remain firmly in place and that guywire tension is correct. Rotators take particular punishment from the elements. Frequently, if they are badly damaged, replacement is the only course but sometimes they can be repaired by mechanically inclined hams. Most manufacturers of amateur rotators stock a good supply of replacement parts. Many hams make a hobby of, and take special pride in, restoring defunct rotators to useful service. If you are not one of them, perhaps there is such a person in your area who can give you a hand. In any case, don't go into the season with a stuck rotator. Chances are that the rare DX will not be in the direction in which your beam happens to be pointed. Like rf transmission line, rotator cable takes a beating from

years outdoors. Although far less critical, it too should be in good condition if you are not to experience trouble at the wrong time. A word to the wise!

It goes without saying that the antennas themselves should be scrutinized for damage such as broken, bent or cracked elements and booms. Of course, this affords a fine opportunity to upgrade the old array to a bigger and better one, possibly by stacking some more like it or replacing it with a longer boom beam of one of the newer and better designs. Or, you may wish to consider adding another section or two of tower to raise your antenna above those trees that have been growing up around it. Getting the antenna above the trees is worthwhile on any band, but it is particularly important on 70 cm and the higher-frequency bands.

The refurbishment and improvements accomplished, now that the weather is reasonably accommodating, is sure to pay big dividends during the exciting DX-filled months to come. This applies whether your primary interest is 6 meters and the Es that will burst upon us soon, 2 meters with its warm-weather tropo enhancement, meteor scatter (as well as its own share of E skip), or the higher bands with their sometimes fantastic tropospheric propagation.

### MELVIN S. WILSON W2BOC/W1DEI

The world above 50 MHz lost one of its truly great inhabitants with the passing, on February 3, of Mel Wilson, W2BOC. For over 40 years, Mel devoted a substantial portion of his time to the study of sporadic E and auroral propagation, and significantly added to mankind's knowledge of these two modes so important to our exploitation of the vhf bands. In quest of proof of his belief that some types of sporadic E are triggered by violent atmospheric storm systems, he systematically pored over stacks of weather maps, correlating their information with mountains of reports submitted by hundreds of amateurs. From this mass of data, Mel was able to trace the "birthplaces" and subsequent migration of literally thousands of sporadic E clouds responsible for hundreds of openings occurring over several decades. His findings were documented in a number of articles, including a major two-part work that appeared in *QST* for December 1970 and March 1971.

A particularly outstanding example of his painstaking use of amateur-supplied data was presented in conjunction with a talk he gave at the 1973 Central States VHF Conference. It consisted of a film produced with WASHNK. To create the film, they pieced together hundreds of still photos of maps, each showing plots of Es paths existing at a specific time. The result graphically displayed the life history of a typical opening. This was only one of many talks W2BOC presented at Central States Conferences. He was a regular attendee of these annual meetings of vhf-minded hams since they began in 1967. In addition to formal talks given at these and other amateur gatherings, he spent many hours in individual discussions with fellow hams sharing his interest in sporadic E and related subjects. As well as being very patient in explaining the intricacies of the subject, he was always

eager to hear the observations, thoughts and ideas of others.

Mel Wilson was one of those for whom it can truly be said that the world is better informed because of his diligent pursuit of a keenly held interest and the insight that he brought to bear in unraveling some of its mysteries. Of course, this is especially so for our particular niche in the hobby of Amateur Radio. But that's only part of the work of this man. In addition to his outstanding contribution to the physical science of radio propagation in connection with his hobby of Amateur Radio, he was, in his professional career, a noted expert on the subject of underwater sound propagation. As such, he materially aided the defense of his country during the Second World War and for years thereafter in the vital field of sonar.

As with all of his friends, I will miss Mel's absence from Central States Conferences and other amateur meetings but I, for one, will be content in the knowledge that his contributions will serve as a foundation and guide for others also gifted with his brand of curiosity, insight and determination to learn how our signals get from one place to another. Their own accomplishments and discoveries will be the best monument to him and his work that I can imagine. I am certain that Mel would echo this feeling.

### JAMES R. SCHELLENBERG WA9DOT

It is with deep regret that I announce the passing of another well-known vhf'er. WA9DOT was an able and enthusiastic practitioner of the radio art as applied to the world above 50 MHz. Among his many other accomplishments, he was a successful moonbouncer, holding 2-meter WAS number 8 as well as WAC on that band. He was also active on 6 meters and had earned WAS there as well. The sound of Jim's resonant voice and excellent signal will be missed by his friends in the vhf fraternity.

### WANT TO TRY YOUR HAND AT 902 MHz?

Indications are that we are destined to have a new

band from 902 to 928 MHz added to our list of assignments once provisions of the WARC treaty are put into effect. When this will happen is currently a matter only for speculation. Nevertheless, there is no reason we should not start preparing now for operation in this exciting part of the spectrum. There are exciters to be built and tuned up. Power amplifiers, whether vacuum tube or solid state, should be easier to construct and get working than is the case 400 MHz higher, but they represent a significant challenge nevertheless. You will certainly want a good, low-noise preamp. Then there is the antenna. It will be interesting, indeed, to see what forms high-performance antennas for our new 33-cm band take.

To provide encouragement for would-be occupants of the new band, the Central States VHF Society is scheduling competitions, and just plain "show and tell" exhibitions, of 902-MHz equipment at its annual conference to be held in Baton Rouge, Louisiana, the last weekend in July. There will be an antenna-gain test on that frequency, as well as a noise-figure measurement session for 33-cm preamps and converters. The other, more traditional, bands will be included in these events also, but won't it be intriguing to see what innovative devices people come up with for this new band? It will be particularly interesting because there is as yet no commercial equipment available for 902 MHz. Everything will have to be home built.

So, get started on that 33-cm equipment right away. Even if you know you won't be able to attend the Conference, chances are that some other vhf'er from your area will be going. I am sure you can prevail on that person to take your creation and enter it for you. I'll have more to say in a forthcoming column regarding the 1982 Central States VHF Conference. In the meantime, information may be obtained by sending an s.a.s.e. to W4FJ or WB5LBT at their *Callbook* addresses.

### ON THE BANDS

**6 Meters** — Following what we have come to expect, a rather dull three weeks or so in mid-January, F2 propagation picked up markedly toward the end of the month. This improvement was accompanied by a

\*Send reports to Bill Tynan, W3XO, P.O. Box 117, Burtonsville, MD 20866, or call 301-384-8736 and record your message.

sharp rise in the 10.3-cm solar flux from 147 on the 21st to 301 on February 1. It did not drop below 200 again until February 15, when it stood at 190. Along with this were quite high levels of geomagnetic activity, which produced several notable auroras. These were felt on 6 meters as well as higher bands up through 220 MHz, with the evenings of February 2 and 3 being particularly good for that mode. Such conditions often lead to north-south F2 openings the following day. The morning of February 3 certainly followed that pattern, with the East Coast experiencing a particularly good Caribbean opening. The star attraction on this occasion was newly activated Grenada station J3AE. Jim had an excellent signal and provided a new country for many of the gang. Also worked widely that day were 8P6KX and 9Y30LL, a special call for 9Y4LL. HC1BI was in there as well, along with quite a number of respectable backscatter signals from the East and Midwest. Other Caribbean-area stations reported widely over the following two weeks include J6LOV, VP2MJ, VP2MH, VP2MO, DL3ZM/YV5, YV5PE, PJ9EE, HP1XDF, FY7AZ and FY7BC. The latter two were especially welcome to those who had been regularly hearing the FY7THF beacon for several years, but had never made a two-way contact with French Guiana.

Six-meter operation in that part of the world has certainly increased over what it was a few years ago, and more is on the way. KH6IAA is one who was especially grateful for this pick-up, as well as the conditions to make it worthwhile. In less than 24 hours February 13 and 14, Al worked six new Caribbean countries. Six new countries in a day would be good for anyone, but when it brings a station's total to 66, as it did in this case, it's astonishing! The two days of February 13 and 24 were interesting indeed. Like the period 10 days earlier, geomagnetic activity was quite high, with aurora taking place the afternoon of the 13th. At the same time the band was open in many areas for F2 backscatter to the south and southwest. During both afternoons, KH6IAA was workable from the East Coast with beams aimed considerably south of the true path. On the 14th, LU8WAT put in an appearance with an S-9 signal. For a short time on both days, WA5IYX San Antonio noted Channel 2 TV signals from the direction of South America. Since only the video was observed, Pat concluded that the muf reached about 37 MHz. Unfortunately, he was not able to identify the station, or stations. The 13th and 14th also produced ZL openings for much of the western part of the country. Once again, the ability of the ZLs to work in the 50-MHz portion of the band before TV hours paid off in many contacts. W5UWB in south Texas reports working five ZLs and two ZLs on that end of the band. In addition, a few QSOs were completed above 51 MHz. W5UWB QSOed ZL1TOP and ZL2KT at 51.1. The latter was also worked on this frequency by K7ICW Las Vegas.

This reporting period was full of additional interesting DX happenings too numerous to enumerate. Nevertheless, here are a few examples. WA1OUB notes a cw QSO with T32AB at 1847Z on February 7. The ZB2VHF beacon was reported on several occasions and a number of stations on this side worked ZB2GW. Probably the best of these Gibraltar openings occurred about 1530Z on January 31. At the same time exactly one week later, this conductor heard the ZS6DN beacon on 50.062 for a few minutes. I understand the ZS6LN worked a few U.S. stations around that time, but I do not have details. In the afternoon of February 12, W4CKD, in the Virginia suburbs of Washington, caught quite a good LU opening. Worked were LU8 8YYO, 8AHW and 5DJZ, while 9AEA and 3VCF were heard. At deadline, one of the masters of 6-meter DX, VE1ASJ, comes up with still another tantalizing tidbit to add to the many he has to his credit already. During the afternoon of February 16, Andy heard Kenya beacon 5Z4YV on 50.105. Although he was successful in breaking it and bringing up 5Z4CS, conditions faded before he could complete a QSO.

Most of us have despaired of working the PAOs at 53.875 MHz, but not everyone. Word has reached this conductor that the feat has been accomplished by at least two North American 6-meter operators. K8WKZ in Michigan is one and, not surprisingly, VE1ASJ is the other. Both completed cw contacts with PA3AAN at 53.875 in mid-December.

A very complete report on his HC8VHF operation is turned in by WB8ABN/HC1MD. In the three weeks on the air from the Galapagos Islands between November 13 and December 7, Rick made a total of 2080/QSOs. In the first one and a half hours of operation, 47 U.S. states were worked. In all, 49 were contacted, with KL7 the only one missed. Even that hard-to-get state was heard. A total of 330 JAs were worked including all Japanese call areas. WAC was completed in the first two days and the 6-meter two-way country total was 23. In addition, four European countries were QSOed via crossband. All of this was accomplished with a Belcom Liner transceiver producing

about 10 watts and operated from a storage battery. The antenna was a home-built quad on a 2-foot boom that was built from locally available materials for a few dollars. It was up 90 feet on an existing pole, which certainly didn't hurt the signal. QSLs, with self-addressed envelopes and IRCs, should go to Box 665, Cuenca, Ecuador. Since returning home, he has been active as HC1MD/5 using the same rig and antenna. Cards for those contacts should go to K8LJG. Rick is undertaking the construction of two 6-meter beacons, one for use at HC8. To raise funds for this project, he will send two color photos of the Galapagos Islands and its unique wildlife to anyone mailing a donation of five dollars to his Cuenca address.

PJ9EE has certainly been the most active Netherlands Antilles station since getting on 6 meters a few months ago. Chet has provided that much needed country to probably hundreds in the U.S. and elsewhere. However, few have received cards confirming their contacts. Chet has told me that he will QSL his 6-meter QSOs, but that he must have s.a.s.e.'s with Netherlands Antilles stamps affixed. He says that he cannot use IRCs, as his post office doesn't wish to honor them. To accommodate those desiring QSLs, he has sent this conductor a supply of the proper stamps. I will be happy to provide one to anyone mailing me an s.a.s.e. along with one dollar to cover cost of the stamp. Any excess money will be donated to SMIRK for their overseas equipment fund.

**2 Meters** — K8UR/1 Marlboro, Massachusetts, comments on a great aurora the evening of February 3. Dennis says that between 1800 and 2330 local time he made 25 contacts and picked up four new states plus VE1s, 2s and 3s. He wonders if they work 2-meter aurora in Europe. Yes, it is a very popular mode over there. I will try to present a summary of auroral operation in Europe in a forthcoming column.

K8J.S, formerly WB8TOB, Royal Oak, Michigan, notes that he got state number 34 out of the Es opening that hit on January 3. Dave comments that he tried for six years to work Texas, and when he finally did, he worked seven of them in 16 minutes! He comments that spreading out more above and below 144.2 would be very helpful during times of heavy activity. This sentiment is echoed by WA7JUO Las Vegas, Nevada. Sam suggests that, especially for m.s. we use frequencies spaced 25 kHz from about 144.150 to 144.250. This writer believes that, unless there are stations in very close proximity, a 10-kHz separation would be better, as it would provide for more total activity. In any case, there is no reason for everyone to be on 144.2

From the *Lunar Letter* published by KI7D and N7CSF comes word of a proposal by Dave, KI7WS, who suggests that those interested in making ssb contacts via EME congregate on 144.105. This conductor urges that anyone not engaged in this activity stay above 144.110 when working ssb. In this way we can all aid in the making of these interesting QSOs, even if we ourselves are not equipped for moonbounce. I will certainly pass along reports on how this experiment progresses.

**1-1/4 Meters** — N3AHI near Allentown, Pennsylvania, took good advantage of the aurora the evening of February 3. Included in Jim's contacts were WA8HTL Michigan, K9MRI Indiana, WB9SNR Illinois and VE3CRU in Toronto. That night of work brought his 1-1/4 meter state total to 15.

The effort that VE3EMS is putting into this band is paying off. Peter is now up to 22 states following a January 3 m.s. contact with WA4CQG in Alabama. The ability to train his array of eight Boomers on the horizon, in addition to its height, makes it a very good tropo and meteor-scatter antenna, as well as providing a first-class EME set-up. An example of the terrestrial capability of the station is his ability to regularly work KB9NM Wausau, Wisconsin, at 350 miles, who runs 10 watts. VE3EMS is always looking for 1-1/4-meter skeds via any mode. His address is Peter Shilton, 6 Stollery Pl., Elliot Lake, ON P5A 1V1.

Another active participant on this band is W5RCI Marks, Mississippi. Rex has a kw of ssb and cw to a 15-1/2-foot boom Yagi with three like it to go up soon. So far, W5RCI has come up with 14 states. I am sure the new four-Yagi array will produce a lot more before long.

**70 Cm and Down** — When W9AAG near Chicago can't find anyone to talk to on 23 cm, which is all too often, he amuses himself by bouncing his signals off of nearby objects such as church steeples and grain elevators. Dallas says that he has also worked both W9ZIH and WB9SNR by reflection from such surfaces. Those living in mountainous regions may be able to take very good advantage of this ricochet mode. It is reported every so often on 2 meters and 70 cm, and should be quite useful on the higher bands as well.

Much of the rest of the news this month comes by way of newsletters. In the terrestrial department,

W0OHU's informative sheet contains interesting accounts of both 70-cm and 23-cm activity. A report turned in to Ed by WBSLUA notes excellent tropo conditions the evening of January 20. On this occasion, Al worked nine stations in four states of 70 cm including four Floridians, W4ODW, WD4JEJ, K4KJF and K4NTD. The latter station is 960 miles from WBSLUA's QTH. The same conditions also affected the 23-cm band producing contacts with W5UWB Kingsville, Texas, 400 miles, and WASTBE Corpus Christi, 360 miles. Fellow Dallas-area station W5HN, running only 3 watts, worked both of these stations also. In addition, WBSLUA picked up Florida for a new state by QSOing W4ODW. Al remarks that most of the terrestrial activity on 23 cm in his area of the country is now concentrated around 1296.1 rather than 1296.0. With increasing EME work on the band, he expresses hope that the rest of the country will follow suit.

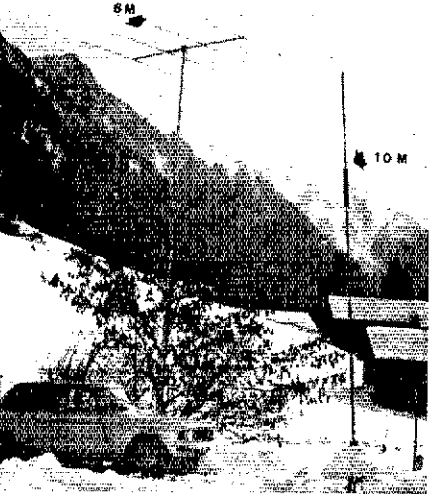
Another piece of information from WBSLUA concerns the new edition of the *1296-MHz Directory*, on which he and WASTBE are now putting the finishing touches. Anyone wishing to be listed should send information to WBSLUA at Rte. 7, Box 32, McKinney, TX 75069. Central States VHF Society members will receive a copy on request. Others may get one by sending a legal-size envelope, with 56 cents postage, to the above address.

WBSLUA also notes that the NE72089 GaAs FET, when used in his preamp described in January 1981 QST, produces a noise figure of 0.5 dB at 1296 MHz. He states that this device is now available from California Eastern Laboratories, 3005 Democracy Way, Santa Clara, CA 95050. Price is 15 dollars plus 5 dollars for shipping. Delivery is said to be 60 days.

The *432 and Above News* put out by K2UYH notes that several stations are within one state of completing 70-cm WAS. W5FF and W1JR are among them. Both need Kentucky for the final state. Al is planning a DXpedition to the Ashland area sometime in March. He plans to use the same portable 20-foot dish and 7650 final that he employed so successfully in Delaware and West Virginia. So, by the time you read this, the number of WASs on this band should stand at six or more.

A 70-cm EME DXpedition to the Principality of Liechtenstein by HB9QQ, as HB0QQ, is also featured in the January issue of the K2UYH publication. Mid-winter is hardly the time of year to visit that country, unless you're wearing skis, but Pierre decided to brave it anyway. Although the weather was characteristic for the season, including an ice storm the first night that did bad things to the VSWR, HB0QQ managed to work K2UYH, W1JR, ADIC, W5FF, K5FF and WBSLUA. A number of European and Asian stations may have also been contacted, but details are sparse as of this writing.

A very interesting technical note is also included in the January *432 and Above EME News*. It is from the Crawford Hill VHF Club and describes an offset-fed parabolic dish. A number of advantages for this arrangement are cited, among which are: ease of getting access to the feed to make adjustments and fewer problems because of the feed antenna and transmission line being in the center of the dish's beam, where they can disrupt its pattern and cause higher than wanted sidelobes and noise pickup. □



The site of HB9QQ's mid-December 10- to 6-meter crossband DXpedition to the Principality of Liechtenstein. The call used was HB0QQ/P.

# Hamfest Calendar

Conducted By Marjorie C. Tenney,\* WB1FSN

[Note: Sponsors of large gatherings should check with League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.]

**Colorado:** The Grand Mesa Repeater Society will sponsor the third annual Western Slope Swapfest on Saturday, April 17, from 10 A.M. to 4 P.M., at the Plumbers and Steam Fitters Union Hall, 2384 Hwy. 6 and 50, Grand Junction. Admission is free. Swap tables are \$5. Auction, prizes and refreshments. Talk-in on 22/82. For further information, send s.a.s.e. to Dale Ellis, KD0M, 588 Starlight St., Grand Junction, CO 81501, or call 303-434-5981.

**Connecticut:** The fifth annual PVRA Flea Market will be held on Sunday, May 2, at the George Penney High School, East Hartford (Exit 91 off I-86). Hours 10 A.M. to 4 P.M. Tables \$8.50, admission donation \$1. For advance tables or info, contact Arnie, K1NFE, P.O. Drawer M, Plainville, CT 06062.

**Illinois:** The 21st annual Moultrie ARK Hamfest will be held April 18, at the Moultrie County 4-H Center Fairgrounds, on Cadwell Rd., 5 miles east of Sullivan. Heated indoor and large covered outdoor flea market. No charge to vendors. Space on a first-come, first-served basis. Talk-in on 146.94 and 146.655/055. For more information, write Ralph Zanche, N9CDK, P.O. Box 55, Lovington, IL 61937, or call 217-873-5287.

**Illinois:** The 16th annual Rock River ARC Hamfest will be held on Sunday, April 25, at Lee County 4-H Club Center, one mile east of junction of Rte. 52 and Rte. 30, south of Dixon. Advance ticket donation \$2. at gate \$2.50. Prizes; breakfast and dinner served. Talk-in on 52 simplex. For advance tickets write to: Ed Webb, WD9CJB, 618 Orchard, Dixon, IL 61021.

**Illinois:** The Centralia Wireless Assn., Inc., will hold its annual hamfest at the Kaskaskia College Gymnasium, 3 miles northwest of Centralia, on Sunday, May 2, Doors open at 7 A.M. for flea market set up and exhibit displays with no charge. Limited number of tables on first-come, first-served basis. No admission charge. Prizes, food and plenty of free parking. Prize tickets \$1 each 6/\$5, in advance or at hamfest. Talk-in on 27/87 and 52. Mail ticket orders with s.a.s.e. to Centralia Wireless Assn., Inc., Hamfest Tickets, P.O. Box 1166, Centralia, IL 62801. For further information, contact Bud King, WB9QEG, tel. 618-532-6606, or Lou Hodges, W9IL, tel. 618-533-4724, or write to CWA, Inc. at above address.

**Kentucky:** The Paducah ARA annual Ham/Swap Fest will be held April 18 from 9 A.M. to 3 P.M. at the Paducah Jaycee Civic Center, 2701 Park Ave., Paducah. Admission is \$1. Vendors will be on hand; many prizes. Talk-in on 66/06. More information from Bruck Huyck, WD4BVW, Rte. 8, Box 431, Paducah, KY 42001, tel. 502-444-7725.

**Massachusetts:** The Wellesley ARS is conducting its annual auction on Saturday, April 17, at the Wellesley High School cafeteria on Rice St., Wellesley. Doors open at 10 A.M. Talk-in on 63/03, 04/64 and 52. Contact: Kevin P. Kelley, WA1YHV, 7 Lawnwood Pl., Charlestown, MA 02129.

**Massachusetts:** To celebrate its 51st anniversary in Amateur Radio, the South Shore ARC of Braintree will hold an indoor flea market on Sunday, April 25, at the Viking Club, 410 Quincy Ave., Braintree, from 11 A.M. to 4 P.M. Tables available (8 ft), for \$8 each (includes one free admission) and may be reserved in advance. Send appropriate amount to Ed Doherty, W1MPT, 236 Wildwood Ave., Braintree, MA 02184. Checks should be made payable to South Shore ARC; confirmation will be sent. Viking Club open to vendors at 10 A.M., to public at 11 A.M. Entrance fee \$1. We'll run, rain or shine. Questions? Call Ed at 617-843-0510 or 843-4431, evenings.

**Massachusetts:** A general Amateur Radio outdoor flea market on May 2, sponsored by NEAT (New England

Amateur TV) Group, Inc., will be held at Freeport Hall, Dorchester, just off the S.E. Expressway, rain or shine. Admission \$1. Sellers \$4 pre-registration mailed by April 25 to P.O. Box 406, Boston, MA 02102; \$7 at the gate. Plenty of parking, 300 separate selling spaces in a secured area. Talk-in on 145.29 repeater and 52.

**Massachusetts:** Quannapowitt Radio Assn. (QRA) will hold an indoor/outdoor hamfest Saturday, May 1, from 9 A.M. to 4 P.M. at South Hall Fire Station, corner of Salem and Sumner Sts., Lynnfield. Admission \$1 at the door, tables \$7 on day of hamfest. Tables reserved in advance are \$5. Food available. Talk-in on 19/79 or 52. For details write to Dave Meldrum, KA1MI, 28 Cedar Ln., North Andover, MA 01845.

**Minnesota:** The Bemidji ARC will sponsor a swapfest on Saturday, April 24, starting at 9 A.M. at the Holiday Inn, Hwy. 2 west. Prizes, refreshments, plenty of parking. For more information, contact Bill Williams, WA0ABX, Rte. 1, Box 369J-3, Bemidji, MN 56601, tel. 218-751-9070.

**Nebraska:** AK-SAR-BEN ARC, Inc., will hold their annual ham auction on May 2 from 8 A.M. to 6 P.M. CST, at the American Legion Post No. 374, 4670 South 135th St., Omaha. Talk-in on 34/94 and 52 simplex. Auctioneer, Bob Buman, W0PPT. For further information, contact auction chairman Jim Sanford, N0AIH, 9718 Jaynes St., Omaha, NE 68134, tel. 402-571-2704.

**Nevada:** SAROC, annual prestige convention for radio amateurs, is at the Aladdin Hotel, Las Vegas, April 1-4. Many veteran exhibitors returning. *Ham Radio Magazine* will host cocktail party Friday evening for all exhibitor personnel and SAROC paid registered guests. Exhibits, technical sessions. Special room rates, \$36 per night, plus room tax, single or double occupancy. Send deposit with SAROC room request card to Reservations Manager, Aladdin Hotel, 3667 Las Vegas Blvd. South, Las Vegas, NV 89109. If you did not advance register for '80-'81 SAROC, send QSL card with s.a.s.e. for details to POB 14217, Las Vegas, NV 89114.

**New Hampshire:** The 2nd annual hamfest-fleamarket, sponsored by the Great Bay Radio Assn., will be held on Saturday April 17, at the Somersworth Armory, Somersworth, from 9 A.M. to 3 P.M. Antique radios and computers will be on display. Many prizes, food and refreshments, and parking. Entrance fee \$1 per person. For advance registrations and further information, call Dick Sedgewick, N1EX, tel. 603-742-3703 or write Great Bay Radio Assn., Rte. 16, Dover, NH 03820.

**New Jersey:** The 1982 Flemington Hamfest sponsored by the Cherryville Repeater Assn. will be held on Saturday, April 3 at the Hunterdon Central High School Field House, off Rte. 31, north of Flemington. Set-up on Friday from 7 to 10 P.M. and Saturday from 6:30 A.M. on. Tables (8 ft), \$8 with ac, \$6 without. Talk-in on 975/375, 615/015, 222.52/224.12, 222.94/224.54 and 52. For further information, write to Cherryville Repeater Assn., Box 76, Fairview Dr., RD, Annandale, NJ 08801, tel. 201-788-4080.

**New Jersey:** The 7th Trenton Computer Festival will be held at Trenton State College, Trenton, on Saturday and Sunday, April 17-18, from 10 A.M. to 5 P.M. *This show is oriented toward computers and would be primarily of interest to hams who have an interest in this field.* Commercial exhibits, electronics flea market, many technical sessions of interest to the ham and free short courses on Sunday. Admission for all activities \$5 (\$3 students). For further information, write TCF-82, Trenton State College, Hillwood Lakes CN550, Trenton, NJ 08625, or call 609-771-2487.

**New Jersey:** The Tri-County RA will hold its annual hamfest/flea market on Sunday, May 2, at the Passaic Township Youth Center, Valley Rd., Stirling, from 9 A.M. to 4 P.M. Donation is \$2.50 and tables are \$6. Hot food and refreshments available. Many prizes. Talk-in on 147.855/255 and 52. For table reservations or information, write to Jack Sammarco, KC2FS, 2062 Emerson Ave., Union, NJ 07083 or call Herb Klawunn, W2CHA, tel. 201-647-3461.

**New Mexico:** The Mesilla Valley RC of Las Cruces is having their 18th annual bean-feed and Swapfest on Sunday, April 25, at the Dona Ana County Fairgrounds, 13 miles west of Las Cruces off I-10 at exit 127. Tickets \$6, children under 12 \$2. Ticket

holders entitled to meal of chili, beans, rolls, cold slaw, hot dogs and soft drinks, as well as prizes and free swap tables. Lots of indoor/outdoor space with free parking. Bring your camper and stay overnight. Talk-in on 04/64 and 16/76. See Victor Borge on Sunday night at Pan-American Center, University Campus in Las Cruces. For advance tickets or further information, write or call Ted Hipkens, W3FFB/5, 3260 Fairway Dr., Las Cruces, NM 88001, tel. 505-522-1351.

**New York:** The Southern Tier ARC will hold their 23rd annual hamfest on May 1, at the Owego Treadway, Owego, (Rte. 17 to exit 65). Gates open 9 A.M. until 5 P.M. Outside flea market spaces, dealer displays, technical and nontechnical talks, prizes and refreshments. For additional information, contact Craig England, KF2X, RD 1, Box 144, Vestal, NY 13850. Talk-in on 22/82 and 16/76.

**Ohio:** The 13th annual B\*A\*S\*H sponsored by the Miami Valley FM Assn. will be held on Friday night of the Dayton Hamvention, April 23, at the Convention Center, Main and Fifth Sts., Dayton. Parking in adjacent city garage. Admission free. Sandwiches, snacks, C.O.D. bar available. Live entertainment provided for super social evening. Many awards. For further information, contact the Miami Valley FM Assn., P.O. Box 263, Dayton, OH 45401.

**Ohio:** On April 23-25, the 31st Annual Dayton Hamvention will take place at the Dayton Hara Arena and Exhibition Center, Dayton. In 1981, there were over 200 exhibitors and a registration of 21,000 — not "just another hamfest"! For reservation request form write to: Dayton Hamvention Housing, 1406 Third National Bldg., Dayton, OH 45402, tel. 513-226-1444.

**Pennsylvania:** Eighth Annual Northwestern Pennsylvania Hamfest sponsored by the Crawford ARS is Saturday, May 1, from 8 A.M. to 4 P.M., at the Crawford County Fairgrounds, Meadville. Bring your own tables: \$5 per table to display inside, \$2 per car space outside. Admission \$3, children under 12 free. New equipment exhibits, computer TV demonstration, many prizes, camping, food and refreshments on grounds. Talk-in on 04/64, 81/21, 63/03. Details from CARS, P.O. Box 653, Meadville, PA 16335, Attn: Hamfest Committee. We are known as the friendly hamfest!

**Rhode Island:** The Fall River ARC will hold its flea market on Sunday, May 23, at the American Legion Hall, Freetown, Massachusetts, from 10 A.M. to 4 P.M. Flea market spaces are \$7 in advance and \$9 at the door. Admission \$1. Table prices include two admissions. Free coffee available. Talk-in on 63/03 and 52. Make check or money order payable to Fall River Amateur Radio Club, and mail to: Ann M. Carro, KA1DNB, 652 Old Colony Ter., Tiverton, RI 02878.

**South Carolina:** The annual Greenville Hamfest sponsored by the Blue Ridge ARS, will be held at the American Legion Fairgrounds, White Horse Rd., 1/2 mile north of I-85 in Greenville, May 1-2. Admission will be \$3 at the gate; no advance sales. Talk-in on 01/61 and 223.46/224.06. For further information write Hamfest Chairman Gary D. Whidy, Rte. 6, Box 268, Travelers Rest, SC 29690.

**Tennessee:** Memphis Mini-Fest will be held this year at the Pipkin Bldg. in the Mid-South Fairgrounds on Saturday, April 3. Doors open 8 A.M. to 5 P.M. Flea market unloading starts at 6 A.M. Bring your own tables and chairs. Admission is \$1; flea market space \$5 or two spaces for \$8. Hospitality party Saturday night in same building at 7:30 P.M. For further details contact Mid-South ARA President Clayton Elam, K4FZJ, 28 N. Cooper St., Memphis, TN 38104, tel. (days) 274-4418, (nights) 743-6714.

**Tennessee:** The second Tri-Cities Hamfest will be held at the Appalachian Fairgrounds, Gray, on May 1-2. Bristol, Johnson City and Kingsport ARCs are cosponsoring the event with forums, dealers, flea market and RV hookups. Only two hours away from 1982 World's Fair that starts on May 1. For further information write Tri-Cities Hamfest, P.O. Box 3682 CRS, Johnson City, TN 37601.

**Texas:** The annual 7290 Traffic Net Picnic will be held in Kerrville on April 23-25, at the Kerrville State Recreation Area. Many activities planned. Register in advance for Saturday barbecue supper. Hotels and motels available, advance reservations recommended. Overnight camping, shelters, RV hookups available at

park and reservations may be obtained by writing Kerrville State Recreation Area, 2385 Bandera Hwy., Kerrville, TX 78028, or by calling 512-257-5392. Talk-in on 7290, 37/97 and 52. For more information, write the 7290 Traffic Net, P.O. Box 126, New Braunfels, TX 78130.

**Virginia:** Sunday, May 2, the Lynchburg ARC will hold its annual swapfest at Brookville High School on Rte. 460 west of Lynchburg. Large covered tailgating area and plenty of food. Talk-in on 01/61. Details via P.O. Box 4242, Lynchburg, VA 24501.

**Washington:** The 29th annual Skagit ARC hamfest will be held at Bryant Grange Hall, near Arlington, on April 17, from 9 A.M. to 7:30 P.M. Vendor exhibits, technical program, ARRL program, ladies activities, auction, prizes. Tickets at \$8 include all activities and dinner. Limited trailer parking available. For further information, contact Van, K7CTP, tel. 323-2732 or Norm, W7LFA, tel. 773-8594 (office) or 821-2985 (home). Ticket mail order: send money and s.a.s.e. to Jack Carlson, W7GHO, 121 15th Ave., Kirkland, WA 98033.

**Washington:** The third annual Inland Empire Swapfest will be held April 24 at the Spokane Interstate Fairgrounds, sponsored by the Amateur Radio Clubs of the Inland Empire. Commercial and noncommercial displays, swap tables, contests, raffles, auctions, public service displays, collectors' displays, working amateur stations, slow-scan TV,

snack bar and much more. Admission \$1. Activities from 9 A.M. to ? Flea market tables (4 ft x 8 ft) at \$5 per full table. Talk-in on 34/94 and 52 simplex. For reservations and further info, mail to "Swap Fest", c/o Jan Thiemann, KA7DDU, 7803 E. Mission, Spokane, WA 99206, tel. 509-928-1778.

**Washington:** The Yakima ARC, W7AQ, announces their annual Ham Fest, May 1-2, at the Ahtanum Youth Activities Park in Yakima. Overnight camping Friday and Saturday night at the site. Regional dealers of ham equipment, a free swap and shop, prizes and plenty of QSOs and "eye-balls" are a few of the activities offered. Talk-in on 84/24 and 52. Doors open at 9 A.M. Saturday, with lunch available both days. Breakfast starts at 6 A.M. on Sunday. Contact David Pankey, N7BRB, 512 So. 7th St., Yakima, WA 98901 for more information.

**Washington:** The 50th anniversary of the Clark County ARC (W7AIA) will be celebrated at the Fort Vancouver Hamfair on Saturday, May 8, and Sunday, May 9, at the Clark County Fairgrounds, 7 miles north of Vancouver on I-5 (Exit 9). Admission \$4.50; Saturday night dinner \$5.50 adults, \$2 children 12 or under. Unlimited swap tables for ham and electronic equipment at \$5 per table per day. Seminars, dealers, swap and shop, contests, prizes. Limited hookups for RV (self-contained) at \$3 per day. Make checks payable to Clark County Amateur Radio Club. For further information and registration, write to Ken Westby,

W7DYX, 606 Miami Ct., Vancouver, WA 98664.

**Wisconsin:** 3F ARC Swapfest, Saturday, May 1, 8 A.M. to 3 P.M., will be held at the Neenah, Wisconsin Labor Temple. Admission is \$1.50 advance, \$2 at door. Tables \$1.50 advance, \$2 at door. Prizes, food and beverages, auction at end of day. Talk-in on 16/76 and 52. A semi-formal banquet is available. Cost \$8 per person to advance ticket holders — no banquet tickets available day of swapfest. Contact Mark Michel, W9OP, 339 Naymut St., Menasha, WI 54952, tel. 414-722-4034, after 0000 zulu.

**Wisconsin:** The Ozaukee RC will sponsor its 4th annual swapfest on Saturday, May 8, at the Circle B Recreation Center, located on Hwy. 60 in Cedarburg (20 miles north of Milwaukee), from 8 A.M. to 1 P.M. Admission is \$2 advance and \$3 at door. All 8-ft tables are \$3. Prizes, food and refreshments will be featured. Sellers admitted at 7 A.M. for set-up. For information or tickets, send an s.a.s.e. to Ozaukee Radio Club, P.O. Box 13, Port Washington, WI 53074.

**Wisconsin:** The Milwaukee RAC annual auction of equipment and parts is Thursday, May 13, at 7:30 P.M. at the club meeting hall, 7500 West State St., Wauwatosa. Open to all hams and proteges. Free admission; no sales charges. No flea market dealers. Please tag all gear to be sold with seller's name and minimum opening bid. For further information write Milwaukee RAC, N50 W16328 Pin Oak Ct., Menomonee Falls, WI 53051.



# Coming Conventions

## GREAT LAKES DIVISION CONVENTION

April 17, 1982, Muskegon, Michigan

The Muskegon Area Amateur Radio Council will sponsor the ARRL Great Lakes Division Convention and Hamfest at Muskegon Community College, a facility with free parking for over 2000 vehicles, dining/cafeteria services and clean modern facilities.

Friday evening, April 16, the Ham Hospitality at the Muskegon Ramada Inn is open to all. Also at the Inn, the Wouff Hong initiation will be put on by the MAARC players at midnight. Saturday, April 17, at the Muskegon Community College, doors/registration open at 8 A.M. The event features many technical forums, annual net meetings, commercial exhibits, a satellite TV demonstration and a large swap and shop.

MAARC again will present a varied and interesting ladies program, featuring demonstration of crafts, CPR classes, hospitality room during the day of the convention and an opportunity for the women to see what others have done during the year.

Saturday's tickets are \$3 each. No advance or mail ticket sales. Swap and shop table space may also be purchased on Saturday. Advance reservations are required for the Saturday evening dinner program. Overnight reservations should be made directly with the Ramada Inn, Holiday Inn or other motels in the greater Muskegon area. For additional information write to Muskegon Area Amateur Radio Council, Box 691, Muskegon, MI 49443, or contact Joe Sienkiewicz, N8DBP, Convention Secretary, at 616-744-5378.

## MISSISSIPPI STATE CONVENTION

April 17-18, Jackson

The Jackson Amateur Radio Club will host the ARRL Mississippi State Convention April 17-18 at the Raymond Road National Guard Armory. Activities include forums, net and special activity group meetings, dealer exhibits, prizes and flea market. Food will be available on-site both days.

Admission is free. Swap tables are \$5 each day. Talk-in on 146.52 and 3987.5. Hours are noon to 5 P.M. Saturday, and 8 A.M. to 2 P.M. Sunday.

Headquarters hotel is the Holiday Inn Southwest, where special rates are available to attendees. Reservations should be made directly with the hotel (specify

April 3-4

Arkansas State, Little Rock

April 3-4

Missouri State, Kansas City

April 17

Great Lakes Division, Muskegon, Michigan

April 17-18

Mississippi State, Jackson

May 14-15

Atlantic Division/New York State  
Rochester

May 15-16

Alabama State, Birmingham

May 22-23

Delta Division, Knoxville, Tennessee

June 4-6

Texas State, Dallas

June 4-6

Southwestern Division, San Diego, California

June 5-6

Oregon State, Seaside

June 12-13

Southeastern Division, Atlanta, Georgia

June 19-20

Kansas State, Salina

July 2-5

ARRL/CRRL Midwest, Saskatoon,  
Saskatchewan

July 3-4

West Virginia State, Weston (Jackson's Mill)

August 6-8

Northwestern Division/Rocky Mountain  
Division, West Yellowstone, Montana

August 22

Illinois State, St. Charles

## ARRL NATIONAL CONVENTIONS

July 23-25, 1982

Cedar Rapids, Iowa

October 7-9, 1983

Houston, Texas

you are attending Jackson Hamfest). A hospitality room will be open at the hotel Saturday night.

For swap table reservations or further information, contact Don Elder, KC5VD, 2806 N. Mill St., Jackson, MS 39216, tel. 601-362-0336.

## OREGON STATE CONVENTION

June 4-6, 1982, Seaside

The Oregon State Convention cosponsored by the North Coast Repeater Association and the Oregon Tualatin Valley Amateur Radio Club will be held at the Seaside Convention Center on Friday June 4, through Sunday, June 6. Hours are 12 noon to 4 P.M.

Friday, 8 A.M. to 9:30 P.M. Saturday, and 8 A.M. to 2 P.M. Sunday.

Seminars will include receiver design, construction, satellite earth stations, contests, radio and TV boobies, ARRL forum, traffic nets and emergency services, ham satellites, and many others. Banquet speaker will be a NASA Space Shuttle astronaut. Master of Ceremonies will be Mel Ellis, K7AOZ, vice director, ARRL Northwestern Division.

Registration is \$5 per single and \$7 per couple, \$1 for children. Banquet is \$12.50 per person. Talk-in on 52 simplex and local repeater 145.45/144.85. For more information and/or reservations, write to: Doc McLendon, W7GWC, P.O. Box 920, Seaside, OR 97132.



# In Training

Conducted By Steve Pink,\* KF1Y

## NEW IDEAS ABOUT LEARNING

□ Amateur Radio is fun, and learning about Amateur Radio should be fun also. We, as involved amateurs interested in adding others to our ranks, know that. Sometimes, however, the enjoyable aspects of our hobby fade to the background, and our licensing sessions take on somber, "serious business" overtones. If you as an instructor are prepared, know the material and are using tried-and-true ARRL guidelines, half the battle against dull classes and subsequent high dropout rates and exam failures is won. Let's examine the other half — receptive students and a learning-conducive environment — in light of recent and somewhat unorthodox findings about the actual process of learning. Our goal, after all, is that potential hams learn, really learn, about Amateur Radio and not just memorize answers to exam questions.

### Primed for Success

Students of all ages often come into a licensing class with the preconceived notion that learning this or that will be difficult, that code or theory or both will be a problem. Help them get rid of that notion. Students must be absolutely sure they can and will master what

is presented. A positive attitude is essential. Happily, the mind is nearly unlimited in its capacity to learn. So program your students for success, and reinforce that idea. Eliminate their talk and thoughts about failure. We got our licenses; so can they. Encourage students to discuss their upcoming on-the-air activities. Help them actually picture themselves with their licenses. Will they work DX, enjoy ragchewing or contesting, be certificate hunters or traffic handlers, or get involved in any of the numerous activities granted by their future amateur licenses? They should be as graphic and specific as possible about their Amateur Radio futures.

Once the idea of having their license is accepted and reinforced, students must learn how to relax. Anxiety, any kind of anxiety, interferes with learning. Luckily, researchers have found some techniques that facilitate our abilities to relax and acquire knowledge. Deep, rhythmic breathing increases concentration. So does Baroque music, which has a tempo of approximately one beat per second (selections of Bach, Handel and Vivaldi are effective). How can these findings be applied to Amateur Radio classes? As a prelude to your next class, why not try substituting soothing music and a calming, deliberately slow introduction instead of coffee and rushed chatter?

### Two Sides Are Better

Of major import are findings that learning is easier, faster and more enjoyable when both sides, or hemispheres, of the brain are involved. The right and

left sides of our brains appear to function very differently. The left hemisphere works with facts, point-by-point thinking, and language and reading skills. The right hemisphere seems to be the center of spatial abilities and of intuitions, processing patterns of information. When both hemispheres are integrated and working together, learning is more successful.

The key to this harmonious fusion is mental imagery. Humans think mainly in words, but we learn much more effectively by visualizing those words and concepts. For our purposes, Morse code and electronic theory can be better understood through hands-on demonstrations of equipment and electronic phenomena. Include a lot of these in your teaching. Why not have your class imagine that they are part of the ac or dc within circuits under discussion, and have them describe what happens at each juncture along the way?

If these ideas sound silly to you, remember that dull classes contribute to high drop-out rates. Keep your licensing classes fresh and alive, and refine and expand your teaching methods to produce results — successful students. Learning about Amateur Radio is a function of time and motivation; teaching about Amateur Radio is a function of knowledge of the subject and zeroing in on successful methods of transmitting that knowledge. Let's not get stuck in the same old ruts. Retain what works, but be open and receptive to ideas that could improve instruction. We've discovered the joys of Amateur Radio; let's remember to pass along some of those joys in our licensing classes. — Carol L. Colvin, AJ2I

\*Training Program Manager, ARRL

# Club Corner

Conducted By Sally O'Dell,\* KB1O

## THE A-THON IN PUBLIC SERVICE

The weather is getting better as "that time of year" dawns again. It's the season for walking and, therefore, walk-a-thons, bike-a-thons and any other "a-thons" you can imagine. Clubs, working with their local Red Cross or other social service agencies, organize communications for these events.

In April 1981, the Albany New York ARC, working with the March of Dimes and the local police, assisted with communications. The club helped make the march organization much smoother for all involved. The executive director of the Albany chapter of the March of Dimes wrote, "We could not have done it without you. . . . Without your cooperation, dedication and expertise there would have been no [march]. . . . Amateur Radio operators are ready to help when the public needs us."

The Oak Ridge (Tennessee) ARC is another club extremely visible in the public eye. Any organized group in town planning on a large gathering of people knows they can contact the Oak Ridge club for communications assistance.

Over the past three years, this club has provided communications for a series of events. Since August 1980, East Tennessee hams contributed over 550 hours to community service. Besides club members, other groups in surrounding areas support them, including the Radio Amateur Club of Knox County, Roane County ARES Group, Smokey Mountain ARC, Loudon County ARC, Walnut Mountain ARC and other, unaffiliated, amateurs. This all adds up to working together to support the common goal — providing communications in times of happiness and therefore being prepared, in advance, for times of stress or need. —

The ORARC used 2 meters for all their events, but could have used 220 or 440 (if enough people had equipment). And all of this is just the highly visible tip of the ORARC iceberg. As an active Amateur Radio club, ORARC members are also active in contests, traffic nets and satellite communications, along with other Amateur Radio activities.



Ron Kors, WB4MXN, a member of the Oak Ridge ARC, provides communications to help coordinate team launches at the Oak Ridge Marina.

The Overlook Mountain Amateur Radio Club (Kingston, New York) has provided its communications services in many area public events. When canoe races are held on the swelling Esopus River, club members are there to report any white water emergencies and to keep track of participants' progress (or dampness). When disaster-preparedness drills are held, Overlook Mountain members are on the scene at local hospitals and designated "hot spots." Their presence, and smooth and efficiently handled communications, reassure authorities about Amateur Radio's communications capabilities. At walk-a-thons, members annually brave blisters and the wilds of nature to make sure that all walkers are accounted for. All of this has had a beneficial effect for both the club and Amateur Radio, and has generated favorable publicity and a sense of genuine accomplishment for the club.

What can you do to get ready for the first stage of public service work? Find out what is expected of your club members. Speak to the officials sponsoring the event. Be sure everyone understands their own contribution — both the sponsors and the club members. Make up a check list and use it. (One of my favorite aids for almost everything is checklists!) Pass it out to members at the next club meeting. If members don't all show up at the club meetings (or even if they do), try a Santa Clara Valley Repeater Society (Sunnyvale, California) idea. SCVRS printed an information/sign-up sheet in the club newsletter describing the upcoming event briefly and the positions to be covered. The sign-up sheet is a pullout from the newsletter. Members can carry it to the next meeting or fold and mail to the address printed on the reverse side.

The rules for organizing are the same for an "a-thon" as they are for any other well organized, well-thought-out event. *Plan ahead.* Those who wish to participate in a club-sponsored public service event should know what their group is expected to do.

What do your fellow club members expect from you and what will you contribute to your next club-sponsored event?

\*Club Program Manager, ARRL

# Silent Keys

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


KA1BRL, Edward F. Beaudry, Easthampton, MA  
WAIETT, Robert M. Gardner, Kittery Point, ME  
KA1JU, Harold A. Friberg, Trumbull, CT  
WINDG, George W. Adams, Augusta, ME  
WA1RGO, Joseph P. Oleckniche, Vero Beach, FL  
KITEO, Leo J. Campagna, Conway, NH  
WITGD, Arthur M. Les Carbeau, Sr., Barrington  
RI  
W2AOW, Arnold M. Weichert, Nobleton, FL  
W2BOC, Melvin S. Wilson, Pittsford, NY  
W2GTI, Spencer L. McCarty, Delmar, NY  
W2NGQ, S. Paul Hess, Thornwood, NY  
W2OF, Richard L. Gale, New York, NY  
WA2QMF, Harold S. Warner, Coxsackie, NY  
K2RZI, Harland G. Hogeboom, Rochester, NY  
WA2SJK, Leo Lukianoff, Sag Harbor, NY  
W2VI, Dr. Arthur G. Mathews, Little Neck, NY  
W2VS, Frederick L. Reynolds, Rochester, NY  
N3AKS, Charles N. Gibson, Pittsburgh, PA  
K3AWK, Wesley H. Shaprow, Baltimore, MD  
KB3BQ, Sam S. Rollison, Morton, PA  
WA3BSP, George M. Leif, Washington, PA  
K3CT, Joseph D. Welch, Secane, PA  
W3HYJ, Joseph J. Slotnick, Huntingdon Valley,  
PA  
W3JGB/ex-9BIE, Robert D. Ferree, Springfield, PA  
W3LDV, Joseph J. Blühar, Tamaqua, PA  
W3NNX, Philip J. Crist, Baltimore, MD  
W4AVS, Robert L. Gougler, Hendersonville, NC  
\*W4CE, Bannie L. Stewart, Columbia, SC  
K4CS, Donald L. Alfred, Nokomis, FL  
N4EEF, John A. Millick, Vienna, VA  
KA4EOV/ex-IFL, Charles W. Larrabee,  
Port St. Lucie, FL  
K4HOV, Willis W. Murray, Sarasota, FL  
W4HWR, Hilda B. Andrew, Fairfield, CA  
\*WB4INJ, Joseph R. Lewis, Ocala, FL  
K4JSM, Olan W. Hicks, Moulton, AL  
W4OPF, Carl L. Karlson, Venice, FL  
AB4P, Fred W. Hiker, Dacula, GA  
W4SAE, James W. Graham, Dunedin, FL

W4UGZ, Kenneth "Don" Wilson, Springfield, VA  
W4UMU, Sanford S. Crenshaw, Fort Mill, SC  
W5AEQ, James E. Hodge, Sr., San Marcos, TX  
W5AVB, Jerry B. Lee, Corpus Christi, TX  
W5CDW, John J. Kirby, Albuquerque, NM  
W5DGW, Larry J. Sizer, Victoria, TX  
W5DSTQ, William C. "Dub" Grubbs, Jr.,  
Garland, TX  
W5HCM, John T. Cannavan, Houston, TX  
W5B1YQ, John E. Ledbetter, Arkadelphia, AR  
KA6CIR, Pat Padgham, Huntington Beach, CA  
W61VT, Roy M. Landrum, Goodman, MS  
W60Q, Edwin L. Murrill, San Jose, CA  
WB6ESC, Julian K. Potrecz, Wofford Hts., CA  
WA6CWY, Jeffrey Candler, Pinole, CA  
W6DDC, William S. Clausnitzer, Fresno, CA  
W6FTA, Edward Burke, Jr., Fresno, CA  
W6GJZ, Russell R. "Doc" Crane, Gilroy, CA  
WA6GRM, Rod O. Bettencourt, Vallejo, CA  
ex-W6PAU, Dr. Mary Jaquette, El Cajon, CA  
W6PVI, James S. Fennell, Oakland, CA  
K6SC, Donald W. Baake, Chatworth, CA  
K7AKP, Charles C. Edwards, Salem, OR  
ex-W7ANG, Dr. Rene S. Julian,  
Bainbridge Island, WA  
\*W7DDK, Lyle L. Whitsett, Reno, NV  
WA7HKV, John F. Rose, Klamath Falls, OR  
K7KDP, Russell L. Hauser, Orem, UT  
W7KLL, Wallace N. Wintler, Eugene, OR  
K7NDF, George T. Squires, Jr., Vernonia, OR  
AF7Y/ex-W0ELN, J. Watson Justice, Sun City, AZ  
W8CTR, Richard W. Crowell, Paulding, OH  
W8CVH, Jesse W. Dover, Dayton, OH  
KA8DKO, Thomas E. Cook, Allegan, MI  
W8IJS, Raymond L. Haeusler, Bay City, MI  
K8IQQ, Joseph J. Abraham, Amherst, OH  
K8JZP, Ronald P. Titus, Portage, MI  
W8LKP/ex-W3GJR, William P. Riedell,  
Kalamazoo, MI  
W8LXP, George F. Sharp, Macedonia, OH  
W8LZA, Frank J. Tarr, Salem, OH

W8RZ, Otto T. McVey, East Liverpool, OH  
W8SOE, Allen H. Kammer, Anchorville, MI  
K8UHB, Kenneth C. Burgoon, Columbus, OH  
WB8VNO, Martin Quinten, Grand Rapids, MI  
WA9DOT, James R. Schellenberg, Grafton, WI  
\*WA9EXP, Dr. Raymond J. Thill, Tucson, AZ  
W9KXX, Paul R. Niles, Waupaca, WI  
W9LDT, Charles A. Pierson, Mulberry, IN  
K9TAJ, William W. Parker, Wisconsin Rapids, WI  
WA9YVX, Emil J. Paruolo, Bensenville, IL  
W0ICT, William L. Pruden, Aurora, CO  
K0JFK, Russell Blackman, Eagle Grove, IA  
W0LJZ, Joel Gainsley, Duluth, MN  
WB0VJL, Dr. James B. Smith, Powers Lake, ND  
\*WB0ZAX, Laveen C. Maple, Iola, KS  
W0ZSU, Mark L. Wilson, Kansas City, MO  
KH6DK, Sadami Katahara, Kahului, HI  
VE1AAR, Louis E. Darres, Bear River, NS  
VE1UW, R. Lawson Fulton, Halifax, NS  
VE2FDL, Marcel Leblanc, Drummondville, PQ  
VE3AAZ, Walter H. Anderson, Toronto, ON  
ex-VE6AM, Claude Martlew, Halifax, NS  
VE7CFA, Abram Isaac, Surrey, BC  
VE7ON, George M. McNeill, Vancouver, BC  
OE3HSW, Helmut Sauer, Ternitz, Austria  
ZL3UX, Les H. Wass, Christ Church, NZ

\*Life Member, ARRL

In order to avoid unfortunate errors in the Silent Keys column, reports of Silent Keys will henceforth be confirmed through acknowledgment only to the family of the deceased. Thus, those who report a Silent Key will not necessarily receive an acknowledgment from Hq.

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. Please allow several months for the listing to appear in QST. 

# Special Events

Conducted By Mark Wilson,\* AA2Z

**North Yorkshire, England:** Scarborough ARS will operate G4BP during 1982 celebrating the club's 50th anniversary. Certificate available for contacts with G4BP and five SARS members. SWLs eligible, too. For details, contact: G4EDR, 39 Clarence Dr., Filey, N. Yorkshire YO14 0AZ, England.

**Rhineland, Wisconsin:** W9IAL and KC9GW will operate during 1982 to give out the "Hodag Award" celebrating the city of Rhineland's centennial. Certificate available for large s.a.s.e. to: W9IAL, 322 N. Stevens St., Rhineland, WI 54501.

**St. Joseph, Missouri:** W0HRL and others will operate from the Jesse James home on April 3 to mark the 122nd anniversary of the Pony Express and the 100th year since the end of Jesse James. Certificate for large s.a.s.e. to: P.O. Box 1022, St. Joseph, MO 64502.

**St. Joseph, Missouri:** Missouri Valley ARC will operate W0NH from 1400-2300Z April 10 to commemorate the original running of the Pony Express and the 100th anniversary of the death of Jesse James. Frequencies: phone — 28,575 and 10 kHz up from bottom of General-class band; cw — 7.125 21.150

28.150. Certificates for 2 first-class stamps and QSL to: MVARC, 401 N. 12th St., St. Joseph, MO 64501.

**Alamo Village, Texas:** Border ARC and Uvalde RC will operate W5LFG on April 17-18. The village is a reconstructed western town and has been the site for many movies, including *The Alamo*. Operation will be 80-10 meters, phone and cw. Certificate for large s.a.s.e. to: BARS, P.O. Box CQ, Brackettville, TX 78832.

**Wilmington, North Carolina:** Azalea Coast ARC will operate WD4ORA from the battleship *U.S.S. North Carolina* from 1330-2300Z April 17-18. Frequencies: 25 kHz from lower General-class phone band edges. QSL for s.a.s.e. to: ACARC, P.O. Box 4044, Wilmington, NC 28406.


**Fort Moultrie, South Carolina:** Trident ARC will operate KB4VT on April 17-18 in recognition of the first shots of the Civil War fired at Ft. Sumpter in 1861. Frequencies: phone — 15 kHz up from lower General-class band edges; cw — 40 kHz from lower band edge; Novice — center of band. Certificate available from KB4VT, 29 Elmora Ave., Goose Creek, SC 29445.

**Novice, Texas:** North Texas High Frequency Assn. will operate KC5YN from 1800Z April 17 until 1800Z April 18 for Novices. Frequencies: center of the Novice bands. Special QSL for large s.a.s.e. to: KC5YN, Box 77815, The Colony, TX 75056.

**Rock Island, Illinois:** Quad Cities ARC will operate W9YCR from 1800Z April 17 until 1800Z April 18 in commemoration of the first bridge across the Mississippi River. Frequencies: phone — 30 kHz up from lower General band edge; cw — 30 kHz up from lower band edge; Novice — center of band. Certificate for large s.a.s.e. to: N9BKY, 413 23rd Ave., Moline, IL 61265.

**Reading, Pennsylvania:** Reading RC members will operate from 1300Z April 17 until 0100Z April 18 and 1300Z April 18 until 0100Z April 19 to give amateurs a chance to earn the Pagoda award. Frequencies: 10-meter band. Certificate for contacts with 10 or more members. Send log info to: RRC, P.O. Box 124, Reading, PA 19603.

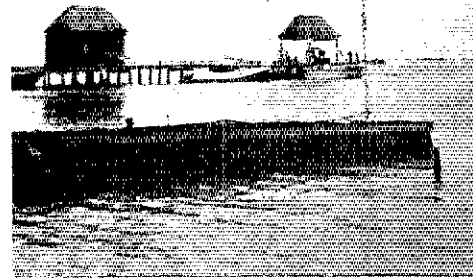
**Alexandria, Minnesota:** Runestone RC will operate WA0VVM from 1200-2200Z April 24 to commemorate the discovery of America by the Vikings. Frequencies: 10 kHz up from bottom of 80-10 meter General phone bands. Special certificate for large s.a.s.e. to: RRC, 1600 Jefferson St., Alexandria, MN 56308.

**Nebraska City, Nebraska:** Nebraska City ARC will operate K0TIK from 2400Z April 23 until 0600Z April 26 from the Nebraska State Arbor Lodge during the annual Arbor Day celebration. Frequencies: General-class phone and cw bands. Certificate available from: W0GRB, P.O. Box 146, Nehawka, NE 68413. 

\*Assistant Communications Manager, ARRL

# Results, 12th Annual ARRL 160-Meter Contest

By Mark J. Wilson,\* AA2Z



The 160 antennas at V3MS. Northerners, eat your hearts out!

1981 will be remembered as the year that the FCC "opened up" the top band. To some, that will mean the removal of power and frequency restrictions, allowing amateurs to run a kilowatt and restoring the full band to amateur use. To others, however, that will mean the band has been opened up to poor operating practices not in keeping with the longstanding tradition of the "gentlemen's band."

On the positive side, although the number of official entries is about the same as in the past few years (386 this year vs. 393 in 1980), the number of stations actively participating is way up. This year's top single operator worked 101 more stations than last year's, and the average score in the single-op Top Ten is up a whopping 14 percent to 126,893 points; the top four single ops all beat last year's top score. On the multiopt front, scores among the top five were also up 14 percent. Thanks, casual participants, for helping to make this year a success!

There was plenty of DX to work this time around. West Coast stations had their hands full of JAs at dawn, and East Coast stations grabbed a fair number of European multipliers. And, there were several Caribbean and South American stations such as V3MS, W4BPD/C6A, HK0BKK and VP2MFZ for all.

On the negative side, several problems unique to this contest were even more apparent this year. Eric, KX4V, sums up the feelings of some participants with these words: "By the way, the contest rule prohibiting transmitting by W/VE between 1825-1830 kHz was a joke; no one told the DX not to accept calls there. So, W/VE stations were caught in a 'Catch-22': Either answer the calls on the DX station's frequency or go without. Obviously, many opted for the former, thus incurring the wrath of the omnipresent 'DX Window Police' who told them to QSY. Of course, there were also the usual pack of lids who just didn't know any better and started calling CQ in the window because it seemed like a nice clear spot. Also, stations calling DX on the low end QRMed others."

Eric addresses two problems: improper use of the DX Window and general contest QRM. Contest QRM is by no means indigenous to the 160-Meter contest. However, the limited size of

## Top Ten

Single Operator		Multioperator	
W8LRL	178,882	W8LT	130,393
N4AR	146,832	WB7J	122,848
K0ZZ	133,431	KK5I	115,920
K3LR	131,558	WA9EYY	106,029
AB0I (WA0TKJ)	125,440	K0FVF/9	104,052
W1ZM (K1ZM)	122,080	W9AZ	100,584
K1ZZ	109,060	K0DD	95,711
N4SU	108,813	W8MNL	90,596
W0EJ	106,726	K9ZUH	80,884
WB0CMM	106,116	W4CN	79,520

## Division Leaders

Single Op	Division	Multiopt
K3LR	Atlantic	N3ND
A19J	Central	WA9EYY
K0ZZ	Dakota	K0DD
N5AN	Delta	---
N4AR	Great Lakes	W8LT
W2IB	Hudson	K2GBH
AB0I	Midwest	W0YBV
W1ZM	New England	K1TZQ
K0PP/7	Northwestern	---
N6RO	Pacific	WA6EUZ
W8LRL	Roanoke	---
WB0CMM	Rocky Mountain	---
N4IN	Southeastern	---
WB7FDQ	Southwestern	---
N5JB	West Gulf	KK5I
VE3BVD	Canadian	VE3BXI
V3MS	DX	JA2YKA

the band severely aggravates the problem as hundreds of stations try to squeeze into the available 45 kHz. There just isn't enough room for everyone to have an exclusive frequency. Not that protecting "your frequency" for the duration of the contest is the key to success; the winning contesters do a lot of CQing, but they also spend lots of time tuning around to pick up more contacts and multipliers.

The other problem, violation of the DX window, is indigenous to the 160 contest. Think for a moment. Why is there a narrow slice of the 160-meter band designated as the DX Window? Most of you know that local signals on 160 are loud, but DX signals are weak. Because the band is so small and crowded, it's difficult to pick out DX signals through the mass of wall-to-wall stateside stations. So there is a small "window" in that wall of locals for stations to look through and "see" DX.

Because the DX window is so small, only DX

stations are supposed to transmit in the window. They then announce a listening frequency somewhere outside the window and accept calls there from W/VE amateurs, usually at the low end of the band or adjacent to the window.

During the 1981 ARRL 160 contest, operators noted two types of stations not respecting the window. One type is the operator who is either new to the band and doesn't understand the purpose of the window or doesn't have the antenna to hear DX and doesn't care that some ops want to work it. The other type is the DX operator who doesn't understand why he is expected to transmit in the window and listen outside the window. While this type of operator is not personally violating the concept of the window, he or she is encouraging others to do so. Given that the only way to work a new country is to call on the DX station's frequency inside the window, many stateside ops will violate the window in the heat of the contest.

What to do about this problem? Some sort of educational program is certainly in order. The more experienced 160 hands can politely tell newcomers about the purpose of the window. If DX stations get no answers on their own frequencies, they will probably get the message and listen elsewhere. What if the DX station doesn't have an external VFO or separates? Most modern rigs have an RIT control of some type. There is no reason why a DX op can't transmit just inside the window and take calls 1 or 2 kHz lower.

The window concept is a good one, for it allows stateside stations to work DX that they otherwise wouldn't hear. But the concept won't work without the voluntary cooperation of everyone. Let's work together to keep the contests fun events, rather than blood-pressure-raising battles.

## SOAPBOX

Our 50% score increase has the crew so high that I don't think they will ever come down. Conditions were outstanding here both nights. We had zero noise. . . Had mixed feelings about the use of high power and only 50 kHz of band. The number of big signals was not as great as expected so it worked out okay, I guess (KK5I). It was the very first ARRL 160 Meter Contest for the new "unrestricted" band, and my score slipped more than 10k points from last year's score. Somehow, I managed to sneak four JA stations into the log while the west coast artillery barrage wasn't looking (W7XZ). I wonder if I could buy a

\*Assistant Communications Manager, ARRL

160-meter beam at Dayton this spring (WD8JCR). Operating in this contest is quite a feat considering that I live in New York City in an apartment house. Shouldn't we apartment dwellers get a special award for bravery or at least insanity? (N2KA). I was sitting in my shack sending CQ TEST when a neighbor came over. He said that sparks were shooting off of my antenna and the lawn was on fire! I lost some operating time in correcting this problem. At least now I know where the high-voltage points are on the antenna (KK9A). I live about 1.5 miles from an a-m broadcast station and as I use a vertically polarized antenna, there was a constant S9 hash across the band. I spent the whole contest with my receiver's 20 dB pad in. This may explain why I missed some multipliers. It will be nice when we here in Canada can run some reasonable power on 160. . . (VE2ZF).

## FEEDBACK

Please refer to April 1981 QST, page 88, for the following corrections to the 1980 contest results.

Several logs were mistakenly filed in with the 10-Meter contest entries. Apologies to all. W2MTA's 42,771 points place him second in Western New York. WV2ZOW made 672 points, good for seventh in Northern New Jersey. W4TMR should have been listed as top scorer in North Carolina with 76,368 points. W6YKM made 1584 points for fifth in San Joaquin Valley. And finally, K0DD should have been credited with 88,616 points and first place in the Minnesota section and the Dakota Division.

One DX log arrived too late to make the listings; JH0CZQ operated JA7YCQ to 60 points and third place in Japan.





## Retrospective

Although many of us would associate the story of the Italian earthquake emergency with late 1980 and early 1981, news stories have recently surfaced in the national media suggesting that the crisis is far from over. The disaster which wrought such havoc and misery to the Italian populace is, in fact, a continuing one. Many remain homeless, while rebuilding and reconstruction efforts are still incomplete. Perhaps this is an appropriate time to take a retrospective look at the emergency and its communications aftermath, in which radio amateurs in Italy and around the world gave so unselfishly of their unsurpassed communications talents. A trio of representative dispatches follow.

### Amateur Involvement In Italy Starts Immediately After the Earthquake

On November 23, a meeting of the Associazione Radioamatori Italiani (ARI) was held at the Hotel Universo in Rome. Among the issues that the board of directors and regional representatives discussed was the structure of the Corpo Emergenza Radioamatori (CER), an organization similar in scope to ARES. Various aspects of a possible reorganization of CER were discussed at the meeting. The ARI assembly concluded at 1800 hours local time, and I returned to my home.

At 1932 hours, I felt the floor moving under my feet. The lamps in my living room started swinging and a strange, hollow noise swept through the air like a deep, strong wind. Throughout the block, burglar alarms started ringing. One thought came to mind: earthquake!

Within minutes, I0LL, the Central Italy CER coordinator, was on the air, gathering information from various parts of the country. Region after region, from north to south, answered. "Strong earthquake," the amateur stations reported, "no damages." But a part of Italy was silent. No word from Campania and Basilicata. Something bad had happened, the amateurs thought, as no stations from that region were reporting into the net.

At 2030 hours, an amateur reported that the strong quake had caused heavy damages in some parts of Napoli. It wasn't until midnight when a mobile came on the air from Avellino Province, reporting an unbelievable disaster. In the village of S. Angelo dei Lombardi, 90% of the town was destroyed, including a new hospital. Terrible howls and groaning were heard coming from the ruins. The amateur community was horrified by the news.

The CER hams were the first to reach many of the devastated villages. Power and communications were out; many roads were almost impassable. Human losses were terrible. From Rome, the alarm was given to the CER, which mobilized all over Italy.

In the early morning, I0LL could estimate the magnitude of the tragedy. Mobiles had been reporting to Rome through vhf repeaters, and at 0700 hours, I0LL was interviewed by the

State Broadcasting Network since he was considered the most informed source of information about the emergency. He reported that 4000 people were believed to have perished. (This figure was confirmed by government sources several weeks later.)

A complete communications network, coordinated by I1BAY, was established in Campania and Basilicata, and was extended to the whole country. An operations center, headed by I8KRV, was established at the Government House in Napoli. Amateur Radio operators, with their own rigs and emergency power generators, came from various Italian regions to help out in the villages. In less than 24 hours, one of the most important and widespread emergency operations ever carried out by Italian amateurs was underway.

Two main networks were established: An "internal net," equipped with hf and vhf, was active in every main village of the destroyed areas. The amateurs handled official messages on behalf of government authorities, police and the army. An "internal sub-net," on vhf only, was set up in the smaller localities. These internal nets were connected to an "external net" operating mainly on the hf bands (7 MHz daytime, 3.5 MHz nighttime), with vhf operations through repeaters for backup purposes. Thus, the whole Italian territory was connected to Campania and Basilicata.

The Italian Red Cross, which was unable to contact its field hospitals, also asked the amateurs for help. I0EYZ was the control station at Red Cross Headquarters in Rome, and five other stations operated in cities around the destroyed area. A mobile station, I0QG, with both hf and vhf capabilities, was on the air from the field hospitals. Amateurs were interviewed several more times by the national television network and the major Italian newspapers published several articles about the assistance being rendered by radio amateurs.

The effort by the ARI CER was impressive. Forty stations were active in the internal net, 24 primary stations in the external net at Government Houses and the Regional Headquarters, and about 20 stations were assigned partial functions. About 200 mobiles and fixed stations on vhf coordinated the transportation of relief materials. Seven fixed stations and one mobile handled Red Cross traffic. About 200 hams, from every Italian call area, came to the disaster area and volunteered to help with communications. Many operated from the Napoli control center, I8KRV, which was manned 24 hours a day. Hundreds of hams operated on the external net and mobile along the highways. Many others backed them up with auxiliary and logistical tasks.

The volume of traffic handled on all modes — ssb, cw, fm, RTTY — was immense. Communications were provided for every official organization involved in the relief effort. We were also authorized by the Central Post Office to handle radiogram messages from the earthquake area. We handled about 10,000 of these radiograms. I8UDB, I3MAU and others handled the international traffic to the U.S.,

Canada, Australia and Venezuela.

So many operators participated in this emergency that it is obviously impossible to list them all. But I want to praise them all by praising one — Giulio Nardone, I0LL, the Central Italy traffic coordinator for CER, a man of outstanding culture and human feeling. He was on the air within minutes after the earthquake, and continued working for many days afterward with little or no sleep. He put in an average of 20 hours a day throughout the emergency effort, an effort which was one of the most massive emergency operations in the history of Amateur Radio in Italy. — *Giancarlo Martelli, I0XXR*

### Rhode Island Was Ready

W1YNE received a telephone call on November 25 from a local television station checking to see if any information concerning the earthquake was available through Amateur Radio. The following day, he started monitoring 20-meter RTTY to see if any news was being sent from Italy. W1YNE made contact with I2OLW in Milan, and twice-a-day skeds were established for relaying Welfare traffic. Various logistical problems were settled; the biggest problem was solved when the Italian consul in Boston agreed to waive the requirement that all traffic must be cleared through the consulate. (It was felt that this requirement would create an unmanageable logjam, seeing that the consulate had only two incoming telephone lines and it would take literally hours to get a message cleared.)

The next problem was to set up a local organization to handle what was expected to be a large influx of inquiries from the Italian-American community in the area. Amateurs who were experienced in emergency traffic operations were contacted and all agreed to assist. W1KKP was designated as the "intake message center" based on her expertise in emergency operations and also because she had two telephone lines coming into her home. To increase her communications capabilities, a 220-MHz transceiver and antenna were installed, enabling her to access the WCIRAC RACES repeater on 223.26/224.86 MHz in Coventry, Rhode Island.

An on-the-air NTS/ARES organizational meeting was held simultaneously on 52 direct and WCIRAC to set-up parameters for the traffic operation. These included the following:

1) Welfare traffic only. No personal messages.

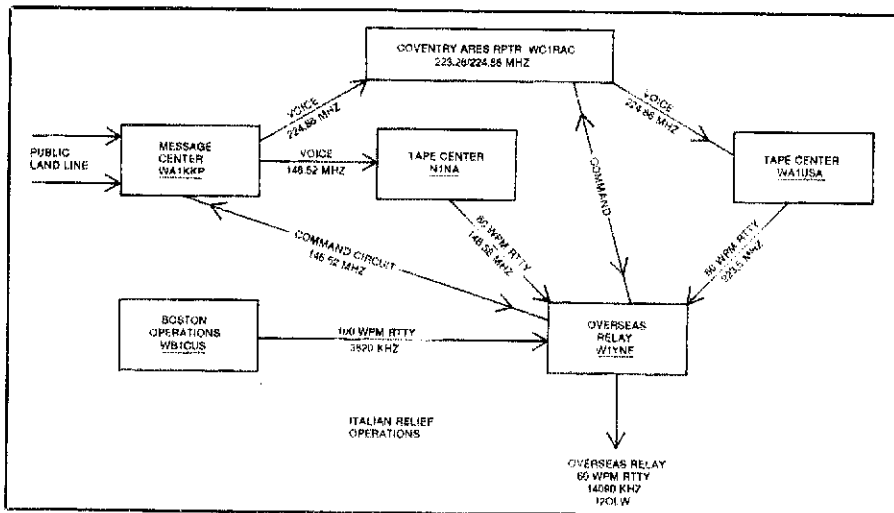
2) Traffic was to be transmitted in standard ARRL format with addressee for all messages I2OLW MILAN and the text for all messages ARL NINETEEN and the name of the party.

3) All answers were to be routed to W1KKP, who maintained the message file and would make return phone calls to inquirers.

4) Any fatality reports would be routed to the local Red Cross chapter for delivery.

The original plan was for messages to be originated by W1KKP and relayed via vhf

\*Assistant Communications Manager



Rhode Island's network for handling emergency related traffic.

used no fixed formats and he remarked many times how much easier and more efficient it was to use fixed, standardized tape formats. The format developed was a hybrid of amateur cw, amateur manual RTTY, and Navy MARS tape formats, and has been used on the New England Teleprinter Net with much success.

#### Statistics:

Hours of on-the-air operation — 250  
 Hours in QSO with Italy — 45  
 PR spots for Amateur Radio — 9 on TV,  
 4 in newspapers  
 Number of messages — 525  
 Number of inquiries — 205  
 Number of return answers — 182 (89%)  
 Stations participating — W1YNE WA1KKP  
 N1NA K1GK KA1DYD WB1CUS K1BSO  
 W1YDU N1RI W1YUSA KA1BAT  
 W1YVV N1ASR W1GO KA1ABI.  
 — Gordon F. Fox, W1YNE, SCM Rhode  
 Island

#### The Report from Delaware Valley

When the earthquake hit, November 23, Amateur Radio was the only means of communications in and out of disaster areas such as Avellino Province. Tens of thousands of messages were exchanged between Canadian and United States amateurs, with fellow Italian amateurs advising families here of the location, health and welfare of relatives in the affected areas. Arrangements for food, shelter and medicine were expedited through Amateur Radio channels.

Through very difficult circumstances, Amateur Radio excelled, despite the barriers of language and misinformation. Many amateurs showed initiative. Sil, WA3YOB, handled most of the traffic out of the Philadelphia area. Peter, KA1BQ, in Boston, and Marshall, WB2FID, on Long Island, coordinated an Italian emergency network, aided by 11MOL/W8, some 16 hours daily. In the beginning, everyone and his brother could (and did!) jump in.

Initially, an Italian amateur would receive one or two "locate and advise" Welfare inquiries, drop his microphone and literally run out to locate the party single-handedly. Message exchanges closely resembled telephone conversations. After a while, texts and formatting were standardized, and the advent of government casualty lists made matters run more smoothly.

Several National Traffic System stations in New Jersey took notable initiative to channel traffic effectively. Among them were WA2MVQ (now KB2WI) and W2PSU, who handled 569 pieces on RTTY; and WB2IQJ/W2ZQ (operated by K3CPF and WB2IQJ), whose story I can tell.

W2ZQ (the club station of the Delaware Valley Radio Association) was in contact with Italian amateurs when the earth quaked. Traffic was already piling up while the special third-party agreement was pending. The second the FCC gave the word, we sent our first message. As traffic increased, W2ZQ activated its 24-hour vigil. W2ZQ received widespread publicity on television, radio interviews and in the newspapers. To add to the traffic load, the W2ZQ annual message booth operation at a local mall ran December 13 and 14. December statistics reflect the overall effort. W2ZQ totals: 1839 messages handled; WB2IQJ 1206 messages handled. Combined totals for Italian traffic were Welfare 733, Priority 49, Emergency 16. — Pete Skorupsky, WB2IQJ

voice to W1YNE, who would then cut tape for transmission to Italy via 20-meter RTTY. Later, this plan was modified because of the overload that developed.

The organization was tested and all seemed to be ready. Local relief agencies including the Red Cross, the Lt. Governor's Italian Relief Office and the *Italian Echo* (a statewide Italian-language newspaper) were notified of the service. The three local TV stations were also notified and agreed to promulgate the information.

Things started off with a bang when WA1KKP's phones started ringing off the wall. It soon became evident that WA1KKP would not be able to keep up with the inquiries and at the same time transmit the messages. N1ASR and W1YDU were dispatched to assist. It also became apparent that W1YNE was not going to be able to keep up with punching tape and also coordinate operations. Thus, it was decided to decentralize operations.

N1NA assisted by K1GK, and W1YUSA assisted by KA1BAT and W1YVV, were set up as additional tape centers. A 52 direct voice link was established between WA1KKP and N1NA, and a WCIRAC voice link was established between WA1KKP and W1YUSA. The two tape centers received traffic from WA1KKP and then cut tape for RTTY. An hourly sked was established between the two tape centers and W1YNE; RTTY was used on both frequencies. During the skeds, a composite tape was reperfed for transmission to Italy. The tape centers relieved the overload problem at W1YNE and enabled the service to be extended to other areas.

WB1CUS and K1BSO (in the Boston area) were notified that the outgoing service was available. They set up a similar operation in the Boston area, and a sked was maintained on 3620 kHz (100 wpm RTTY) between WB1CUS and W1YNE. This traffic was also cut into composite tape.

At one point in the operation, the two tape centers were overloaded, and it was evident that the tape would not be ready for the sked to Italy. KA1ABI came on line (52 direct) and took a large number of messages from WA1KKP and proceeded to cut tapes that were delivered by courier to W1YNE. KA1BAT did the same, but with one slight difference.

KA1BAT is a sergeant in the Coventry Police Department. Using a combination of amateur ingenuity and police connections, he took numerous messages and went to police Hq., where he used their TTY to cut tapes.

All this scrambling led to the bottom line — the RTTY sked with I2OLW in Italy.

Twice a day, from November 26 to December 13, I2OLW was on frequency receiving traffic. It took about a week to send all the Welfare traffic to Italy. The load of traffic in the beginning was very heavy, but as all who wanted to avail themselves of the service did so, the load dropped to five or six a day. Propagation during the entire operation was excellent, and print was almost solid both ways. The cooperation of the other RTTY operators on 20 meters was outstanding. We experienced only one case of interference and that station moved when asked. Quite a difference from ssb.

In a few days, answers began arriving and were delivered to relatives in the United States. The incoming operation was more manageable as it was spread out over many days and was handled by WA1KKP and W1YNE. During the operation, liaison was maintained with the following National Traffic System nets: EMRI, EMRI Phone Net, Heavy Hitters Traffic Net, First Region Net, as well as the New England Teleprinter Net and Navy-Marine Corps MARS.

#### Conclusions and Observations:

1) An autocratic organization was a necessity. Decisions in a crisis situation cannot be made efficiently by a committee.

2) Experience and training are extremely important. An emergency is not the time for on-the-job training. All amateurs can help, but those without experience or training must be relegated to peripheral duties. Get training *before*, not during.

3) RTTY is the way to handle large volumes of record traffic. Not to detract from other modes, but if we had used ssb for overseas relay, we would still be there sending traffic. We used voice to the tape centers out of necessity, and that is where most of the bottlenecks occurred.

4) Some organization has to prescribe RTTY tape relay message standards. I2OLW had other skeds with other RTTY stations who

## PUBLIC SERVICE DIARY

□ Tulare, California — Dec. 1, 1981. K6VWV witnessed a car striking some pedestrians, one of whom was an eight-year-old boy who wound up trapped under the car. K6VWV used WB6BAI/R to call K6LSB to report the accident to the Highway Patrol, and then assisted in trying to dig out the youth, whose breathing was impaired by the weight of the car. After the rescue the boy was taken to a nearby hospital, and was treated for a broken leg and road burns. (KB6CC)

□ Lincoln, Nebraska — Dec. 16, 1981. A major snowstorm hit eastern Nebraska, and weather information nets were started on two Lincoln repeaters, WR0ACD and WR0AEV, in response to a request from the Lancaster County c. d. agency. During the storm, an emergency run was made to an outlying suburb to pick up two nurses and drive them to the local hospital. (K0GND, EC Lancaster Co., NE)

□ Tallahassee, Florida — December 20, 1981. N4FHP witnessed a man jump out of a pickup truck and rip the mirrors from both sides of a vintage car parked nearby. N4FHP followed the escaping vehicle in his own vehicle, and during the pursuit called for help over W4CUJ/R. KD4FK answered and notified police, and then served as relay between N4FHP and the police department. (KD4XK)

□ Jefferson County, Kentucky — January 8. A firefighter, driving a water tanker, was trapped inside and seriously burned when the truck overturned following an accident. An urgent request for a rare blood type to match the driver's went out over W4BDC/R. W8INY relayed the request over several Louisville-area repeaters, and at least six pints of the blood were located. (WA4AGH, EC Jefferson Co.)

□ Petersburg, New York — February 2. While traveling on Rte. 2 outside of town, N2API spotted a young man lying unconscious alongside the road. He quickly contacted WB1HIH using K1FFK/R, and requested that an ambulance be sent immediately. (WB1HIH, SEC WMA)

## AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Sherman, Texas — October 13, 1981. Heavy rains caused flooding, which forced the evacuation of many residents. During the crisis, the telephone circuits failed and c.d. officials could not contact the National Weather Service for updated reports. However, WB5RZU contacted the ARES group in a neighboring county, and then relayed the weather reports to the city officials. (WB5SNO, EC Grayson and Fannin Cos.)

□ Medford, Oregon — December 20-21. Following heavy rains, a serious flood situation developed in the area. When flooding began to threaten homes, amateur stations at Red Cross Hq. and at Department of Emergency Services disaster control were activated immediately. An ARES net was placed in operation on the WB7ROQ repeater, and several mobile units were dispatched by the net control to critical areas to help the Sheriff's Department establish needed communications. The local net also organized and coordinated local Boy Scout troops to help fill and distribute sandbags for threatened areas. Thirty members of the Jackson County ARES participated in this operation. (W7QMU, SCM OR, and KA7DBS, AEC Jackson Co.)

## ARRL SECTION EMERGENCY COORDINATOR REPORTS

□ For December, 41 SEC reports were received denoting a total ARES membership of 21,066. Sections reporting were: AL, AB, AZ, CO, CT, DE, EB, ENY, IN, IA, KS, KY, LA, ME, MI, ME, NH, NLI, NNJ, NTX, OH, OK, ON, ORG, RI, SV, SDG, SJV, SCV, SK, SC, SFL, STX, UT, VA, WA, WV, WMA, WNY, WPA, WI. At deadline, SEC reports received for 1981 totaled 440 from 58 different sections.

Reports received for 1981 increased from the total received for 1980 (404). The number of different sections reporting also rose from last year's total of 54. Twenty-one SECs reported every month, an increase of 31% over last year (16). Including late reports, the following sections had 100% reporting; the number in parentheses shows how many consecutive years of complete reporting have occurred: AL (2), AB (4), AZ (7), CO (1), IN (2), KS (1), LA (2), ME (1), MI (1), NLI (1), NTX (1), OH (4), ORG (1), SV (1), SDG (11), SJV (4), SCV (2), SC (1), SFL (30), WV (6), WMA (2). Over-90% reporting included IL, SNJ and VA. The all-time record of 100% reporting still belongs to SFL with 30 consecutive years of reporting.

Non-reporters numbered 15, down from 19 in 1981. These sections were: AK, BC, ID, MB, MAR, MDC, MT, NM, ND, PAC, PQ, SD, VT, WIN and WY.

□ For January, 40 SEC reports were received denoting a total ARES membership of 21,168. Sections reporting were: AL, AB, AZ, CO, CT, ENY, GA, IN, KS, KY, ME, MI, MN, NE, NH, NLI, NC, NNJ, NTX, OH, OK, ON, ORG, RI, SV, SDGO, SJV, SCV, SK, SC, SFL, SNJ, STX, TN, UT, VA, WV, WMA, WNY and WPA.

## COMMUNICATIONS SERVICE OF THE MONTH

□ Santa Cruz, California — Numerous amateurs responded to a call for help on January 4, after a major storm lashed out against Northern California. The death toll is expected to exceed 50. Thousands were left homeless.

The worst damage occurred in Santa Cruz County, where 15 died, nine were reported missing and 50 people were left injured. Hundreds of homes were either damaged or destroyed.

A state of emergency was declared in Santa Cruz, late in the afternoon after the rain had washed out roads, and had cut telephone and power service. Mud slides, triggered by more than 15 inches of rain, obliterated homes and killed people.



Under the feet of numerous Red Cross volunteers is State Highway 9 at Brookdale, California. Sandbags were placed across the road to prevent further flooding. (WD6CZY photo)

On the first day of the disaster, some of the first hams at the scene worked for over 24 hours until replacements arrived. While off duty, many stayed at the site to assist the Red Cross by supplying transportation for the displaced and medical supplies for the injured. Some also assisted in digging the mud out of homes.

Amateurs were notified of the emergency, and they quickly set up communications at the Santa Cruz County communications center, which was used as the command post, operating on the W1PW repeater. Hams from all over the San Francisco Bay area responded to the call for help. As the communications needs became more pronounced, two additional repeaters were pressed into operation. WR6AOK in Ben Lombard was used for communications between the Red Cross shelters. K6FB repeater was used to pass messages from evacuees to their friends and relatives. The W1PW machine was reserved for coordination of the emergency operation.

The first obstacle that became apparent to the hams was the condition of the roads leading to the hardest hit areas. In some places the roads were destroyed or blocked by slides. Many of the hams had to use four-wheel-drive vehicles to get to the back areas to establish communications. Some had to walk to their assigned posts, as was the case in the small city of Lompico, which was completely cut off from the outside world until the hams arrived. A lack of commercial communications required the hams to supply the town's status information to disaster officials.

Hams were also located at the Santa Cruz County communications center, the Salvation Army, the Santa Cruz and San Jose chapters of the American Red Cross, and in East Santa Cruz at a fire station. — David H. Moss, WD6CZY

## REPEATER LOG

According to reports received between January 21 and February 21, the following repeaters were involved in the delineated public service events.

	Weather Emergency	Criminal Activity	Medical Activity	Vehicular Emergency	Public Safety Search and Rescue	Fire	Drills/Alerts	Power Failures	Total
KA1NH	44				12	16		7	83
WC1TRAC	1								5
W1XJ									4
KC2CY	3	1			15				20
K2JXU							1		1
K2UZS									1
W2VL				1	31	2			34
N3AIA	1			1	5				7
N3BFL					4				4
K3JSZ	1				2				17
K3TR	1	1			1				3
W3UER	1								1
W4BDC								1	1
K4DXZ								1	1
WA4LZR								1	1
W4PEA								1	1
WB4QES	1				26	1			28
K4SCL					1				1
W4UFA								1	1
WB4WVH					1				1
N5AAY	1								1
K5DI								1	1
WB5FXA	1								1
W5GB					2				2
W5GIX	1				6	1			8
W5RVT					3	1			4
N6AUB	5	1	2		1			3	12
WD6AWP					2				2
W6EJZ	2				5				7
KH6HHG								3	3
W6RHC	1	1	1		1				3
WA6ZTT					1				1
WR7ACE					1				1
WC7AAT					1				1
K7CTS					1				1
WB7ETT								4	4
K7FM	1								1
K7LVB					1				1
W7NXX					1				1
WB7TPY		1	1	1	10		1		13
W7WGW	1				7				8
WR8AES								3	3
WR8ARB	1				5			1	7
N8ARE								1	1
W8ULB					3				3
W8BXR	1								1
WB8CMC		1	1	7			4	1	14
W9MME	3				2				5
W9VQR					1				1
TOTAL	71	5	19	152	18	0	7	42	326

## NATIONAL TRAFFIC SYSTEM

Your conductor worked another traffic handler turned DX operator: former TCC Director W4SQQ now signs SV0CG in Grecco. AB4V reports that the 4RN/c4 duty roster is now complete; all net control stations are very reliable, while the liaison stations are doing a reliable job. Blair also reports that the implementation of International Assistance and Traffic Net (IATN) liaison is working well. Twenty-four EAN/c4 to IATN skeds were carried out in January. W7VSE advises of the sad news of the passing of George Wells, VE7OM. George was a long-time traffic man and a faithful supporter of RN7 and BCEN. He will be greatly missed by all of us. WD8LRT WB8MTD KD8G and WB8TJM received 8RN/c4 certificates. The following received RN5/c2 certificates: W4IBU W4AZJ/5 KA5HDT N4DZW W9NWS/5 N5AMH W5CTZ.

## January Reports

	1	2	3	4	5	6	7
<b>Cycle Two</b>							
<b>Area Nets</b>							
EAN	31	1001	32.3	.745	98.4		
CAN	31	697	22.5	.459	100.0		
PAN*	60	696	11.6	.339	100.0		
<b>Region Nets</b>							
1RN	61	289	4.7	.287	88.5	100.0	
2RN	62	316	5.1	.320	93.2	100.0	
3RN						100.0	
4RN	62	585	9.1	.373	78.1	100.0	
RN5	31	308	9.9	.358	92.7	100.0	
RN6	93	516	5.5	.253	83.0	100.0	
RN7	93	772	8.3	.930	100.0	100.0	
8RN	60	283	4.4	.388	79.0	100.0	
9RN						100.0	
TEN	31	202	6.5	.203	72.8	100.0	
ECN						90.3	
TWN	60	278	4.6	.360	62.9	100.0	
TCC							
TCC Eastern	110 <sup>1</sup>	627					

TCC Central	87 <sup>1</sup>	363			
TCC Pacific	100 <sup>1</sup>	377			
<b>Cycle Four</b>					
<b>Area Nets</b>					
EAN	31	1813	52.0	1.507	96.2
CAN	31	1054	34.0	1.072	100.0
PAN	31	1281	41.8	1.263	98.9
<b>Region Nets</b>					
1RN	62	809	9.8	531	91.4 90.3
2RN	91	594	6.5	456	98.2 93.5
3RN	62	382	6.2	504	98.9 100.0
4RN	62	711	11.5	535	94.5 100.0
5RN	62	837	13.5	601	89.3 100.0
6RN	62	903	14.6	458	100.0 100.0
7RN	62	632	10.2	899	98.8 96.8
8RN	61	356	5.8	410	97.3 96.8
9RN	62	573	9.2	496	98.0 100.0
TEN	62	328	5.3	385	91.9 100.0
ECN	62	292	4.7	440	93.0 96.8
TWN	62	484	7.8	427	97.4 100.0
<b>TCC</b>					
TCC Eastern	124 <sup>1</sup>	677			
TCC Central	59 <sup>1</sup>	483			
TCC Pacific	121 <sup>1</sup>	922			
<b>Sections<sup>2</sup></b>					
Summary	6900	27,332	3.9		
Record	8347	47,343	5.7		
	7468	50,754	19.1		

\*PAN operates both cycles one and two.  
 †TCC functions not counted as net sessions.  
 ‡Section and local nets reporting (232): APSN ATN (AB), ABN ACN ASN SSN (AK), AENB AEND AENH AENI AENJ AENK AENN AENW (AL), ATEN HARC (AZ), NCN NCTN (CA), EAST FMSN FMTN FPPN FTRN GN MEN NFPN PEN QFN QFNS SPARK SWFTN TPTN (FL), CGVHFN GCN GSN GSSBN GTFCN (GA), BSN IMN MTN (ID/MT), ILN (IL), ICN ITN QIN (IN), ICN INPMN ITEN I75MN TFCN (IA), KPN KSNB QKS (KS), 3ARES 4ARES 5ARES 6ARES 11ARES 13ARES BARES CARN CCEN KEN KNTN KPON KRN KSN KTN KYN MEN MKPN PAEWTN PAWN SEKEN TSTMN WARES (KY), LAN (LA), EM2MN EMRI EMRIPN EMRISS HHTN NEEPN RIEM2MN RITN WMN WMPN (MA/RI), MMN MTN (MB), AEN CMEN MPN PTN SGN SPSN (ME), MACS MITN MNN QMN UPN (MI), MSN MSPN MSSN MSWX (MN), APN (MR/IN), MTN (MS), 4CARES CFARS CMN CN CNCTN CNN JFK M2MEN NCSSBN PCTN RARS THEN (NC), MNARES NCHN NEAO NE75 NE180 NMPN NSN PVTN WNN (NE), GSFM GSPN NHH (NH), NJN NJPN NJVN NWNJVN OBTTN TCETN (NJ), BAYHFN CDN CNVTN EPN HVN NLICW NLIPN NLIVHF NYPPN NYS OCTEN SDN STAR SVHF WDN (NY), ALERT BN BRTN FRCN HCARES LCNWOARES OBMN OSN OSSBN OSSN TATN (OH), OFON OPEN STN (OK), BSN MPARES ORARES OSN PDXARES PTTN SCARES SOFM WCN (OR), CCAREC D3ARES D5ARES D10ARES EPA EPAETN LCARESNC MCAREC PFN PTTN SKY WARCVTN (PA), WGVUARES (PQ), BP2MN GPD2MN LC2MN SCNTN SCSSBN (SC), PWN RARA S2MN SATN SPN (SK), TNQW TNPN TNVN TSRN (TN), DFV TEX TSN TTN (TX), BUN UCN (UT), VLN VN VNTN VSN VSN (VA), VTN (VT), EWTN NTN NWSSBN PSTS SCARES WARTS WSN (WA), BEN BWN NWTN WIN WNN WSN WSSN (WI), WVARES WYFN WVHN WVMN WVN (WV).

1 — NET	5 — RATE
2 — SESSIONS	6 — % REP.
3 — TRAFFIC	7 — % REP. TO AREA NET
4 — AVERAGE	

<b>Transcontinental Corps</b>					
<b>Cycle Two</b>					
TCC Eastern	124	88.7	1254	627	
TCC Central	93	93.5	547	363	
TCC Pacific	124	80.6	772	377	
Summary	343	87.6	2573	1367	
<b>Cycle Four</b>					
TCC Eastern	148	83.8	1354	677	
TCC Central	62	95.2	947	483	
TCC Pacific	124	97.6	1837	922	
Summary	334	92.2	4138	2082	
1 — AREA	4 — TRAFFIC				
2 — FUNCTIONS	5 — OUT-OF-NET TRAFFIC				
3 — % SUCCESSFUL					

**TCC Roster**  
 The TCC Roster (January) Cycle Two — Eastern Area (N2YL, Director) — K1s CE EIC, N1BHH, W1s QYY XX, AH2M, K2s KIR PH, KB2HM, KO2H, N2s CER YL, W2s, CS XD ZQJ, WB2s IQJ MCO, K3JSZ, WB3GZU, WA4CCK, WB4PNY, AF8V, WB8PMJ, WB8YDZ, VE1WF, VE3s GOL HTL, Central Area (W9JUU, Director) — WD4HIF, K4VM, W4s OGG ZJY KA4MZU, W5KLV, N5s AMH AMK, WA5EQQ, KB5C, WB5s NKC YDD, K5s BNH KJN, W9s JUJ NXG, WB9WGD, Pacific Area (W8HXB, Director) — KV5U, KM6I, KN6C, KT6A, KU6D, N6FTQ, VE8CHK, W8JGS, W86EIG, KD7I, KF7R, W7s DZX GHT TGU VSE, WA7WQE, WB7TQF, W8DJJ, KB8MB, KJ8G, N8ACW, W8s EJD HXB, W89MTA, WB7TQF, WD8AIT. Cycle Four — Eastern Area (W2CS,

Director) — W1s EFW NJM QYY, K1s BA GN, N1s BHH NH, WB1CPF, W2s CS FR GKZ MTA RQ XD, N2YL, AH2M, KO2H, WA2SPL, W3s ATQ FAF PQ YQ, WB3GZU, W4UQ, KZ4K, N4KB, AB4V, WA4s CCK STO, WB4s PNY UHC, W8PMJ, KB2JL, N8XX, AF8V, WB8s MTD WTS YDZ, VE1WF, Central Area (W5GHP, Director) — W4s WXH ZJY, W5s RB SBE, N5s RB TC, K5s GM TL, W9s CXY NXG, WB9UYU, W9s AM HI, K6EZ, Pacific Area (K8DJ, Director) — K5MAT, W5KH, N6s GW FTQ, W6s EOT OZ VZT, KN6C, KT6A, K7s HLR KSA, KN7B, KD7I, W7s AK DZX EP GHT LYA VSE, WB7NHR, N7AKX, K8s BN JI, KC8D, N8IA, W8s HXB LQ OGH, WD8AIT, VE7ZK.

**Independent Nets (January 1982)**

1	2	3	4
Amateur Radio Telegraph Society	31	936	304
Central Gulf Coast Hurricane	31	148	2530
Clearing House	30	107	381
Early Bird	31	808	402
Empire Slow Speed	27	65	420
Hit and Bounce Traffic	31	321	689
IMFA	26	642	1308
Mission Trail	31	223	1451
New England Novice	31	60	338
New England Teleprinter	12	74	74
North American SSB Traffic	28	87	201
Piconet All Day Watch	182	330	4161
Southwest Traffic	31	80	1476
20-Meter ISSB	26	887	621
75-Meter ISSB	31	1249	322
7290 Traffic	46	459	4078

1 — NET	3 — TRAFFIC
2 — SESSIONS	4 — CHECK-INS

**Public Service Honor Roll January 1982**

This listing is available to amateurs whose public service performance during the month indicated qualifies for 60 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 30; (2) Checking into phone/RTTY nets, 1 point each, max. 30; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned NTS liaison, 3 points each, max. 12; (6) Delivering a formal message to a third party, 1 point each, max. 5; (7) Handling an emergency message, 5 points each, max. 5; (8) Serving as emergency coordinator or net manager for the entire month, 5 points, max. 5; (9) Participating in a public service event, 5 points, max. 5. This listing is available to Novices and Technicians who achieve a total of 40 or more points.

823	113	K3JL	N3CJP
KA9CPA	WB5YDD	K3EST	WB4WVY
176	112	K6YD	KA4GFU
K5CXP	WB2EAG	N9AUG	KT6D
168	WD4CNO		WB1GXZ
WB7WOW	111	102	WA0TFC
153	KA7ELI	WB8JGW	K7GXZ
WD4COL	W9DM	W7VSE	KA9IKR
141	WD4CNR	K83LF	95
KE6JV	AF8V	N8BQK	W1RWG
134	110	K2VX	VE3DPO
WB3GZU	KZ4K	WD8RHU	WB8MTD
133	WA4JDH	101	KA3DLY
WB4FVV	W5DTR	WB1CPF	WB8SYA
132	W1EOF	WA3WVY	94
W9JUJ	109	W8OYH	WB2PKG
131	KA8CPS	VE1WF	K4VWK
NG4J	W2XD	100	WDBIBY
129	W1TN	W4GPL	WB7WOW
KC9CJ	K1OSM	W6ANK	W4WXH
128	KA1FE	W8NTN	WB4FVV
108	108	W8NTN	N4EFB
WB2MCO	AA4FG	K1JHC	KT6A
AA4RE	WA5RVT	99	WB7OGA
WA7LGN	WB7DZX	N1NH	N9BYR
126	AG2R	AK1E	KC5NN
KA8AID	N7AKX	W9YCV	AD7G
W2GLH	107	98	92
125	W4WXH	KA4ASZ	WD4AWN
KM9B	WB1HIH	N7BGY	K3CR
KA5CXW	106	WB5MMI	91
124	WD4ALY	KY4K	N6AWH
WA4PFK	KASCL	K6FTQ	W5TFB
119	K2GCE	97	W9QBH
WD4HIF	105	W2YJR	AC3N
116	N2AKZ	W7LNE	WB0TF
WD8LRT	WD8ESZ	AK1W	90
115	104	96	N1BPD
N4EDH	W2MTA	WB2BNY	W8GGX
114	KA1BBI	WA4SRD	W5CTZ
KC5FX	103	N1ARI	K4EV
	KV5X	WA30FD	NT4S
		WA4EIC	K4ZB

N5DKW	80	69	KA4JQG
89	KT6A	N2BDW	63
KB4OZ	79	K4ZN	WB2HDU
W4OQG	KA4IUM	WA4EYU	W4LXB
WD8AIT	KA3GJT	K5TL	WA3WQP
WB9ICH	78	68	WB9PYP
WP4AOH	K4IWW	KB2KW	KB3NV
88	W4ZJY	WA8LVO	WP4BCV
W5KLV	VE3KK	N4DZW	WB4TZR
KB4WT	WB4NV0	KA2HNG	K8GVX
WA4CCK	KC8Z	N2BLX	WD8KBW
87	77	WA1YNZ	WB8GMT
W7GHT	N2CER	87	62
N9ATP	W9UMH	KA2CTU	WA7IHS
N2XJ	WB4AID	N7BGW	KA4ERP
86	KB3DT	WB2ID8	WB6BZ
KB3UD	N4PL	WB4NTW	KA2JMH
N5TC	76	KA4BBA	N4EEB
W2BIW	W2ZOJ	WA4HON	WB9QAM
VE3WM	VE3HTL	WD5AAH	61
KB5EK	WB7TQF	WA1VRL	K42NMA
N6AED	N4BZB	WA6QCA	K7NTG
WP4BDS	75	66	KD4TY
85	WB8RL	66	N8GW
W2AET	WB2QWO	KA2GFA	KC8HV
W4CKS	KY4U	WA5ME	60
KB5NX	VE2PJ	KA9N	WB2TWQ
AJ5F	KB3XO	WA8PIM	N3ADU
WB8YDZ	N8WA	WB1CGK	KA2BHB
KB5UL	74	AA4WJ	K0SI
84	VE2PJ	KA2BHR	59
VE2GAG	KB9XO	65	WB3HXW/T
WB3FKP	73	WA2KOJ	54
KB9MB	K1NAN	WB7OEX	KA5IWF/T
W5VMP	KF4U	KA2GOH	53
N5BT	72	N5AMH	KA2GTE/N
83	WA7MEL	VE3GOL	52
WB8YTD	N5EFG	W3DP	52
KG8B	W3VA	WB8CFB	KA5MAY/T
KA8IWW	WA5EHD	K8DJ	50
82	N7CSP	KA5AZK	KA8DEZ/N
K2ZM	N8AUH	WA5DFK	47
WA4WUW	71	KA5DLV	KA2DBD/T
N1ALM	N5DZT	KA8CUF	43
WD5JYI	VE3GT	64	KA8SAA/N
81	WB9QBZ	N9AZI	N8DAD/T
KF8J	N9AZI	70	42
KA2GSL	70	K7LW	K1WGO
KV5N	WA2AGV	WA4JPK	KA5KRI/N
W8OGH	VE3LDU	WD5GKH	KA9M/FV/N
KA4BCM	K5ZG	KA3DTE	41
N2BNB	VE3JRT	KD4PJ	KA8GX/T
WA4QXT	KN6C	KC4LA	40
N8BDG	KC6T	WB9HOX	40
	KATT	WB1HIH	KA9GBG/N
		W8EK	

**Brass Pounders League January 1982**

A BPL Medallion (see April 1979 QST, page 77) has been awarded to the following amateur since last month's listing: VE3HTL.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

1	2	3	4	5	6
N8BQP	46	1788	348	941	3123
W3CUL	679	891	1326	59	2955
KA8CPA	52	1182	211	769	2214
WA8HJZ	30	725	20	443	1218
W9JUJ	5	493	501	31	1030
W7DZX	9	400	384	6	799
WBACH	31	348	379	0	758
NG4J	25	369	292	31	727
W7VSE	4	348	319	13	684
N7AKX	137	211	309	21	678
W3VR	201	116	312	15	644
WB3GZU	36	273	293	33	635
WB7WOW	37	224	275	52	588
W4WXH	23	265	259	6	563
WB4FVV	5	259	235	32	531
N4EFB	40	140	324	7	511
KT6A	3	245	251	5	504
K8NCV	15	236	247	4	502
K8BYR (Dec.)	13	491	488	16	1088

BPL for 100 or more originations plus deliveries:

KE4IK	178
WD4II0	157
N2BOP	139
WP4BDS	127
K7GV	120
WD4COL	103
WB7OGA	103
KA8CPS	102
KA5DQP (Dec.)	254
N5CDN (Dec.)	181
KA5FPV (Dec.)	118

1 — CALL	4 — SENT
2 — ORIG.	5 — DEL.
3 — RCVD.	6 — TOTAL

# Operating News

Conducted By John F. Lindholm,\* W1XX

## Straight Key Night — the Spirit Lives On

### "Auld Call Signs"

*Should old acquaintance be restored  
And brought to mind again  
Through ancient ways we once adored  
On the eve of SKN*

— Hunt, KØHT

From the glowing reports received in the wake of the 1982 running of Straight Key Night (SKN) on New Year's Eve, I don't think we're ready to put the venerable straight key on that "endangered species" list just yet.

Let's face facts. It appears as if advancing technology is trying to make the old "brass pump handle" go down for the count and just can't do it. We now have automatic keyers, keyboards and computers that are capable of sending, and in some cases receiving, nearly perfect cw. What a shame it would be to tune the hands and hear only that antiseptic machine-generated cw. Gone forever would be the recognizable characteristics of an individual operator's fist, that unique individual style. It's not that we shun the advancement of technology, but we feel there's plenty of room in the ham shack for all of the yesterdays as well as all of the tomorrows.

It is the nature of the radio amateur and the spirit of Amateur Radio that make us hold that which the straight key and SKN stand for in such high regard — a respect for and interest in the past with an eye on the future. When we grab the business end of that straight key with the thumb and first two fingers of our sending hand, which feel as if they were by design destined to "pump that brass," we imagine ourselves "communicating" with those early wireless pioneers, sharing their dreams of a higher technology and advancement of the communications art.

If we, as radio amateurs, ever lose that spirit, we might as well take the license off the wall and look for a new hobby.

Exactly 90 of the "sore arm set" sent in reports of their activities in Straight Key Night. Those reports showed 538 different stations active from throughout North America, Europe and Oceania.

There's nothing sweeter than the praise of our peers. Four SKN ops thought that KB2Z had the "Best Fist." Runnerup W4KFC had three votes, and tied at two votes apiece were W1NFE, W2LYH, W7BMI, W7ZMD, W8DL and W9PCF.

Loren, A1ØM/m, strapped his key to his leg and pounded out a few SKN QSOs while driving a trailer truck from Omaha, Nebraska to Cheyenne, Wyoming. For his efforts, Loren was selected by four other straight key enthusiasts as the "Most Interesting QSO." K5JMC and A16L, tied at two nominations apiece, were the only other stations to receive multiple votes in this category.

Now that the 1982 edition of SKN is history, we have the memories of some pretty FB QSOs, made the old-fashioned way, and the promise of more to come in the next Straight



Key Night to be held on New Year's Eve in 1983.

Join us then for a QSO or two. Help keep the spirit alive.

### KEY KLIX

Very pleasant, relaxed party. . . Used a Clapp-Eastman marble-based (1915) key (N4EE). While electronic keying devices are fine (I have one), it is always a pleasure to copy cw sent on a straight key by a good fist (VE2UM). SKN is an excellent chance to reflect on what we can do and how much fun we can have with simple equipment (KR8L). Please keep SKN alive at least one night a year. . . if for nothing else but to remind people where they started in ham radio (KA1FPP). I used a "new" key for SKN, A. W. H. Bunnell key and sounder mounted on a teakwood base, dated "MFRTD 1874" on the key. Is this the oldest key used in SKN? (N1CC). [Don't know if it is the oldest used in this SKN, Jim. Anybody out there beat 1874? — Ed.]. This activity was so relaxing that I had two QSOs while riding my exercycle. Bet you can't do that with the side keying paddles (W3GIS). Good clean fun. Keeps us hams off the streets (K1KO). I used an antique telegraph key that I purchased at a yard sale for two dollars. Is there anyone who might know something about it? (W6SBE) [Dan has photos of the key. If anyone can help him identify his key, please contact W6SBE. — Ed.] Oldest brass pounder worked was KA4F at age 74. Youngest one worked was KAØJTF at age 18 (N4ARO). — Bill Jennings, K1WJ

### W1AW Schedule

April 25-October 24, 1982

MTWThFSSn = Days of Week

Dy = Daily

W1AW code practice and bulletin transmissions are sent on the following schedule:

UTC	Slow Code Practice	MWF: 0200, 1300 2300; TThSSn: 2000; Sn: 0200
	Fast Code Practice	MWF: 2000, TTh: 0200, 1300; TThSSn: 2300, S: 0200
	Cw Bulletins	Dy: 0000, 0300, 2100; MTWThF: 1400
	RTTY Bulletins	Dy: 0100, 0400, 2200; MTWThF: 1500
	Voice Bulletins	Dy: 0130, 0430
EDT	Slow Code Practice	MWF: 9 A.M., 7 P.M.; TThSSn: 4 P.M., 10 P.M.
	Fast Code Practice	MWF: 4 P.M., 10 P.M.; TTh: 9 A.M.; TThSSn: 7 P.M.
	Cw Bulletins	Dy: 5 P.M., 8 P.M., 11 P.M.; MTWThF: 10 A.M.
	RTTY Bulletins	Dy: 6 P.M., 9 P.M., 12 P.M.; MTWThF: 11 A.M.
	Voice Bulletins	Dy: 9:30 P.M., 12:30 A.M.
CDT	Slow Code Practice	MWF: 8 A.M., 6 P.M.; TThSSn: 3 P.M., 9 P.M.
	Fast Code Practice	MWF: 3 P.M., 9 P.M.; TTh: 8 A.M.; TThSSn: 6 P.M.
	Cw Bulletins	Dy: 4 P.M., 7 P.M., 10 P.M.; MTWThF: 9 A.M.
	RTTY Bulletins	Dy: 5 P.M., 8 P.M., 11 P.M.; MTWThF: 10 A.M.
	Voice Bulletins	Dy: 8:30 P.M., 11:30 P.M.
PDT	Slow Code Practice	MWF: 6 A.M., 4 P.M.; TThSSn: 1 P.M., 7 P.M.
	Fast Code Practice	MWF: 1 P.M., 7 P.M.; TTh: 6 A.M.; TThSSn: 4 P.M.
	Cw Bulletins	Dy: 2 P.M., 5 P.M., 8 P.M.; MTWThF: 7 A.M.
	RTTY Bulletins	Dy: 3 P.M., 6 P.M., 9 P.M.; MTWThF: 8 A.M.
	Voice Bulletins	Dy: 6:30 P.M., 9:30 P.M.

Code practice and cw bulletin frequencies: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz.

RTTY bulletin frequencies: 3.625, 7.095, 14.095, 21.095, 28.095, 147.555 MHz.

Voice bulletin frequencies: 1.89, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.

Slow code practice is at 5, 7-1/2, 10, 13 and 15 wpm.

Fast code practice is at 35, 30, 25, 20, 15, 13 and 10 wpm.

On Monday, Wednesday and Friday, 1300 through 2100 UTC, transmissions are beamed to Europe on 14, 21 and 28 MHz.

Code practice texts are from QST, and the source of each practice is given at the beginning of each practice and at the beginning of alternate speeds. For example, "Text is from February 1981 QST, pages 9 and 82" indicates that the main text is from the article on page 9 and the mixed number/letter groups at the end of each speed are from the contest scores on page 82.

On Fridays, UTC, a DX bulletin replaces the regular bulletin transmissions.

Cw bulletins are sent at 18 wpm; Teletype bulletins are sent at 60 wpm with 170-Hz shift, then repeated on 110-baud ASCII.

W1AW is open for visitors Monday through Friday from 7:30 A.M. to 1 A.M. EDT and on Saturday and Sunday from 3:30 P.M. to 1 A.M. EDT. If you desire to operate W1AW, be sure to bring a copy of your license with you. W1AW is available for operation by visitors between 1 and 4 P.M. Monday through Friday.

In a communications emergency, monitor W1AW for special bulletins as follows: voice on the hour, RTTY at 15 minutes past the hour, and cw on the half hour.

W1AW will be closed on May 31, July 4 and 5, and September 8.

Station staff: Chief Operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Charles Chadwick, K8AXL; P. Russo, N8AXA.

\*Communications Manager, ARRL

## JANUARY CD PARTY HIGH SCORES

The following are high scores from the January CD Parties. Scores list: Call, score, QSOs, multiplier, hours, section.

CW	
K7NHV	35,220-587-60-10-ID
N6RO	31,440-524-60-10-EB
K6LL	29,174-503-58-10-AZ
KN5H	27,240-454-60-10-STX
N6OP	25,810-445-58-10-SJV
W5XX	25,114-433-58-10-MS
N4KG	24,696-441-58-10-AL
K1XA	24,339-427-57-10-CT
W2RQ	23,016-411-56-7-NNJ
K9GDF	22,562-389-58-9-WI
WA9EKA	21,056-376-56-10-IL
K2C8	20,940-349-60-10-WV
WB1HIH	19,600-350-56-4-WMA
W0AIT	19,398-318-61-9-CO
K85UL	18,755-341-55-10-NTX
N4SA	18,582-326-57-5-NFL
N6HE	16,936-292-58-10-LAX
K5WG	16,302-286-57-10-OK
VE3AWE	15,675-285-55-7-ON
Phone	
N6BT	
(WA6VEF, opr)	22,007-373-59-10-SCV
N5KW	16,830-306-55-10-OK
WB1HIH	13,750-250-55-10-WMA
WA9EKA	12,366-229-54-10-IL
K2OY	11,935-217-55-10-ENY
AG7M	10,098-198-51-8-WA

## SCM ELECTION NOTICE

To all ARRL members in the Southern Florida, North Dakota, West Indies, Oklahoma, Minnesota, Connecticut, Idaho, Western New York and Ohio 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 St., 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, June 4, 1982.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on July 1, 1982 and returns counted August 24, 1982. SCMs elected as a result of the above procedures will take office October 1, 1982.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition for a two-year term beginning October 1, 1982.

If no petitions are received for a section by the specified closing date, such section will be resolicited in October 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 SOLICITATIONS

Since no petitions were received for the South Dakota section as a result of notices in October and November QST, nominating petitions for this section are herewith resolicited. See the above notice for details on how to nominate.

## Amateur Radio Satellite Schedule

AMSAT-OSCAR 8				Soviet RADIO 5		Soviet RADIO 6		Soviet RADIO 7		Soviet RADIO 8	
Date (UTC)	Ref. Orbit	Time (UTC)	Long W.	Time (UTC)	Long W.	Time (UTC)	Long W.	Time (UTC)	Long W.	Time (UTC)	Long W.
1 April	20,752A	0142	95	0112	342	0127	349	0138	351	0138	351
2 April	20,765A + J	0003	70	0107	342	0112	347	0128	350	0135	351
3 April	20,779J	0008	71	0101	343	0056	344	0119	349	0132	352
4 April	20,793J	0013	72	0056	343	0041	342	0109	348	0130	353
5 April	20,807A	0017	73	0051	343	0026	340	0059	348	0127	354
6 April	20,821A + J	0022	74	0045	343	0010	337	0050	347	0124	355
7 April	20,835X	0026	76	0040	343	0154	5	0040	346	0121	355
8 April	20,849A	0031	77	0035	343	0138	2	0031	345	0118	355
9 April	20,863A + J	0035	78	0029	343	0123	0	0021	344	0116	357
10 April	20,877J	0040	79	0024	343	0107	358	0011	343	0113	358
11 April	20,891J	0045	80	0019	343	0052	356	0002	342	0110	359
12 April	20,905A	0049	81	0013	344	0037	353	0151	11	0107	0
13 April	20,919A + J	0054	82	0008	344	0021	351	0141	10	0104	0
14 April	20,933X	0058	84	0002	344	0006	349	0132	10	0101	1
15 April	20,947A	0103	85	0157	14	0149	16	0122	9	0059	2
16 April	20,961A + J	0107	86	0151	14	0134	14	0113	8	0056	3
17 April	20,975J	0112	87	0146	14	0118	11	0103	7	0053	4
18 April	20,989J	0117	88	0141	14	0103	9	0053	6	0050	4
19 April	21,003A	0121	89	0135	14	0048	7	0044	5	0047	5
20 April	21,017A + J	0126	90	0130	15	0032	4	0034	4	0045	6
21 April	21,031X	0130	92	0125	15	0017	2	0024	3	0042	7
22 April	21,045A	0135	93	0119	15	0001	0	0015	2	0039	8
23 April	21,059A + J	0139	94	0114	15	0145	27	0005	2	0036	9
24 April	21,072J	0001	69	0109	15	0129	25	0155	31	0033	9
25 April	21,086J	0005	70	0103	15	0114	23	0145	30	0030	10
26 April	21,100A	0010	72	0058	15	0059	20	0135	29	0028	11
27 April	21,114A + J	0014	73	0053	15	0043	18	0126	28	0025	12
28 April	21,128X	0019	74	0047	16	0028	16	0116	27	0022	13
29 April	21,142A	0024	75	0042	16	0012	13	0106	26	0019	14
30 April	21,156A + J	0028	76	0037	16	0156	41	0057	25	0016	14
1 May	21,170J	0033	77	0031	16	0140	38	0047	24	0014	15
2 May	21,184J	0037	78	0026	16	0125	36	0037	23	0011	16
3 May	21,198A	0042	80	0021	16	0110	34	0028	23	0008	17
4 May	21,212A + J	0046	81	0015	16	0054	31	0018	22	0005	18
5 May	21,226X	0051	82	0010	16	0039	29	0009	21	0002	18
6 May	21,240A	0056	83	0004	16	0023	27	0158	50	0159	49
7 May	21,254A + J	0100	84	0159	47	0008	24	0148	49	0156	50

Orbit predictions by K1HTV, KA1GD and W9KDR. To keep abreast of the latest developments, tune in the regular phone and cw bulletins over W1AW, or the AMSAT nets. Tuesday — East Coast and Mid States at 9 P.M. and West Coast at 8 P.M. local time on 3550 kHz. Saturday — International at 2200 UTC on 28,878 kHz. Sunday — International at 1800 UTC on 21,280 kHz and 1900 UTC on 14,282 kHz. OSCAR 9 orbits are no longer listed — because of its low altitude, long-range predictions are not always accurate. Use W1AW and AMSAT Bulletins for weekly updates. For a three-month printout of each orbit of satellites that are carried in the Project OSCAR calendar, send an s.a.s.e. and any donation to Project OSCAR, P.O. Box 1136, Los Altos, CA 94022. O8 modes of operation are Monday and Thursday — Mode A, Tuesday and Friday — Modes A + J, Wednesday is reserved for authorized experiments or recharge of the batteries. Do not operate through the OSCAR or RADIO satellites on Wednesday UTC. Do not use more power than is needed to operate through the OSCAR or RADIO satellites. Your downlink signal should never be stronger than the satellite's telemetry beacon. Reduce your uplink power to prevent overload causing 10 dB attenuation of received signals. Advise operators whose signals are stronger than the telemetry beacons.

Exact orbit numbers have not been determined for the Radio satellites.

Satellite	Period (min.)	Increment (deg.)	Inclination (deg.)	Height (km)
OSCAR 8	103.1836	25.7959	98.79	919
RADIO 5	119.4988	30.0159	82.95	1682
RADIO 6	118.6616	29.8063	82.95	1632
RADIO 7	119.1403	29.9259	82.94	1654
RADIO 8	119.7090	30.0683	82.95	1681

RADIO 3 and RADIO 4 orbital data will not be listed because these satellites are for Soviet experiments. QSLs and telemetry reports should be sent to Box 88, Moscow.

### Spacecraft Frequencies

	Uplink	Downlink	Beacon
OSCAR 8			
Mode A	145.850-145.950 MHz	29.400- 29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.200-435.100 MHz	435.095 MHz
RADIO 5	145.910-145.950 MHz	29.410- 29.450 MHz	29.330/450 MHz
RADIO 6	145.910-145.950 MHz	29.410- 29.450 MHz	29.410/450 MHz
RADIO 7	145.960-146.000 MHz	29.460- 29.500 MHz	29.340/500 MHz
RADIO 8	145.960-146.000 MHz	29.460- 29.500 MHz	29.460/500 MHz
RADIO 5 ROBOT	145.826 MHz	29.331 MHz	
RADIO 7 ROBOT	145.835 MHz	29.341 MHz	

RADIO 3 and RADIO 4 are for experiments only to be announced by USSR.

### OSCAR 9

Hf Beacons — 7,050, 14,002, 21,002 and 29,510 kHz. On-off keying with Morse telemetry.

Interspersed with a carrier or continuous carrier.

Vhf Beacon — 145.825 MHz nbfm ± 5 kHz. ASCII, Baudot, voice, afsk and Morse.

Uhf Beacon — 435.025 MHz nbfm ± 5 kHz. ASCII, Baudot, voice, afsk and Morse.

S-Band Beacon — 2401.0-MHz nbfm ± 10 kHz. ASCII, Baudot, voice, afsk and Morse.

X-Band Beacon — 10.470-GHz steady carrier. S- and X-band beacons use lhcp.

**Mode J Club:** Become a member of the Mode J Club. Complete eight Mode-J contacts. QSL cards are not required. Just list the call sign of each station worked, date, orbit number and station equipment used. Send this information along with \$3 in U.S. funds, a one-time charge to cover the certificate and newsletter costs, to Mode J Club, c/o Larry Roberts, W6MXX, 3300 Fernwood, Alton, IL 62002.

**OSCAR 8 QSL:** To receive an OSCAR 8 QSL card, send a copy of the telemetry from the 29.402- or 435.095-MHz beacons. Please send your report, along with s.a.s.e., to ARRL Hq.

Further information on the radio amateur satellite program can be obtained free of charge from ARRL Hq. The all-new OSCARLOCATOR package is now available: \$7 U.S., \$8 elsewhere.

# Contest Corral

## A Roundup of Upcoming Operating Events



Conducted By Mark Wilson,\* AA2Z

### APRIL

#### 3-4

**ARRL International EME Competition**, part 1, March *QST*, page 82.

**ARRL Open CD Party**, phone, March *QST*, page 82.

**SP-DX Contest**, cw, cancelled this year.

**VS6 Activity Days**, sponsored by the Hong Kong Amateur Radio Transmitting Society, from 0001Z April 3 until 1700Z April 4. VS6 stations send signal report and serial number; others send signal report and CQ zone. Suggested frequencies: phone — 3.770 7.070 14.170 14.220 21.270 21.320 28.470 28.520; cw — 3.502 7.002 14.025 21.025 28.025. Contacts good for awards. Information available from HARTS, P.O. Box 541, Hong Kong.

#### 6

**West Coast Qualifying Run**, 10-35 wpm at 0500Z April 7 (9 P.M. PST April 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 s.a.s.e. will help expedite your award/endorsement.

#### 7-8

**DX-YL to North American-YL Contest**, cw, March *QST*, page 88.

#### 10-11

**Commonwealth Contest**, March *QST*, page 88.

#### 14-15

**DX-YL to NA-YL Contest**, phone, March *QST*, page 88.

#### 15

**WIAW Qualifying Run**, 10-35 wpm at 0300Z April 16 (10 P.M. EST April 15). Transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 147.555 MHz. See April 6 listing for more details.

#### 17-18

**ARRL Open CD Party**, cw, March *QST*, page 82.

**SP-DX Contest**, phone, cancelled this year.

**QRP ARCI QSO Party**, sponsored by the QRP ARCI International, from 1200Z April 17 until 2400Z April 18. Stations operate max. 24 hours, 160-6 meters, ssb only. Work stations once per band. Exchange signal report and state/province/country name. ARCI members also send QRP number; nonmembers send power output. Suggested frequencies: 3.985 7.285 14.285 21.385 28.885 50.385. Count 5 points per ARCI-member QSO, 2 points per W/VE nonmember QSO and 4 points per DX nonmember QSO. Multiply

by power multiplier (PEP output): 8-10 watts,  $\times 2$ ; 6-8 watts,  $\times 4$ ; 4-6 watts,  $\times 6$ ; 2-4 watts,  $\times 8$ ; less than 2 watts,  $\times 10$ . More than 10 watts will count as check log only. Bonus multiplier:  $\times 2$  if 100% natural power,  $\times 1.5$  if 100% battery power. Logs must be received by May 20 (enclose large s.a.s.e. for results) by: W. Dickerson, WA2JOC, 352 Crampton Dr., Monroe, MI 48161.

#### 24-25

**ARRL Morning Special**, from 1200-1300Z and 1400-1500Z April 24. First hour, 40 cw; second hour, 10 ssb. Take the hour in between for a coffee break or breakfast. Work stations once per band. Suggested frequencies: 7.040-7.075 and 28.650-28.700. Exchange telephone area code and rig (exciter) name (e.g. CLINE, TS830, FT107, IC720, KWM2, HBRW, etc.). Score equals number of QSOs, no multiplier. Mail entries by May 7 to ARRL Hq. Include s.a.s.e. for results; top scores will be listed in *QST*.

**Helvetia Contest**, sponsored by USKA (Switzerland), from 1500Z April 24 until 1500Z April 25. Cw and phone, 160-10 meters. Work stations once per band. HB stations work the world. Exchange signal report and serial number starting with 001. HB stations also send 2-letter abbreviation indicating canton. Count 3 points per HB QSO and multiply by number of cantons worked per band (max. 26 per band). Possible canton abbreviations are: ZH BE LU UR SZ OW NW GL ZG FR SO BS BL SH AR AI SG GR AG TG TI VD VS NE GE JU. Send entries within 30 days to: G. Stalder, HB9ZY, Tellenhof, 6045 Meggen, Switzerland.

**YL ISSB QSO Party**, phone, March *QST*, page 88.

#### 25

**WIAW Qualifying Run**, 10-35 wpm at 2300Z (7 P.M. EDT) April 25. See April 15 listing for more details.

### MAY

#### 1-2

**ARRL EME Contest**, part 2, March *QST*, page 82.

**10-Meter RTTY Contest**, sponsored by DARC, from 1100-1700Z May 2 (other dates Sept. 4 and Nov. 7). Exchange signal report, serial number and name. Entry classes: single and multiop, and SWL. Count 1 point per complete RTTY contact, multiply by total DXCC and WAE countries worked. Each W/VE/VK call area also counts as a separate multiplier. Entries must be received in 30 days by: Klaus Zielski, DF7FB, P.O. Box 1147, D-6455 Erlensee, West Germany.

**County Hunters SSB Contest**, from 0001-0800Z May 1, 1200Z May 1 until 0800Z May 2 and 1200-2400Z May 2. Work fixed stations only once. Work mobiles again each time they change counties or bands. Mobiles on a county line count for one contact and two multipliers. No net or repeater QSOs. Exchange signal report, county and state (country for DX stations). Suggested frequencies: 3.920-3.940 7.220-7.240 14.275-14.295 21.375-21.395 28.625-28.650. Avoid "mobile windows" from 3.925-3.935, 7.225-7.235 and 14.280-14.290. Count 1 point per W/VE fixed station, 5 points for DX (incl. KL7 and KH6), and 15 points for mobile stations. Multiply by total U.S. counties plus number of VE stations worked. Awards. Entries

must be received by June 15 by: John Ferguson, W0QWS, 3820 Stonewall Ct., Independence, MO 64055.

**Georgia QSO Party**, sponsored by the Atlanta RC, from 1600Z May 1 until 0200Z May 3. Single op, multiop and mobile/portable entry classes. No repeater QSOs. GA to GA contacts allowed. Work stations once per band. Work mobiles again as they change county. Exchange signal report, serial number and QTH (county for GA stations; state, province or country for others). Suggested frequencies: phone — 3.900 3.975 7.245 14.290 21.360 28.600; cw — 1.805 3.560 7.060 14.060 21.060 28.060; Novice — 3.718 7.125 21.110 28.110. Try 160 at 0300Z; 10 on the hour and 15 on the half hour 1300-2300Z. Count one point per QSO. GA stations multiply by total states, VE provinces and DXCC countries worked. Others multiply by total GA counties (159 max.). Awards. Mail entry by June 1 to: Dave Thompson, K4JRB, 4166 Mill Stone Ct., Norcross, GA 30092.

**Seville World Wide Contest**, sponsored by the Seville RC (Spain), from 1600Z May 1 until 2000Z May 2. Single operator, all band only. Operate 24 hours max.; off time must be taken in 1 or 2 periods, 80-10 meters. Ssb and cw contacts allowed, but work stations once per band regardless of mode. Exchange signal report and serial number starting with 001. Count 2 points for QSO in same country, 3 points for different country. QSOs between EA, EA6, EA8 and EA9 stations count 2 points. Multiply by number of DXCC countries worked per band. Entries must be postmarked by June 30. Send to: Radio Club Sevilla, P.O. Box 555, Sevilla, Spain.

#### 5

**West Coast Qualifying Run**, 10-35 wpm at 0400Z May 6 (9 P.M. PDT May 5). See April 6 listing for more details.

#### 10

**WIAW Qualifying Run**, 10-35 wpm at 0200Z May 11 (10 P.M. EDT May 10). See April 15 listing for more details.

#### 15-16

**Armed Forces Day  
Florida QSO Party  
Michigan QSO Party**

#### 23-24

**Rocky Mountain QSO Party**

#### 27

**WIAW Qualifying Run**

#### 29-30

**CQ WW WPX Contest**, cw, March *QST*, page 88.

**Ibero-American Contest**

### JUNE

#### 12-13

**ARRL June VHF QSO Party**

#### 26-27

**ARRL Field Day**

□□□

\*Assistant Communications Manager, ARRL

## Strays

### ATTENTION STAMP COLLECTORS

□ A new quarterly magazine is devoted to the two hobbies of stamp collecting and Amateur Radio. For further information, contact M. Bjerrang, LA5NM, Box 210, N-9401 Harstad, Norway.

### I would like to get in touch with . . .

□ amateurs interested in setting up 10-GHz skeds for June VHF contest. Larry Caracciolo, N3CCW, 849 Cedar Hill Dr., Allentown, PA 18103, tel. 215-264-7447.

□ amateurs 20 years old and under to participate in the International Kiddies Net, which meets every Monday at 0000 UTC on 14.310 MHz. Mark Strept, RA3GYL, 180 Millview Dr., Pittsburgh, PA 15238.

□ fellow amateurs who have been awarded the Purple Heart medal by the U.S. Government. Clement L. Harris, KC5MM, 6110 Pecan Trail Dr., San Antonio, TX 78249.

□ former R.O.s of the 149th AACs, WYVC in New Caledonia. Bernard Binder, WA2CQT, 1 Woodland Rd., New City, NY 10956.

□ others interested in cryptology. Michael H. Landwehr, KBT7, 54 Ivey Rd., Huachuca City, AZ 85616.



# Section Activities

A-1 OPR EC DXCC RCC WAS STM OES ORS NM  
SCM ARES OVS SEC OBS TCC OO NTS WAC CP X

## CANADIAN DIVISION

**ALBERTA:** SCM, E. Roy Ellis, VE6XC — SCM/SEC: VE6XC, ASGM: VE6AMM. STM NM-ATN ANM-APSN: VE6ACB. The Shell National 4-Day Cross Country Ski Run was covered by the NARC with 2M radio and ATV. An on-the-air poll by VE6ABC re his VE6QST bulletins indicated that net members enjoyed a healthy interest in them. Traffic: VE6CHK 167, VE6ABC 17, VE6AMM 11, VE6XC 10, VE6QN 9, VE6CDH 8, VE6YW 8, VE6JH 6.

**BRITISH COLUMBIA:** SCM, H. Ernie Savage, VE7FB — British Columbia Emergency Net has lost, by Silent Key, one faithful net member and representative to RN-7, VE7SM. British Columbia Phone Net, 3755 kHz at 2000Z, reports high attendance again, low 129 high 200 for grand total of 8306. VE7FL and VE7QO both are sporting casts on foot. VE7AAJ is seriously ill in Kelowna Hospital. Okanagan Amateur Radio Teletype Assn. president is VE7ASY and secretary is VE7EQD. Aim is to have fm and RTTY repeater on Apex Mountain (alt 7372 ft.) solar powered. Looking for membership. VE7ZK 107, VE7FB 51, VE7COA 27, VE7BLO 23, VE7BIR 19, VE7CDF 12, VE7BNI 9, VE7BZI 9.

**MANITOBA:** SCM, Peter Guenther, VE4PG — ASGM: JP. SEC: HK. STM: RO. NMs: VJ TE NM ACX. We regret the passing of VE4RY. He was very active on cw and will be missed by many. The Canadian Amateur Radio Research Club is reorganizing into a national club. We wish it every success. MTN QNI 335, QTC 100, sess 31. MMN QNI 621, QTC 36, sess 31. MFPN QNI 1219, QTC 51, sess 31. WYRN QNI 269, QTC 49, sess 9. Traffic: VE4ACX 90, VE4RO 88, VE4FX 43, VE4AJ 35, VE4ADS 33, VE4TE 32, VE4CR 22, VE4ID 22, VE4JA 19, VE4AAD 16, VE4FK 10, VE4NE 8, VE4ALX 7, VE4DS 4, VE4EN 4, VE4TL 4, VE4GW 2, VE4AE 1.

**MARITIME-NEWFOUNDLAND:** SCM, Donald R. Welling, VE1WF — ASGM: VO1FG. SEC: VE1EI. NMs: VO1JN VE1VF. STM: Open. This column will be short because of lack of info. Please fwd info from your area to your SCM. Hospital patients during January were VE1BKQ & VE1ASW. Silent Keys: VE1BI VE1AZD. VE1IS lost home and business in a fire. VE1RO/LCR has been very busy running phone patches and handling trc. Don't forget the Maritime convention to be held in Charlottetown in August. A mailing should be out by this time. Hope to see you there. Several Halifax area amateurs suffered antenna loss in recent ice storms. Net: AF7 76 QTC in 31 sess. Traffic: VE1G 189, VE1OQ 189, VE1LU 7, VE1XF 6, VE1BPM 5, VE1BX 4. (Dec.) VE1BPM 9.

**ONTARIO:** SCM, Larry Thivierge, VE3GT — ASGM: VE3GOL. SEC: VE3GV. STM: VE3OI. The Ottawa ARC: Certificate of Merit for 1981 was presented to VE3BNO who has been an active radio enthusiast for some 35 years. Presently he is very active in AMSAT, sstv, satellite communications and the OARC activities. Congrats. Incidentally, my first receiver, an R-1155, was obtained from him. The Welland Co. Emergency Net meets every Wednesday at 2030 on VE3WCR. VE3JJA new EC for the District of Kenora. The CD Party this month is an open one. Let's hear some VE3 activity. OSND certificates have been issued to VE3CJUR and VE3FRG EC for Oxford and JF. LSW and L5J as his assistant ECs. Regrettably must report the passing of VE3BNU VE3EEH and VE3GV. The Canadian Top Band Net meets Tuesday evenings at 2200 on a clear frequency between 1815 and 1825 kHz as an informal net to encourage the use of 180M band. All VE, K, W and N amateurs are welcome. VE3ADP conducted the Algoma ARC on a very interesting tour through the Ministry of Natural Resources facility. Burlington ARC has received a Wintario grant to purchase a new repeater and two handie-talkies. During the 150th centennial of Smith Falls, that club will be using the call C235FR. Repeater VE3MGI is on the air from the Whiteoaks area. Frequencies used are 147.175 and 147.185 MHz. Input on either 2 or 6 has output on both bands. VE3 recently made his 900th GSO to VK-Land. Time to start thinking where your club or group is going to place in FD results. VE3XSD undertaking an update of their station with the help of a New Horizons grant. VE3AUI is working hard at getting his Intruder Watch program operating. I'm sure he'd appreciate any help you can provide. Congrats to CARTG celebrating their 15th anniversary and to ONTARS on their 10th year of continuous operation 11 hours a day, 0700 to 1800 on 3755 kHz. Traffic: VE3KK 309, VE3GOL 169, VE3GT 157, VE3CYR 142, VE3PDO 117, VE3GNY 105, VE3GT 87, VE3OUB 83, VE3KXB 68, VE3BZ 67, VE3KZ 57, VE3JAT 55, VE3VM 37, VE3LOK 35, VE3FPI 32, VE3DVE 28, VE3WG 28, VE3FRG 27, VE3LNN 23, VE3DUK 16, VE3AJN 13, VE3ANJ 9, VE3KLY 6, VE3LDU 6.

**QUEBEC:** SCM, Harold Moreau, VE2BP — SEC: VE2DEA. STM: VE2PJ. NMs: VE2PJ VE2FA. VE2YW now has a new IC-730 and getting good reports. VE2CBS (Sorel-Tracy ARC) making plans and getting ready for Field Day. Le Congres RAQI will be at St-Hyacinthe on 13, 14 and 15 August. Attendance at code and theory classes is very good and a lot of new calls should be heard soon. Le réseaud de VE2MO (Trois-Rivieres) a 1745 hrs toues les soirs sur 146.67. Traffic: VE2PJ 171, VE2FKI 117, VE2EDO 37, VE2BP 38, VE2PFE 35, VE2EC 30, VE2EKO 27, VE2GAG 18. (Dec.) VE2FSA 21.

**SASKATCHEWAN:** SCM, W. C. (Bill) Munday, VE5WM — STM: VE5QY. SEC: VE5II. It is with regret that I announce VE5ZZ and VE5II have become Silent Keys. The City of Moose Jaw celebrated their 100th anniversary and a special prefix "CG" was employed by members of the Moose Jaw ARC. VE5MP is the new NM for the Prairie and a thank you is extended to VE5SF for his cooperation during his year as NM. Activity on 2-meter sbs and RTTY is becoming more popular and a few composites are appearing in the ham stacks. Traffic: VE5KS 62, VE5WM 15, VE5AAT 8, VE5AE 6, VE5KZ 2.

## ATLANTIC DIVISION

**DELAWARE:** SCM, Harold K. Low, WA3WY — STM: W3DKX. SEC: W3PQ. PSHR: K3JL. We regret W3DKX had to step down as SCM because of poor health. I will try to be as available to everyone as he was. New officers Kent Co. ARC: AF3R, pres.; W1FDH, v.p.; WB3ILX,

treas.; WB3HEJ, sec. 1982 officers Sussex ARA: K3JL, pres.; W3WD, v.p.; K3ZXP, secy/treas. AWARE welcomes new members KA2MLN WA3DLI WA3JDJ W3KET KA3ILO NB3QS. A net meets Saturdays at 8:30 P.M. on 146.955 repeater. All are welcome. Nets: DTN QNI 379, QTC 45; DEP QNI 87, QTC 20; SEN QNI 31, QTC 4. Traffic: W3PO 120, WA3WY 70, W3CO 68, K3JL 46, N3AKC 33, W3DKX 32, WB3DUG 28, WB3GAD 28, WA3PUM 16, W3FEG 10, W3WD 10, K3ZXP 9, N3A 4, WA3PWT 4.

**EASTERN PENNSYLVANIA:** SCM, Karl W. Pfeil, W3VA — SEC: WA3FPQ. STM: K3JSZ. DECS: N3BFL N3CJP W3EEK W3YZW.

Net Freq. Time QNI QTC Sess. Mgr.  
EPAEPTN 3917 6 P.M. Dy 603 194 31 WA3EHD  
EPA 3610 7:10 P.M. 580 254 59 AA3B  
PFN 3958 5 P.M. Dy 330 278 31 WA3WQP  
PTTN 3610 6:30 P.M. 291 92 31 K3JSZ  
Local & vhf nets reports: (QNI/QTC/Sec) D3ARE 189/25/4, D5ESN 81/12/5, D1OARES 128/90/18, Carbon Co. ARES 49/0/4, LCARES 128/20/9, MTG Co. ARES 49/0/4, SKYWARN WJ 82/68/10, WARGVNT 40/20/4, OO reports: KB3XO KC3B N3BFL W3JAF W3GVR, OBS reports: K3EZZ N3CJP WA3VJ W3GL W3JD W3VA, OVS reports: K3EZZ N3CJP WA3VJ W3GL W3JD W3VA, W3JAF WA3GJT KB3LF KB3JD KB3LU KB3CJ W3PDP W3GOA W3VA WA3EHD WA3OFP WA3TKU WA3WQP WB3CAI WB3FKP WB3FYT. New appointment: WB3KJL to OHS. EPAEPTN welcomes KA3EJG. New call KB3XK (ex-WB3FER). N3BHF is sporting new IC-22U. N3CIX reports for first time. New officers: Frankford RC — NZLT, pres.; K3KNH, v.p.; KB2XZ, secy.; KF3R, treas. Murgas ARC — WA3YON, pres.; KA3A, v.p.; WA3ZTM, secy.; K3JML, treas. Tamaqua ARC — W3VA, pres.; WB3JZP, v.p.; WA3OFP, secy.; KB3CH, treas. W3HK wants to know what goes faster than time? WB3AAC, EC Chester Co., reports 35 ARES members provided communications for 3 recent social events. Congrats ARC K3JL for first place finish. EPA and Atlantic Div. in September will contest also to WB3CJG for first EPA in individual score. Our hats off to Murgas, Hazelton. Scranton PCs and interested hams for tracking down an illegal station in the 2M band. They also helped recover stolen ham equipment which the illegal station was using. DF gear was used on the station who was transmitting obscene language and racial slurs. Another fine job was done by District 5 hams during the chemical spill and evacuation Feb. 3 in the Stroudsburg area. Approximately 27 amateurs took part under the direction of N3BFL, DEC for District 5. Nets activated were D5ESN, RACES and EPAEPTN. The emergency lasted from 10 A.M. until 10:30 P.M. when residents were allowed to return to their homes. Nice to hear WA3QN, 53 years with same call, again active in the traffic nets. The section has openings for District Emergency Coordinators and Emergency Coordinators. Anyone interested in emergency work is invited to contact WA3PZO or this office. Traffic: WA3WQP 323, KB3LF 274, K3JSZ 214, W3PDP 142, N3CJP 130, W3IPX 119, KB3UD 111, W3JAF 108, WA3EHD 96, KB3XO 93, W3VA 92, KA3GJT 87, N3CD 75, AA3B 72, WB3FKP 67, W3KUZ 59, KA3DLY 55, W3YZW 56, WA3OFP 35, WA3CQM 31, W3TWV 24, N3BFL 22, WA3DE 21, WA3QN 20, K3OXK 18, W3CO 16, W3VA 15, WB3FYT 12, WA3CAK 11, KB3JL 10, WA3WY 10, W3EEK 10, W3JD 10, W3PTM 8, KA3BQS 6, K3EBZ 5, KA3FJJ 5, N3CIX 2, W3HK 2, WA3VIL 1.

**MARYLAND — DISTRICT OF COLUMBIA:** SCM, Karl R. Medrow, W3FA — Congrats to WB3LTA and the Montgomery County ARES/RACES group. They provided the DC Red Cross with communications during the Air Florida crash. Notice the Chesapeake Bay Weather and Traffic Net 147.705/105 at 1100 and 1500 local every weekend and public holiday April 1 through November 15. This boater service sponsored by the AARC. Spring is coming WA3GXN is heading north for home. Congrats to W3CDD her WAS/YLRL worked KA3WIF ND all of 11 years out for her last state. Sounded like WB3KJ has that new rig, KA3T has many obstacles and is back on the air. He set lists to be in the county net 147.175 for Westlink news Tuesdays at 1915 local. W3HR stopped traveling long enough to help a few in his OO category. W3LDD W3UT KB3NL and W3HTE are chasing DX and catching some! Congrats to KA3GWH upgrade to Advanced and awaiting for new call, and his friends KA3GUB now General and KA3GWI now Tech. KA3EFK made Advanced too. Congrats to all. KA3CDD is enjoying his prizes, a new color TV and VCR. W3FZV made SKN and did a stint in the 160-meter test. N5EAZ/3 has an acre and his eye on 160 meters too. KB3WL is looking for W3RUF contacts in the mountains of Garrett County. W3RUF was surprised to find T2SB working with him at the Washington hospital center. AK3X vows more activity after taming the radio. W3COI plans for those summer cookouts. WB3GZU is back at earning a living full time. With the nets. Net/manager Sessions/Traffic QNI average. MDC PON/W3OYY 4/425/3. Thanks to K3IFB while W3OYY was repairing damage from frozen burst pipes at his folks home. WR PON/WB3BFFK 2/14/21, W3DFW/0 reports in regularly from Missouri. MDD/W3PQ 5/21/0/8.3. MEPN/WB3GZU 3/12/31/30/4. BPL: W3FA WB3GZU. Toppers: W3LDD and K3ONU. Also, N3AGM KA3AMK/4 KA3CDD KA3GWA WB3GZU and WA3YFM (New York). MTN/KA3CDD 13/7/4. New name Maryland Training Net. New freq is 3737 kHz at 1930 local time alternating nights with Delaware SSN. Traffic: W3BGT 163, W3COI 159, W3FA 137, W3UT 129, W3ZNV 40, KB3WL 32, WB3BFF 27, W3CDD 25, KA3T 13, W3FZV 12, N4DRJ/3 10, W3LDD 6, WB3KJT 5, WB3LTA 4, KB3NL 2. (Dec.) KA3T 18.

**SOUTHERN NEW JERSEY:** SCM, Bill Luebkekmann, WB3LCC — STM: WB3LCC. SEC: W3HOB. January was a cold, cold month for the annual running of the VHF Sweepstakes. Perhaps it is this fact that caused participation in this area to slacken just a bit from previous years. It seemed towards the end of the contest that the serial numbers being given out were not quite as high as in previous years. All who participated reported they had a lot of fun. I'm sure that it could be considered a success. Just who the winners were we will find out in a few short months. How did you do?? I wonder just how

much antenna work got done during the unusually severe weather of the winter of 1982. I understand several clubs are planning another round of licensing classes this spring. If you care to get the info to me, I'll be happy to print details on the numbers of students and just how successful your classes were. Check my address and phone number on page 8 of this issue. A reminder that there is still plenty of work to be done on your local two-meter traffic net. Now that the holidays are over, we need you more than ever. Why not QNI and QSP some QTC. QRC? Traffic: N2CER 265, WB3PKG 142, WA2AGV 77, WB2IOJ 55, KA2SLL 52, KA2E 41, KA2GE 40, WB2GFM 30, WB2LCC 20, KA2BKF 18.

**WESTERN NEW YORK:** SCM, William W. Thompson, W2MTA — SEC: W2BCH. STM: N2APE. ASGM: W2GHL. DECS: WA2AIV KA2BHR WA2DZH WB2NAO. Silent Key: WB2MCP Rochester. PSHR: W2AET KA2BHB KA2BHR N2BLX KA2CTU KA2BDD W2GLH KA2GHO WA2BDS WA2KOJ W2MTA WB2OWO W2ZOJ. Events WNY LO Meeting #1 April 3, Watertown; #2 May 22, Batavia; STARC Fest May 1, Owego; Rochester May 14-15; Batavia Fest, July 11; RAWNY Picnic July 18. THANKS: WB3GUF moved NY, WB2TXK married WKBOK Tennessee — now we need DEC Mohawk and EC Wyoming: WA2AIV N2EH KB2XI and crews for double effort at Gining nuclear plant. Apts: EC: KB2DP Onedia Co. KA2MYD Chicago Co. OES/OVS/VS: KA2LHC. RARA's K2JD has new QTH in N2E and coolies; Prez W2EBF out of hospital. Reports: OO: WB2LGH 83, OBS: W2GLH K2WKV; OES: WA2RKB (OS/D) RS-8I, WB2KWF, v.p.; K2QR. Sasquatch Winter Camporee at Cherry Valley WB2PEE WA2PEF. SLVARES Red Cross Drill Colton — WA2RXD W2VJHK. Onandaga ARES and WA2PUU get kudos from Village of Manlius. New officers: OCARA — WA2MNA WB2QFE WB2ZL; CVARA — WA2DIO WA2EYH WA2LFI W2RME, Champaign Valley ARC — N2ID KA2IOX KC2JO W2ADF; BARA — KF2X N2BLX N2CFN WB2GHI; SVARA — N2BLX N2CQI WA2Z5C WA2QEL K2CC; Utica ARC — WA2AZA WB2BIN WB2JUN WA2WZ; Sylvane ARC — WA2BGM N2AGF KA2NLK KA2OJH TIGAR — WA2AUD K2UNY K2OH. N2DE K2QR and SVARA hatching Novices.

Net	Freq.	Time/Dy	QNI	QTC	QND
NYS/1*	7077	1000 M-S 120	50	25	
NYS/CN	3677	1000/Sn 48	17	5	
THIN	3913	1800/Sn 85		5	
NYPON*	3913	1700/Dy 666	194	31	
NYSPTEN	3925	1800/Dy 847	103	31	
ESS	3590	1800/Dy 493	73	31	
OCTEN*	3494	1830/Dy 699	88	31	
Q NET	3191	1830/Dy 463	5	31	
STARPE	3939	1830/Dy 91	79	26	
W3RUF*	0464	1830/Dy 518	80	27	
NYS/2*	3677	1900/Dy 449	220	31	
NARASEN	7515	1900/Sn 81	0	5	
SLVARES	3191	1930/Sn 48	0	4	
JCARCN	1070	2000/Dy 411	6	31	
OARCN	2585	2000/W 80	0	4	
WIN	0464	2000/M SKYWARN			
WNYEON	3955	2000/Sn ARES			
BRVSN	055/565	2100/Dy 300	0	31	
CNYTN	9030	2115/Dy 455	83	31	
STAR/L	325/295	2130/Dy 82	12	24	
WDN/L*	0464	2130/Dy 788	86	31	
NYS/3*	3677	2200/Dy 328	216	29	

\*NTS nets Traffic: WA2PJC 270, W2MTA 253, KO2H 232, WA2E 231, W2COJ 194, WA2HSS 193, KA2CTU 180, WB2OWO 174, WB2IDS 172, W2GLH 166, WB2LX 91, KA2CLT 80, N2BLX 79, WB2LCC 70, WB2M 62, WA2NAD 55, W2PZL 54, KA2BHR 51, WA2PUU 44, WA2KJO 41, KA2GHO 38, AF2K 35, W2GJ 34, NZARD 32, KG2D 28, KA2BHB 25, N2ABA 24, WB2SGI 22, WA2AIV 14, WA2RXO 14, KA2BDD 12, WB2NAO 11, K2QR 7, KARN 7, WA2TCZ 5, WA2RKB 1. (Dec.) WB2NAO 29, WA2DHZ 12.

**WESTERN PENNSYLVANIA:** SCM, Otto L. Schuler, K3SMB — ASGM/STM: N3EE. NMs: AC3N N3ADU W3NEM W3MML. SEC: AB3Q. DECS: WB3JDI WB3EFO WB3KJH.

Net	Sess.	QNI	QTC	kHz	T/D
WPACW	31	422	184	3585	7:00 P/D
WPAPT	31	714	109	3583	8:15 P/D
WPA2MTN	31	523	109	146.08/88	8:00 P/D
NWPA2MTN	30	414	9	146.04/84	9:00 P/D
PFN	31	330	278	3585	5:00 P/D

We are saddened by the passing of W3MOM and our sympathies are with his XYL K3ENM. Upgrades: Novice — N3CNU; Techs — KA3QXG KA3QYA; Gen — KA3HGR; Adv — KB3TX/WA3LIA WA3VJP KA3CEO; Extra — K3GJex/WA3JZN WB3KJH. Congrats to all. New call N3CMR (ex-KA3CYB, age 74). Southern Hills Brasspounders and Mod. WA3ZNP, pres.; WB3DHF, v.p.; N3AEV, treas.; WA3ZNO, secy.; W3MML/W3QNI W3LDB, dir. K3NPJ/WA3BP WB3AXQ, trustee, Indiana Co. ARC: WB3EUL, pres.; KA3EA, v.p.; W3VJ, secy/treas. Foothills RC/WB3CCQ, pres.; KA3EA, v.p.; KA3EG, secy.; KA3DFK, treas.; WB3EKR, member-at-large; WB3LHG, act. mgr. January was a disastrous month for parts of western Pa. Armstrong Butler Westmoreland and Venango Counties had storms that put down power lines and many had no lights or heat for hours, some 24 or more. Oil City in Venango has flood problems. Amateurs rose to the occasion and did yeoman work for the EMA & AMRC. Traffic: N3ADU 368, K3CR 191, AC3N 189, W3JA 113, KB3DT 102, N3FM 89, W3EGJ 77, N3NV 70, K3SMB 62, KA3CDD 54, WA3UNJ 44, W3KUN 39, W3RUL 35, N3BKJ 32, W3OKN 32, W3GJD 31, W3M 29, W3GJ 28, WA3QNT 25, KB3BG 24, KA3LTV 20, N3BKJ 17, KA3B 15, W3KJ 15, W3SN 15, KF3V 14, KB3WV 14, W3WJ 12, K3YOV 15, W3TIN 11, W3AHH 9, N3BPY 9, K3HCT 9, N3CLE 8, W3KUN 7, N3K 4, W3SMV 4, W3LOD 3.

## CENTRAL DIVISION

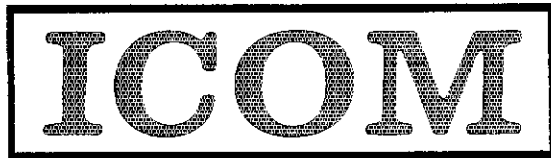
**ILLINOIS:** SCM, Larry M. Keeran, KR0PP — SEC: W9CBH. STM: WB3JSR. ASGM: WD9EBQ.  
Net Freq. Times/Days QTC Sess.  
ILN 3690 2300/0300 Dy  
IL Phone 3915 2130 Dy  
NCPN 7270 1215 Dy



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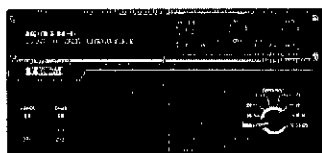
NEW

NEW

NEW

NEW

## IC-AT 100 & IC-AT 500 AUTOMATIC ANTENNA TUNER



Newly developed detector circuit detects "R" and "X" of load, controls powerful motors to automatically tune two variable capacitors. Has four coax sockets for antennas, selects suitable antenna for each band automatically.

COVERS 160-80-40-20-15-10 meters plus new WARC-79 bands. CONTROLLED by band switch in IC-720A or IC-730. INPUT IMPEDANCE, 50 ohms. MATCHES output impedances 16.7 to 150 ohms (VSWR 3:1). POWER CAPABILITY, AT-500, 500 watts. AT-100, 100 watts. VOLTAGE, 12VDC @ 0.5A or 115/220VAC @ 13 watts.

## NOW IC-3A & IC-3AT 220 MHz HAND-HELD TRANSCEIVER



Brand new transceiver covers entire 220MHz band, provides simplex and duplex operation. Identical in size, appearance to popular IC-2A series and fully compatible; can use same accessories. Power output, nominal 1.5W w/standard IC-BP3. Comes complete with NiCd battery pack, wall charger, belt clip, "rubber duckie" and wrist strap.

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Exceptional! 25 watts/5 memories/2 scan system in a very small package, only 2"H, 5 1/2"W, 7"D. 13.8VDC. Comes w/Touch Tone™ mic.

## IC-490A TRANSCEIVER 430 MHz, FM, USB/LSB, CW.



- Four memories
- Two VFO design
- 10 watts output
- 25/5/1kHz tuning FM. 1kHz/100Hz tuning SSB

- Scan memories or band (whole or part) • FM, LSB/USB, CW
- Programmable offsets (±5MHz standard) • IC-HM11 mic supplied.

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## IC-720A ALL-BAND TRANSCEIVER



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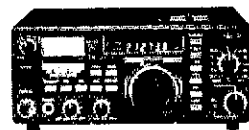
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Product No.	Description	Regular	Special	Product No.	Description	Regular	Special
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KT-34XA	6 el. Tri-band	\$569.95	\$469.00	432-16LB	432MHz, 16 el. long boom	\$ 74.95	\$ 60.70
7.2-1	40M rotatable dipole	\$199.95	\$159.00	144-150-16C	2M, 16 el. Cir. pol.	\$116.95	\$ 93.55
7.2-2	40M 2 el. beam	\$349.95	\$299.00	420-450-18C	435 MHz, 18 el. Cir. pol.	\$ 69.95	\$ 58.70
7.2-3	40M 3 el. beam	\$529.95	\$449.00	TRI-EX W51	51 foot tower.	\$999.95	\$829.95
7.0-7.3-4A	40M 4 el. beam	\$749.95	\$629.00				

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W51 tower  
w/KT-34A antenna  
**\$1099**

W51 tower  
w/KT-34XA antenna  
**\$1239**

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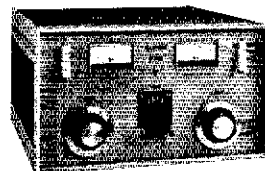


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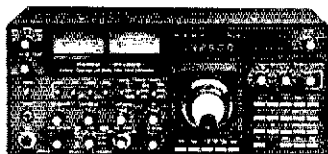
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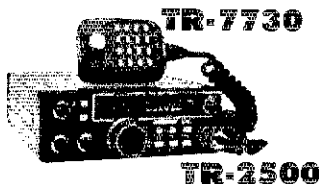
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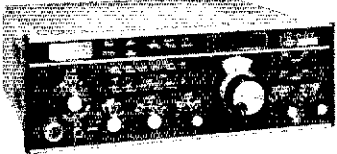


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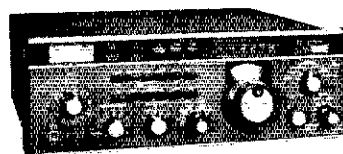
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**CONTINUOUS COVERAGE SOLID STATE HF SYSTEM**

- CONTINUOUS FREQUENCY COVERAGE: Continuous receiver coverage, 1.5-30MHz. Transmit coverage, 160 through 10 meters.
- ADVANCED, HIGH PERFORMANCE RECEIVER DESIGN: Up conversion, 48.05MHz I-F. High level balanced mixer front-end.
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- UNIQUE INDEPENDENT RECEIVER SELECTIVITY: Standard 2.3kHz filter with space for three optional crystal filters.
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- RUGGED, BUILT-IN SOLID STATE POWER AMPLIFIER.
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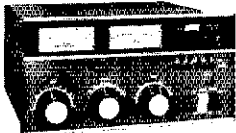
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- BUILT-IN POWER SUPPLY: 100-120-200-240VAC, 50-60Hz or 13.8VDC.

### L-7, 2KW LINEAR AMPLIFIER.

Continuous duty cycle, 160-10M.\*

Temperature controlled design for "key-down" operation over wide freq. range. Features wide coverage for new HF amateur bands, MARS, other services authorized by FCC amplifier rules.



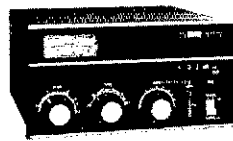
2KW pep, 1KW CW, RTTY, SSTV. Uses two 3-500Z triodes. Has accurate built-in wattmeter. Separate power supply operates on 120/240VAC, 50/60Hz.

\*10 meter coverage available only on export models.

### L-75, 1.2 KW LINEAR AMPLIFIER.

1.2KW pep SSB continuous, 1 KW CW, 50% duty cycle

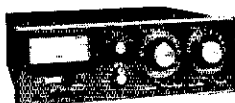
160-10 meters\* plus expanded ranges, future HF band expansion or additions within FCC rules, also MARS, other services.



Uses single 3-500Z triode. Built-in power supply operates on 120/240VAC, 50/60Hz.

\*10 meter coverage available only on export models.

### MN-2700 MATCHING NETWORK.



160 thru 10M coverage plus MARS, future band expansions. Matches antennas fed with coax, random wires, balanced lines (with optional B-1000 balun). Built-in RF wattmeter/VSWR bridge. Handles 2000 watts pep, 1000 watts continuous.

### MN-75 MATCHING NETWORK.



Covers 1.8 to 30MHz. Matches antennas fed with coax, random wires, balanced lines (with optional B-1000 balun). Built-in RF wattmeter/VSWR metering. Handles 200W average, continuous duty.



### WH-7 RF WATTMETER.

Covers frequency range of 1.8 to 30MHz. Has three scales: 0-20, 0-200, 0-2000 watts, also VSWR scale.



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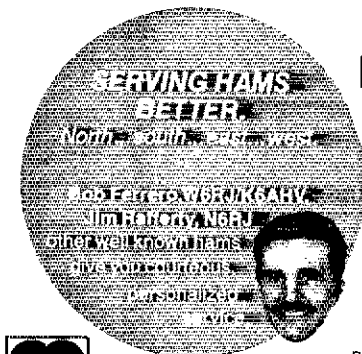
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Capable of communication rates to 300 baud, the TU-300 is designed specifically for modern high-speed and standard RTTY applications. The TU-300 operates with standard microcomputer, TTY and radio equipment and is TTL and RS 232-C compatible. Controllable by remote, this next generation terminal unit with innovative modular design provides more than six times the conventional amateur data transmission rate using present radio and computer equipment. Featuring three frequency shifts, the TU-300 is the only 300 baud terminal unit offered in easy to construct kit or wired.



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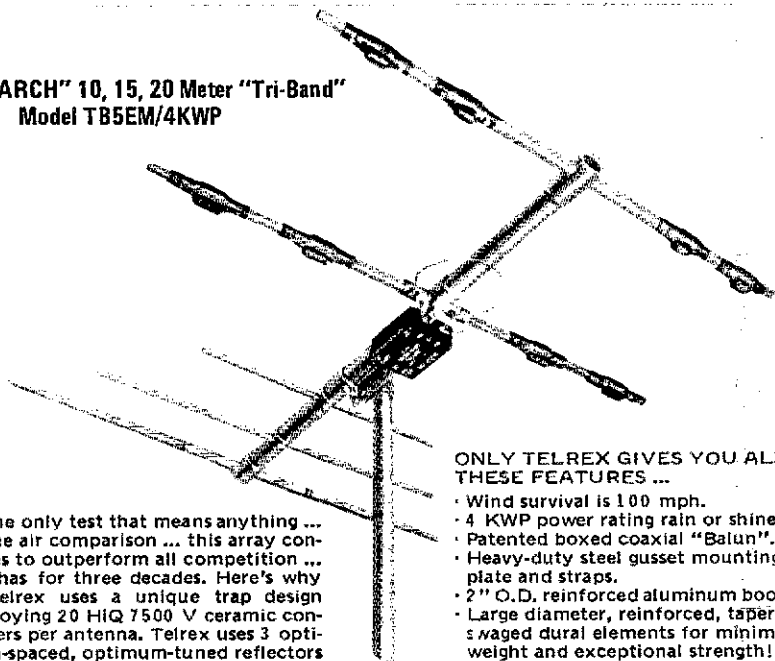
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"MONARCH" 10, 15, 20 Meter "Tri-Band"  
Model TB5EM/4KWP



ONLY TELREX GIVES YOU ALL THESE FEATURES ...

- Wind survival is 100 mph.
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- Heavy-duty steel gusset mounting plate and straps.
- 2" O.D. reinforced aluminum boom.
- Large diameter, reinforced, taper swaged dural elements for minimum weight and exceptional strength!
- Stainless steel electrical hardware.
- Phone and CW capability all bands!

By the only test that means anything ... on the air comparison ... this array continues to outperform all competition ... and has for three decades. Here's why ... Telrex uses a unique trap design employing 20 HIQ 7500 V ceramic condensers per antenna. Telrex uses 3 optimum-spaced, optimum-tuned reflectors to provide maximum gain and true F/B Tri-Band performance.

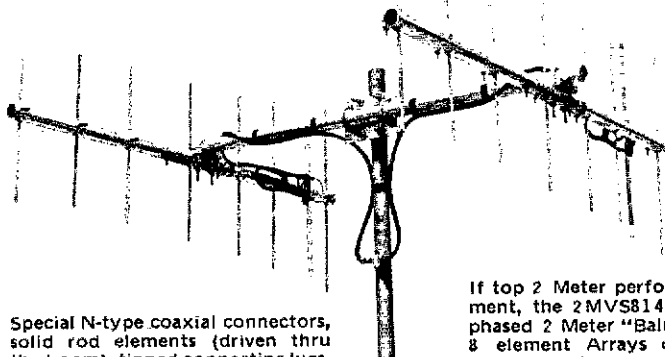
A Telrex "Balun" fed "Inverted-Vee" kit is the ideal hi-performance inexpensive and practical to install low-frequency mono or multiple band, 52 ohm antenna system.



Better than optimum full sized Dipole performance in an antenna which can be set up within the hour, needing a minimal support structure. (existing tower, house tree etc.) The "Inverted-Vee" produces a low-angle "Balanced" Omni-Directional pattern, which increases the signal to noise, and signal to interference ratios. Complete simplified instructions are provided.

NO TUNERS NEEDED!

MIVD/2 frequencies \$75.95 Post Paid (U.S.)



Special N-type coaxial connectors, solid rod elements (driven thru the boom), tinned connecting lugs, and s/s electrical hardware provide you with peace of mind for many years!

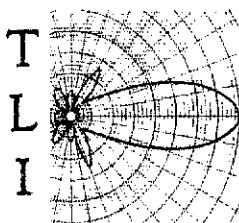
If top 2 Meter performance is your requirement, the 2MVS814 kit consisting of 2 ea. phased 2 Meter "Balun" fed precision tuned 8 element Arrays outperform even quad stacked antennas of other makes.

For technical data and prices on the complete Telrex line, write for Catalog PL-8

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WPNP 3915 1700D 130 99  
 IEN 3940 1400 Sn  
 ITN 3705 1900 Local By 61 27  
 DRN9 (CAND) 100% stations: WBOT WB9WGD  
 W9NKG. Navy Memorial Station has 8 QTC during 4  
 sessions. National news in December featured our Cen-  
 tral Division Director W9P9N in the Saturday Evening  
 Post and Nations Business. KA9MDE is the new ham in  
 the W9RVG family, joining her brother WD9EXD in com-  
 petition for the rig. During the severe weather season,  
 the secret to a successful weather spotting team is the  
 availability for "fresh" reports from the weather ser-  
 vices. WD9EBQ has directly contributed to the safety of  
 the southern Illinois APES groups by providing RADAR  
 summaries from St. Louis over 147.39 MHz. Many of the  
 recipients of this data are APES members who are  
 weather spotters trained by the National Weather Ser-  
 vice, and this information is helpful to them both on a  
 routine day-to-day basis for keeping an eye on potential  
 developing weather systems. WD9EBQ has recognized  
 the need for a second source of advancing weather in-  
 formation and has implemented aviation service "A"  
 report availability on 147.39 MHz. Emergency coordi-  
 nators all over southern Illinois consult the service  
 before advising their communities on the severity of ap-  
 proaching storms. The APES weather spotters can now,  
 thanks to WD9EBQ, be confident of the conditions pre-  
 sent before they travel to their respective positions.  
 Whenever you remember that your EG knows the pro-  
 cedures for handling any emergency situation that may  
 occur, you will brief you on February 7th for their first eyeball  
 QSO. For further information on the ITN contact KB9X,  
 947 Oxford, Glen Ellyn 60137. The ITN plays an impor-  
 tant part in local traffic handling by using the proper  
 methods of servicing messages at slow cw speeds (5  
 wpm). The only BPL recipient for December was WB9HT  
 with a total of 647 pieces of traffic. Congrats to great-  
 grandpa W9SXL. Bulletins: WD9EBQ 199. Traffic:  
 WB9HT 234, KB9X 208, WB9WGD 135, W9IJJ 130,  
 KN9BAM 92, W9QBH 52, W9TLU 40, W9OK 35, W9LNQ  
 22, W9KR 21, N9AJE 21, WD9HJZ 20, W9HBI 18,  
 W99EDL 16, W9WAS 16, KD9D 12, WD9EBQ 8, W9KSU  
 6, W9SSP 5, WD9ED 2.

INDIANA: SCM, Bruce Woodward, W9UMH — SEC:  
 W9UMH, STM: W9IJJ, NMS: ITN — W9OYU; QIN —  
 WD9GXW; ICN — WD9CSZ; VHF — W9PMT; IWN —  
 K9DCK; IPN — W9DLF.

Net	Freq.	Time/UT/Day	QNI	QTC	QTR	Sess.
ITN	3910	1330/2300	2817	311	1999	62
QIN	3656	1430/0100/0400	800	341	2085	93
ICN	3708	0015	154	40	787	31
IPN	3910	2130	1227	148	974	31
IWN	3910	1310	1321	528	31	

Hoosier VHF nets: QNI 6958, QTC 315, QTR 9623,  
 bulletins 25 for 28 nets. D9RN 100%-319 QTC in 62 ses-  
 sions. W9IJJ K9CGS W9QLW W9BWK W9RQ,  
 and QTC 315. QTC 315 sessions. K9CGS  
 W9QLW W9IJJ. No 9RN report. Appts: KK9N, ORS;  
 N9CQS, DEC for Lake Jasper Le Porte Newton Kent  
 Jasper and Pulaski counties. Silent Keys: W9HLO  
 W9EHZ. We certainly wish W9DLF a speedy recovery  
 and hope he returns to our nets soon. All Indiana ECs  
 are to be commended for their efforts during the several  
 snow emergencies this month. Thanks to all APES  
 members and ITN members for a job well done. We wish  
 to thank particularly KA9IYJ, Grant County EC, and  
 WB9FDC for the H & W messages from the emergency  
 shelter. We are sorry the MAARC lost their hamfest site  
 when the roof caved in because of snow. Fortunately no  
 one was hurt. I notice from several news letters that  
 many clubs are really taking Field Day seriously. I am  
 torn between fun and games and the Fort Wayne RCs  
 serious contest challenge. I can think of several clubs  
 that could take up the challenge. Thanks to KJ9J  
 W9ZGC WD9GXW N9PS and others for very enjoyable  
 evening prior to the South Bend Hamfest. The ARRL  
 Forum was well attended and I hope the things planned  
 will be implemented. I see by the WVVARC that KB9OR  
 is a very, very busy ham. I like their motto "Promoting In-  
 ternational Goodwill and Public Service". W9IJJ should  
 enjoy the Tri-State Hamfest. It was great last year. I  
 don't know KA9EBQ but W9TDI says he was with the  
 Clark Co. Club at Bethlehem. He reports a very good  
 hospital disaster drill also with good PR. Thanks for a  
 fine job. K9LSB reports that Area II INCERT coordinator  
 Trooper Terry Sutton is studying for his amateur license.  
 It would be nice if the other Indiana state police coordi-  
 nators could also become hams. If you have cable TV  
 problems or potential problems contact N9WB, IRC fre-  
 quency coordinator. Traffic: W9IJJ 1030, WB9IYU 205,  
 W9QLW 143, N9PS 128, W9EI 101, KJ9J 101, KM9B 96,  
 W9QY 87, W9UMH 87, K9FZX 81, KB9HH 78, W9URQ  
 71, WA9QCF 67, W9PMT 60, K9VWJ 58, K9DCK 53,  
 W9WKM 53, K9N 51, WA9OK 46, N9AE 43, W9BWMK  
 29, W9QHX 29, W9AWX 21, W9VW 20, W9DIX 17,  
 W9IJJ 15, K9IYN 15, W9BZQE 15, WA9JNC 13, K9GK  
 12, WD9ART 11, W9IWH 11, K9IR 11, K9OUP 9, W9EUP 9,  
 K9CGS 8, W9RTH 7, WD9EXI 6, W9WEXI 6, W9XD 6,  
 W9DKP 5, WD9DWD 5, WD9EPU 5, N9AST 4, N9BLK 4,  
 KB9WJ 3, W9BDP 2, WD9CIS 2, WB9AJY 1, KA9FFO 1,  
 WA9PKL 1, W9UPI 1. (Dec.) KA9DHL 40.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC:  
 W9OAK, STM: K9UTO, BWN 3984 1215Z QNI 1188, QTC  
 1296 WB9YPP, BEN 3985 1800Z QNI 778, QTC 231  
 WB9ESM, WBSN 3985 2300Z QNI 1222, QTC 432  
 WD9ESZ, WNN 3723 0000Z QNI 258, QTC 66 KA9HPQ,  
 WSSN 3645 0030Z QNI 239, QTC 35 N9BYK, WIN-E 3662  
 0100Z QNI 517, QTC 187 W9YCV, WIN-L 3682 0400Z QNI  
 399, QTC 105 K9LQU, XPO 3925 1831Z QNI 316, QTC 37  
 W9AKY, NWIT 34, 34 0030Z QNI 18, QTC 1 WB9YPP,  
 G. Bay 72:12 W 0030Z QNI 18, QTC 1 WB9NRK,  
 WCVTN 31/91 0030Z QNI 352, QTC 46 N9AUG, Tri-SES  
 3985 0015Z QNI 49, QTC 0 N9AZI, KA1EBA is now  
 KA9MFV, WB9JYR worked all states on 6 meters. Sorry  
 to report WA9JKD K9AQ WA9DOT as Silent Keys.  
 KA9AJB is now N9CUW, Tri-County Swapfest March 21  
 Jefferson Co. Fairgrounds. BWN certificates to N9BDL  
 & K9LRS, WBSN certificates to KA9HPQ K9EC KC9FW  
 WB9JW WB9PKL KB9TC KA9IHR. New officers  
 FLARC: N9CPW, pres.: WB9NOV, v.p.: K9BIL, secy.:

# Ringo Ranger II

## Simply the best

The best combination of gain, bandwidth and low angle radiation for simplex or repeater operation.

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**Mount anywhere with compact dimensions and neat appearance**

**Proven performance and durability in all environments**

**Complete FM band coverage**

**One year warranty**

Cushcraft antennas created the FM antenna revolution by making the best performance and value available to every ham. We continue to set the pace with a broad line of antennas for every FM application. Tune across the band and you will find the overwhelming majority of hams using one, two, or more Cushcraft antennas. The reason is very simply that they are the best. Now is the time for you to enjoy the value of a Cushcraft antenna. See your nearby dealer today.

### RINGO RANGER II

ARX-2B	134-164 MHz
ARX-220B	220-225 MHz
ARX-450B	435-450 MHz

### RINGO RANGER

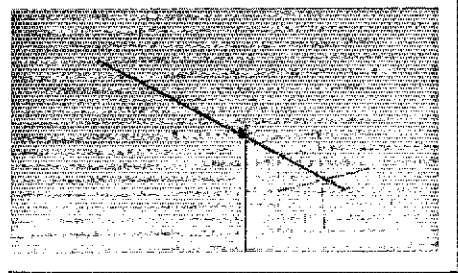
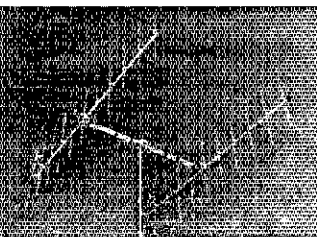
ARX-2	134-164 MHz
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### RINGO

AR-6	50-54 MHz
AR-2	135-175 MHz
AR-10	28-29.7 MHz
AR-220	220-225 MHz
AR-450	440-460 MHz

### MOBILE ANTENNAS

MS-147	144-148 MHz	Magnetic Mount
TS-147	144-148 MHz	Trunk Lip Mount
MS-220	220-225 MHz	Magnetic Mount
TS-220	220-225 MHz	Trunk Lip Mount



### YAGIS

A147-4	145.5-148 MHz	4 Element
A147-11	145.5-148 MHz	11 Element
A147-22	145.5-148 MHz	22 Element
214-FB	145.5-148 MHz	14 Element
A220-7	220-225 MHz	7 Element
A449-6	440-450 MHz	6 Element
A449-11	440-450 MHz	11 Element

### CROSS YAGI

FOR CW/SSB and FM

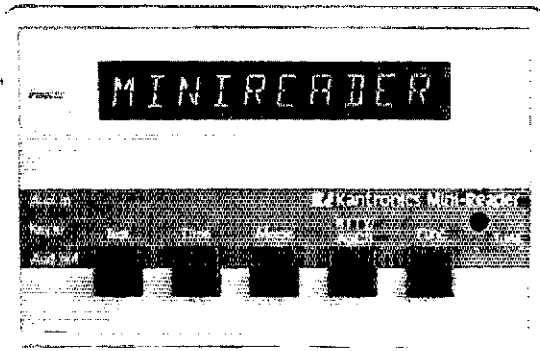
A147-20T	144-146 MHz	Horizontal
	145.5-148 MHz	Vertical



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by Thomas P. Harrington

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If you're looking for a code reader, you should take a look at the multi-feature, compact **Kantronics Mini-Reader**.

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Code reading made simple.

W9VFD, treas.; WA9ACI KA9KUA N9BYK, directors. KA9DYW is now N9CWX. WD9CPX is now KC6LM. BPL to KA9CPA. Tri-State Emergency Net, which meets Wednesday evening at 6:15 P.M. local, could use more QNI. This is a good net, fellows and gals, checkin. WA9DOT was one of the top 10 to work all states on 2 meters. New officers Eau Claire ARC: N9AUG, pres.; K9EC, v.p.; K99R, secy.; KA9AVH, treas. New EC for Washington Co. WA9THF. W9YCV received DXCC certificate with credit of 107 countries. New Novices in Waupaca are KA9MJK & KA9MJL, son and daughter of KA9GZQ & KA9IDK. W9NH certifies to W9BICH. W9NH certifies to WD9EDZ. W9NH certifies to KB9W & WD9ESZ. KA9GSX is now N9CPC. Traffic: KA9CPA 2214, WD9ESZ 430, W9CXY 243, N9BYK 242, W99YPY 242, W9YCV 208, KC9CJ 180, K9FHI 176, W99ESM 165, N9AZI 152, K9GDF 138, W9UCL 118, N9AUG 112, K9AKG 104, KA9GYD 87, WA9WYS 87, W99RGO 79, AD9X 79, WABZTY 74, KA9HPO 72, K9BKFR 67, WD9FRI 64, N9ATP 61, W9SO 60, W9IHW 56, W9LDO 55, W9KTG 51, W9BICH 49, K9LGU 49, N9BDL 46, K99B 45, AG9G 45, W99PKL 42, K9ANV 40, N9BCX 40, W99NRK 39, W9DND 37, KA9GTF 34, K9UTQ 34, K99CV 30, K99GV 30, K99NV 30, KA9MF 29, W99UW 29, WD9BKT 28, K99FA 28, K99GO 27, K9HDF 26, W99JKA 25, K99EC 21, W99FY 21, W99IMZ 21, KA9EM 21, K99LU 11, WA9GGH 15, K99C 14, K99K 14, WA9UJK 14, K99FM 8, K99W 8, KA9IHR 5, (Dec.) WA9BZW 2, K99W 2.

### DAKOTA DIVISION

**MINNESOTA:** SCM, Helen Haynes, WB0HOX — Congrats to KA9MJG, who upgraded to Advanced, and to KA9LRR, now General. A BIG THANKS to the gang at Rochester for a super Dakota Div. convention. See you at their hamfest on April 3 at Adams Jr. Hi School. Sri to report that WB0IAE is a Silent Key. Congrats to N9BTU, new chrm of SE District Lions Club. Tnx to all for better activity in the nets. A -104 degree windchill is terrible.

Net QNI CTC  
MSPN/E 3929 2345Z 1304 222 KCOT  
MSPN/N 3945 1810Z 686 79 WA9AIN  
MSN/1 3685 0030Z 295 76 W9DM  
MSN/2 3685 0400Z 179 57 K9JCF  
MSSN 3710 2345Z 150 21 W99WXU  
MSWX 3929 0030Z 653 496 W99CGM

See you at the first Robbinsdale Mid-winter hamfest. Please send news to STM AD9S. We need your input. Traffic: WA9TFC 448, WB0HOX 342, KB0MB 229, W9HZU 202, WD9CGM 166, KA9JUX 154, W9DM 145, W9DFP 142, KA9IAQ 122, N9CLS 76, W99VYE 75, W99SJ 73, K9JCF 69, W99RW 64, W99NZ 53, K99A 57, K99CF 56, KA9EFY 41, W99NE 38, A9S 38, WA9AIN 33, K99Z 31, K99I 21, W99MI 21, W99RL 20, KA9HLP 20, N9JP 8.

**NORTH DAKOTA:** SCM, Lois Jorgensen, WA9RWM — SEC: WB9TEE, OBS: W9DM, NM: WA9CRH. Officers of Red River Club are: WB9FNX, pres.; K9E WB9BIN, v.p.; KA9C, sec.; W9LHS, treas. The club would like to get other ND club newsletters. Send them to W9LHS and get theirs in return. WB9AUM has changed his call to K9BC. Check your FCC license for expiration date. Send your 810 for renewal at least 90 days before expiration date. There has been talk about establishing a council of ND amateur radio clubs. They could hold meetings over the air. The council could sponsor things like ND QSO Party, interclub events, etc. So pass it around and let's hear your opinion. WA9JEB, ex-K9TP, would like to have a QSO with ND. He is on 7.35 at 0530 UTC. See you at RACES when he was in Fargo. The ND QSO Party went off real well. Results next month.

### DELTA DIVISION

**ARKANSAS:** SCM, Dale Temple, W5RXU — The ALL ARKANSAS HAMFEST, sponsored by the CAREN Club, will be April 3 & 4, at the North Little Rock Community Center on Pershing Blvd same place as last year. The North Little Rock Holiday Inn, Ramada Inn and Passport Inn are all within walking distance. This year, the hamfest is with the Arkansas ARRL State Convention. Newly elected ARRL Delta Division Director W5CH will speak at the Saturday night banquet held at the Ramada Inn. W9YCE WD5CAQ WA5PKG NSDOP & W5SGQG are most faithful on the region nets. We need more participation. SEE YOU AT LITTLE ROCK HAMFEST. Nets: Ark. Phone 38, OZK 10, Razorback 58. Traffic: W5QFU 45, W4AZJ 43, W5UAU 19, W5SGQH 16, W5KL 10, W5EJ 7, K5DW 4.

**LOUISIANA:** SCM, John Meyer, N5JM — Thanks to N5IB for a job well done as SCM. As your new SCM I welcome your news and views so please write or call. Welcome to K9CSF as new ASCM who will cover the northern parishes, and also to W5GHP who takes over the helm as STM. Lots of club news. New BRAC board members are: KB5AQ KB5OI KB5AS KB5YK; NSADP pres.; KB5YY, v.p.; KD5BA, secy.; WB5RYC, treas.; NSADF, asst. treas. Jefferson ARC: WB5RNM, pres.; KB5GO, v.p.; KB5XZ, secy.; WA5HAX, treas.; K5PO KB5GA WB5UBI NSCNJ, directors; K95R, trustee. GNOARC: WA5WJZ, pres.; AJ5O, v.p.; WB5LII, secy.; WD5HOC, treas.; WB5IIA, mbr-at-large; WB5BJT, EC. Congrats to W5CJO recently retired and now prey of the QOTC. DXA has five Honor Roll members plus K5RSG on the DX Advisory Committee. Special thanks to NSADF KB5YY NSCQO KA5AMF and K5BTP for their work at Baton Rouge CD Hq. during the recent wx emergency. Don't forget the Baton Rouge Hamfest May 15-16, talk-in 1979.

Net Freq. Time Mgr.  
LAN 3515 kHz 7 & 10 P.M. Dy K5TL  
LTN 3910 kHz 6:30 P.M. Dy W5GHP  
LSN 3703 kHz 7:30 P.M. Dy WB5IYH  
LRN 3587.5 kHz 6:30 P.M., Sn, 8 P.M. W N5RB  
Traffic: K5TL 177, W5LQ 145, K95SF 104, W5GHP 82, W5VMY 54, N5BFBV 38, WB5LBR 27, WA4IYU 4.

**MISSISSIPPI:** SCM, Paul Kemp, KW5T — STM: KB5W, SEC: WB5FXA. Freq. Coord.: WD5DCI. Hamfest time is with us now. Support them. N5AMK appointed alternate Net Mgr CAND. KB5W has met requirements for BPL 3 months consecutive. New net in state, Mississippi Baptist Hams, Meets each Sun. on 7.257 MHz at 2030 UTC. For details contact K5MK. New calls: KB5NE now K5WN; WB5SNB now KW5T. Don't forget time change this month for MSBN. New time for summer is 2315 UTC. MSBN did fine job during snow storm keeping everyone up to date on conditions. CAND (W5KLV) sess. 31, CTC 697. DRN5 (WB5YDD) sess. 31, CTC 308. MTN (K5OAF) sess. 31, QNI 182, QTC 54. MSBN (WD5EYM) sess. 31, QNI 2638, QTC 44. MN (WB5RMW) sess. 31, QNI 598, QTC 10. MSN (KA5GGG) sess. 20, QNI 115, QTC 28. RACES (K5GEI) sess. 5, QNI 184, QTC 1. CAEN (KA5AGD) sess. 5, QNI 99, QTC 4. G5EN (KB5W) sess. 23, QNI 494, QTC 27. Traffic: KB5W 575, N5AMK 289,



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electrically  
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1. non-absorption and no re-radiation of radio signals.
2. no need to compute non-resonant lengths.
3. complete elimination of RFI associated with steel guys.
4. substantial reduction in guy-installation time.
5. no more cutting of steel cable to install insulators and cable clamps.
6. no more handling of steel cable; and no "fish hook" frayed ends to snag your hands.
7. non-corroding and maintenance-free.
8. high strength combined with lightweight, non-stretch and inherent flexibility.
9. a neater, more aesthetically pleasing tower appearance.
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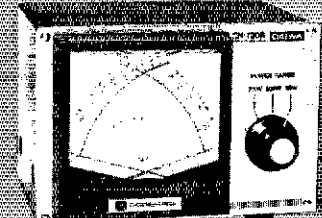
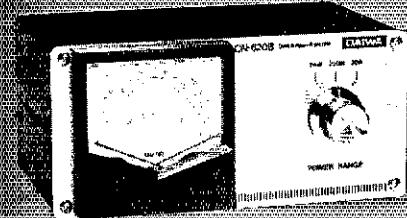
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**Simultaneous SWR/Forward & Reflected Power Readings** **SWR & POWER METERS**

Tolerance: ± 10% full scale  
Input/output Impedance: 50 Ohms  
Connectors: SO-239

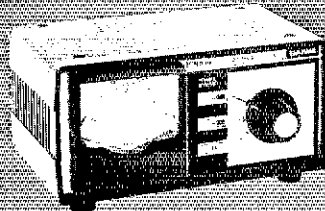
**Model CN-620B (New 2 Kw Scale)**

**Model CN-720B (New 2 Kw Scale)**



Frequency Range: 1.8—150 MHz  
SWR Detection Sensitivity: 5 Watts min.  
Power: 3 Ranges (Forward, 20/200/2000 Watts)  
(Reflected, 4/40/400 Watts)  
Dimensions: 165 x 75 x 97 mm;  
6.5 x 3 x 4 in.

Frequency Range: 1.8—150 MHz  
SWR Detection Sensitivity: 5 Watts min.  
Power: 3 Ranges (Forward, 20/200/2000 Watts)  
(Reflected, 4/40/400 Watts)  
Dimensions: 180 x 120 x 130 mm;  
7 x 4.75 x 5 in.

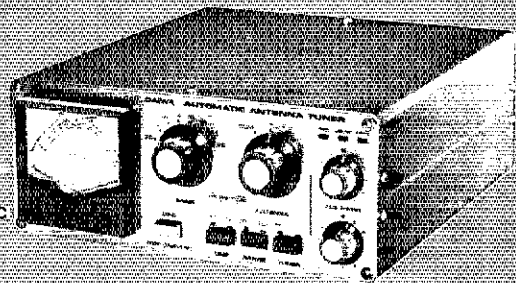


**Model CN-630**

Frequency Range: 140—450 MHz  
SWR Detection Sensitivity: 5 Watts min.  
Power: 2 Ranges (Forward, 20/200 Watts)  
(Reflected, 4/40 Watts)  
Dimensions: 180 x 85 x 120 mm;  
7.12 x 3.37 x 4.75 in.

**Automatic Antenna Tuner**  
**Model CN-AT-100**

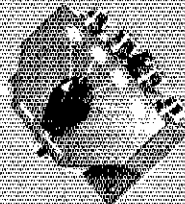
Frequency Range: 3.5—30 MHz  
(WABC & Amateur Bands Only)  
Power Rating: 500 Watts PEP  
Internal Dummy Load: 50 Watts/  
1 Minute  
Impedance Matching: 15-250 Ohms  
to 50 Ohms Resistive  
Input Power Required for Automatic  
Tuner: 1, 5 or 10 Watts (Set by rear  
panel switch)  
Tune-up Time: 45 Seconds Max.  
Power Requirement: 13.8 VDC/2 Amp



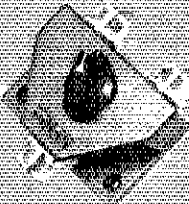
**Coaxial Switches**  
Power Rating: 25 kW PEP, 1kW CW  
Impedance: 50 Ohms  
Insertion Loss: Less than 2 dB  
VSWR: 1:1.2  
Maximum Frequency: 500 MHz

Isolation: Better than 50 dB at 300 MHz;  
better than 45 dB at 450 MHz;  
adjacent terminal  
Unused terminals grounded  
Connectors: SO-239

**4 Position/  
Model CS-401**



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**Power Pocket Mobile Unit for IC2A - Call for Price & Delivery**

K5OAF 159, KT5Z 90, W5HKW 42, KD5P 27, N5DDV 13, W5LSG 10, W5EYM 9.

**TENNESSEE:** SCM, John C. Brown, NOAQ - STM: K4YOL, SEC: K4TKQ. Amateur upgrades still seem to be the major activity item for this time. Have been advised that NW4E and NV4Z (ex-KA4KT) are among the recent for Extra. KE4LS (ex-WB4JM) for one is in the Advanced area. We are in the process of losing two very hard working NMs. NG4J is moving out to take the job as traffic manager for the Knoxville World's Fair AR Station. The station is to be sponsored by the Tenn Wireless Assn. The station will be active all through the fair. That is 1 May through 31 October. Much help will be needed from Tenn hams to make it a real go. This is an independent entity and is not associated with any specific club or individuals. Activity is planned to cover all facets and modes of Amateur Radio for the public. If you think you can assist in the project, please contact Chairman W4NZW, the Vice Director, Delta Division, W4C5Y has to step down as NM of evening section of the TN phone net, as the Head-Master of his school job is requiring too much time. The RTTY net has gotten off to a good start. Activity is light as a net but about 15 or so different stations have visited the frequency of 3.625 at 0000 UTC. N4EAM will take over the 15N and WA4BWW is taking over evening phone net. CW honors go to: TSU: KA4R5G WA4CMS WA4MB N4E8 N4E3 N4E2 KA4BP NG4AJ WA4LX KA4PWU KA4RJC N54Y WB4YSN KE4IK: TNW-W4WXH W4DDK NO4Q W4ZJY Traffic: NG4J 727, W4WXH 553, N4E8F 511, KE4IK 266, W4ZJY 732, N4EAM 226, W4OGG 200, W4DDK 158, KA4BSG 26, N4FTC 74, N4DZV 65, K4WOP 85, W4TVY 31, W4MRD 28, W4UJG 12, N4CRO 16, W4D5J 15, KB4G 14, W4HJW 14, N4M4W 12, K4JMW 11, K4AMC 8, W4AGLS 8, W4PSN 7, NQ4Y 7, W4EWR 6, W4DPO 1.

## GREAT LAKES DIVISION

**KENTUCKY:** SCM, Dave Vest, K2VJ - STM: KA4GUF. Nets reporting: KRN MKPN KTJN KYN K8N KNTN KEN BARES CCEN CARN JARES 4PES 5AKES 6AWES 11ARES 13ARES TSTM WARES KPON SEKEN PAWEN PAWEN. Sessions 355, ONI 6110, QTC 623. New appointments: KC4WN, NM KSN; W4DEKZ, AEC; KD4TJ, EC; KE4GJ, EC; KA4MKG, EC; KD4IF, EC; WB4ILF, EC. Upgrade: KE4LQ. New repeater in Berea, 147.99/39 Murray and Bluegrass clubs sponsoring General class. ARTS club will again sponsor "RUN FOR THE ROSES" May 7 and 8. OWBARC officers: WB4NHO, pres.; KA4NIP, v.p.; KA4BCM, secy.; WD4YH, treas. Stations reporting special activities are KU4A A4T, WA4JJD, WA4TPB and W4RHZ. The nets workshop is being held the first Sunday of the month on 7.245 at 1900 UTC. Traffic: KA4MZJ 179, WA4JTE 131, N4W4P 38, WD4YJ 81, KB4OZ 77, KC4WN 68, KA4GUF 69, K24G 56, KA4BCM 54, W4WGV 44, W4BSC 41, KA4SAA 39, N4E2E 35, KA4JLX 35, KA4MBF 35, KS4V 32, WA4AVV 25, KD4TY 24, WB4APC 21, K4MHL 21, W4DCGF 19, W4PKX 18, K4HOE 15, W4RHZ 15, WA4YPO 14, WA4JLV 13, WB4ILF 12, WD4JTO 12, WB4NHO 12, WA4GH 11, KA4SKV 10, WA4JAY 9, W4DCJH 8, WA4GAL 8, N4AH 7, KA4GBZ 6, W4QY 6, WA4UQA 6, WA4IGD 5, KA4MAP 5, WA4SWF 5, K4AVX 4, WD4YH 3, KA4AD 2, KD4IF 2, KA4MKG 2, KD4SN 2.

**MICHIGAN:** SCM, James R. Seeley, WB8MTD - ASCM: W4BDHB, SEC: W4BEX, STM: AF6V, DECA: KC8DN, W4DBE, KRCP: W4VUB, NM: KA3DZ, W4BHJ, K8LNE, KRKMO W8DLRT W8DNKT W8BPM W8SCW W8BRNQ W8BYDZ W8YIQ K8ZJL.

Net Freq. Time/Daily ONI Tlc Sess. Mgr  
 QMN\* 3663 1800 dy\*\* 1430 366 83 W4BPM  
 MITN\* 3953 1900 dy 751 363 31 W8LRIT  
 GLETN 3932 2100 dy 1411 153 31 W8DLV  
 MACS\* 3953 1100 dy\*\* 646 133 31 K8LNE  
 UPN\* 3922 1700 dy 867 122 36 W4BDHB  
 MNN\* 3722 1730 dy\*\* 420 99 62 KABE2  
 WSSBN 3935 1900 dy 622 36 31 W8BSUR  
 TASYL 3822 1900 M 24 3 4 KM8E  
 E930 3930 1730 M5 W88ZGP  
 MEN 3930 0900 SN W88ZGP

\*NTS nets. Times local. \*\*QMN late net, 2200; MNN late net, 2000; MACS SN 1300. Vhf nets 9 rpts, QNI 539, 114, sess 40, mgr W8BNKT. 3932 is Mf emer. freq. Traffic workshop Sn 3953 kHz, 1600. ARES net Sn 3932 kHz, 1720. OO reports: K8JH ACBY W8QG. Silent Keys, with deep regret: W8BDM W8NJM K8SAP, EC appointments: KA8LAQ, Monroe Co.; KA8T, Isabella Co. Thanks to WA2JOC, retiring Monroe EC, for many months of fine service, and good luck on the new venture in PA. Upgrades: No Extra, KA8LJU, to General, KABDEZ KA8WV. New officers for Chelsea Communications Club: W8BISN, managing dir.; KABPM, secy/treas.; N8CLJ, act. mgr. For Manistigoye ARC: W8DLRT, pres.; W8BSKP, v.p.; W4BKHA, secy. ARRL numbered radiograms (CD-3) are available in brail through the Saginaw chapter of American Red Cross. Contact K8OCP for details. W8BLRT, MITN NM, reports a 22% increase in participation and a 15% increase in traffic, 1981 vs 1980. BPL: KA8CPS. Traffic: W8BMTD 389, AF8Y 389, KA8CPS 318, W8DLRT 291, KA8AID 239, W8BYDZ 190, K8GKV 130, K8BMX 135, W8BRHU 129, W4BDHB 121, N8BNK 117, W8BYO 108, W8DSE 94, W8BIM 90, W8BMO 89, KABDEZ 87, W8HJX 80, KA8IWW 84, K8BMO 64, W8SSB 61, W8DLB 60, W8BNKT 59, N8COT 58, W8VIZ 57, W8BY 54, W8SCW 52, W8REI 47, K8KQJ 47, K8OCP 46, W8BTTA 41, K8UPE 35, K8LNE 33, W4OAF 33, W8YIC 32, W8BYR 32, W8WZP 31, W8DOP 30, N8DGN 27, KM8I 24, K8S20 20, K8KCF 18, K8JQ 18, W8SLIP 16, W8BYWA 18, W8BHSN 15, W8JUP 14, N8BBY 13, W8MOP 13, W8BHPZ 12, W8CUP 11, W8DIZ 10, W8LDS 10, W8TBP 10, K8GZ 9, N8AOM 7, K8FM 7, K8ZJU 7, W8BSIW 6, KA8LHJ 5, W8BEZ 4, W8BJOH 4, W8WVL 4, K8DD 3, KC8DU 3, W8CBH 2, K8EX 1. [Dec.] W8LUCU 132, W8ECK 34.

**OHIO:** SCM, Allan L. Severson, AB8P - ASCM: W8MOK, SEC: K8AN, STM: K8OZ, NMs: W4BULW W4BDYX W8EK, KF8J W8BJGW W8KFN W8BYTD.  
 Net QNI QTC Sess. Time (local) Freq.  
 BN 408 202 61 8:45/10 P.M. 3:577  
 BNR 295 61 30 6 P.M. 3:609  
 ONN 289 63 30 8:30 P.M. 3:708  
 OSN 285 105 30 6:10 P.M. 3:717  
 OSSBN 3066 836 93 10:30 A.M. 3:9725  
 OSSN 146 26 29 6:45 A.M. 3:577  
 O6MN 512 39 31 9:00 P.M. 60:160  
**First, an editorial comment: I'm often asked why news of a particular happening or club event never appears here. The answer is simple: If I don't know about it, I can't very well report it. When something noteworthy happens, please let me know and I will use it if space permits.**

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	Cable 2#16, 6#18	45c/ft
<b>Belden</b>	8214 RG-8 Foam	36c/ft
<b>Belden</b>	9258 RG8x Mini-Coax	19c/ft
<b>Belden</b>	8267RG 213	
	Non Contam Jacket	43c/ft.
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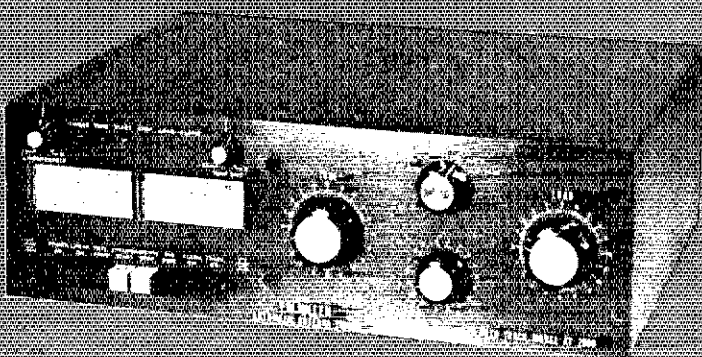
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- Direct Reading Power Meter: Two meter scales from 0 W to 250 W and 0 W to 2500 W; front panel switch selects FWD or Reflected Power (illuminated panel meters)
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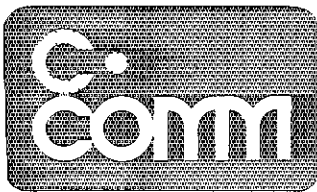
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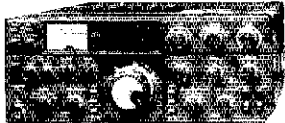
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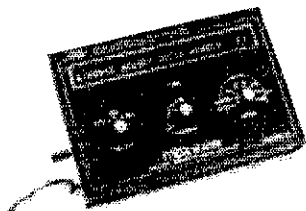
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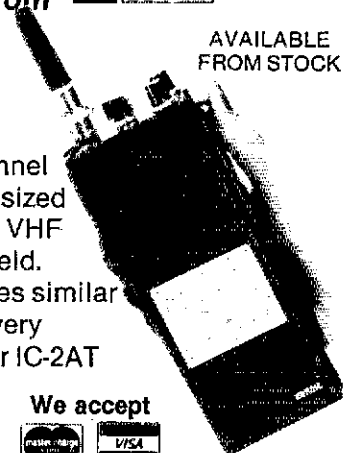
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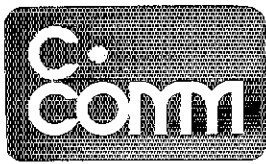
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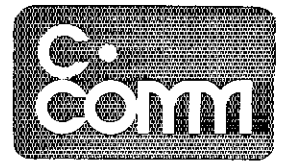
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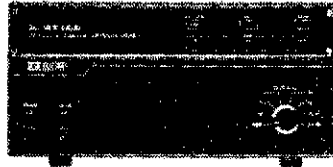
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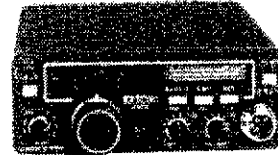


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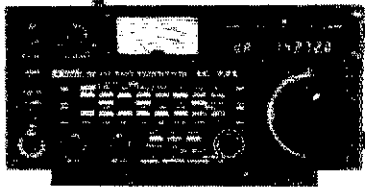
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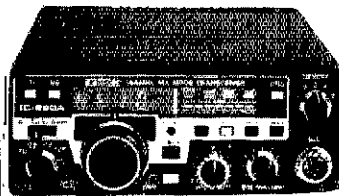


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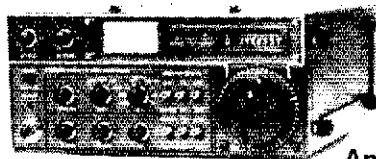
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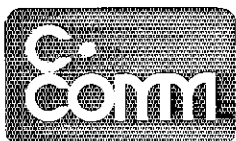


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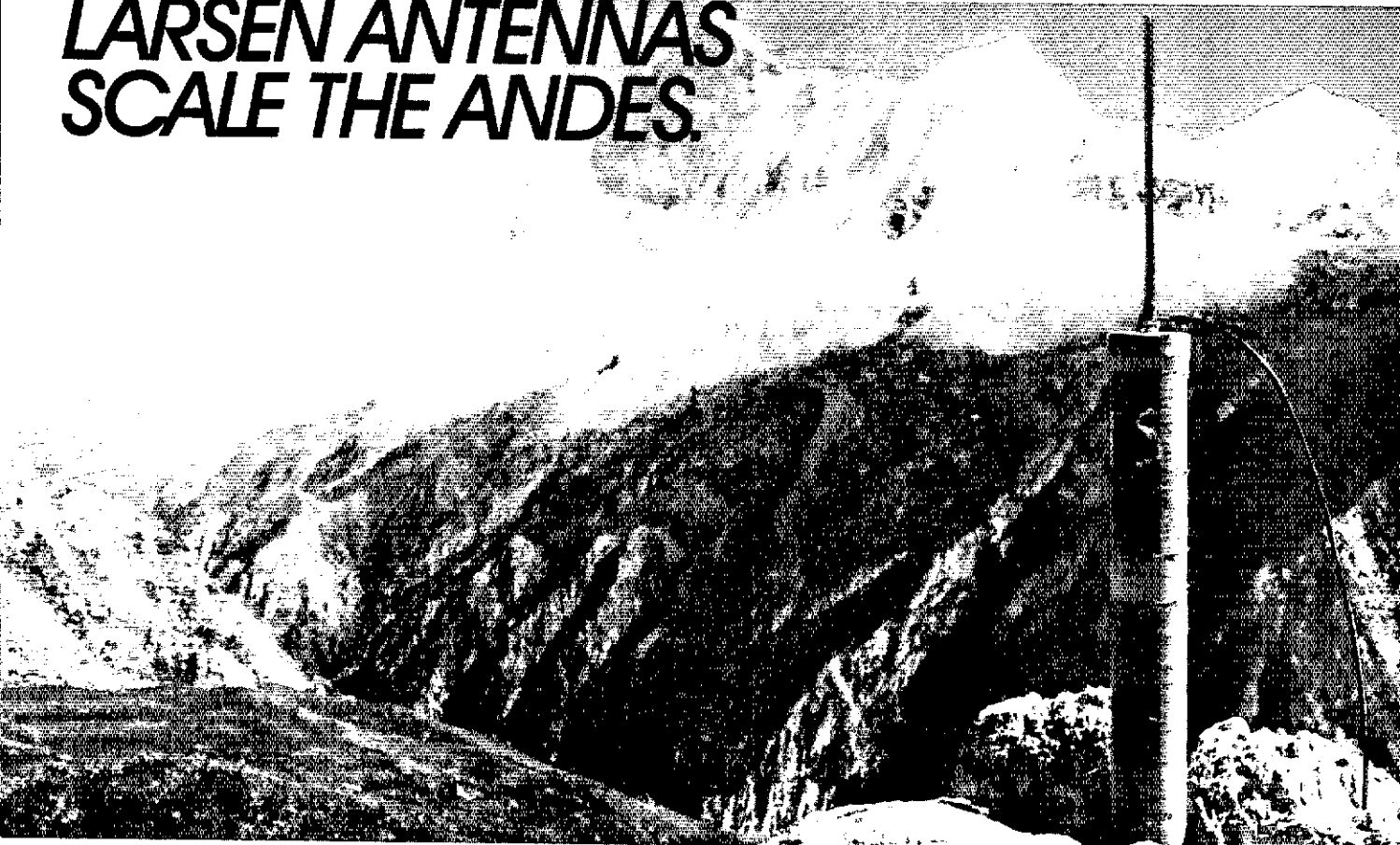
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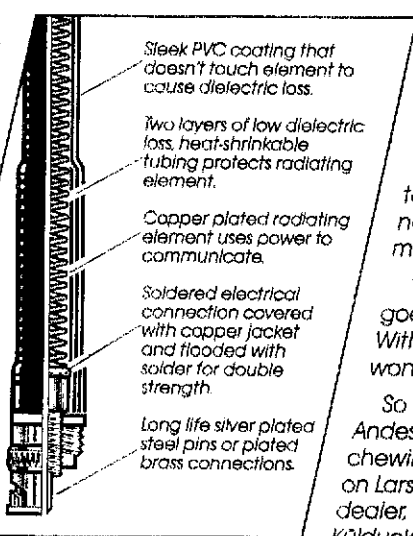
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283 E. 11th Avenue, Unit 101  
Vancouver B.C., V5T 2C4 Phone 604-872-8517



# N&G

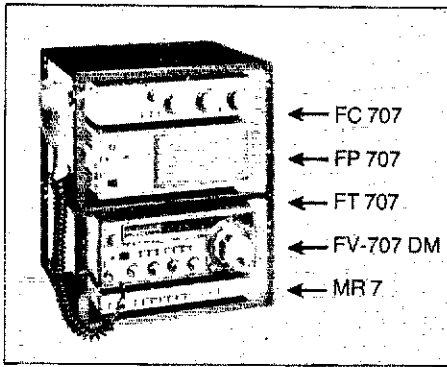
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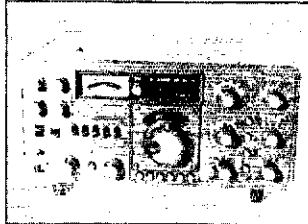
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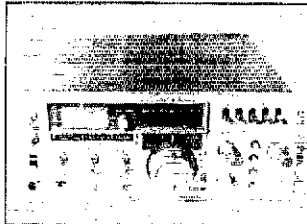
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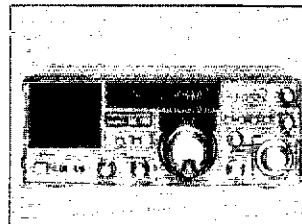
## The Radio



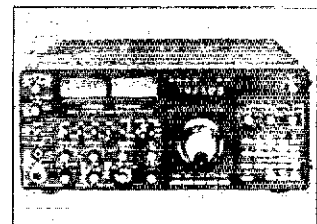
FT 902 DM  
LIST 1535.00



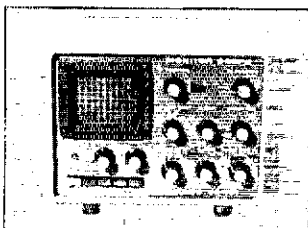
FT 107 M  
LIST 1149.00



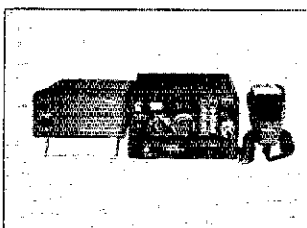
FRG 7700  
LIST 550.00



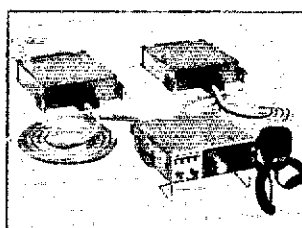
FT-ONE  
LIST 2995.00



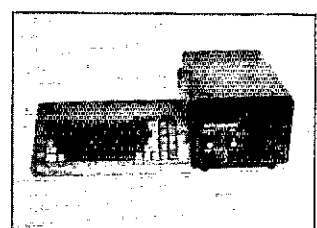
YO 101 SCOPE  
LIST 320.00  
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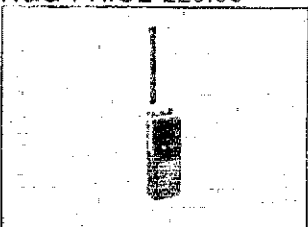
FT-290-R 2-METER  
ALL MODE LIST 399.00



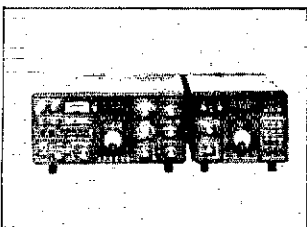
FT-720 SYSTEM  
U.H.F. - V.H.F.



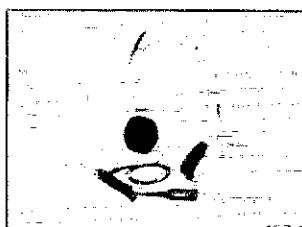
CW-RTTY SYSTEM  
YK-901 LIST 175.00  
YR-901 LIST 730.00



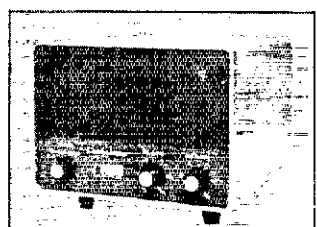
FT-208 R FT 708-R  
LIST 359.00



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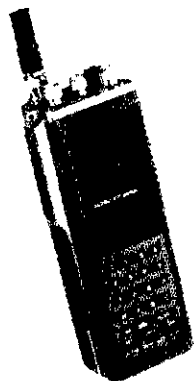


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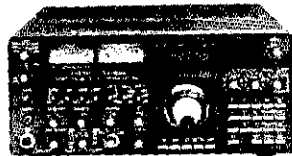
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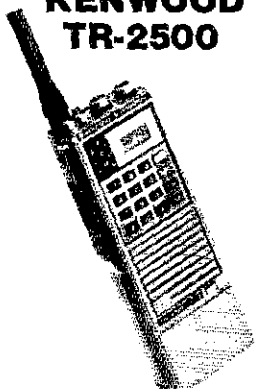
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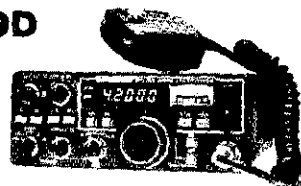
CONTINUOUS HF COVERAGE

### KENWOOD TR-2500



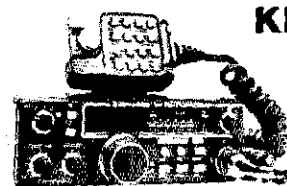
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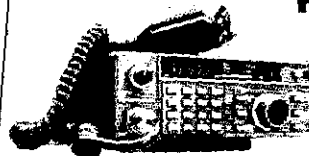
COMPACT 2-METER MOBILE

### KENWOOD TR-7800

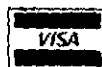


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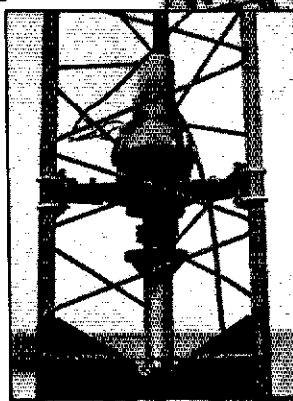
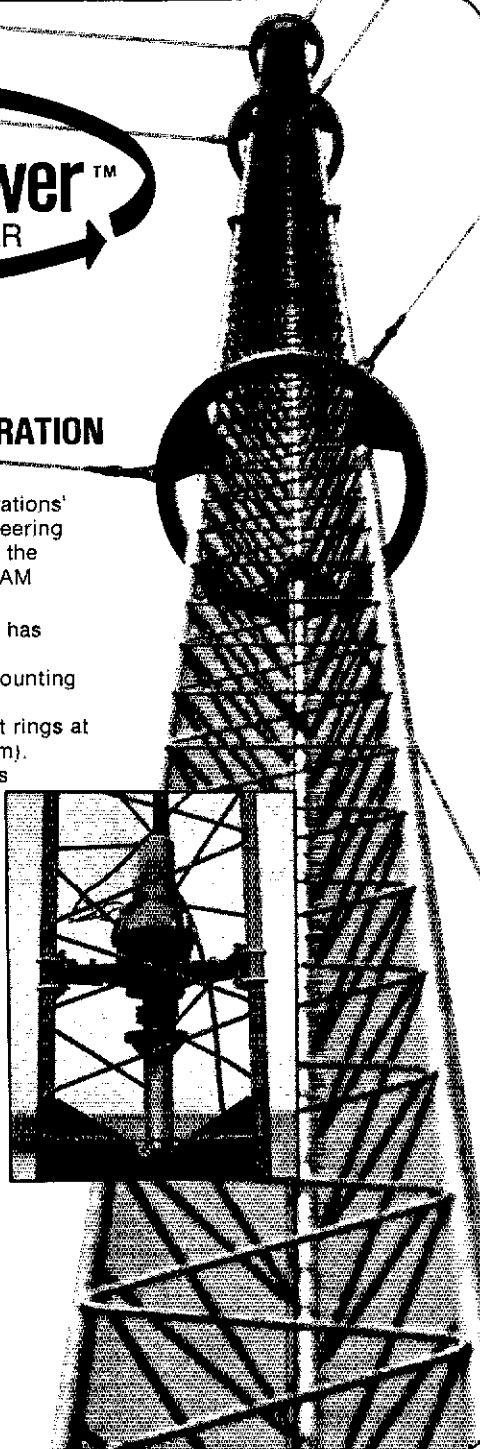
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Last month we also made the 13,000 level in reported traffic, falling only 27 short. However, if all reports had arrived on time, our total would have been 13,657, an even more impressive figure. Please make every effort to get your traffic reports and news to me on or before the sixth of each month, so I can mail my report on the seventh to meet Headquarter's deadline. Club elections: NCARS-KBUS, pres.; KB8MU, v.p.; WBANM, secy.; W8DAE, treas. Lorain Co. ARA-AF8B, pres.; KA8DCN, v.p.; K8TEZ, treas.; N8ODN, secy. Portage ARC-W8BMPV, pres.; KBWJH, v.p.; WBWAY, secy./treas.; KA8HOH, radio officer. Welcome to W8BDYX, assuming the Ohio 8 Meter Net membership from long-time manager W8BYGW. New ECs: N8COU, Monroe Co., and W8BIOL, Erie-Huron Counties.

Local Nets	QNT	QTC	Sess.
ALETT	34	8	3
BRTN	464	197	31
CCOMF	116	13	9
Firelands Red Cr.	55	2	4
IE Net (Dec)	51	11	5
LCNWOARES	829	213	62
RARA (Dec)	102	4	5
RARA (Jan)	85	2	4
TATN	324	280	31
TSRAC	1045	98	38
VWGEN	94	4	5

Traffic: K8NCV 502, W8PMJ 368, W8DKFN 242, W8BMMZ 190, W8BCHV 187, AB8P 183, N8BCK 182, AB8GX 172, W8BDDY 160, KB8JL 146, W8BDMO 134, W8BWT5 118, W8BUBR 103, W8ASSI 102, W8BAMQ 99, W8GZK 96, W8DKBV 95, W8BDDY 87, K8BYR 84, KF8J 81, K8OZ 79, K8SYS 76, W8EK 72, W8MOK 72, K8AN 66, K8KL 65, N8CW 64, K8DL 62, W8TXV 62, W8BJU 61, K8BKFV 60, W8WEG 56, W88YTD 53, W88OHU 52, W8BGMT 51, W88NCD 51, K8PYT 51, W8BKC 49, W8BSIQ 44, N8AUH 43, W8BBLU 43, K8BCDE 41, W8UPD 41, W88TTQ 34, K3RC 32, W8BAMW 30, K8BGGZ 28, W8BMR 28, K8BJV 24, N8NS 23, W8BDYX 22, W89HDZ 22, W8BNEC 22, N8DAD 21, N8AKS 20, N8CWJ 20, K8NJQ 20, N8DQZ 19, W8HGH 19, N8JR 19, W8BOL 19, W8BTRK 19, N8CGM 18, N8CJS 18, K8CKY 18, W8BWCJ 18, K8ABZ 17, K8BLA 17, W8BZID 17, W8RG 14, W8BAC 13, W8B8GS 13, N8AEH 12, W8FUP 12, W8COL 12, W8BYGW 12, W88HHZ 11, K8BIUK 11, W8BAS 11, W8RYT 10, W88HD 9, W8MGA 9, W88DO5 8, AC8X 8, K8BHG 7, W88PI 7, W8BEK 6, W88OY 6, N8BZ 5, W88KKI 5, W88NHV 5, K8ANXV 5, N8AJU 4, K8CMR 4, WA10AA 3, K8MBE 2, W8ZM 2, W8BYUS 1 (Dec.) K8BYR 1008, W88UBR 416, W8TP 85, K8JE 60, N8CW 45, W8ZPF 31, K8BJD 30, N8DBY 28, N8DQZ 13, K8ANXV 2.

**HUDSON DIVISION**

**EASTERN NEW YORK:** SCM, Paul S. Vydareny, W2VLUK — SEC: K82KW, STM: WA2SPL, ASCM: W2IT KB2TM. New officers for Orange Co. ARC are: W82ENA, pres.; N3BAY, v.p.; N2CGN, treas.; N2AWL, secy.; K2JV, program dir. Congrats on their tenth year! The Albany ARA is holding an interesting meeting in May: homebrew contest. Sounds like a great idea for clubs. Might encourage the almost lost art of building one's own equipment! AARA also reports that W2DSK is celebrating 50 years as a licensed amateur. W2NC is at the top of the World WPX CW Honor Roll, K2VV is 5th, and W2NC is 6th in the mixed mode prefixes. Congrats to all. A comment concerning the last PD. Comments have been made concerning the fact that some message packets were never received by the PD committee. Everyone was treated equally! No one, to the best of my knowledge, was contacted on an individual basis; only general announcements were made on the staff nets! Unfortunately, mail service is sporadic at best. No one is accusing anyone of incompetence. Responsibility was left with the individuals to insure paperwork was received! PSRR: W82MCO, W82EAG, W2YJR, W2BIW, K2ZM, N2BDW, K82KW, W82HOU, W82TWO, traffic: W82EAG 448, WA2SPL 343, W82MCO 258, W2YJR 123, W2BIW 96, K82KZV 69, K2ZM 60, K82KW 60, N2BDW 38, W82HOU 36, W82TWO 20, K2MI 18, W82SPL 18, AAZY 14, W82OHR 12, K2HNW 11, N2CPX 9, N2CSX 8.

**NEW YORK CITY — LONG ISLAND:** SCM, John Smale, K2IZ — SEC: WA2KKJ, STM: W82BNY.

NLI CW	3630 kHz	1900/2200	K2GGE
NLIPN	3928 kHz	1815	KS2G
NLS	3720 kHz	1930	W82EUF
NCVHF	6,04/64	2100 MWth	WA2SOE
BAVHF	7,915/315	2030 M-F	N2BMF
SOVHF	4,77/5.37	2030 M-F	WA2ARC
LIMARC	6,25/85	2100 F	WA2SOE
ESS	3590 kHz	1800	W2WSS
NYS	3677 kHz	1900/2200	KA2CTU
NYS	7077 kHz	1000 M-5	W82EAG

Note: All times are local. Please try and help out by checking when you can. Please try to attend the Hudson Division convention being held Oct 29-31 at the Playboy Club at Great Gorge, NJ. It is with great pleasure to put in this column that W82LZN has been ordained in the Lutheran Church and has accepted a call as Associate Pastor of Trinity Lutheran Church in Dayton, Ohio. I want to wish him all the best in his new QTH and hopefully I will have a place to stay at the hamfest. W2GKZ and KA2LIB have the new Heath keyer and both report it is FB. N2BQD is out of the hospital and operating from the home QTH. Please note that change in 2nd district QSL bureau, it's now NJDXA, P.O. Box 599, Morris Plains, NJ 07950. Metro Operation Santa took place on Dec. 29 at Babies Hospital of the Columbia Presbyterian Medical Center. Stations helping were WA2JKG, WA2JIN, K2KLN, W2KQL, WA2AXD, KQ2T, KK2T, N2CGH, WA2JZN and WA2OVG. W82IWI is back on the air after a hiatus of 17 years. KS2G finally on 21m with a Santec HT 1200, KA2CLQ has upgraded to Extra. NLIPN still has open NCS and 2RN liaison slots. Contact KS2G if interested. PLEASE!!! KA2CLQ is keeping up his QNI by operating from the NY Maritime College. The Suffolk Co. RC Explorer post visited the Suffolk Co. Police communications bureau. The NLIPN is in need of NYC outlets, so are the other nets for that matter, please try and help out by opening in Traffic: N2KZ 73, W2GZ 65, K2GCE 50, WA2ZC 49, W82BNY 48, KA2NMA 42, K2IZ 26, KS2G 21, W2BQD 20, N2BQD 18, KA2GFA 18, KR2B 7, W2GP 2, W82JAY 1. (Dec.) W2XS 58, N2BQD 21, N2RO 13.

**NORTHERN NEW JERSEY:** SCM, Robert Neukomm, KB2WI — ASCM: W8DTR/2, SEC: W82YUF, STM: W2XD, NMS: W2CC, AG2R, N2BNB, N2BOP, KA2GQ, KA2HNG, W82IQ, W2PSU.

Net	Mgr	Freq	Time	Sess	QNI	QSP
NJPN	W2CC	3950	6 P.M. Dy	35	541	188
			9 A.M. Sn			
NJNE	AG2R	3695	7 P.M. Dy	31	390	93
NJNL	AG2R	3695	10 P.M. Dy	31	266	89

**Benchner 1:1 BALUN**



- Lets your antenna radiate, not your coax
- Helps fight TVI—no ferrite core to saturate or re-radiate
- DC grounded—helps protect against lightning
- Heavy brass contact posts; non-rusting materials throughout
- May be used with antenna tuners; rated 5KW peak
- Handles substantial mismatch at legal limit
- Built-in center insulator; Amphenol® coax connector
- Rugged UV resistant custom Cycloc® case, not plastic plumbing parts

ZA-1A \$17.95  
3.5-30 MHz

ZA-2A \$21.95  
14-30 MHz, with hardware for 2' boom

Available from your  
dealer in U.S.A. add  
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# Full Color SSTV is Here!

## K/W CONTROL SYSTEMS, INC.



Simulated TV picture

### Announcing the K/W SC-422A 3-Memory SSTV Scan Converter System\* ... The World's First FULL COLOR SSTV with Motion Animation and Colorflash!

The only complete SSTV 3-Memory System for color transmission on the market, ready, and available for the active Amateur!

The K/W SC-422A Scan Converter System now makes it possible for you to transmit and receive both FULL COLOR or BLACK and WHITE SSTV with selectable 128 or 256 pixel resolution!

Every color of the rainbow is possible with this "complete" COLOR SSTV Operating System!

FULL COLOR PICTURES CAN BE DISPLAYED:

- \* On an RGB Color Monitor
- \* On a Standard Color TV set (with the help of the K/W Color Encoder Model #CE 1101)
- \* Or (for the technical minded amateur) on a Standard Color TV set using a K/W Interface Board which allows you to hook up directly to the three color guns of a standard color TV!

Color pictures can be put into the three memories of the K/W SC-422A Scan Converter with a standard black and white TV camera using in succession Red, Green, and Blue filters!

A tunable signal sync control assures painting of off-frequency stations without having to retune the VFO.

The dual-speed switching circuit between memories #1 and #2 provides a unique frame rotation and motion animation.

In addition, the "fantastic" KB 422A Keyboard Graphic Generator and LP 422A Light Pens allow you to produce great color graphics and special effects that can be layed on top of any video picture in memory!

Now you can add FULL COLOR SSTV to your system at reasonable cost using the amazing K/W SC-422A SSTV Scan Converter System... backed and serviced by K/W Control Systems, Inc., the leading supplier of power systems for computers in the U.S.!

For detailed technical and ordering information, contact: Mr. Walter Giesser WB20WX, R & D Manager, Ext. 207.

\*Built in Germany by Volker Wraase Elektronik to K/W Control Systems specifications.

**K/W CONTROL SYSTEMS, INC.**  
South Plank Road, Middletown, New York 10940  
Phone: (914) 355-6741 TELEX No. 13-7428



# ICOM IC-730

ICOM's Go-Anywhere HF Rig for Everyone's Pocketbook



## Compact.

Only 3.7 in (H) x 9.5 in (W) x 10.8 in (D) will fit into most mobile operations (compact car, airplane, boat, or suitcase)

## Affordable.

Priced right to meet your budget as your main HF rig or as a second rig for mobile/portable operation.

## Convenient.

- Unique tuning speed selection for quick and precise QSY, choice of 1 KHz, 100 Hz or 10 Hz tuning.
- Electronic dial lock, deactivates tuning knob for lock on, stay on frequency operation.
- One memory per band, for storage of your favorite frequency on each band.
- Dual VFO system built in standard at no extra cost.

## Full Featured.

- 200W PEP input—powerful punch on SSB/CW (40 W out on AM)
- Receiver preamp built-in • VOX built-in
- Noise blanker (selectable time constant) standard
- Large RIT knob for easy mobile operation
- Amateur band coverage 10-80M including the new WARC bands
- Speech processor—built-in, standard (no extra cost)
- IF shift slide tuning standard (pass band tuning optional)
- Fully solid state for lower current drain
- Automatic protection circuit for finals under high SWR conditions
- Digital readout • Receives WWV • Selectable AGC
- Up/down tuning from optional microphone
- Handheld microphone standard (no extra cost)
- Optional mobile mount available



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3331 Towerwood Dr., Suite 307, Dallas TX 75234

# ICOM Presents the Minicom IC-25A

**Imagine...25 watts/5 memories/2 scanner systems in a 2" H x 5½" W x 7" D 2 meter transceiver!**

A very small package with a 25 watt punch, the IC-25A is a full featured FM transceiver for the space conscientious operator. Nearly the same size as an automotive AM radio, the IC-25A will fit in places usually considered impossible for a one piece 2 meter transceiver. The IC-25A is no lightweight when it comes to features:

- 5 memories. Store your favorite frequencies.
- Priority channel. Monitor your most important frequency.

- 25 watts high/1 watt battery saving low power.
- Touchtone™ mic standard, no extra cost...to work your favorite autopatch repeater.
- Full band scan/programmable scan (set your own limits)/memory scan...all with automatic resume after preset delay or carrier drop.
- 2 VFO's with data transfer standard.
- 2 tuning rates 5KHz (A VFO) or 15 KHz (B VFO).
- Nor/Rev switch for instant monitoring of repeater inputs.
- Memory back up power supply option holds memory when attached.

Actual Size.  
(Clip this actual photo out and try it in your car.)



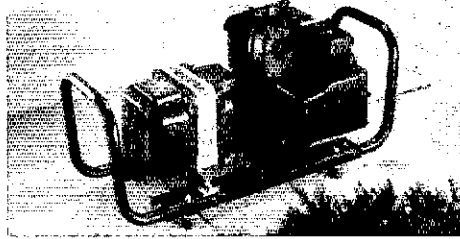
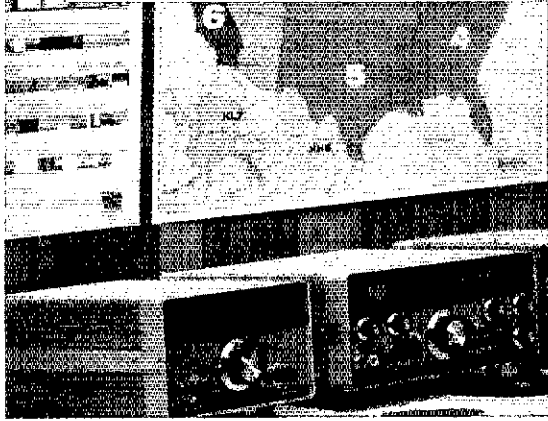
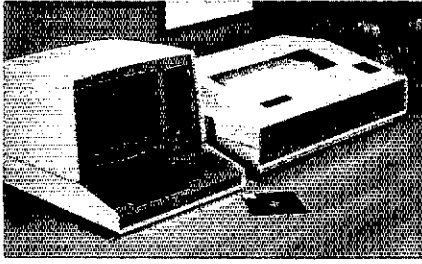
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Who builds the best Amateur Radio gear around? *You do!* Thousands of Hams attest to the reliable performance, specifications and long-term dependability of Heathkit Amateur equipment. Not to mention the thrill of airing a rig that you've built with your own hands. The more than 200 Hams at Heath invite you to join the fun.

For over three decades, our unique "We won't let you fail" philosophy has created a strong partnership between Hams and Heath, the world's leading electronic kit manufacturer. Heath is committed to designing equipment and accessories of the highest quality that will withstand the test of performance - QSO after QSO.

Amateur Radio is an exciting, worthwhile hobby. Starting and pursuing it with Heathkit equipment is the best way to go. Our complete line can provide everything you need, from a basic Code Practice Oscillator and self-study License Courses all the way to a sophisticated station of operation with remote capability. Pacesetter Amateur Radio enthusiasts are even using Heath/Zenith computers to design antennas, plot beam headings, track OSCAR and transmit RTTY. Heath and Hams, once again, are "perfect partners" in a new adventure.

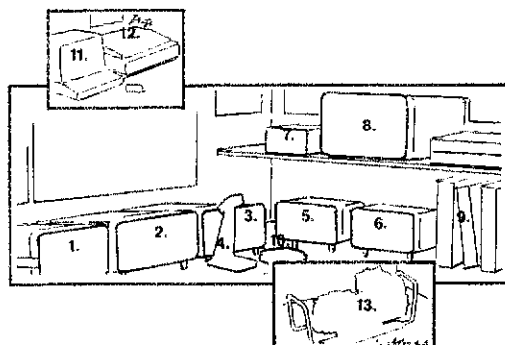
See the complete Amateur Radio line in our latest catalog or visit your nearby Heathkit Electronic Center\*

Where Heathkit products are displayed, sold and serviced. See your telephone directory white pages for the store near you.

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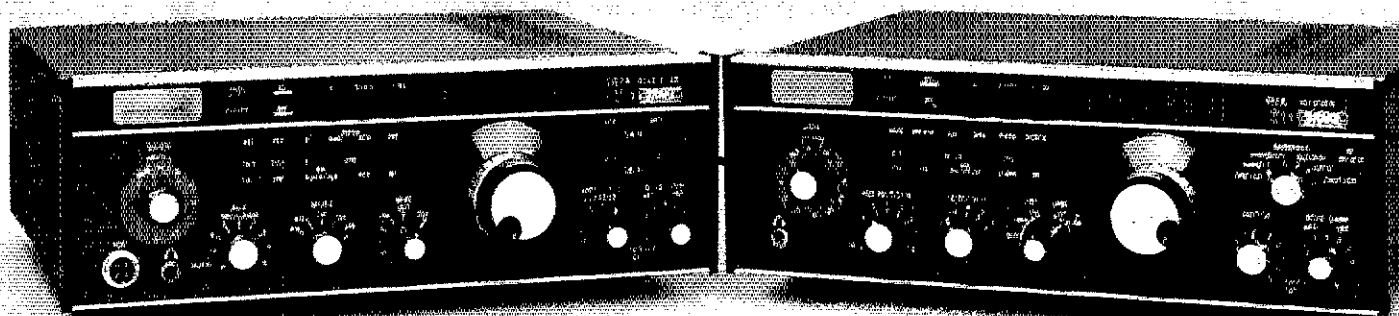
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# The ultimate team... the new Drake "Twins"



## The **TR7A** and **R7A** offer performance and versatility for those who demand the ultimate!

### TR7A Transceiver

- **CONTINUOUS FREQUENCY COVERAGE** — 1.5 to 30 MHz full receive coverage. The optional AUX7 provides 0 to 1.5 MHz receive plus transmit coverage of 1.8 to 30 MHz, for future Amateur bands, MARS, Embassy, Government or Commercial frequencies (proper authorization required).

- **Full Passband Tuning (PBT)** enhances use of high rejection 8-pole crystal filters.

**New!** Both 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity are standard, plus provisions for two additional filters. These 8-pole crystal filters in conjunction with careful mechanical/electrical design result in realizable ultimate rejection in excess of 100 dB.

**New!** The very effective NB7 Noise Blanker is now standard.

**New!** Built in lightning protection avoids damage to solid-state components from lightning induced transients.

**New!** Mic audio available on rear panel to facilitate phone patch connection.

- **State-of-the-art design** combining solid-state PA, up-conversion, high-level double balanced 1st mixer and frequency synthesis provided a no tune-up, broadband, high dynamic range transceiver.

### R7A Receiver

- **CONTINUOUS NO COMPROMISE** 0 to 30 MHz frequency coverage.

- **Full passband tuning (PBT).**

**New!** NB7A Noise Blanker supplied as standard.

- **State-of-the-Art features** of the TR7A, plus added flexibility with a low noise 10 dB rf amplifier.

**New!** Standard ultimate selectivity choices include the supplied 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity. Capability for three accessory crystal filters plus the two supplied, including 300 Hz, 1.8 kHz, 4 kHz, and 6 kHz. The 4 kHz filter, when used with the R7A's Synchro-Phase a-m detector, provides a-m reception with greater frequency response within a narrower bandwidth than conventional a-m detection, and sideband selection to minimize interference potential.

- **Front panel pushbutton control** of rf preamp, a-m/ssb detector, speaker ON/OFF switch, i-f notch filter, reference-derived calibrator signal, three agc release times (plus AGC OFF), integral 150 MHz frequency counter/digital readout for external use, and Receiver Incremental Tuning (RIT).

### The "Twins" System

- **FREQUENCY FLEXIBILITY.** The TR7A/R7A combination offers the operator, particularly the DX'er or Contester, frequency control agility not available in any other system. The "Twins" offer the only system capable of no-compromise DSR (Dual Simultaneous Receive). Most transceivers allow some external receiver control, but the "Twins" provide instant transfer of transmit frequency control to the R7A VFO. The operator can listen to either or both receiver's audio, and instantly determine his transmitting frequency by

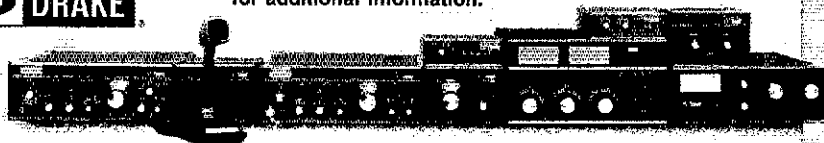
appropriate use of the TR7A's RCT control (Receiver Controlled Transmit). DSR is implemented by mixing the two audio signals in the R7A

- **ALTERNATE ANTENNA CAPABILITY.** The R7A's Antenna Power Splitter enhances the DSR feature by allowing the use of an additional antenna (ALTERNATE) besides the MAIN antenna connected to the TR7A (the transmitting antenna). All possible splits between the two antennas and the two system receivers are possible.

Specifications, availability and prices subject to change without notice or obligation.



See your Drake dealer or write  
for additional information.

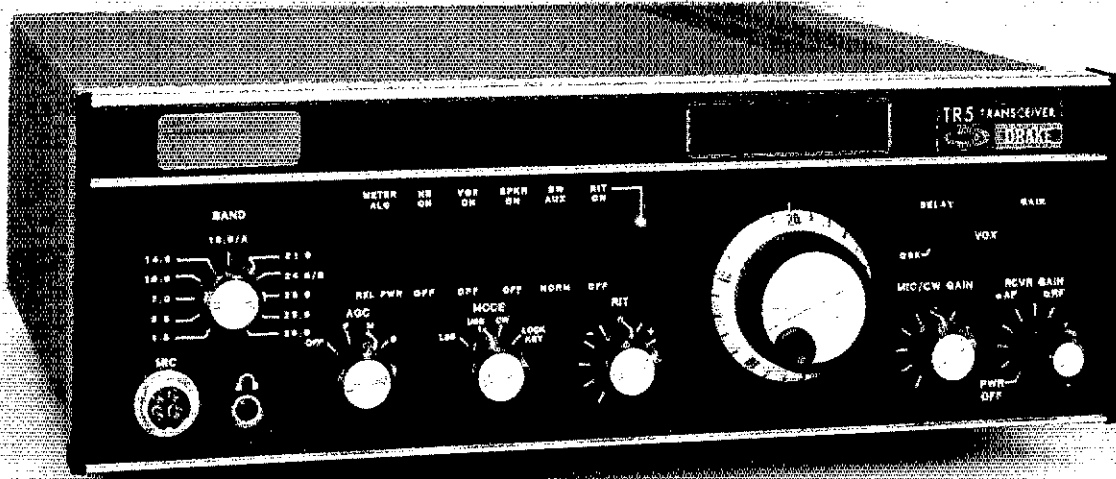


**COMING SOON: New RV75 Synthesized VFO**  
Compatible with TR5 and 7-Line Xcvrs/Rcvrs

- Frequency Synthesized for crystal-controlled stability
- VRTO (Variable Rate Tuning Oscillator) adjusts tuning rate as function of tuning speed.
- Resolution to 10 Hz
- Three programmable fixed frequencies for MARS, etc.
- Split or Transceive operation with main transceiver PTO or RV75



# New Drake TR5 Transceiver



## far above average!

COMING SOON:  
RV75 Synthesized VFO  
featuring the Drake "VRTO"

- Frequency Synthesized for crystal-controlled stability • VRTO (Variable Rate Tuning Oscillator\*) adjusts tuning rate as function of tuning speed.
- Resolution to 10 Hz • Three programmable fixed frequencies for MARS, etc. • Split or Transceive operation with main transceiver PTO or RV75.

\* Patent pending

## With the new TR5 versatility and value are spelled D-R-A-K-E...

### DYNAMIC RANGE

The dynamic range of the TR5 is unexcelled by any transceiver in its class. The TR5's greater than 0 dBm third order intercept point (85 dB two-tone dynamic range) at 20 kHz spacing can be achieved only by the use of a passive diode-ring double balanced mixer. Drake was the first to bring this technology to the Amateur market with a high-level mixer in the TR7.

### RELIABLE SERVICE

When you purchase a TR5, or any Drake product, you acquire a product of the latest production techniques, which provide reliable performance.

Yet with a product as sophisticated as one of today's transceivers, after-sales service is a must. Ask any Drake owner. Our Customer Service Department has a reputation second to none.

### ACCESSORIES

Drake is the only Amateur Radio manufacturer who offers a full complement of accessories to satisfy almost every desire the HF Amateur may have. This wide selection allows any operator to assemble a station which meets his needs, and assures compatible interfacing and styling instead of a desk full of equipment with a variety of styling and poor operation as a system.

### KILOWATT AMPLIFIER

Everyone wants to be heard! The accessory L75 and its 3-500Z (1200 watts PEP input) and a decent antenna will do the trick. This rugged self-contained amplifier / power supply will put the TR5 on an even footing with the best of them.

### ENGINEERING

The TR5 and all Drake Transceivers, are backed by the best in engineering. The TR5 is the result of an extensive engineering effort, combining proven past techniques and ideas with new state of the art concepts.

As a result, the TR5 will not be superseded by a new model every six months. It represents a true radio communications value that will provide many years of operating enjoyment.

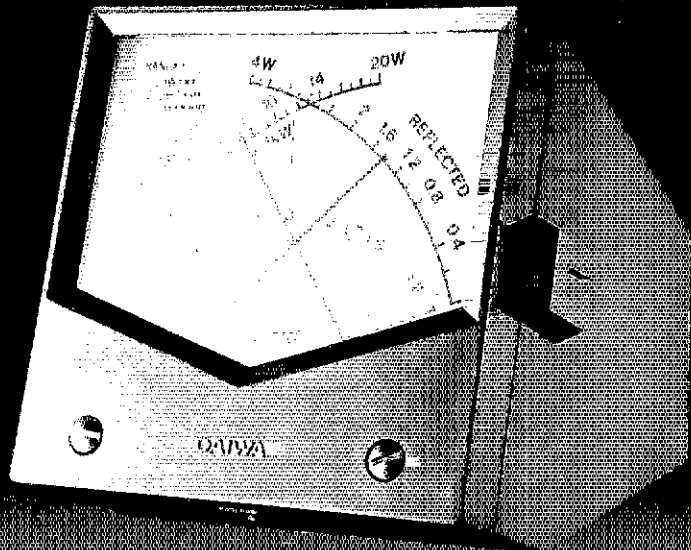
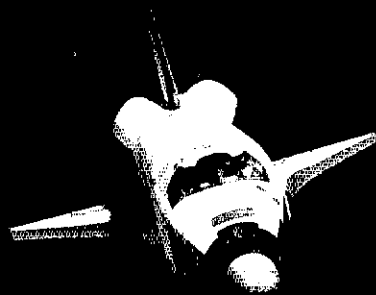
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or write for  
additional information.

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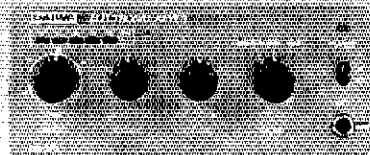
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Features, availability and prices subject to change without notice or obligation.



# Future Technology Today

## NEW DK200/DK210 Electronic Keyers

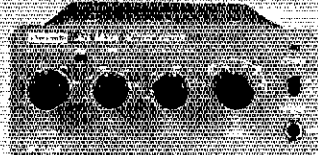


CW is both communication and art. Sharpen your "fist" with Daiwa precision!

**DK210**—L. E. D. Speedmeter; Reads speed to 50 WPM • Lambic operation with squeeze key • Automatic, semi automatic, or tune modes • Dot-dash memory • Solid state keying • Weight Control: Adjusts dot-dash space ratio • Dimensions: 150W x 62H x 150D m/m • Rugged, all metal cabinet

**DK200**—Same as DK210 without L.E.D. speed-meter

## NEW AF606K/AF406K All Mode Active Filters



Luxurious selectivity at an affordable price!

**AF606K**—Innovative PLL Tone Decoder circuitry locks onto the CW signal and reproduces it with incredible clarity • Variable Notch Frequency: 300-3000Hz • CW Pass Band: 140Hz, 110Hz, & 80Hz • Lowpass and Highpass filtering for excellent SSB reception • Built-in speaker • Dimensions: 150W x 62H x 150D m/m

**AF406K**—Same as AF606K without PLL Tone Decoder • CW Pass Band: 170Hz, 140Hz, 110Hz, 80Hz

## NEW LA2030 2 Meter Power Amplifier



Be Heard! Give your hand-held the boost it needs!

**LA2030**—Selectable power output: Low (15 watts) or High (30 watts) (all models) • Power Input: 150mW - 300 mW (LA2030A), 300mW - 600mW (LA2030B), 1.5 - 2.5 watts (LA2030C). Choose the model that's right for you • Fast acting protection circuitry • RF level indicator • BNC input, SO-239 output • Compact size: 90W x 42H x 121D m/m

## CNA2002 Automatic Antenna Tuner



State-of-the-art automatic antenna matching in under 45 seconds.

**CNA2002**—Frequency range: Amateur bands 3.5 - 30MHz including new WARC bands • Power Rating: SSB-2.5 kW PEP, CW-1 kW (50% duty), AM-500 watts, SSTV, RTTY-500 watts (10 minutes) • Dummy Load: 50 watts continuous (100 watts/1 minute) installed • Two antenna outputs for unbalanced lines • Dimensions: 225W x 90H x 275D m/m

## CNW518/CNW418 Manual Antenna Tuners

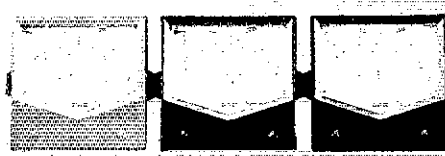


Maximize station performance with high quality Daiwa tuners.

**CNW518**—Frequency range: Amateur bands 3.5 - 30 MHz. Including new WARC bands • Power Rating: SSB-2.5 kW PEP, CW-1 kW (50% duty) • Two antenna outputs for unbalanced lines • Dimensions: 225W x 90H x 275D m/m

**CNW418** (not shown)—Same specifications as CNW518 except Power Rating: SSB-500 watts PEP, CW-200 watts • Dimensions: 225W x 90H x 245D m/m

## CN520/CN540/CN550 Cross Needle Meters



Daiwa cross-needle convenience in a compact case! Get SWR and Power readings in a single glance.

**CN520**—Frequency: 1.8 - 60 MHz • Power rating: 2 kW max. • Sensitivity: 40 watts minimum • Accuracy: ±10% at full scale • Dimensions: 72W x 72H x 95D m/m

**CN540**—Frequency: 50 - 150 MHz • Power rating: 200 watts max. • Sensitivity: 4 watts minimum • Accuracy: Same as CN520 • Dimensions: Same as CN520

**CN550**—Frequency: 144 - 250 MHz • Power rating: 200 watts max. • Sensitivity: 4 watts minimum • Accuracy: Same as CN520 • Dimensions: Same as CN520



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Heart of a  
Great Project!

Reg. **288**  
4.49

SN76477. Produces an amazing variety of sounds with simple support parts. "Explosions," arcade noises and more. 28-pin with data. 276-1765 . . . Sale 2.88

## Cooling Fan

**1595**

Diecast  
Venturi



Extends life of amplifiers, power supplies, computers and more. Delivers up to 70 CFM. 120VAC. U.L. listed. 4 1/2 x 4 1/2 x 2 1/2". 273-241 ..... 15.95

## "Analog/Digital" ICs

Many uses for these. You may even discover some new ones! 100% prime, specs and ep notes included. More info in Archer Semiconductor Reference Guide, \$2.99

Low As

**259**

### A to D Converter



TL507. Converts analog processes to the signals required for microprocessor controlling—up to 1000 operations per second! Single supply. 8-pin. 276-1789 ..... 2.59

### D to A Converter



DAC801. Gives you an analog output up to 20 volts peak-to-peak with 8-bit digital input. Interfaces with all popular logic. Low power consumption. 16-pin. 276-1791 ..... 4.49



9400. Linear frequency-to-voltage/voltage-to-frequency converter that operates up to 100 kHz. Ideal for AFSK and modems. 14-pin. 276-1790 ..... 3.49

F to V,  
V to F IC

## 5-Amp SPST Switch



With LED Indicator

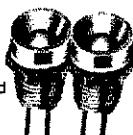
Ideal for mobile use—LED glows when on.  $\frac{7}{16}$ " mounting hole. 12VDC use only. 275-680 ..... 2.99

## LEDs and Holders

**159**

Pkg. of 2

Good-looking chromed holder is ready to mount in  $\frac{1}{8}$ " hole.



Color	Cat. No.	Pkg. of 2
Red	276-068	1.59
Green	276-069	1.59

## Electret Element

**299**



Ideal replacement for crystal elements. Flat 100-15,000 Hz response. 2-10VDC.  $\frac{25}{64}$ " dia. 6" leads. 270-092 ..... 2.99

## SALE! Schottky ICs



Up to **33%  
Off!**  
Low As **49c**

• 100% Prime • With Pinout & Specs

Type	Cat. No.	Reg.	SALE
74LS00	276-1900	.79	.49
74LS02	276-1902	.79	.49
74LS04	276-1904	.79	.49
74LS08	276-1908	.79	.49
74LS32	276-1915	.89	.59
74LS74	276-1919	.79	.49
74LS75	276-1920	.99	.65
74LS90	276-1923	1.09	.69
74LS123	276-1926	1.49	.95
74LS138	276-1939	1.19	.75
74LS161	276-1931	1.39	.89
74LS164	276-1932	1.39	.89
74LS175	276-1934	1.19	.75
74LS193	276-1936	1.49	.95
74LS240	276-1940	1.99	1.25
74LS244	276-1941	1.99	1.25
74LS245	276-1942	2.99	1.99
74LS367	276-1835	1.29	.79
74LS373	276-1943	2.39	1.49
74LS374	276-1944	2.39	1.49

## RS-232 Connectors

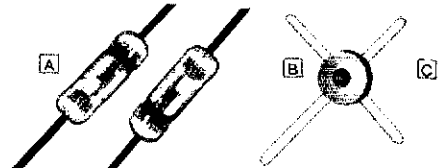


**499**  
Each

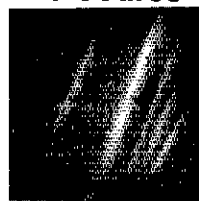
Reusable ribbon cable type. Ideal for microcomputer interfacing, RTTY terminals and extensions.

Type	Cat. No.
D Submini 25 Male	276-1559
D Submini 25 Female	276-1565

## Shack is Your Microwave Device Source

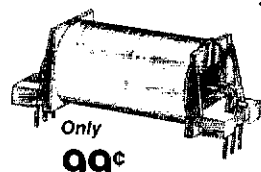


- (A) H-P 5082-2835. Microwave mixer diodes. Low noise, 1 pf max. capacitance. Ideal for UHF and SHF converters. 276-1124 ..... Pkg. of 271.99
- (B) MRF-901. NPN transistor for small-signal use to beyond 2 GHz. Manufacturer's prime. We buy in big lots to save you lots of money! 276-2044 ..... 2.99
- (C) Dual-Sided Epoxy Glass PC Board. Low leakage for RF use. 6 x 6". 276-1590 ..... 2.99



Why Wait for  
Mail Order?

## DPST Reed Relay



Only  
**99c**

5VDC, 180-Ohm Coil. Contacts rated 0.5A at 120VAC. PC board mountable. 275-228 ..... 99c

## Ceramic IF Filters



**199**  
Pkg. of 2

Top Quality—  
Why Pay More?

SFE10.7MA5-A. Ideal replacement for costly "cans" in FM entertainment radios. Also useful in CB to 10-meter FM mods, custom IF strips, more. In/out Z: 330 ohms. Bandwidth: 280 kHz (3dB). 272-1301 ..... 2/1.99

## 25 Assorted Ferrites

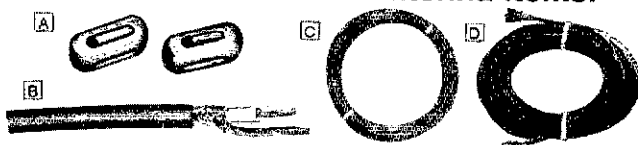


**198**

Many  
Amateur  
Uses

Includes toroids, ferrite beads, and threaded cores suitable for RF chokes, HF inductors, matching transformers and more. Great value—come take a look at these! 273-1571 ..... Set 1.98

## Check Our Prices on Antenna Items!



- (A) "Egg" Insulators. Low-loss, high-strength. 270-1518 ..... Pkg. of 2/69c
- (B) Tandy RG8/M Coax. 52 ohms. Less loss than RG8/U, yet it's smaller and easier to install. Typical loss per 100 ft. at 100 MHz: 3 dB. Made in USA by Tandy Wire and Cable. 278-1328 ..... Price Per Foot: 21c
- (C) RG8/M Coax Assemblies. With PL-259 plugs installed on each end. 50-Foot. 278-973 ..... 15.95
- (D) 100-Foot. 278-974 ..... 28.95
- (E) Heavy-Duty Antenna Wire. 7 strands of 22-gauge copper for high strength. Uninsulated. 278-1329 ..... 65-Ft. Roll 4.59

**FREE!**

NO  
PURCHASE  
REQUIRED!

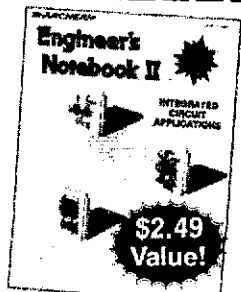
(With Coupon Only) Cat. No. 276-5002

## Engineer's Notebook II

By Forrest M. Mims III

128 pages of practical, tested, easy-to-build circuits using Radio Shack ICs. Bring coupon to any participating Radio Shack store or dealer.

One per customer. None sent by mail. Offer void where prohibited. Expires 4/28/82. QST 4/82



**\$2.49  
Value!**

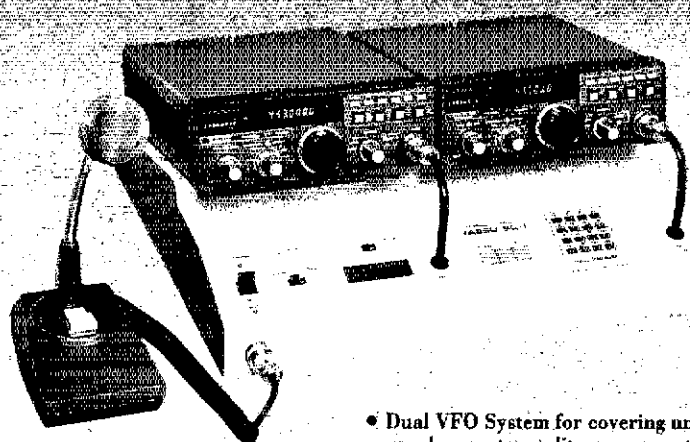
# Radio Shack

A DIVISION OF TANDY CORPORATION  
OVER 8200 LOCATIONS IN 76 COUNTRIES

Prices may vary at individual stores and dealers

# VHF/UHF Line of the 80s FT-480R/FT-680R/FT-780R SC-1 Station Console

**NEW!**



- Dual VFO System for covering unusual repeater splits or separate TX/RX Frequencies during weak signal work.

- Microprocessor-controlled multimode transceivers with three mode-optimized synthesizer step selections.
- Up-down Scanning, Priority Channel, and four Memories with Memory Scan.
- FT-480R coverage 143.5 - 148.5 MHz, FT-680R coverage 50 - 53.99 MHz, FT-780R coverage 430 - 439.99 MHz. Coverage may differ in other countries.
- Satellite operation provided using FT-480R and FT-780R. Transmit frequency may be varied while transmitting to follow Doppler Shift.

- Scanning microphone provided for instant QSY with fingertip control. YM-48 (option) provides two tone operation for autopatch work.
- Blue fluorescent display for maximum visibility.
- Red - Yellow - Green LED Signal Strength/Relative PO Meter.
- Optional SC-1 Station Console includes quartz LCD Clock, AC Power Supply, DTMF 16 Button Pad, Scanning Controls, and XCVR A - XCVR B Microphone Switching.
- Optional Accessories: FP-80A AC Power Supply, FTS-64E 32 Tone CTCSS/Burst Encoder, YM-34 Desk Microphone, YM-38 Desk Microphone with Scan Switches.

Look to the future with the most complete line of VHF Multimode Transceivers available — The Line of the 80's . . . from Yaesu!

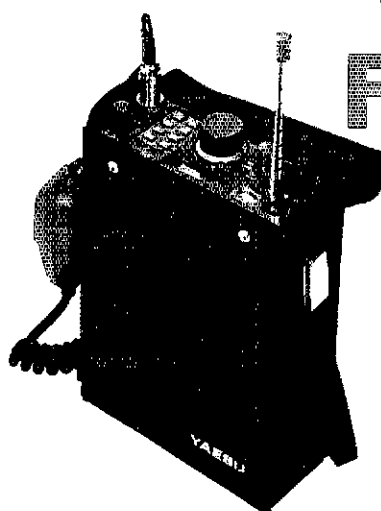
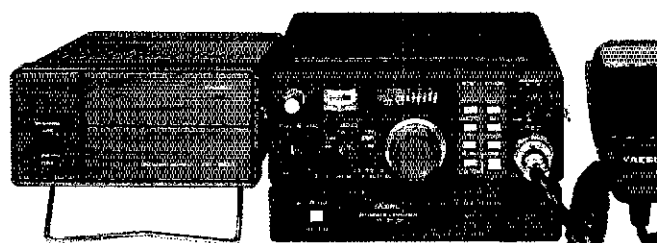
## FT-290R

**NEW!**

### 2 METER MULTIMODE PORTABLE

- Completely self-contained, battery powered 2 meter multimode Transceiver with Telescoping Antenna.
- Microprocessor control for operating convenience usually found only in base station equipment.
- Dual VFO System with two synthesizer steps per mode. Use one VFO for the FM band and the second VFO for SSB, if you like!
- Ten memories, priority channel, and up/down scanning of band or memories for busy or clear channels.
- Built in Noise Blanker, RIT, Hi/Low Power Switch and Battery Condition Meter. Lithium memory backup battery with estimated 5 year life.
- Optional MMB-11 Mobile Bracket, FL-2010 10 watt Amplifier, LCC-90 Leather Case, NiCd C-Cells, YM-49 Speaker/Microphone and CTCSS Boards.

Don't miss those great DX openings this year! The FT-290R and FT-690R are ready whenever (and wherever) you are!!!



## FT-690R

### 6 METER MULTIMODE PORTABLE

- Repeater splits of  $\pm 1$  MHz built in for FM work.
- Use with FT-290R accessories, including YM-50 16 Button Tone Encoder Microphone and NC-11B Battery Charger. Use FP-80A AC Power Supply for base station work. FL-6010 Amplifier available outside USA.
- LCD Display with night light for excellent visibility.
- 2.5 watts RF Output on SSB/CW, 300 MW Output on AM.
- Synthesizer steps optimized for mode in use.

**YAESU**  
*The radio.*



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# FT-ONE

## A BOLD ADVENTURE IN ENGINEERING!

### WORLD CLASS GENERAL COVERAGE TRANSCEIVER



- General Coverage on Receive, with Transmit capability on present and proposed amateur bands.
- All solid state for long-term reliability.
- Ten digital VFOs with A-B selection for unmatched contest flexibility.
- Keyboard frequency entry for instantaneous band change, plus fine tuning in 10 Hz steps via Tuning Dial or Scanner.
- Cascaded Filtering available for SSB and CW modes for outstanding ultimate attenuation (600 Hz and 300 Hz Filters optional).
- Full CW break-in, even crossband if you wish! Optional Electronic Keyer Board available.
- Wide Receiver Dynamic Range, specified at 95 dB in CW Bandwidth.

- PIN Diode RF Attenuator for adjustment of noise figure on noisy bands.
- IF Shift with variable bandwidth control allows you to preset IF bandwidths and passband center frequencies for maximum interference rejection.

- Audio Peak/Notch Filter for razor-sharp selectivity.
- AC and DC Supplies built in.
- One Year Factory Warranty.

- Noise Blanker using all-new circuitry with threshold control.
- RF Speech Processor for increased talk power.



# FT-707

## COMPACT SOLID STATE TRANSCEIVER TOP OF THE LINE PERFORMANCE AT HOME OR AWAY!

- All Solid State, with individual Low Pass Filters for each band providing excellent Harmonic Attenuation.
- 80 through 10 Meter operation, including the new 10, 18 and 24 MHz bands.
- Variable IF bandwidth using cascaded crystal filters for excellent interference rejection and ultimate attenuation.
- Wide Receiver Dynamic Range provided by doubly-balance Diode Ring Mixer.
- Optional FV-707DM provides 12 memories with scanning in 10 Hz steps.
- CW-wide and CW-narrow Selection using optional 350, 450 or 600 Hz Crystal Filters.
- Optional FP-707 AC Power Supply, FC-707 Antenna Coupler, MR-7 Mounting Rack, YM-35 Scanning Microphone (Scan Function with FV-707DM).

The FV-707DM is the ideal traveling companion, yet you need not sacrifice performance away from home. Ask your Authorized Yaesu Dealer for a demonstration today!

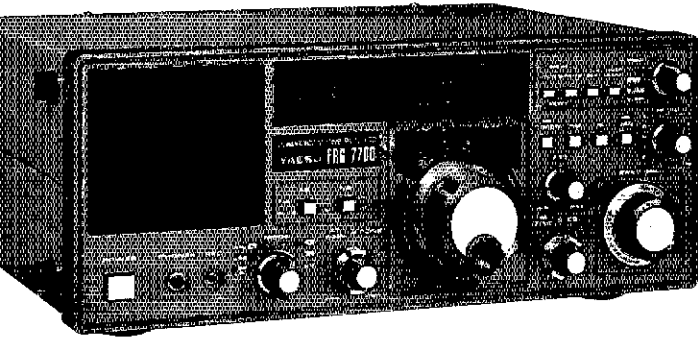
**YAESU**  
*The radio.*



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# FRG-7700

## DELUXE HF COMMUNICATIONS RECEIVER



- 150 KHz through 29.99 MHz coverage on AM, SSB, CW and FM
- Three AM bandwidths for changing interference conditions on crowded shortwave broadcast bands.
- Built-in Quartz Digital Clock with timer for control of station accessories.
- Tape Recorder Output Jack on front panel.

- Noise Blanker and AGC Selection controlled from front panel.
- Optional memory unit allows storage and recall of up to 12 frequencies — no more frantic dial twisting at I.D. time!
- Optional Accessories: FRV-7700 VHF Converter, FRT-7700 Antenna Tuner, FF-5 500 KHz Low-Pass Filter, DC-7700 DC Kit, YH-77 Headphones and QTR-24D Deluxe World Clock.



## FRG-7 HF COMMUNICATIONS RECEIVER

- Top-selling Shortwave Receiver provides high performance at a reasonable price.
- 500 KHz - 29.99 MHz using Wadley Loop Synthesizer for excellent stability.
- Audio Filter for enhanced reception under difficult conditions.

- Built-in Tunable Preselector for excellent out-of-band interference rejection.
- Front panel Tape Recorder Jack plus Headphone Jack.
- Dial Lamps may be switched off for reduced power consumption.

# FT-101ZD MK III

## COST-EFFECTIVE DX PERFORMANCE!



- 160-10 Meter coverage on SSB and CW. AM or FM Unit may be added as optional accessory.
- Variable IF bandwidth, using cascaded crystal filters for excellent interference rejection.
- Audio Peak/Notch Filter for razor-sharp selectivity.

- CW Wide-Narrow Selection using optional 350, 450, or 600 Hz CW Filter.
- RF Speech Processor and Adjustable-Threshold Noise Blanker are built in.
- Worldwide Power Capability provided by Multi-Tap Power Transformer, covering 100/110/117/200/220/234 VAC.

- Rugged 6146B Finals with RF negative feedback.
- Optional Accessories: FV-101DM Scanning VFO with 10 Hz Synthesizer and Memory, ETV-901R VHF/UHF Transverter, FC-902 Antenna Coupler, SP-901P Speaker/Patch, DC 101Z DC-DC Converter, FA-9 Cooling Fan, complete line of Microphones.

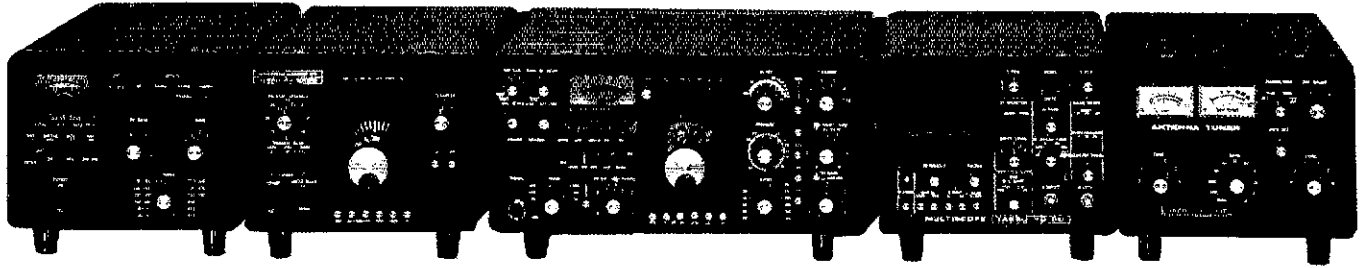
# YAESU

*The radio.*



# FT-902DM

THE CHOICE OF CHAMPIONS  
FOR DX AND CONTEST  
OPERATION AROUND THE WORLD



- SSB, CW, AM, FM and FSK operation built in for All-Mode Versatility.
- 160-10 Meters, including the new bands recently assigned at WARC.
- Variable IF Bandwidth and IF Rejection Tuning for outstanding Selectivity. Cascaded Filters standard, not optional accessories.
- Audio Peak CW Filter provides single signal reception.
- Built-in Curtis 8044 IC Keyer.
- Built-in Memory System for control of Transmit, Receive, or Transceive Frequency.
- Rugged 6146B final tubes with RF negative feedback for excellent spectral purity.
- Built in RF Speech Processor and IF Noise Blanker.

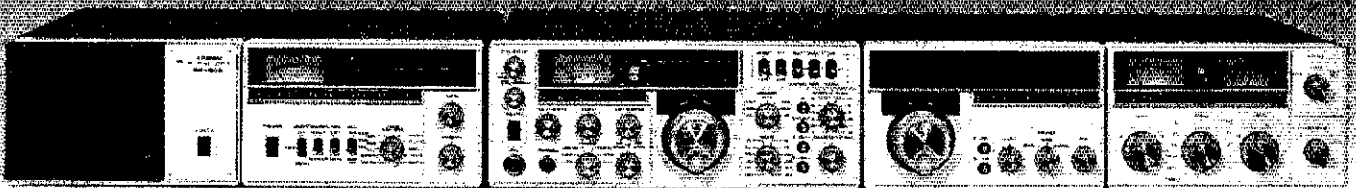
#### FT-902DM Accessories

- FTV-901R extends coverage to 50, 144, and 430 MHz on full duplex (External Receiver required for duplex operation) for satellite work. 6M/70CM Units optional.
- FV-901DM Synthesized VFO scans in 100 Hz steps and sports 40 Frequency Memory Bank for DX or contest work.
- YO-901P Multiscope includes IF Monitor, Panadapter, and Two-tone Generator for quick station testing.
- FC-902 Antenna Coupler provides for matching 3 Coax-fed Antennas plus one random wire.
- YR-901 CW/RTTY Reader provides versatile Teletype or CW Monitoring using external video monitor.
- SP-901P Speaker/Patch and SP-901 External Speaker round out your FT-902DM Total Communications System.

# FT-107M

SOLID-STATE HF TRANSCEIVER

BROADBAND PERFORMANCE  
FOR EASE OF OPERATION



- All Solid State, 160-10 Meter Transceiver equipped for SSB, CW, FSK and AM operations.
- 12 Frequency Memory System with Digital Memory Shift providing scanning capability (Scanning Microphone optional).
- Excellent VSWR Turndown Characteristics: 75% Power Output at 3:1 SWR.
- Variable IF bandwidth using Cascaded Crystal Filters, Audio Peak/Notch Filter built in.
- Diode Ring Mixer for strong IMD performance. Low-Noise Premix Crystal Local Oscillator.

- Digital plus Analog Frequency Counter Readout. Digital Display utilizes true frequency.
- Built-in RF Speech Processor and IF Noise Blanker.
- Choice of optional internal or external AC Power Supply.
- Optional 350, 450, and 600 Hz CW Filters.
- Optional Accessories: FV-107 External VFO, FTV-107R VHF/UHF Transverter, FC-107 Antenna Coupler, SP-107P Speaker/Patch, SP-107 Speaker.

Price And Specifications Subject to  
Change Without Notice or Obligation

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Eastern Service Ctr., 9812 Princeton-Glendale Rd., Cincinnati, OH 45246 • (513) 874-3100

# AGL<sup>®</sup> Electronics



Need antenna and tower supplies? Check with the tower experts of Texas. Call Gordon, N5AU, or Bill, K5FUV, about your antenna set-up. In Texas ask for Mike, KG5F, (214) 699-1081.

### CUSHCRAFT

A3, 3 element triband beam	\$167.00
A4, 4 element triband beam	\$205.00
A743, 7-10 MHz add-on kit	\$71.00
A744, 7-10 MHz add-on kit	\$71.00
20-3CD, 3 element monobander	\$169.00
20-4CD, 4 element monobander	\$231.00
15-3CD, 3 element monobander	\$89.00
15-4CD, 4 element monobander	\$95.00
10-3CD, 3 element monobander	\$68.00
10-4CD, 4 element monobander	\$82.00
A32-19, 19 element 2m "Boomer"	\$75.00
214B, 14 element SSB "Jr. Boomer"	\$61.00
214FB, FM "Jr. Boomer", 2 meter	\$61.00
ARX2B, 2 meter "Ringo Ranger II"	\$93.00
ARX450B, 450 MHz "Ringo Ranger"	\$38.00
A-147-20T, 20 element 2, meter	\$58.00

### HY-GAIN

V2, 2 meter gain vertical	\$34.37
TH7DX, 7 element tribander	\$339.00
TH5DXS, 5 element tribander	\$220.20
TH3MK3S, 3 element tribander	\$199.54
TH2MK3S, 2 element tribander	\$130.72
TH3JRS, 3 element jr tribander	\$154.80
HQ-2S, 2 element quad	\$240.85
402BAS, 2 element 40 meter	\$185.79
205BAS, 5 element 20 meter	\$275.27
204BAS, 4 element 20 meter	\$213.32
203BAS, 3 element 20 meter	\$116.97
155BAS, 5 element 15 meter	\$165.13
153BAS, 3 element 15 meter	\$68.80
105BAS, 5 element 10 meter	\$116.97
103BAS, 3 element 10 meter	\$55.02
DB1015AS, 3 element duobander	\$150.68
64BS, 4 element 6 meter	\$48.15
66BS, 6 element 6 meter	\$96.31
18 HTS, hy tower vertical	\$326.88
18AVT/WBS, 5 band vertical	\$89.00
14AVQ, 4 band vertical	\$54.00
214, 14 element 2 meter	\$32.00
2BDQ, 2 band dipole	\$49.00
5BDQ, 5 Band dipole	\$89.00
BN86, balun	\$14.00

Note: Parts numbers with "s" denote stainless steel hardware.

### ROTORS

Ham IV	\$167.00
T2X	\$247.00
HDR300, for LARGE arrays	\$386.00
Alliance HD73	\$97.00

### CABLE

RG213, 50 Ohm coax	\$0.29/ft
RG 11/11, 75 ohm coax	\$0.29/ft
LDF4-50, Andrews HELIX <sup>®</sup>	\$1.40/ft
8 cond rotor cable	\$0.18/ft
8 cond HD rotor cable (for 150+ft)	\$0.36/ft

Gordon Fogg, N5AU, & Bill Kenamer, K5FUV, invite you to call us today. We make it easy for you to get the very best!

**FREE PHONE CALL!  
FAST DELIVERY!**



Local sales taxes added where applicable.

### NOW, KLMII

Most require truck shipment. FOB California or Texas, Freight Collect. Call for details.

KT34XA, 32 ft boom tribander	\$469.00
KT34A, 16 ft boom tribander	\$309.00
72-1, 40 meter dipole	\$155.00
72-2, 40 meter 2 el. beam	\$
72-3, 40 meter 3 el. beam	\$
72-4A, 40 meter 4 el. beam	\$639.00
4el 20m "4-Banger" mono	\$304.00
4el 15m "4-Banger" mono	\$129.00
4el 10m "4-Banger" mono	\$122.00
5el 20m "Big Sticker" mono	\$429.00
6el 20m "Big Sticker" mono	\$610.00
6el 15m "Big Sticker" mono	\$389.00
6el 10m "Big Sticker" mono	\$225.00
144-148-13LB 2m "Long-Boomer"	\$75.00
144-150-16C 2m circular	\$95.00
432-16LB 432 MHz "Long-Boomer"	\$59.00
420-470-18C 450 MHz circular	\$57.00

### HUSTLER

5BTV, 5 band trap vertical	\$99.00
----------------------------	---------

### Mobile antenna resonators:

	std	super
10 meter	\$10.00	\$15.00
15 meter	\$10.00	\$15.00
20 meter	\$12.00	\$18.00
40 meter	\$15.00	\$21.00
75 meter	\$17.00	\$32.00
BM-1, bumper mount	\$16.95	
MO-1, fender mount mast	\$22.36	
MO-2, bumper	\$22.36	
OCT-144, 2m colinear with mount	\$46.70	

### HY-GAIN CRANK-UP TOWERS

HG-52 SS, 52 foot self support	\$777.50
HG-54-HD, 54 foot self support	\$1287.50
HG-70 HD, 70 foot self support	\$2187.50

Above shipped from Lincoln, NE. Call for details on these and other HY-GAIN items.

### ROHN FOLD-OVER TOWERS

FK2548, 48ft, 25G foldover	\$699.00
FK2568, 68ft, 25G foldover	\$795.00
FK4544, 44ft, 45G foldover	\$981.00
FK4564, 64ft, 45G foldover	\$1170.00

Freight prepaid on foldover towers.

### CONNECTORS

Amphenol PL259 (silver plated)	\$1.25 ea
Amphenol 82-61 type n	\$2.85 ea
Andrews L44U, UHF female	\$17.00 ea
Andrews L44P, UHF male	\$17.00 ea

### ROHN TOWER

25G, 10 ft section	\$38.50
45G, 10 ft section	\$87.60
25AG4, top sec., requires bearing	\$52.00
45AG4, top sec., requires bearing	\$99.00
GA25G, guy bracket with bars	\$21.00
GA45G, guy bracket with bars	\$41.25
SB25G, short base section	\$18.00
SB45G, short base section	\$41.00
EP 2534-3, 3 hole equalizer plate	\$9.95

### Self-supporting towers:

HXB56, 56ft self support	\$335.00
HDBX40, 40ft self support	\$249.00
HDBX48, 48ft self support	\$305.00

Our BX series towers include the base stubs. Beware of those who charge extra for them. Also, freight collect from Dallas may save over freight pre-paid because of varying distances and routing.

### PHILYSTRAN GUY CABLE

This is RF transparent, sun resistant, guy cable. Avoid those hours of putting insulators into steel cable. Enjoy the advantages of freedom from unwanted resonances that can soak up your radiated RF energy.

HPTG 4000, 4000# test cable	\$0.44/ft
HPTG 6700, 6700# test cable	\$0.60 / ft
9901, potting head	\$3.99
9902, potting head for #6700	\$4.99
Socketfast Potting compound	\$9.00/pt

### TOWER HARDWARE

3/8" EHS steel guywire	\$0.12/ft
1/4" EHS steel guywire	\$0.15/ft
3/8" ccm cable clamp	\$0.29 ea
1/4" ccm cable clamp	\$0.39 ea
3/8" x 6" TBE&E tumbuckle	\$5.39
1/4" th thimble	\$0.24 ea
3/8" preformed guy grp	\$1.75
GAS604, screw anchor	\$12.00
GAR604, concrete guy anchor	\$12.00
M200H, 2" x 10" steel mast	\$37.00
500D, guy insulator	\$0.85
502, large guy insulator	\$1.80

### TELREX ANTENNAS

WARNING: These antennas are not for the faint of heart. They are heavy. They are large. They are expensive. They also work. These antennas require truck delivery and come in large boxes.

	wt.	area
10m523, 5 el 10 meter beam	64lb.	4.5
10m636, 6 el 10 meter beam	85lb.	6.0
15m532 5 el 15 meter beam	95lb.	10.0
15m845 5 el 15 meter beam	140lb.	14.0
20m436 4 el 20 meter beam	108lb.	12.0
This is a custom antenna		
20m536, 5 el 20 meter beam	113lb.	13.5
20m546, 5 el 20 meter beam	n/a	n/a
This is a custom antenna		
20m646, 6 el 20 meter beam	176lb.	17.0
40m329, 3 el 40 meter beam	110lb.	12.6
40m346, 3 el 40 meter beam	177lb.	13.8

Call for prices. F.O.B. Dallas

### HY GAIN ANTENNA PACKAGE #1

TH7DX	7 el tribander
HG52SS	self supporting tower
HAM IV	rotor
COA	(3 furnished) ... coax arms
HG-10	... 10 ft mast
HG-TBT	... thrust bearing

Your Price, Freight Prepaid!!! \$1381.00  
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TH3MK3S	3 el tribander
HG50MT2	50 ft side support tower
CD-45	rotor
ROTOR lower mast support:	
COA	... coax arms (3 furnished)
HCS	... 5 ft steel mast
HG-MT2-20	... tower guying kit
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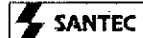
### TEXAS RESIDENTS:

Please call (214) 699-1081. Also note that our retail store is open Saturdays. We're in Keystone Park Shopping Center, look for the towers.

### WATS LINE CALLERS:

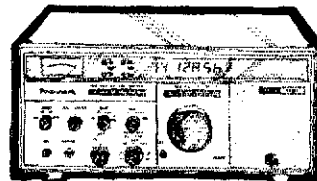
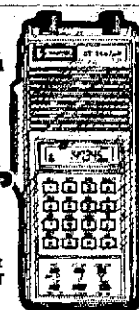
We have more phones ringing than personnel to answer them. Please be patient or call back during business hours. Sorry, no WATS Line calls taken Saturdays.

**NEW!**

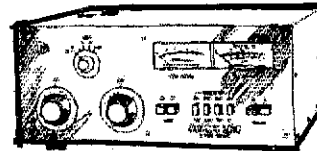


**ST-144/μP**

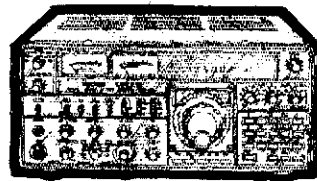
Ask about our great price on the ST-7/T



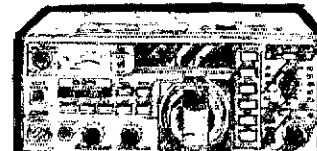
**Pro-Mark KWM-380**



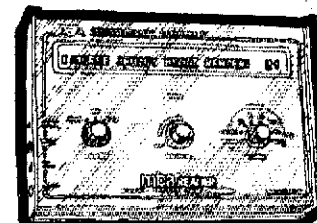
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# The Standard for Comparison

## New AZDEN® PCS-300 2-M Handheld FM Transceiver



**8 MHz COVERAGE** • 142 to 148.995 MHz in 9 kHz steps, including CAP and VARS.

**IDEAL SIZE & WEIGHT DISTRIBUTION** • 7.5" front by 2.5" wide by 1.8" deep - 1.4 lbs.

**MICROCOMPUTER CONTROL** • All frequency operations are done by means of a microcomputer keyboard with acquisition tone.

**LCD DISPLAY WITH TIMED LAMP** • Draws almost no current. Lamp times out automatically after 20 seconds.

**16 KEY AUTOPATCH** • Keyboard works as a Touchtone® pad while transmitting.

**PL TONE SWITCH** • Actuates optional subaudible tone module.

**PROGRAMMABLE "ODD SPLITS"** • Transmit and receive on any possible frequency combination. Reset in seconds.

**9 CHANNEL MEMORY WITH SCAN** • Eight addressable channels and one externally accessible up/down channel retain frequency and standard offset. Backup drain is a scant 10 microamps!

**AUTOMATIC INCLUSIVE OR EXCLUSIVE PROGRAMMABLE BAND SCAN** • Limits may be reset in seconds. Scans either inside or outside the limits.

**BUSY AND VACANT SCAN MODES** • Scan for either an occupied or empty frequency.

**KEYBOARD LOCK** • Prevents accidental change of frequency or scan status.

**TRANSMIT LOCK** • Avoids unintentional transmission.

**DIGITAL S/R/F AND MEMORY ADDRESS METER** • Shows relative signal strength on receive, relative power on transmit. Also shows memory address.

**HIGH OR LOW POWER** • 3 watts high, 1 watt low. Low power is continuously adjustable from 0.5 to 3 watts.

**TRUE FM** • Not phase modulation - Unparalleled audio quality.

**AUTOMATIC FRONT END TUNING** • RF stage is varactor-tuned for superior sensitivity and selectivity.

**RUGGED COMMERCIAL-GRADE MODULAR CONSTRUCTION**  
The PCS-300 is built to take years of the toughest operating conditions.

**SUPERIOR RECEIVER** • Sensitivity is 0.25  $\mu$ V for 20 dB quieting, 0.2  $\mu$ V for 12 dB SINAD.

**BNC ANTENNA CONNECTOR**

**STANDARD ACCESSORIES** • Heavy duty NIMH battery pack (500 mAh), belt clip, band strap connector, flexible rubber antenna, earphone, ac charging unit, and special stand for table-top operation.

**OPTIONAL ACCESSORIES** • Deluxe leather case, mobile dc charging cord, external speaker/microphone, and PL tone module.

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EXCLUSIVE DISTRIBUTOR: AMATEUR-WHOLESALE ELECTRONICS, INC.  
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**SPRING**

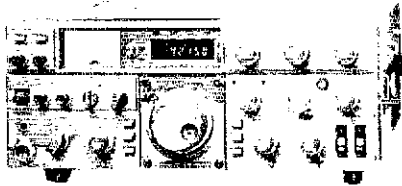
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- ★ 135-165 MHz Standard Range



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- ★ Optional Digital Display
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**New Technology** (patent pending) converts any VHF FM receiver into an advanced Doppler Direction Finder. Simply plug into receiver's antenna and external speaker jacks. Use any four omnidirectional antennas. See June 1981 issue of 73 for technical description. Kits from \$270. Assembled units and antennas also available. Call or write for full details and prices.

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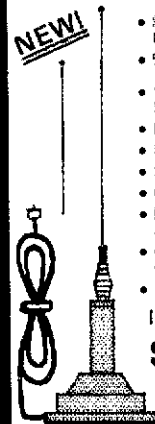
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**AZDEN**

**PHASE II TWIN ANTENNA**

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- SUPER 80-POUND, 100-MPH GRAY MAGNETIC MOUNT WITH MYLAR BASE
- 5/8 WAVE FOR PHASE II SIGNAL AND
- 1/4 WAVE FOR CLOSE-IN AND RESTRICTED HEIGHT AREAS
- INSTANT CHANGE-OVER
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- CHROME ON BRASS BASE COMPARE!
- BOTH ANTENNAS ARE FREQUENCY ADJUSTABLE
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- MADE IN U.S.A.

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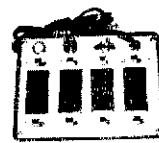
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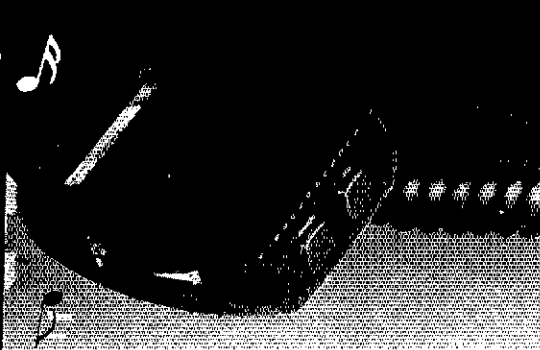
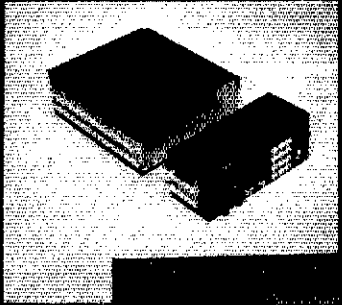


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# BLAZING THE FRONTIER OF MICROCOMPUTER COMMUNICATIONS



**SUPERIOR  
COMMERCIAL GRADE  
2-METER FM TRANSCEIVER**

**FREE!  
TOUCH-TONE<sup>®</sup>  
PAD KIT INCLUDED**

**COMPARE THESE FEATURES WITH ANY UNIT AT ANY PRICE**

- **8 MHz FREQUENCY COVERAGE, INCLUDING CAP/MARS BUILT IN:** Receive and transmit 142.000 to 149.995 MHz in selectable steps of 5 or 10 kHz. **COMPARE!**
- **SIZE:** Unbelievable! Only 6 3/4" by 2 3/4" by 9 3/4". **COMPARE!**
- **MICROCOMPUTER CONTROL:** All frequency control is carried out by a microcomputer.
- **MUSICAL TONE ACCOMPANIES KEYBOARD ENTRIES:** When a key is pressed, a brief musical tone indicates positive entry into the microcomputer. **COMPARE!**
- **PUSHBUTTON FREQUENCY CONTROL FROM MICROPHONE OR PANEL:** Frequency is selected by buttons on the front panel or microphone.
- **8 CHANNEL MEMORY:** Each memory channel is reprogrammable and stores the frequency and offset. Memory is backed up by a NICAD battery when power is removed.
- **INSTANT MEMORY 1 RECALL:** By pressing a button on the microphone or front panel, memory channel 1 may be accessed immediately.
- **MEMORY SCAN:** Memory channels may be continuously scanned for quick location of a busy or vacant frequency.
- **PROGRAMMABLE BAND SCAN:** Any section of the band may be scanned in steps of 5 or 10 kHz. Scan limits are easily reprogrammed.
- **DISCRIMINATOR SCAN CONTROL (AZDEN EXCLUSIVE PATENT):** The scanner stops by sensing the channel center, so the unit always lands on the correct frequency. **COMPARE** this with other units that claim to scan in 5-kHz steps!
- **THREE SCAN MODES WITH AUTO RESUME:** "Sampling" mode pauses at busy channels, then resumes. "Busy mode stops at a busy channel, then resumes shortly after frequency clears. "Vacant" mode stops at a vacant channel and resumes when signal appears. If desired, auto resume may be prevented by pressing one button. **COMPARE!**
- **REMOVABLE HEAD:** The control head may be located as much as 15 feet away from the main unit using the optional connecting cable. **COMPARE!**
- **PL TONE OSCILLATOR BUILT IN:** Frequency is adjustable to access PL repeaters.
- **MICROPHONE VOLUME/FREQ. CONTROL:** Both functions may be adjusted from either the microphone or front panel.
- **NON-STANDARD OFFSETS:** Three accessory offsets can be obtained for CAP/MARS or unusual repeater splits. CAP and Air Force MARS splits are **BUILT IN!** **COMPARE!**
- **25 WATTS OUTPUT:** Also 5 watts low power to conserve batteries in portable use.
- **GREEN FREQUENCY DISPLAY:** Frequency numerals are green LEDs for superior visibility.
- **RECEIVER OFFSET:** A channel lock switch allows monitoring of the repeater input frequency. **COMPARE!**
- **SUPERIOR RECEIVER:** Sensitivity is better than 0.28 uV for 20-dB quieting and 0.19 uV for 12-dB SINAD. The squelch sensitivity is superb, requiring less than 0.1 uV to open. The receiver audio circuits are designed for maximum intelligibility and fidelity. **COMPARE!**
- **ILLUMINATED KEYBOARD:** Keyboard backlighting allows it to be seen at night.
- **TRUE FM, NOT PHASE MODULATION:** Transmitted audio quality is optimized by the same high standard of design and construction as is found in the receiver. The microphone amplifier and compression circuits offer intelligibility second to none.
- **OTHER FEATURES:** Dynamic microphone, built-in speaker, mobile mounting bracket, external remote speaker jack (head and radio) and much, much more. All cords, plugs, fuses, microphone hanger etc. included. Weight: 6 lbs.
- **ACCESSORIES:** CS-ECK 15-foot remote cable. CS-6R 6-amp ac power supply. CS-AS remote speaker. CS-TTK touchtone<sup>®</sup> microphone kit (wired and tested).

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# Food for thought.

Our new Universal Tone Encoder lends its versatility to all tastes. The menu includes all CTCSS, as well as Burst Tones, Touch Tones, and Test Tones. No counter or test equipment required to set frequency—just dial it in. While traveling, use it on your Amateur transceiver to access tone operated systems, or in your service van to check out your customers' repeaters; also, as a piece of test equipment to modulate your Service Monitor or signal generator. It can even operate off an internal nine volt battery, and is available for one day delivery, backed by our one year warranty.

- All tones in Group A and Group B are included.
- Output level flat to within 1.5db over entire range selected.
- Separate level adjust pots and output connections for each tone Group.
- Immune to RF
- Powered by 6-30vdc, unregulated at 8 ma.
- Low impedance, low distortion, adjustable sinewave output, 5v peak-to-peak
- Instant start-up.
- Off position for no tone output.
- Reverse polarity protection built-in.

## Group A

67.0 XZ	91.5 ZZ	118.8 2B	156.7 5A
71.9 XA	94.8 ZA	123.0 3Z	162.2 5B
74.4 WA	97.4 ZB	127.3 3A	167.9 6Z
77.0 XB	100.0 1Z	131.8 3B	173.8 6A
79.7 SP	103.5 1A	136.5 4Z	179.9 6B
82.5 YZ	107.2 1B	141.3 4A	186.2 7Z
85.4 YA	110.9 2Z	146.2 4B	192.8 7A
88.5 YB	114.8 2A	151.4 5Z	203.5 M1

- Frequency accuracy,  $\pm .1$  Hz maximum - 40°C to + 85°C
- Frequencies to 250 Hz available on special order
- Continuous tone

## Group B

TEST-TONES:	TOUCH-TONES:	BURST TONES:
600	697 1209	1600 1850 2150 2400
1000	770 1336	1650 1900 2200 2450
1500	852 1477	1700 1950 2250 2500
2175	941 1633	1750 2000 2300 2550
2805		1800 2100 2350

- Frequency accuracy,  $\pm 1$  Hz maximum - 40°C to + 85°C
- Tone length approximately 300 ms. May be lengthened, shortened or eliminated by changing value of resistor

Model TE-64 \$79.95

**COMMUNICATIONS SPECIALISTS**

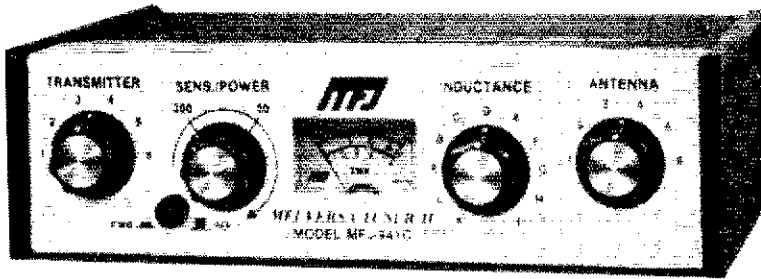
426 West Taft Avenue, Orange, California 92667  
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# MFJ ANTENNA TUNERS <sup>16</sup> MODELS

## MFJ-941C 300 Watt Versa Tuner II

Has SWR/Wattmeter, Antenna Switch, Balun. Matches everything 1.8-30 MHz: dipoles, vees, random wires, verticals, mobile whips, beams, balanced lines, coax lines.



Ham Radio's most popular antenna tuner. Improved, too.

**\$89<sup>95</sup>** (+ \$4)

Fastest selling MFJ tuner . . . because it has the most wanted features at the best price.

Matches everything from 1.8-30MHz: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balanced and coax lines.

Run up to 300 watts RF power output.  
SWR and dual range wattmeter (300 & 30 watts full scale, forward/reflected power). Sensitive meter measures SWR to 5 watts.

Flexible antenna switch selects 2 coax lines, direct or through tuner, random wire/balanced line, or tuner bypass for dummy load.

12 position efficient airwound inductor for lower losses, more watts out.

Built-in 4:1 balun for balanced lines. 1000V capacitor spacing.

Works with all solid state or tube rigs.  
Easy to use, anywhere. Measures 8x2x6", has

S0-239 connectors. 5-way binding posts, finished in eggshell white with walnut-grained sides.

4 Other 300W Models: MFJ-940B, \$79.95 (+ \$4), like 941C less balun. MFJ-945, \$79.95 (+ \$4), like 941C less antenna switch. MFJ-944, \$79.95 (+ \$4), like 945, less SWR/Wattmeter. MFJ-943, \$69.95 (+ \$4), like 944, less antenna switch. Optional mobile bracket for 941C, 940B, 945, 944, \$3 00.

### MFJ-900 VERSA TUNER



MFJ-900  
**\$49<sup>95</sup>** (+ \$4)

Matches coax, random wires 1.8-30 MHz.  
Handles up to 200 watts output; efficient air-wound inductor gives more watts out. 5x2x6".  
Use any transceiver, solid-state or tube.  
Operate all bands with one antenna.

#### 2 OTHER 200W MODELS:

MFJ-901, \$59.95 (+ \$4), like 900 but includes 4:1 balun for use with balanced lines.

MFJ-16010, \$39.95 (+ \$4), for random wires only. Great for apartment, motel, camping, operation. Tunes 1.8-30 MHz.

### MFJ-949B VERSA TUNER II



MFJ-949B  
**\$139<sup>95</sup>** (+ \$4)

MFJ's best 300 watt Versa Tuner II.  
Matches everything from 1.8-30 MHz, coax, randoms, balanced lines, up to 300W output. solid-state or tubes.

Tunes out SWR on dipoles, vees, long wires, verticals, whips, beams, quads.

Built-in 4:1 balun. 300W, 50-ohm dummy load. SWR meter and 2-range wattmeter (300W & 30W).

6 position antenna switch on front panel, 12 position air-wound inductor; coax connectors, binding posts, black and beige case 10x3x7".

### MFJ-962 VERSA TUNER III



MFJ-962  
**\$229<sup>95</sup>** (+ \$10)

Run up to 1.5 KW PEP, match any feed line from 1.8-30 MHz.

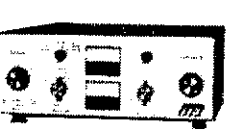
Built-in SWR/Wattmeter has 2000 and 200 watt ranges, forward and reflected.

6 position antenna switch handles 2 coax lines (direct or through tuner), wire and balanced lines.

4:1 balun. 250 pf 6KV cap. 12 pos. inductor. Ceramic switches. Black cabinet, panel.

ANOTHER 1.5 KW MODEL: MFJ-961, \$189.95 (+ \$10), similar but less SWR/Wattmeter.  
MFJ-10, 3 foot coax with connectors, \$4.95.

### MFJ-984 VERSA TUNER IV



MFJ-984  
**\$329<sup>95</sup>** (+ \$10)

Up to 3 KW PEP and it matches any feedline, 1.8-30 MHz, coax, balanced or random.

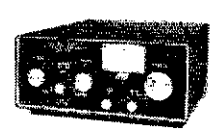
10 amp RF ammeter assures max. power at min. SWR. SWR/Wattmeter, for/ref., 2000/200W.

18 position dual inductor, ceramic switch.  
7 pos. ant. switch. 250 pf 6KV cap. 5x14x14".  
300 watt dummy load. 4:1 ferrite balun.

3 MORE 3 KW MODELS: MFJ-981, \$239.95 (+ \$10), like 984 less ant. switch, ammeter.

MFJ-982, \$239.95 (+ \$10), like 984 less ammeter. SWR/Wattmeter. MFJ-980, \$209.95 (+ \$10), like 982 less ant. switch.

### MFJ-989 VERSA TUNER V



MFJ-989  
**\$329<sup>95</sup>** (+ \$10)

New smaller size matches new smaller rigs — only 10-3/4Wx4-1/2Hx14-7/8D".

3 KW PEP. 250 pf 6KV caps. Matches coax, balanced lines, random wires 1.8-30 MHz.

Roller inductor, 3-digit turns counter plus spinner knob for precise inductance control to get that SWR down.

Built-in 300 watt, 50 ohm dummy load.  
Built-in 4:1 ferrite balun.

Built-in lighted 2% meter reads SWR plus forward/reflected power. 2 ranges (200 & 2000W).  
6 position ant. switch. Al. cabinet. Tilt ball.

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KDK INTRODUCES A NEW GENERATION OF 2 METER FM RADIOS.

The sparkling 2025A Mk II is loaded with new features. Easy of operation is the design concept at KDK.



**SPECIAL!**  
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Includes:  
Touch Tone<sup>®</sup> Mike (Ready To Use)  
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- Features such as ten channel memory in two banks of five each, a solid 25 watts of power, full MARS and CAP coverage from 143,000 Mhz to 148,995 Mhz, plus built in memory retention for up to one year . . . and much, much more makes this the radio of the year. If you have been waiting to move up to a new model, or have wished for a radio with "everything" . . . KDK has it!
- The ten channel memory is easily addressable and you have two banks of five channels each. You can even use both banks at once for odd splits.
- Standard 600 hz shift up or down. Band scan or memory scan. Memory scan is easy. There is also band scan with upper and lower limits you can choose yourself!
- Built in nicads for the memory retention which has drain in nano-amps, not milli-amps. The internal battery will hold the memory for up to one year! No other radio offers you this feature.
- Fast and easy dialing. Full solid state dialing and you can choose from the front panel either a fast or slow dial rate.
- No relays are used, only solid state switching. This eliminates a trouble spot many radios encounter.
- KDK has also eliminated another trouble spot by completely hand wiring each radio. No internal plugs to become intermittent and no wire wraps either, just good solid wiring.

- KDK gives you one of the hottest receivers you can find. By using UHF (not VHF) dual gate MOS-FETs with electronic auto tuning for the RF amplifier and the first mixer, you have a combination of ultra sensitivity and maximum quietness.
- The audio output stage in the 2025A Mk II uses an integrated circuit which has internal protection against over-voltage and shorted output conditions. Plus it is a high audio output chip - just what you need in a noisy mobile situation.
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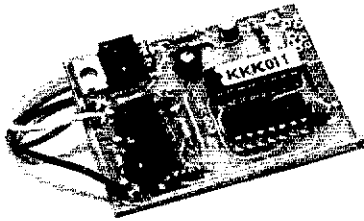
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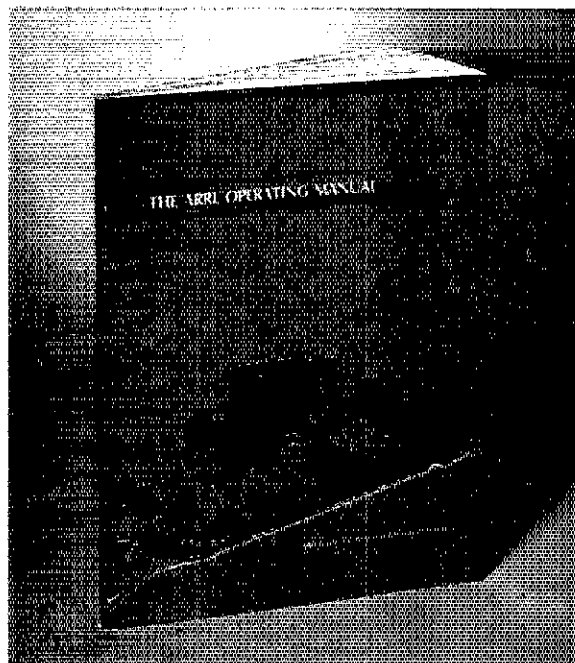
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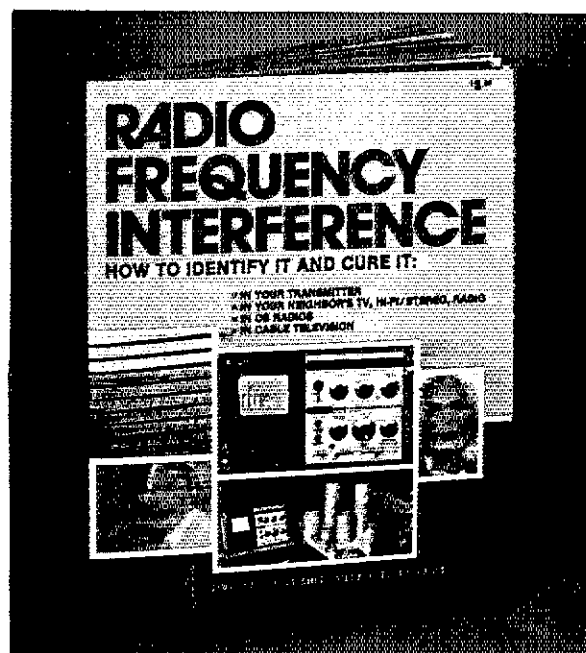


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NJVN	KA2HNO 4949	10:30 P.M. Dy	31	367 111
NWNJVN	N2BNB 9030	8:30 P.M. Dy	4	38 5

The Cherryville Repeater Association (CRA) has scheduled the next Flemington Hamfest for April 3. Members of CRA provided communications for a Boy Scouts Klondike Derby Jan. 30. Split Rock ARA members also supported a Scout Klondike Derby. Sussex Co. ARC members provided communications for NJ Special Winter Olympics. W2XD reports more liaison stations are needed between NJVN and MCN at 10:30 P.M. Congrats to W2XD on being selected for the WB2VEJ Memorial Award for outstanding service in the Second Series. New appts: KA2GSX and KA5DLV as ORSSs. KA5DLV earned OBTTN Local Net certificate. KA2ERG organized support for the soccer tournament in Westfield. Congrats to KR2T (KA2HOA) and K52A (KC2FH) on upgrading to Extra. Officers for Ramapo Mountain ARC for 1982: K2BJG, pres.; N2AAZ, v.p.; WD2ADH, secy.; WA2UJK, treas. K2TKN and several others interested in developing a packet radio network linking East Coast repeater groups recently held a second meeting in Flemington. Are you a member of the Amateur Radio Emergency Service? If not, sign up and also support your local and state nets. Be trained when your help is needed. Remember to send reports and other information for this column to WD2TRZ, RD 3, Box 175, Califon NJ 07830 (201-632-2821) until KB2ZWI returns in mid-April. Congrats to N2BOP on making BPLI PSNR: W5DTR W2XD AG2R K2VX KB2HM N2XJ N2BNB KA2HNO KA5DLV WA7DPK KA2JHM WB3HWX KB2HM PSNR Nov. 110 (Correction). Traffic: N2BOP 258, W2RHQ 230, AG2R 227, W2GVS 220, W2XD 140, K2VX 134, KB2HM 133, N2XJ 105, N2SU 72, KA2JHM 64, KA5DLV 61, N2BNB 58, KA2GQQ 56, WB3HWX 50, KA2HNO 49, WK2LF 44, W5DTR 41, WA2UJK 33, WB2RMJ 25, W2CCG 26, KA2GSX 18, W2UH 17, KC2AK 14, W2ZEP 12, WA2GKG 8.

### MIDWEST DIVISION

IOWA: SCM, Bob McCaffrey, K0CY --- SEC: W0RPK, STM: KA9X, Nms: WB0AVW W0VLS WD0HND WA0AUX. NOW is the time for SKYWARN preparation. Let your EC know that you can help. Hope to see all at the 1981 ARRL National Convention in Cedar Rapids. Get your reservations in now. I have received many reports, but did not get yours? Very successful "Operation Santa Claus" in DSM as well as Salvation Army toy drive in Seo City. It is the 12th anniversary of the Mt. Pleasant ARC. N0BHA has achieved DXCC/GW. WD0FWB is the new president of NIARC. Now receive newsletters from Waterloo and Sioux City. Do I have yours? Upgrades: K0LUZ, Extra; WB0UCK K0VZR, Advanced. New calls KA0MTS KA0KYS. The "Fern Koskovich" award to K0AVW. Congrats. New officers in DSM are WB0MBZ KA0LR KB0VJ WD0DOK WB0ANZ K0PCG. First shipment to Zambia by CIRAS, for Project Gambia. Megahertz Maniacs a new DX contest group from Huxley. KA9GBGN first Novice in Iowa to obtain PSNR. Nice going. I am sure there are more.

Fred. UIC QNI QTC Sess.  
TLCN 3570 0930-0400 Dy 540 140 82  
75M Fone 3970 1830-2300 M-S 2395 85 52  
ICN 3713 0100 TWTHS 104 35 13  
PM Net 3978 2130 M-F 190 2 20  
Traffic: WA0AUX 192, AE0R/KA9X 178, W0SS 110, K0PG 82, WB0QAM 71, W0VLS 67, N0WA 59, WD0HND 52, KA0JQG 46, WB0UFP 44, K0CY 30, W0BW 27, K0EVC 23, KA0JPN 2.

KANSAS: SCM, Robert M. Summers, K0BXF --- SEC: W0KL, STM: W0OYH. Another Silent Key, W0HGE of Scandia. Our sympathy to his family. Also the mother-in-law of N5AE passed away and our sympathy and prayers for him and his family. Nets: K5BN-QNI 1379, QTC 131; K5W-QNI 1054, QTC 624; K5N-QNI 481, QTC 48; CSTN-QNI 1930, QTC 187; QKS-QNI 374, QTC 80; QKS-QNI 33, QTC 2. We continue to ask for your support for the Kansas Slow Speed Net QKS-SS, 3735 kHz MWF at 1930 local time (7:30 PM). N0BBDG needs your QNI and QTC. As you noticed an old call is back in a top position again. Finally convinced W0OYH to become the Section Traffic Manager. We also have a new manager of the cw net, QKS, WB0ZEN, W0FT has taken a leave of absence. We all thank him for the many hours of activity he has donated to cw activities in Kansas the past number of years. Perhaps after W0KL becomes famous in Hollywood or the NY stage, we will not have too much trouble hitting that 1000 mark for ARCS members. A winner always draws attention. In the Parsons Area ARC elects: K0BVF, pres.; KA0KD, v.p.; WB0VEJ, secy.; KA0EB, treas. Also read in the Parsons Bulletin of the passing of W0DFD, who should be added to the list of Silent Keys. Traffic: W0QMT 180, W0H 117, WB0ZEN 82, W0FIR 75, W0FCR 74, WA0LBB 72, W0OYH 58, AC0E 50, K0BVF 48, WB0YLP 39, KA0CUF 38, W0CHJ 28, W0FT 19, KA0E 18, W0PB 16, N0BDG 14, W0RBO 14, W0RT 6, WA0OWH 3, W0KL 1. (Dec.) KA0E 13, W0RT 3.

MISSOURI: SCM, L. G. Wilson, K0RWL --- ASCM: W0OTF, STM: KM0L, SEC: N0AJI. The Kansas City chapter of the GCWA recently elected new officers. They are W0JU, pres.; W0DOK, v.p.; K0BRO, secy./treas. The meeting was attended by 5 past-presidents of the HARC: W0SSG WA0ELU WA0XA AK0V WB0J. New officers for the Eastern Ozarks Area are: W0BPA, pres.; AF0J, v.p.; W0WYF, secy.; WB0UEV, treas. Because of other commitments, WB0WLU was forced to resign as net manager of the MOSSBN. We'll be sorry to see her go after doing such a fine job. She will be replaced by WB0SSB, who is more than capable. We're sure she will do a fine job.

Net	QNI	QTC
NEMOE	99	2
CMEN	95	0
MOSSBN	799	57
MON	258	131
MON2	49	19
AF0J	17	4
HBN	449	30

The PHD ARC is presently conducting Novice classes. Eight soon-to-be Novices are attending classes given by the HARC. All eight have passed their code test and are waiting for the written tests to be sent by the FCC. Brentwood area ops presented a display recently at the Brentwood Recreation Complex. Congrats to W0CHZ on taking first in zero-land during the YL anniversary party. Several outstanding scores were submitted by Missouri cw stations during the recent NCJ Sprint. Congrats to K0MMY K0BO and K0GUG on completing DXCC.

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\* Release squeeze during ddb; dlt follows, and vice versa. (Same as AEA, Ten-Tec, Nya, Heath, Accu-keyer and others) See Nov., 1981 73 Magazine, page 189 for details.



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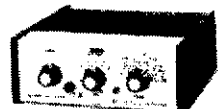
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Congrats to KC0MY, ex-WB0WLX, on new call and Advanced Ticket. Congrats to N0AIG on Extra. Traffic: W0OTF 130, K6SI 110, K6PCK 105, W0BMA 76, W00UD 56, K00HV 40, K00CL 34, K00L 23, K00RL 21, K00RW 6, W0BMAZ/0 4.

NEBRASKA: SCM, Shirley M. Rice, KA0BCB — SEC: N0AIIH, STM, W00SQG. Our sympathy to family & friends of W00RF, who became a Silent Key. New club officers across NE follow: Grand Island ARC: K00GF, pres.: W0EXK, v.p.: N0CSF, secy/treas.: WA0JBL, KA0BFL, board members. Tri-City ARC: K0TUH, pres.: AG0N, v.p.: W0GAG, secy/treas.: WA0JY, board member. Pine Ridge ARC: W0HQZ, pres.: W0DKF, v.p.: K0YIY, secy/treas. North Platte ARC: W00HFZ, pres.: N0BWM, v.p.: KA0KZN, secy.: N0BXJ, treas. AK-SAR-BEN RC: KA0DMB, pres.: N0ANQ, v.p. Central NE ARC: WB0LMX, pres.: KA0LAS, v.p.: WA0LWK, secy/treas. Lincoln ARC: WA0PY, pres.: KB0WB, v.p.: W00FJY, secy/treas. Hastings ARC: W00CPA, pres.: KA0PT, v.p.: K00BCG, secy/treas.: WA0UJZ, W00WHY, trustees. W00PKY is new trustee for Seward Co. & W00BOM is DEC for western NE. Congrats to KABASD who upgraded to EXTRA! Also, to W00EPO to Adv., KA0LDN to Tech. Traffic: K0DKM 22, W0ZNI 20, WA0BOK 14, WA0DX 12, KA0BCB 10, W00GMO 10, W0HTA 8, W00GWH 7, K0TUH 6, W00PP 5, WA0PCC 4, W0VZR 4, W00B0Z 2, W0UJ 1.

### NEW ENGLAND DIVISION

CONNECTICUT: SCM, Pete Kemp, KA1KJ — STM: K1EIC, SEC: K1WGO

Net	Freq.	EST	UTC	QNI	NM
CH	2640	1900/2200	237	414	K1EIR
CPN	915/315	1800/1000	Sn 66	385	WB1AIU
NVTN	28/88	2130			WA1ELA
RTN	13/73	2100	92	330	WB1CPF
WCN	78/18	2030	135	488	W1DPR

High QNI: CN — K1UQE WB1EKV K1EKE W1EFW; CPN — K1AQE K1KDK K1EUW. Appointments: OES — K1DII; ORS — K1UQE; EC — N1BPD. Call changes: KA1GXS/KA1YR, KA1BVR/N1BYR, N1AEK/K1N1, N1BFD/N1BPD. Welcome W1VLS WB1HHW to the nets. Upgrades: Adv — N1AHJ KA1CDH N1BST; General — KA1GGT. K1WGO newest member of the UTC. WB1GXZ back on hf. A. E. TX to all ARS ops who participated in Haddam Neck Nuclear Exercise on Feb 6. Channel E Cable TV QRM is on the upswing. Pse send documentation to Hq. Congrats to N1YL for her 1st place WW Phone and 2nd place WW CW in the Nov YLFL contest. New officers for ECARA: K1UQE, pres.; KH1H, v.p.; WA1DWE, secy.; WB1DXZ, treas.; K1APE, trustee. Murphy's Marauders officers: K1ZZ, pres.; K1GC, v.p.; K1TD, act. mgr; K1NYK, secy/treas.; K1XA, editor. ICRA officers: K01J, pres.; WA1UZZ, v.p. W1HUE is on the way to Vienna as OE1ZES. FARA club station WB1COO is gearing up for RTTY. New slate of officers at Fairfield ARA: K1BR, pres.; W1NU, v.p.; KA1FT, secy.; K1TA, treas.; KA1BZ, act. mgr. KA1RGL, dir. WB1AG finally made DXCC. WA1TRY recently gave demo on ATV at the Shoreline ARC. Wallingford ARS is sponsoring a CPR course. The Meriden ARC Key Klix has gone computerized. WB1JH/1 is back on the air operating with a most unique longwire. KA1JV is busy operating hf/vhf aeronautical mobile. CPN/ICN annual dinner scheduled for April 3rd. All traffic handlers are invited. Tri-City has three members who have been licensed for over 50 years. ARRL affiliated clubs are reminded to send in their 1982 annual reporting forms. Traffic: WB1GPF 323, W1EFW 240, K1EIR 233, WB1EKV 155, N1BPD 132, WB1CXZ 103, WB1PJJ 30, K1UQE 98, K1AQE 75, WB1JH 63, WB1CRH 53, KA1BZ 48, K1EUW 48, KA1KDK 27, W1XX 27, WA1WOG 17, K1WGO 15, KA1AMK 11, K1XA 7, W1QV 6, W1CUM 4, WB1ESJ 4, WB3ANC 3.

EASTERN MASSACHUSETTS: SCM, Rick Beebe, K1PAD — STM: WA1TB, SEC: WA1BLG, ASGM, K8HI

Net	Mgr.	Freq.	Time/cls/Dy	QNI	UTC
EMRI	NTGO	3.658	1900/2200/Dy	367	234
EMRIPN	KA1BJY	3.949	1730/Dy	346	249
EM2MN	KA1CGP	23/63	2000/Dy	238	51
NEEPN	K1BZD	3.945	0830/Sn	83	31
HHTN	K1BSO	04/64	2230/Dy	482	130
EMRIS	N1BHH	3.715	2030/Dy	100	31
MKFARD	WA1DWS	3.925	1800/Dy	222	50

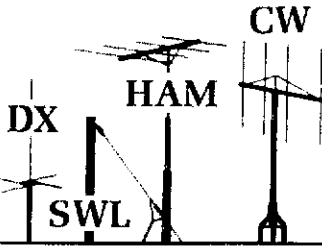
There have been two frequency changes in our nets as you may have noticed from above. EMRIPN has moved up from 3.898 to 3.949 and EM2MN has moved from 9D/30 the Red Cross Boston repeater on 145.23. Massasoit ARA had a very successful banquet enjoyed by all. Acton/Boxboro Club has moved its meeting place to the Junior High and had KB1Q (also SM0COP) give a talk on ham radio in Europe. Middlesex club had a successful Xmas party with 36 people in attendance. Quannapowitt past president, KA1BD, is the proud father of a new baby boy. Wellesley club members were active as usual in the Jan vhf contest from W1YK and made 435 QSOs under less than outstanding condx. Framingham club members and 37HX pairs K1AZ/K1BYR and A15K/KA1GDP have returned reluctantly from trips to warmer climates. Algonquin club planning a flea market as is the Norwood club. The Yankee Clipper Contest Club may have won its first major DX contest. They have their fingers crossed. ATTENTION CONTESTERS: Do you think that a guest operator who is operating alone but at someone else's QTH has an unfair advantage, i.e. combining the best operator with the best station? Should this sort of situation be a separate classification? Send your comments to K1PAD. The Membership Affairs Committee which is chaired by our Director W1HHR met in Feb. and has informally accepted the Long Range Planning Committee Phase II report with the exception of the Blue Ribbon Club proposal. The changes that will be made in the future include a reorganization of the Field Organization with section managers (old SCMs) becoming more like section directors and participating in a steering committee capacity for the director. For more details see the Crosshander and future issues of QST. I'll be glad to talk to your group in more detail about this. All you have to do is ask. Traffic: N1BHH 547, WA1TB 378, N1BGW 226, KA1BJY 186, KA1ON 159, K1BA 140, K1BSO 95, N0TM 50, K1GN 48, KA1BZU 40, KA1EMO 37, N1AJJ 35, K1BZD 28, W1DMH 29, N1AVP 27, KA1KU 27, KD1B 23, WA1FNM 19, WB1TBY 18, W1ATX 13, K1UAF 13, W1CE 10, KA1R 9, WA1DXT 7, K1LCO 5, KA1BTY 2, KE1U 2, WA1HYV 2.

MAINE: SCM, Cliff Lavery, W1RWG — SEC: K1JIG, STM: AK1W, Arcadia Naval Radio Amateurs elected: KA1GGE, pres./QSL mgr; K7ABE, v.p.; KA1HV1, secy/treas. Androscoggin ARA had a successful hamfest at Poland, Feb 14, conducted by WA0UJJ. Public Service narratives are welcome. Net Freq. UTC sess. QTC QNI NM

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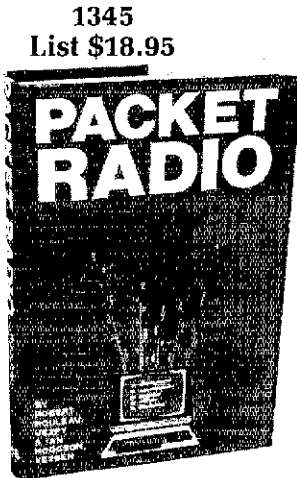


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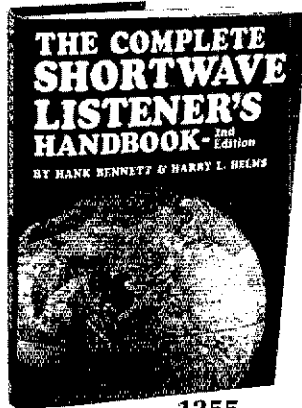
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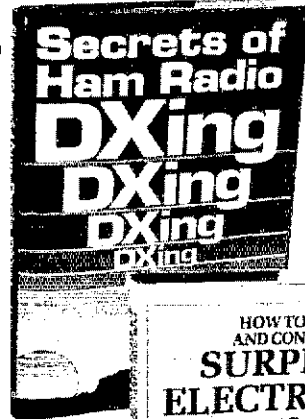
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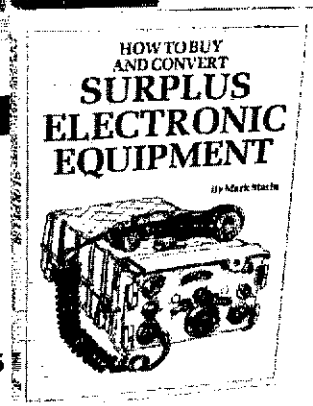
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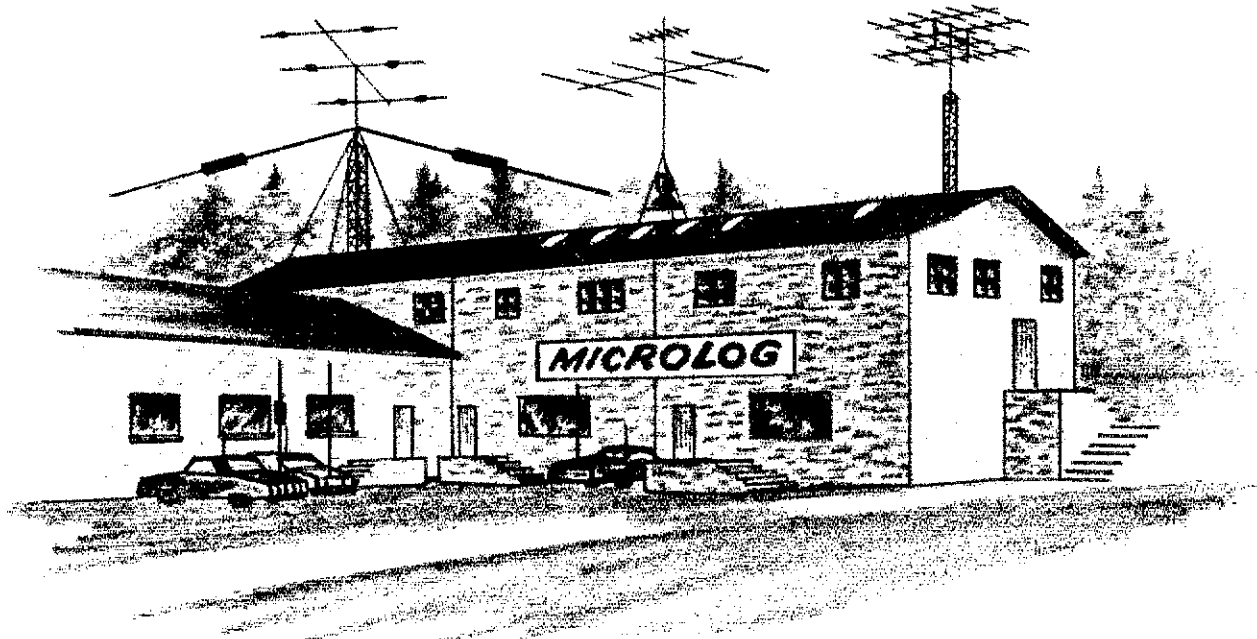
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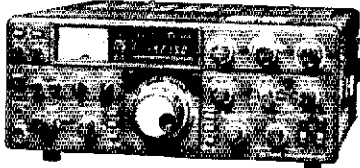
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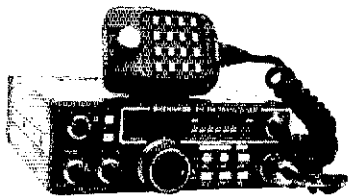
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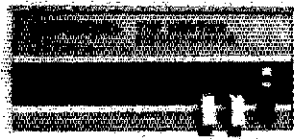
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Traffic: AK1W 202, W1RWG 95, AC1G 68, W1KX 72, W1AHM 68, W1HDC 50, W1B1BYR 47, N1BJV 42, KA1AVU 39, N1BUN 35, W1JTH 34, KA1AJ 33, W1WCI 23, W1CTR 22, K1NAN 21, W1EJ 19, W1BMX 14, W1GCB 14, W1GKU 13, WA1YNZ 12, KA1E1W 11, WA1JHT 8, WA1ZJL 6, KA1GOW 5, WA1ZCE 5, KA1IGE 5.

**NEW HAMPSHIRE:** SCM, Robert C. Mitchell, WINHWT5WX — STM: WITN. SEC: AK1E. NMS: K1OSM W1VTP.

Net	Freq.	Days	Time	Mgr.
CVFMWX	146.76	M-F	8:30 A.M. & 9:55 P.M.	KA1BGT

GSFM	146.94	Dy	6:30 & 8:30 P.M.	K1OSM
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NARCFM	146.73	T	8 P.M.	K1HEJ
Salem ARES	146.165	M	7:55 P.M.	W1PFA
TSFME	147.375	W	7:30 P.M.	W1FYR
Seacoast	3.895	Sn	10 A.M.	WA1WNM
GSPN	3.942	Dy	6:30 P.M.	W1VTP
	3.945	Dy	9:30 A.M.	
	3.547	Dy	7 P.M.	
NHN	3.547	SSn	10 P.M.	N1NH
NHNS				KA1CXP

W1HZN says the Nashua club will be adding a 220 repeater soon on 224.28. KA1FMU is now KG1T. Boy Scout Amateur Radio training is being organized by KA1HXM, KA1BBI now K1IM. Worked All New England award to WB1GXM, for all 67 counties. Write WA1WNM for details. WB1CFP has new IC-2A. K1MFO is often aeronautical mobile on 2 meters. Lots of NH stations heard on 10 working DX. W1KGZ is on RTTY. K1NOR swapped his motorcycle for new color computer. Traffic: WITN 253, K1OSM 229, N1NH 205, KA1BBI 128, KA1FWG 69, N1ALM 74, KA1E 68, W1VTP 56, W1GUX 48, KA1E 43, W1AFZ 39, W1ALF 38, K1YMH 35, K1NH 31, KA1CUI 28, W1CUE 24, KB1A 20, KA1FKM 14, W1MHX 14, K1ACL 12, W1NH 10, N1AKS 2. (Dec.) W1MHX 71, K1ACL 30.

**RHODE ISLAND:** SCM, Gordon F. Fox, W1YNE — SEC: KA1EHR. STM: KA1FE, WA1OSL, NM RIEMTMM, reports sessions 21, QNI 192, QTC 16. NM RI Teleprinter Net K1C1G reports sessions 7, QNI 31, QTC 9. Net meets on 146.805/205 rpt on Tues, Thur, Sat at 1830 local. Affiliated club officers for 1982: Prov Radio Assoc — N1AKO, pres.; K1DT, v.p.; W1GS, secy.; WA1TAQ, treas. Newport Co. — WA1OSL, pres.; W1LO, v.p.; WB1CPO, corr. secy.; W1JPF, rec. secy.; WB1GVH, treas. ARASNE (W1AQ); WA1CVF, pres.; KA1FWF, v.p.; WA1LAD, secy.; W1DK, treas. SubSig: KA1EL, pres.; N1BJY, v.p.; AE1S, secy.; KA1FDF, treas. OYFG (10770) ABT, pres.; K1IDE, v.p.; W1VQB, secy./treas.; W1EOP 492, KA1FE 170, W1YNE 28, KA1EHR 17, KA1FP 14, WA1CSO 11, N1RI 10, AE1S 6. (Dec.) KA1BAT 6.

**VERMONT:** SCM, Bob Scott, W1RNA — SEC: WB1ABQ. STM: N1ARI, WA1PFY called in a report via 2-mtr rpt to W1VSA re car upside down in the median on I-89. Gave info to State Police. AE1J & another ham called info to State Police re an accident on I-89. Carrier 26/637/34; GMN 26/556/42; VSSBN 21/469/84; VTN 30/115/56; VPN 5/90/5; RFD 5/79/12. Fair traffic — junk etc — what does it amount to? Most will not handle it if it involves mailing or a toll call. If not delivered, it does harm radio no good! Tfc count for originating and relay stns, but expense for the delivering stn in most instances in this area, seems to be the only real thing involved. Svc: mgs for the ltrk will be generated, rather than costs incurred from this stn. Traffic: W1RNA 143, K1BQB 133, N1ARI 103, AE1T 27.

**WESTERN MASSACHUSETTS:** SCM, William J. Hall, W1JWP — STM: W1UD. SEC: WB1HH. Congrats to W1YI appointed as Affiliated Club Coordinator, and to W1UD who was awarded BPL medalion. K1SF reports working TF3, VE8 and CT2 on 6M. Mt. Tom ARA officers retiring in Jan. set out to paint town red, resulting in broken leg for WB1EMB. New pres is N1AHV, Hampden Co. RA very active in VHF SS and hopes to top 1981 score. HORA also looking into "Courage Handi-Ham System" as club project. Provin Mt. ARA still. with a few. Red Cross, elected WA1UDX president and is planning '82 FD event. So is NOBARC of Mt. Greylock fame, which elected W1HER president. He just got married too! Congrats to Dan and Blanche. Looking for news from Worcester Co. clubs for next month's column. PSHR: WB1HH K1JHC KA1T WB1CGK. Traffic: WB1HH 170, KA1T 155, W1UD 144, W1TM 116, WA1ITL 84, WB1CGK 61, W1YI 58, K1JHC 47, K1JUV 42, WA1OPN 27, W1KR 21, K1PUG 12, W1JP 11, W1BVR 9, WB1HKN 9, WA1DNB 7, W1UPH 7, WA1OUZ 6, WA1MJE 2, W1ZPB 2.

### NORTHWEST DIVISION

**ALASKA:** SCM, Richard Henry, AL7O — SEC: AL7AC. STM: WL7R. NMS: ACN-KL7Y; ASN-KL7HPU; SSN-WL7APE; ABN-AL7CP. DECS: KL7JFT AL7AW. A sincere thank you to all who worked for and supported my bid for SCM. Visited with 175 members of 3 clubs in January. Plans for future visits throughout the state continue. Congrats to KL7LO for being elected "Ham of the Year" for AARC and for upgrading to Extra. AARC will be helping with communications for the sled dog race during Fur Rondy. Anchorage code practice nightly 147.51 MHz 8:30 P.M. from K1ZAT. AL7E has passed the 20 word code test. Bethel hams KL7IC, KL7IEI and KL7LC handled communications for the Kuskokwim 300. KL7AM invited to be keynote speaker at the 1982 ARRL National convention. Traffic: KL7T 30, AL7O 22, KL7LO 18.

**IDAHO:** SCM, Lem Allen, W7JMH — CLUB NEWS: Voice of Idaho club has new officers: K17B, pres.; AC7R, v.p.; WB7SMM, secy.; W7OCR, treas. The annual Valentine pot luck was a huge success. The Boise club officers: W7SC, pres.; W7IWW, secy./treas. PEOPLE AND THINGS: WA7YXQ has FT-101. W7AZL has new Collins 380. W7IWW had mild heart attack while visiting in Florida. Successful eye surgery was performed on Oly. XYL of W7GHT. She's doing fine.

Net	Freq.	Time/Days	Sess.	QNI	QTC
CD	3990	8:10 A.M. M-F	21	13	13
FARM	3635	7 P.M. Dy	31	1704	32
IMN	3635	8 P.M. M-F	21	182	73
ZRC/R	34/94	8:30 P.M. Sn	5	385	10
TV CD	145.44	9 P.M. Sn	5	284	58

Traffic: W7GHT 239, AC7P 63, W7JMH 48.

**MONTANA:** SCM, Les Belyea, N7AIK — New officers for the Anaconda ARC: K8PP, pres.; WB7QBQ, v.p.; W7UO, secy.; K7YNZ, treas. KB7SE is now the manager for the Montana Section Net, replacing N7AGP. KA7IUP is now

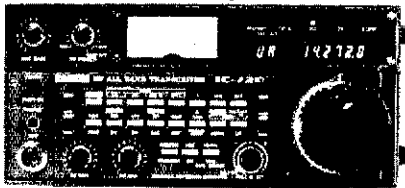




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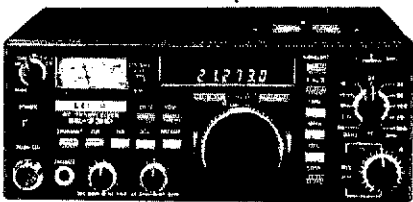
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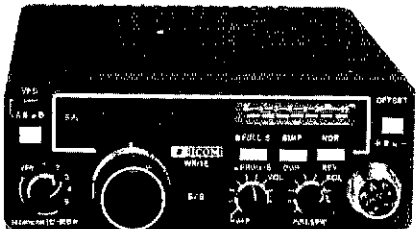
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IC-490A 432 MHz All Mode mobile transceiver. 430-439.995 MHz, 10 watts, scanning microphone ..... TBA

IC-22U 800 ch. mobile, 144-147.995 MHz, 1 or 10 watts, thumbwheel frequency selection, 6 1/2" w x 2 1/2" h x 8 1/2" d, 3 1/2 lbs (Reg. \$299) ... **Limited Special! \$239.95**  
 EX-199 Remote frequency selector ..... 35.00



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IC-2AT Synthesized 2m FM Hand-held with 1/1 pad 800 ch. in 5 KHz steps, 144-147.995, selected by thumb wheels & +5 KHz upshift switch; ± 600 KHz offsets. .15 or 1.5w output with supplied nicad pack. Optional packs for larger capacity or higher power. Supplied with 250 ma. nicad pack (BP-3), wall charger, flex antenna, belt clip, strap, earphone and plugs. 6 1/2" h x 2 1/2" w x 1 1/4" d, 1 lb.

### Regular SPECIAL!

IC-2AT HT w/TTP, nicad & chgr ... \$269.50 **\$239.50**  
 IC-2A 2m HT w/nicad & wall chgr ... \$239.50 **214.50**  
 ML-1 2.3/10w 2m mobile linear ..... 89.00 **79.95**  
 IC-3AT 220 HT/TTP, nicad & chgr ..... 299.95 **269.95**  
 IC-3A 220 HT/nicad & charger ..... 269.95 **244.95**  
 IC-4AT 440 HT/TTP, nicad & chgr ..... 299.95 **269.95**  
 IC-4A 440 HT/nicad & charger ..... 269.95 **244.95**

### HT Accessories: Regular

BC-25U Extra wall charger ..... **\$12.50**  
 BC-30 Drop-in charger for BP-2, 3 & 5 ..... 69.00  
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 BP-3 Extra 250 ma nicad pk, 1.5w output ..... 29.50  
 BP-4 Alkaline battery case ..... 12.50  
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 IC-502A 6m SSB port. (Reg. \$239) ... **NOW 214.95**  
 IC-3PS ps/spkr; portables (Reg. \$95) ... **NOW 89.95**  
 BC-15 Nicads & AC chgr for portables ..... 57.50  
 BC-20 Nicads & DC-DC chgr for portables ..... 57.50  
 SP4 Remote speaker for portables ..... 24.95

### Accessories:

BU-1 Memory back-up; 25A/290A/490A ..... **\$38.75**  
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 EX-2 Relay box w/marker; 720A/730/701 ..... 34.00  
 IC-3PE 3A ps/speaker (Regular \$95) ... **NOW 89.95**  
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 SM-2 4-pin electret desk microphone; 551/D ..... 39.00  
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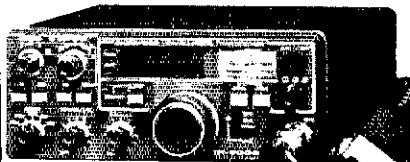
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N7DKL. K27K is new Official Observer station in Lewistown. WB7WVD from Big Arm is doing a good job as Official Relay Station. The Hellgate (Missoula) ARC held a QSO party on Lolo pass which proved to be a quality event. KB7Q KB7BJ and N7BUS got their first contact via EME. Gallatin ARC assisted with the annual snowmobile race from Bozeman to West Yellowstone. KD7Q received a QSL card from a Soviet Union operator along with a request to be sent a pair of U.S. made jeans. W7PSX from Victor has set up a network so as to relay messages from families to hospitalized veterans in various VA hospitals. Very FB. K7FT has received his cw DXCC certificate. K7FR has been busy with his new TRS-80 computer. New reports: W7LGN 182, Q1C 74; BSN 103, Q1C 101, Q1C 132, Q1C 60, PSB; W7BDXZ. Traffic: W7BDXZ 204, N7AIR 40, W7NEG 25, KB7SE 15, W7DB 2.

OREGON: SCM, William R. Shrader, W7QMU — STM: W7VSE. SEC: K7WWW.

Net	Time/Day	Freq.	QNT	QTC
OSN	0230/0800Dy	3587	515	418
BSN	0145Z Dy	3908	1084	31
OARES	0115Z Dy	3993.5	531	83
OARES	0230Z Dy	3993.5	92	9
PTTN	0300Z Dy	148.76	297	35
WCLN	0300Z Dy	3702	584	303
LBLARES	0300Z Dy	148.79	486	10
MPARES	0300Z TTh	147.02	225	4
SCARES	0300Z MThFS	148.82	252	178
SOFM	0300Z T	148.64	148	3

Upgrades: Extra — W2IMS WB7HB; Adv — K7WTC; Gen — N7CWF K7K15; Novice — K7LYO K7M7DU. New calls: N7DDN K7Q7 K7C7OR. K-Bar-A officers: WA7OYC, pres.; WB7CKW, v.p.; K7BQG, treas.; K7TCC, secy. Sunset Empire Club officers: W7HJR, pres.; W7YLV, v.p.; K7GXP, secy. OTVARC club held a "Rusty Key" contest on the 10-meter Novice band in January. W7CPV new president of So. Oregon ARC. W7TC Oregon 1st place in IARU cw and USA 1st class 1-D cw Field Day contest in '81. K7FTS new ARRL member and is 15 yrs old. Traffic: W7WSE 684, WA7LGN 286, K7GV 250, KNTB 202, K7ELI 183, W7LNE 192, W7BZ 149, B7C 132, W7DQX 87, W7DDB 78, W7HIS 82, K7YF 56, K7LW 43, W7QMU 37, W7TC 14, N7BGM 13, W7FDU 12, W7LT 11, W7DAN 5. (Dec.) K7LWE 89, K7GV 52, K7WWR 6, W7DAN 1.

WASHINGTON: SCM, Joe Winter, WA7RWK — ASCM: KD7G. SEC: K7SH. STM: W7GB.

Net	Time (Z)	Freq.	QNT	QTC	Sess.	Mgr.
NTN	1930	3970	1260	101	31	W7VL
WARTS	0200	3970	3108	296	31	W7SFT
NWSSBN	0230	3945	882	48	31	W7JHR
WSN	0245/0545	3590	759	192	61	W7GB
EWTN	0130/0530	146.84	79	74	38	W7CBN
PSTS	0130/0630	145.33	167	108	62	W7IEU
SCARES	0330/0V	147.18	54	2		K7ATM

Congrats to 1982 officers of W7ARA, W7FKH, chm.; WA7JAN, v. chm.; K7OR, secy. treas.; W7LGN WA7FLUS W7JPH W7BPKM board. Many tnx to this dedicated rotf freq. coordinating group. Clark Co. ARC 1982 WB7WIS, pres.; K7FLI, v.p.; W7DYX, secy.; N7BEY, treas.; N7ASX, asst. treas. We should support them. George Washington Birthday (QSO) Party was another success tnx to W7WMO7 at George, WA. WB7SWW Skagit Valley ARC at Mt. Vernon Mall & W7CJZ Olympia ARS in capitol. Over 170 attended CGARC W7AJA dinner (me too) celebrating 50th year with ARRL. Huge success! No. Sea. ARC heard WA7BTZ describe ARES in their area. FEMA official in color. All on the subject of major earthquake in Seattle. K7RRR head. FD Radio Amateurs Skagit Co. 1982 officers WA7WZC, pres.; K7FK, v.p.; K7GB, secy. treas. AASC new permanent home at VFW hall. AASC helped with success of Nookachamp Run (400 runners) helped. Coordinators were: K7DA WA7BH K7FK WB7STH. Sedro Woolley H.S. teacher WB7SX reports 19 new licensees from his class. Congrats. WWDXC Feb. program K7WA on wire ants for low band DX. Forty, 80 & 180 are good DX bands. Mike & Key ARC held huge electronics flea market & auction Mar. 13 - 14 in Bellevue. Radio club of Tacoma held annual installation & awards banquet on March 27. W7OS received nearly 1000 plus for 60 year anniversary. W7P heads Tacoma Hamfair '82. W7DK approved open auto-patch on its 147.28 rpt. They also brought a new 4-kw emergency generator, adding to two 10 kw generators. Evergreen ARS (Jefferson Co.) 1982 officers: W7TXS, pres.; W7KGI, v.p.; K7ALNE, secy.; WB7UGF, treas.; K7RBT, act. mgr. Mukilteo Comm. schod sponsors 10 week Novice course, taught by WA7ZTT. April starts our busy Public Service & hamfest season. Let's give our coordinators lots of help. I would like to hear from our many appointees — CoOs, OBSS, ORSS, ECA, etc. ASCM & I are in process of endorsements. KD7G has it all computerized. Traffic: W7DZX 799, WB7WOW 558, WB7OUG 446, WB7TQF 301, K7GTP 234, N7CSP 210, W7FJZ 168, W7AFZ 146, W7FXZ 129, W7BDB 128, N7ANE 110, N7AFY 98, W7RCR 84, W7GB 84, AD7G 75, K7NA 69, K7WV 55, W7IEU 53, W7BUN 40, WA7JEB 27, W7ERH 16, W7APS 15, K7GSP 4, K7RBT 3, W7EDQ 2. (Dec.) AD7G 285, W7ERH 21.

### PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W6RGG — ASCMs: W6ZF N8DHI VE2ACVW6. SEC: W6BKU. Congrats to GO K6BE on his up and coming. W6ZF West Coast Coast Bulletin is first and third Mondays, 3540 kHz, 8 P.M. PST. Many section members assisted in Marin and Santa Cruz Cos. during the recent emergency. Some of them were: K6BJC WABHAM N8DRT W6LKE WA6ZFV. I know there were many more, but I didn't receive their calls. SARS officers are: N6EIH, pres.; K6BIDT, v.p.; K6BGUR, secy.; W6DNY, treas. SBARA has their FD committee for this year all picked and meetings scheduled! They meet 3rd Wed at Fremont School. MDARC new officers are: K7BX, pres.; W6TEE, v.p.; N6EJU, secy.; K6BIZI, treas.; WA6SOFI, EC; K6XC N6EEG, bd members. Their Jan meeting featured NCCC member WA6VEF as speaker. His topic was "Contesting It's Fun!" complete with slide and tape presentations. Traffic: K6BJ 490, K6APW 68, W6BUZX 40, K6ERF 8. NEVADA: SCM, Ralph E. Covington, W7SK — SEC: K7ALV. Las Vegas club had good program on LASERS at the February meeting. Congrats to K7AJEC on upgrading to Advanced. There are many more who upgraded but are not recognized. A letter, phone call or radiogram with information would solve this problem. New editor of SNARS (in Reno) is WB7EYI. NARA meeting had interesting presentation on solar energy. Nevada Sagebrush Net meets weeknights 7:30 PM on 3906 kHz. Again, N7AKX is keeping up the good work with his fifth BPL. Traffic: N7AKX 678, W7BS 75, W7BKQ

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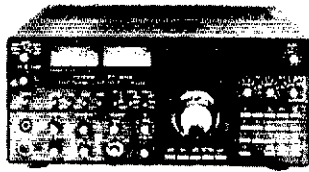
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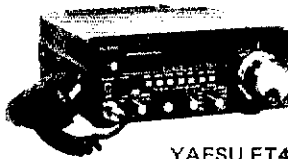
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KENWOOD TS 830S, TS 530S



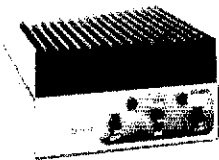
YAESU FT480R,  
FT 680R, FT780R



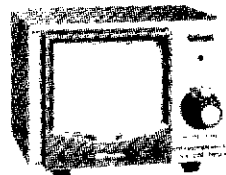
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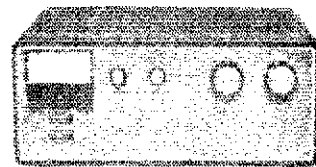
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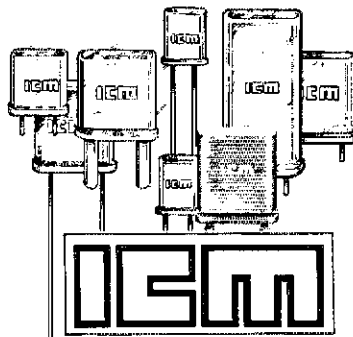
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10, W78K 4.  
PACIFIC: SCM, Pat Corrigan, KH6DD — As you read this, Army Curtis, AH6P will have assumed the duties of SCM. I again appeal to you to volunteer to help him. Traditionally, participation has been very low in this section, but let's renew efforts to increase our activities in our area. Pacific Traffic Net has gone back to 0300Z because of poorer conditions at the earlier hour. Congrats and good luck to KH6PV, who is taking over as president of Emergency ARC. Welcome back to AH6AC, who returned from Guam. KH6JF is now KH6QX. We sadly note that KH6BFF's key has gone silent. Maul's repeater was down for system improvement in January. KH6IPO's sister - the doctor - is coming for visit this summer. Traffic: KH6HJ 44.

SACRAMENTO VALLEY: SCM, Norman Wilson, N8JV — SEC: N6AUB. ASGM: K16T. New officers for the Oroville ARC are: KA6GDE, pres.; WB6AMG, v.p.; KE6NL, secy.; WB6YKQ, treas. New officers for the Sacramento ARC are: N6AAC, pres.; N6DYZ, v.p.; W8Y2D, secy.; K6FC, treas.; W6S1, trustee; WB6WZ, KB7YI, WB6NR, dir. Congrats to KA6FLP on making Advanced class and getting KE6NL as a new call, and to KA6LCO on making Technician. The Sacramento ARC is holding a net, at noon local time on WR6AEN 148.31/91, that is geared to emergency communications, search and rescue, etc. For the latest information on amateur activities and meetings call the Telephone Pioneer Network Newswire at 484-7388. Traffic: KE6NO 19, N8EPG 11.

SAN FRANCISCO: SCM, Bob Smith, NA6T — SEC: KE6CD. STM: K6TP. SCM attended League Officials meeting in Dublin, Ca. and lots of interesting ideas were brought up by attending clubs. The CATV problem is still growing in No. Cal. WB6YS is starting Novice classes Feb 16 for SFRC. Congrats to KA6JED, new EC for Del Norte Co. WB6D had 50th year on air during '82 Novice Roundup. REDXA is having single op test for ARRL DX. K6LRN and others supplied emergency comms for Marin Co. during flooding. RACES-ARES in Sonoma Co. worked FB in flooding, tnx to computer listing of available ops by KB6LO N6BLN and WB7DV. Red Cross network being set up in Sonoma Co. for emergency comms. New 6 mtr rpt in Sonoma Co. Mendocino Co. Emergency Net and Humboldt Co. FWRA Emergency Net worked flawlessly in flooding. SCM newsletter out this month. Traffic: W6PL 209, W6RNL 132, K6TJW 95, K6TP 73, WB6RTE 29, W6GGH 10, WA6QXV 5.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DDP — SEC: WA5YAB. STM: N6AWH. ASGM: N6FK, KB7YK, WB7RP. New officers for the Kern Co. ARC are: N6DTB, Pres.; W6BAA, v.p.; KA6CA, secy.; WB6KLL, treas. Officers of the Tulare Co. ARC: W6DFUF, pres.; W6GJL, v.p.; WB6VGL, secy.; W6DET, treas. Officers of the Stockton ARC are: KB6YC, pres.; WB6GX, v.p.; WB6OIV, secy.; W6EWP, treas. Officers of W6PS are: W6EWP, pres.; K6RAU, sit; K6QCA, WA6KLE, dir. Officers of the Central California DX Club are: W6KPC, pres.; W6GR, v.p.; WB6YH, sit; W6U2, W6MEL, K6DT, W6DDP, dir. Officers of the Sierra ARC: W6UPL, pres.; W6FLB, 1st v.p.; W6KWE, 2nd v.p.; W6KZY, secy.; N6GQ, treas. K6BUL and K6DYM are Silent Keys. WB6EEH is Advanced. KA6SKB and KA6SKD are Novices. KA6TJM is KE6ON. W6JPS has a TS-830. W6OCZ is W6WB. KE6C has 3800 hours. W6BPH has TR-2500s. N6BNW has an Atlas 210X. Plan for the ARRL Pacific Division Convention in Santa Cruz Oct 8-10. The Big Fresno Hamfest is May 21-23. All CD appointees will be notified of the section meeting at the hamfest. Traffic: N6AWH 146, WA6YAB 27, W6DDP 13, WA6JDB 8, K6YBM 3.

SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: WB6IZF. STM: W6ZRJ. Many reports coming in on the Santa Cruz storm disaster. A disaster critique was held to discuss the good and bad of the operations and what to do next time to improve it. There were 85 in attendance. During the disaster approximately 250 amateurs participated! Eighteen stations were dispersed in the disaster area and total time of amateur participation was 10 days and 8 hours! Well done to all! The Gabilan ARC had WA6VAB speak on "The Many Breeds of Components", and they were active in the Gilroy Emergency Drill. W6EKO is moving to Fresno. KA6IVL is now KE6JK. W1PWR ARES repeater is looking for a new frequency pair because of interference from another local repeater. W6VG presented a talk to PAARA on "Niue Expedition". New PAARA members are KA6RMA and KA6JHO. WB6OTS busy on NCN and RN6 as well as W6YB and W6KJZ. Officers of LERA ARC are: WB6PCW, pres.; WB6DHL, v.p.; N6GAH, secy.; WB6WIC, treas.; WA6RRN, editor. SCVRS had W6XN as speaker on Project OSCAR. New member of QOS group is K1ES. Silent Key is old timer W6BJB of San Jose. W6ZPJ published quarterly "NCN Relay," and the following SCV members were on the Honor Roll: W6KZJ, WB6OTS, W6RFF, W6YBV, W6ZRJ. For a copy, contact W6ZRJ, K6AYB off the air for 3 weeks with rig trouble. The FARS annual banquet was a success as usual. The EMARC and FARS clubs man the station and answer questions at the Foothill Electronic Museum on the weekends. This is a worthwhile tour to see a collection of electronic history. Traffic: W6YBV 260, W6KZJ 138, WB6OTS 92, WBASH 82, W6RFF 47, AA4RE 40.

## ROANOKE DIVISION

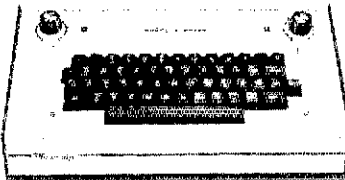
NORTH CAROLINA: SCM, Ian C. Black, WD4CNR — STM: W4EAT. SEC: N64L.

Net	Time	Freq.	Sess.	QTC	QNI
CMN	1382	3.927	31	227	439
JKFN	1519	3.923	31	187	1007
THEN	1741	3.923	31	192	1322
CNN	1157	3.715	31	82	253
CN	1486	3.574	80	307	572

Excitement growing in the section in anticipation of Charlotte Hamfest and Division Convention. KA4FHS and co. have been busy, busy. Reports at this time show booth area sold out and the committee looking for somewhere to put the latecomers. Didn't have the names last month so belatedly congrats to WCARS new officers: N4NH, pres.; W6JPS, v.p.; N4CN, treas.; KD4W, secy. Very interesting newsletter from Forsyth ARC. Good to see ARES activity included but Jim hit a little below the belt with briefs on procrastination. I'm not putting off answering those letters; just making sure I say the right things. FARS getting it together for their hamfest in April and the division planning meeting in May. Sorry to hear of N6CKM's resignation. Oct says she probably did all the work. You CMAA lost about ten days of hamming this month because of some family business that took us to FL. The XYL and I stayed in touch with the section and region via our mobile rig from Fort Lauderdale. There is just no way to describe the feelings upon hearing and talking to friends back home.

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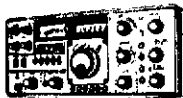
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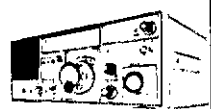
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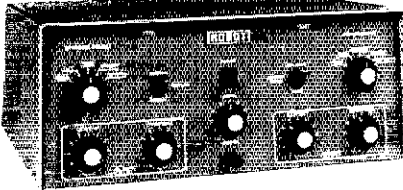
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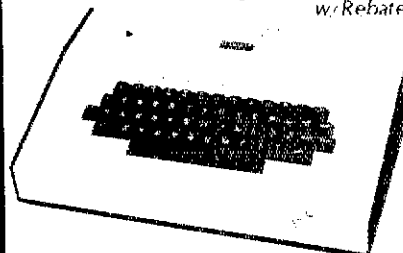
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Our thanks to all the guys who strained their receivers so we could check into the nets. Our VW van is equipped with vhf and hf ants, along with the one for the car radio so we understand the frustration of the guys with 11-meter rigs who kept asking their mikes at us as they passed. Ten-four, Goodbuddy. Traffic: WD4CNG 299, WD4CNR 299, KD4PJ 215, WB4WII 173, KU4W 169, NB4L 163, AB4V 161, WA4EAT 159, WB4S 135, WD4D 135, WA4BR 92, KZ4JL 90, WA4JUL 90, KF4R 85, NA4JJ 84, WB4CYN 82, NJ4L 83, WA4LZD 83, W4PCN 80, KA4KJ 59, NT4K 54, KA4FB 48, KD4WP 42, K4IWW 41, WD4LRJ 36, W4GRO 33, WB4JS 27, WD4AIE 26, KA4KSB 25, NE4J 24, WD4LO 24, KA4LKF 23, K4MC 19, WD4STE 14, KA2DJY 13, WD4CDY 12, WA4PID 12, KA4ATK 11, N4CCK 11, W2JDB 11, N4UE 8, KC4WW 8, WA4UTC 7, KE4CA 6, N4CYG 5.

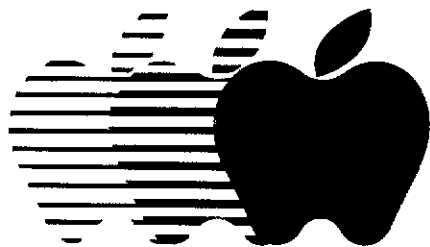
**SOUTH CAROLINA:** SCM, Richard McAbee, W4MTK — ASCM: WB4UDK. SEC: WD4HLZ. STM: WAANK. NMs: K4PFC KC4LA K4AUR. Spartanburg ARC furnished continuous communications and transportation for American Red Cross and CD during Jan severe weather. Western South Carolina ARS planning Novice class to tentatively start on Feb. 22. Student QTC planning transmitter hunt in Feb. Blue Ridge ARC busy last month during ice storm. QNI/Traffic SCSSBN 1551/161, Blue Ridge 2 Meter Net 2218/70, SC Noon Time Net 368/53, Lancaster Co. 2 Meter Net 159/7, Western SC Emergency Net 435/28, Newberry Co. ARS Net 76/6, Carolina State Line Net 76/3, Greater Pee Dee 2 Meter Net 1022/188, CNN 253/64, Lancaster Co. 2 Meter Net (Dec) 172/12, York Co. ARS Net 185/25. Traffic: WAANK 234, K4ZN 225, K4AUR 190, K4ZB 157, WD4EDM 137, W4NTQ 122, K4UJF 108, W4FMZ 63, WB4UDK 54, K4FRX 48, NT4J 47, WA4MIY 34, W4MTK 31, KC4LA 29, KA4LRM 22, NQ4N 20, WA4JWS 12, W4DRF 7, W9IKT 4, WB4NBK 1.

**VIRGINIA:** SCM, Luck Hurdler, WA4STO — ASCM: K3RZR. Chief QO: W4HU. STM: KY4K. SEC: KZ4K. Net QTC  
VSNB 254 021 W4NWM  
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SVEN 34 441 NT4S  
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Hearty CONGRATS to the gang at K4KDJ! Just returning from Blacksburg, I am still overwhelmed by the dedication of that group during their Valentines Day traffic output. Special kudos to KDJ traffic manager, WB2OMZ, who spearheaded the effort successfully. Anyone desiring to see what it takes to transmit 1100 mags in 72 hours should visit the VPI station one time. Congrats to AB9I also for arranging for TV coverage. And most importantly, thanks to the MANY people who devoted hours of time to receiving and delivering gobs of traffic on behalf of the students at VPI. Welcome back on the air to WB2RBA, Charlottesville, who has celebrated his return with a new keyer! Congrats to KA4PNF who boasts the new call of NW4O. STM KY4K is compiling calls and QTHs of 14 ops for a consolidated roster. Thanks, Chief QO W4HU reports a large number of QO notices sent out during January with particular emphasis on strong showings by KB4WT and WA4HHG. Want to be an OO? We need you! Contact WA4STO or W4HU for details. WB2OMZ boasting well-equipped mobile set-up, including TV, mobile repeater, and several rigs for hi-volume emergency capability. FBI Have been receiving many favorable comments over the past 12 months re the VSN move to the Novice band. Now, it's up to y'all to get newcomers to find it! Don't miss the chance. Need League supplies, certificates, or on-air? Contact me for details. Traffic: WA4TO 434, WB4SNY 379, WA4AK 270, WD4FTK 251, KY4K 212, WA4STO 209, K4JST 203, WA4LJ 178, K24K 165, KA3DTE 138, WD4ALY 128, W4NWM 106, W3BBN 96, W4UO 84, K4JM 81, NT4S 78, KA4IUM 74, K4KDJ 62, KB4PW 49, WB4FLT 43, KB4WT 40, KA4ERP 38, WB4FDT 36, W4VVK 36, WB4MAE 32, W4NFA 32, K3RZR 32, W4HIR 30, NN4I 27, N4YQ 27, WB2OMZ 28, WB2RBA 25, WB4ZTJ 25, W4YVG 24, W4PVA 24, WB4RBY 20, W3BBQ 19, N4BJX 19, KC4HN 18, WB4UHC 15, N4EUB 15, W4LXB 14, W4TVL 14, K8LGA 14, W4KXE 14, KB4OG 14, K4I4W 13, NW4 13, N4FNT 10, W4CF 10, KB4FM 10, WB4OZ 9, NC4B 8, W4MKC 7, W4MJC 7, WB4ODZ 6, NT4E 6, W4V4E 6, W4KRE 4, WD4OJ 4, N3RC 4, WD4CNG 3, WB4KSG 2, NT4U 2, W4DM 1, N4DW 1, WD4DUU 1, WA4EQW 1. (Dec.) NT4U 50, W4KFC 13.

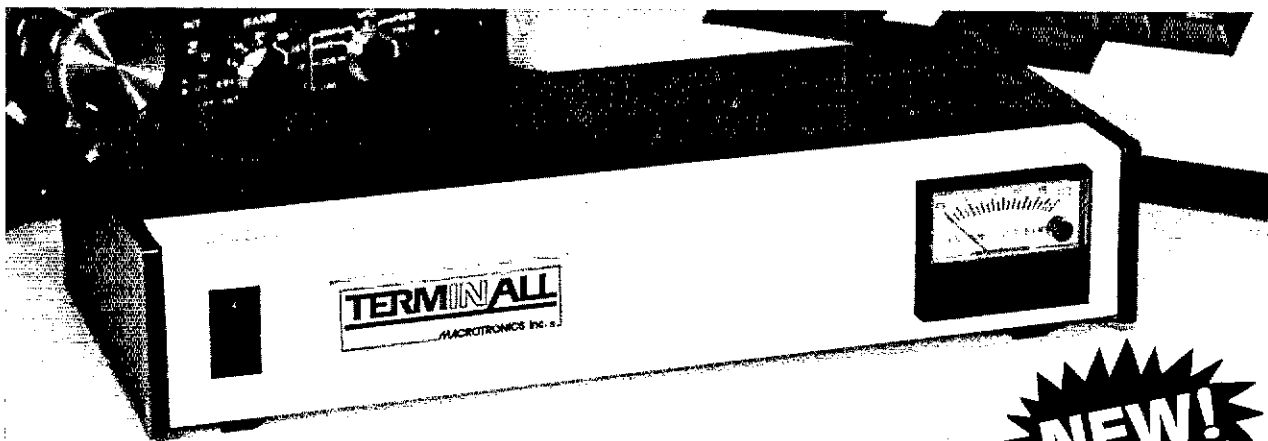
**WEST VIRGINIA:** SCM, Karl S. Thompson, K8KT — SEC: K8QEW. STM: K8BG. WV freq. coordinator is K8LG. I regret to report that WB8UOS and WB8WD are now Silent Keys. Twentieth annual hunt hf will be held at Camden Park on June 13. WA8WZ was successful in getting TV cable company to eliminate interference by moving out of two meter band. KFC's Lock Knob 8747 rpt is back on and is working well after being down for repairs.  
Net Freq. Time QNI QTC Sess. NM  
WVFN 3990 8 059 50 31 K8MHR  
WVYN 3957 58 39 K8BY  
Midday 3980 Noon 528 59 31 WBFPZ  
Hillbilly 14280 1800Z 229 70 51 WBYP  
WV 6 Mtr 51150 8 139 4 20 K8C8G  
KARC 2 Mtr 28/88 8:30 103 3 5 WD8AEW  
Traffic: K8KT 83, K8QEW 61, K8BG 56, K8BY 46, WBFPZ 33, K8MHR 33, NB4JC 32, KC8CR 26, KC8CS 10, N8CFX 7, WB8UDY 6, KA8NXT 3, KA8OPP 3, N8CFY 2.

**ROCKY MOUNTAIN DIVISION**  
COLORADO: SCM, Lawrence E. Steimel, W6ACD — SEC: K3PUR. STM: WB8MCL. NMs: W6HXE N8AXQ KB8Z WD8AIT W6EJ W8RVL. In a report from WB8CJX the section frequency coordinator, as of Jan. 82, there were 102 two-meter frequency repeater pairs assigned, 76 on the 450 band, and 12 on the 220 band. This report indicates a steady growth of repeaters in the section. Our thanks to WB8CJX and his home computer for keeping a fine set of records. With the coming of Spring so does the swapfests and Amateur Radio operators gatherings. Here are some of the activities for the Colorado section: Pikes Peak RAA, Colorado Springs, 18 April; RMVHF Society, Boulder, 23 May; NCARC, Greeley, 5 June; Colombine, Dillon, 17 July; RMRL, Golden, 18 July; BARC, Boulder, 26 Sept. Not to forget the ARRL NW Division Convention at West Yellowstone 6-8 Aug. The date will be the first next month. As a reminder to the many fine traffic people and net managers in the section, I do need your traffic reports on or before the 6th of each month to be included in the



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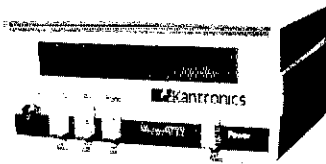
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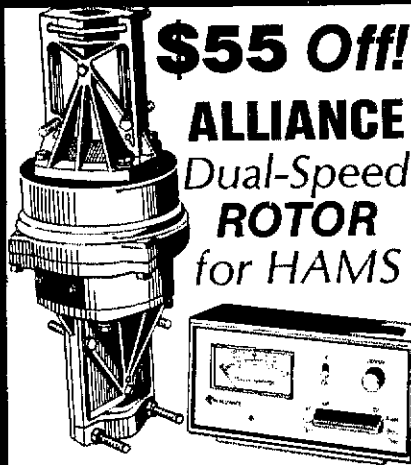
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monthly report. Nets: CWN sees, 31, QNI 222, QTC 173, QNF 703; Colombine sees, 26, QNI 1361, QTC 56, Inf. 340, QNF 1231; HNN sees, 31, QNI 1933, QTC 152, Inf. 252, QNF 1251. Traffic: N8BQP 3123, WA6HJZ 1216, WA6ACH 758, WD9AIT 382, K9DU 323, N8CXI 226, W8EJD 226, W8ACD 196, W8NHA 183, K8BZ 154, W8NFW 30, W8GW 11.

NEW MEXICO: SCM Joe T. Knight, W5PDY — SEC: W5ALR. NMs: W5UNO K8SLI W5VFO, Southwest Nat (SWNR) meets daily on 3533 at 930 local, and they handled 251 msgs with 324 stations. New Mexico Roadrunner Net (NMRRN) meets daily on 3939 kHz at 0100Z, and they handled 94 msgs with 1134 stations. New Mexico Breakfast Club meets daily on 3939 kHz at 0700 local, and they handled 79 msgs with 944 checkins. Yucca 2 Mtr Net, 147.78/18, handled 36 msgs with 883 checkins. Caravan Club 2 Mtr Net, 147.68/06, handled 15 msgs with 193 checkins. Vy sorry to report the passing of W5AGX. He will be deeply missed. Fine newsletters from Las Cruces and Socorro. FB ELT school at State Police Academy in Santa Fe with 85 attending. Traffic: W5DAD 264, K5DUV 162, K5VU 145, W5ENI 116, W5AMY 58, K7SX 52, K8SLI 45.

UTAH: SCM Ronald M. Norman, W7PWB — SEC: W7BZJ, W1MU Joint Rocky m-Northwestern ARRL Division convention August 6-9 at West Yellowstone. Contact WA7ZBO, W7FA, is Commander American Legion for five-county area. WB7JGR KA7DQG KA7IRB and N7DBU all upgraded. W7EVA and W7BZJ teaching Novice class at Dixie. N7UT is QSL manager for VU2KMK, N7TG, CHOP for Washington Co. Fair AR display station. W7BE reports 1202 QNI on Utah VHF WX Net. W87SMI has new hf rig. W7OCX reports 1434 QNI on Beehive Net, 7272. WA7GMB presented the D'Or Cozzena Award to WA7ZBO. Qualified ARRL members interested in CD appts contact W7PWB. W7SUB N7BNC and KM7A, Instructors UARC Novice class, report 15 passed the cw and waiting for results of written. N7GJN and K8TGN operated 50b in Sweepstakes from VY/VE8-L and thanks to the help of VY1a CCR CJ DD BE and AB. N7DF placed 4th in 1981 IARU for entire US. Traffic: W8ANVO 57, WA7MEL 54, K7CKF 35, W7OCX 20, WA7JRC 17.

WYOMING: SCM, Dick Wunder, WA7WFC — SEC: W7BEIN. STM: W8OGH. Wyo. Hamfest is July 17 & 18 at Meadow Lark. WTN needs more participants especially from western part of state. Pse send station activity reports to W8OGH. Recent upgrades are: K7AR to Extra; KA7JXO to Advanced; W87RGO to General; Bill Vanderpool to Technician. Congrats to all of you. WTN meets daily at 8 P.M. on 3720 kHz. Nets: Wyoming Cowboy Net — 21 sees., 789 QNI, 15 QTC. Wyoming Jackalope Net — 28 sees, 784 QNI, 9 QTC. Wyoming Traffic Net — 31 sees., 47 QNI, 49 QTC. Traffic: W8OGH 210, W87NHR 116, W87SQ 82, K7TFW 40, K7SLM 29.

### SOUTHEASTERN DIVISION

ALABAMA: SCM, H. H. Wheeler, W4IBU — SEC: N4DMA. STM: WA4PIZ. Montgomery ARC new officers: W84WIM, pres.; W4CNG, v.p.; K4BT, treas.; N4EXI, secy. Decatur Club officers are: W4PKA, pres.; W84HFZ, v.p.; WA4GGG, treas.; WA4MGJ, secy. Muscle Shoals ARC are: K4OXU, pres.; WA4LBX, v.p.; WA4ZDW, secy./treas. HAYLARC officers are: W84TJE, pres.; W84RIV, v.p. WD4DDJ, secy.; WA4DJY, treas.; W84TJE was voted best ham of the "THE" of the "THE" ARC Club held the Extra Class ticket. New Novice class started in Decatur and Mobile Disaster again hit ALA on Jan 3 with ice storm leaving 100,000 persons in B'ham without power, some for more than a week as was the case in other areas as well. KD4DT K4IEH W4ZLS and WD4JUH were sent certificates of merit for recognition by the B'ham club. All who participated in the emergency are to be commended for their public service activity. New Novices in Mobile are KA4YBG and KA4YBB. KA4BWW upgraded to General. The Butler Co. Swapfest was a rousing success with 300-400 attending. Congrats to K4TNS. New ARRL into Net began Feb 10 following the lister and ask questions. Read carefully the Feb QST re CATV and then ACT. DRN5 represented 100% by WA4JDH W4CKS W4WJF K4AKT N4BEN WA4PIZ and W4IBU. CAND represented 100% by W4CKS and W4IBU. Traffic: WA4JDH 937, W4CKS 100, WA4LXP 100, W4IBU 67, N4BIT 51, WD4IRU 26, K4AOZ 24, K4HJX 24, WA4JPK 21, KA4VFC 20, WB4TVV 16, WD4DHI 14, KY4H 10.

GEORGIA: SCM, Eddy Kosobucki, K4JNL — ASOM: K4VHC. SEC: W84HXE. STM: W4WXA. Chief OBS: W4BIA. Attention all section Novices: As of the end of the year there were over 1150 Novices in Georgia. You are the future amateurs in this great hobby. We don't want you to feel that you are not getting more parts of the section. The GO program going to be more important than ever in the future. Still need more appointees. Gwinett ARS new officers are: W84GKI, pres.; KMAZ, v.p.; KA4BNG, secy.; N4OUU, treas.; KA4EH, act mgr; WA4BXA, editor. One good way to keep a radio club going is to get the YLs involved. Many of the clubs in the section sponsor a "Ladies' Night" which helps the OMs out of the doghouse. K4ZSX doing FB after open heart surgery. Doc says "Prayer helps." According to info received, the Atlanta Hamfestival this year will be the best yet. If your repeater group sponsors a local net please send me the QNI & QTC count by the 15th of each month. Section clubs are being put on FB programs. This type of activity keeps your members coming. If your club is not ARRL affiliated, do so because it's going to be very advantageous in the future. See you at one of the forthcoming Hamfests. Traffic: W84NTW 189, K4EV 181, W4WXA 181, K5TF 143, W4PIM 82, K4JNL 49, K4NM 44, W84ZVX 41, W4ELO 40, W84LB 26, K4CWL 21, K4BAI 19, W4HON 18, NAUJ 17, N4BIM 14, KA4ATM 10, KA4RBN 10, W84APG 7, AA4E1 6, W4DGN 5. (Dec.) AA4E1 6. (Nov.) AA4E1 2.

NORTHERN FLORIDA: SCM, Billy Williams, NAUF — SEC: W4ZGIN. STM: WD4HIF. NMs: N4EC KC4MM KF4U WN4IIV. The Orlando ARC is the largest in the section with 418 members. Recent club projects included the

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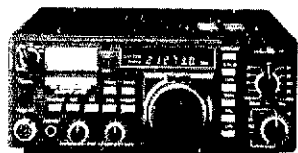
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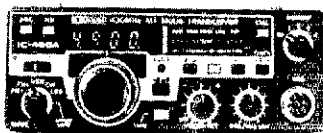
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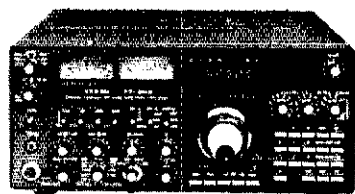


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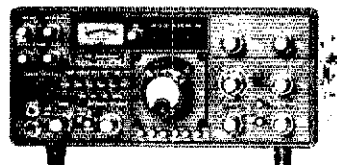
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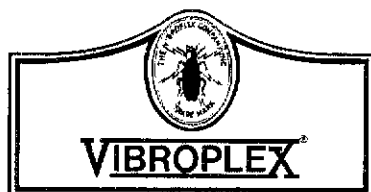
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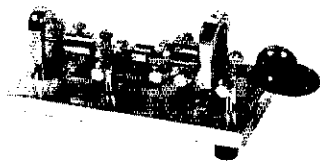
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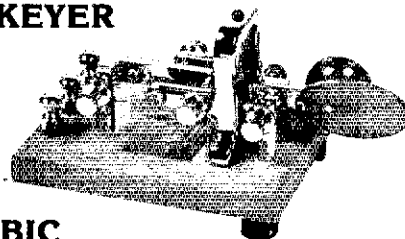
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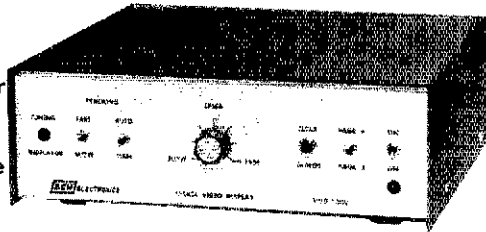
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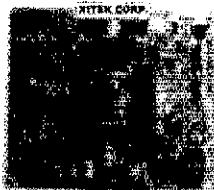
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Orlando Hamcation and Central Florida Fair booth. Orlando Ham of the Year is W4DTV. 1982 OPARC officer: KD4CG, pres.; WD4IWD, v.p.; WA4SOO, secy.; WD4NXY, treas. HB-129, which would have outlawed the possession of certain receivers, was given thumbs down by FLA legislature, thanks to the efforts of hams statewide. RC4N spoke against the bill in a committee hearing. KA4CDF also attended the hearing to assist. K4DHX getting settled in new QTH. New officers of the Gulf Coast ARC are: KE8O, pres.; WB8ONY, v.p.; W2LJ, secy.; KB4VQ, treas.; N44YH K4FMJ W4OHW W4LQV, dir. HCARA now meets first Tuesday of each month at CD Hq in Brooksville. N4EPI is new EC for Hernando Co. K4E2Z is now K4GV and K4RN now K4HJ. Installation of a new preamp has extended the range of the DBARA 75/15 rptr. Seminole Co. ARES to publish an emergency communications newsletter each month. LMARS has a Sat. breakfast at Denny's near intersection of I-4 & SR435. N4BQE & KB4LS are teaching ham classes in Sanford area. Playground ARC held "Old Timers Night" at Feb. meeting. The Gainesville ARS has received a new rptr for installation on 22/82. The Silver Springs RC elected WD4CGE, pres.; KC4OM, v.p.; KA4RWB, secy. K4DSM heads the rptr committee with WB4RZH & WB4NJA handling public service. W1HDQ visited DBARA meeting & is scheduled to visit several other NE clubs. Thanks to those reporting traffic activity. League members reporting for 3 consecutive months will be considered for the ORS appointment. Traffic: WD4HF 418, W4JL 330, WD4IO 315, N4PL 300, W4SIZ 247, N4EDH 191, WA4EYU 185, N4EEB 139, WB4GHU 133, KF4U 112, W4MGO 96, WD4GUZ 85, WB4TZR 85, W4KIX 77, N4BZH 62, WB4DTS 55, K4DHX 54, WA4OXT 47, KA4MGO 45, WB4FJY 40, WD4MLQ 34, N4UF 33, KB4T 17, WA4STZ 15, WB4YQP 14, KA4WOL 11, W3IDO 10, N4EVS 5.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL, ASCM: W4KGI, SEC: AA4WJ, STM: WA4PFK. AA4WJ reports rainstorm on Jan 14 produced considerable havoc in Brandon area with Brandon repeater losing both receiving and transmitting towers. Power was off for about 6 hours because of fire. AA4WJ's beams were damaged. ECs especially note: AA4WJ has a new phone number at work, 621-1778. W4UM getting interested in cw with a new paddle and keyer after 25 of mostly phone. He used to be RM and ORS in Michigan on QMN. K5IHH is sporting a new IC4AT HT on 440 MHz as well as an IC3AT on 220 and a companion unit on 2 meters. It is interesting to see them all lined up for breakfast with St. Pete Club members at Howard Johnson's each Saturday morning. K4TH also has a new IC3AT on 220. St. Pete club has been having plenty of trouble with their 2-meter repeater equipment, but thanks to help from Florida Power & Light members a "new" GE MASTER repeater is now on 6608 and working great. Haven't been able to keep the SPECTRUM machine working. N4KB reports busy as TCC station Bravo, but hopes to be on QFN more in February. We welcome Lee Co. Emergency Net into our Traffic Hounds list in Florida Skip. Manager and EC is WB2OUK. Good luck with the net. Traffic: W3CUL 2955, W3VR 644, WB4FVV 531, K4SCL 419, K4TH 378, WA4PEK 372, WD4COL 322, KY4U 299, K4ZK 253, W4NFK 211, WD4AWN 201, WB4AID 171, KA4ABZ 167, KE4O 156, WA4EIC 143, VE3BSY 142, WB3PIB 120, W4GFL 111, K4EIT 109, W4MIF 106, W4KBYG 99, K4EJK 83, W3TLV 72, WA4HXU 68, N4TB 64, W1NJM 57, W4DVO 63, WA4ES 52, WAIRA 44, KM4G 40, KA4LNA 37, WB4GCK 36, K5IHH 34, KA4FZ 32, NJ4O 30, KE4DA 24, AA4WJ 21, N4APE 19, KA4BBA 17, W4UIU 17, W4WYR 14, W4DL 13, WB4SNX 7, W4JM 4, KA4CPS 1.

WEST INDIES: SCM, Julio Negroni, KP4CV — NP4D's new ARES/NTS repeater is now in the air on 146.915/-315. After general cleanup of interaction from other repeaters in the area, this will be the official repeater for W1NC and other nets. WP4BDS upgraded to Advanced and has new call coming. He worked on CD Party and was 17th nationwide. DX activity on 144, 150/300 at 2300Z to 0200Z. W1NC section actively participating. W4EIT, KP4EON, KP4EM, NP4C, KP4EPE, KP4EID, KP4AWI, WP4BCV, WP4BCV worked LU1DAU Jan 30 at 0030 UTC on cw. WP4BCV actively retransmitting ARRL bulletins on W1NC twice a week. KP4DJ got his 45 wpm certificate from the Connecticut Wireless Association. Congrats. PSHR: WP4AOH, WP4BDS, WP4BCV, WP4BDS made BPL for 10th time. Traffic: WP4BDS 359, WP4AOH 143, WP4BCV 40, KP4DJ 66.

## SOUTHWESTERN DIVISION

ARIZONA: SCM, Erich J. Holzer, N7EH — STM: W7EP, NMs: W47KQE W47FDN. ARA reports their new officers for 1982 are: W7BVS, pres.; W7BMP, v.p.; KA7DTT, secy.; WB7QW, treas. CGARC also reports the following officers: WB7CDO, pres.; Rick Nix, v.p.; W7YS, secy./treas. AAAS new officers are: K7TJZ, pres.; W7KIV, v.p.; AG7L, secy.; K8JOA, treas. The Superstition ARC has forwarded a letter of intent to assist in conn. to the Mesa dir. of civil defense. Keep up good work. Information has been given to AHCA to be circulated amongst member clubs concerning cable TV interference. The Tucson Amateur Packet Radio (TAPR) reports they have begun the creation of a multi-function amateur packet radio system. For more info on this activity, contact K8ZS. A DX club has been organized here. If there is similar interest in your locality, I would like to know about it. Many thanks to all the clubs that have provided me with a copy of their club newsletter in '81. Please keep them coming. If your club's newsletter hasn't made it to me yet, don't hesitate in sending it in my direction. W7KAX reports a Mojave Co. SET on Jan 23. Those participating were: W7KAX, WB7BVV, WB7ESZ, WB7ESY, N7BUC, WB7RYO, W7TAZ, K7LVJ, W7GAA, K7GG, N7BGN, PSHR: N7NTG, A7EN: QNI 1016, QTC 182, SWN: QNI 324, QTC 255. Traffic: W7AMM 62, W7LVB 82, K7NTG 62, W47KQE 53, K7UXB 34, W7OIF 28, N7EH 26, K7EW 22, K7UKM 10, K7GL 7, K7NMQ 7, WA7NXL 7, WB7CDO 4, W47YUL 2, W7YS 1. (Doc.) KA7HJ 1, K7EW 1.

LOS ANGELES: SCM, Stan Brock, N2YO — SEC: N8UK, STK, K5D. Congrats to the new appointees: A8A-ORS, WD8CZV-ORS, K8MPI-OES. Welcome aboard. I hope to hear you on K8QQN/R Thursdays at 8:00 P.M. The Romona Radio Club successfully ran a simulated emergency drill for the city of San Gabriel. Thanks to KA8JVJ, N8TG, W6ELL, W6BOX, W6MLZ, and W6DRJ. The W6LS gang had a successful magazine sale this last month. The club has one of the largest collections of CQ, 73, and QST back issues available. I went to the TRW swap meet last month and saw many of you there. I am going to try and make it every month and to have ARRL supplies available. This is a very short month, not many reports. Guess everyone is recuperating from the holidays. OO reports: K8CL 2, K8KA 80. Traffic: W6INH

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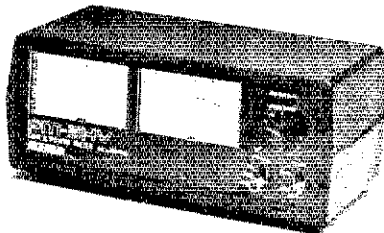
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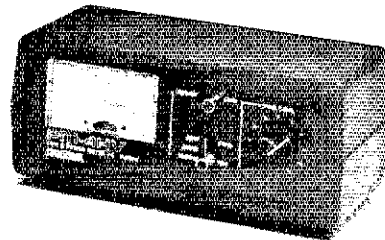


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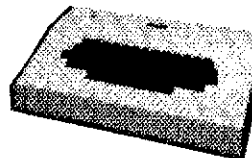
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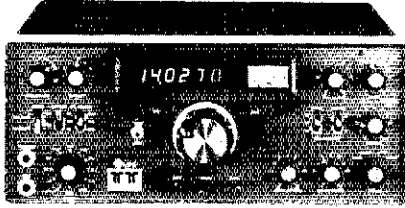
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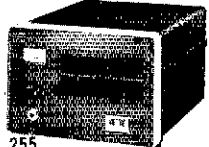
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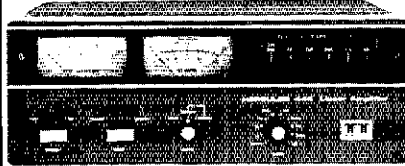
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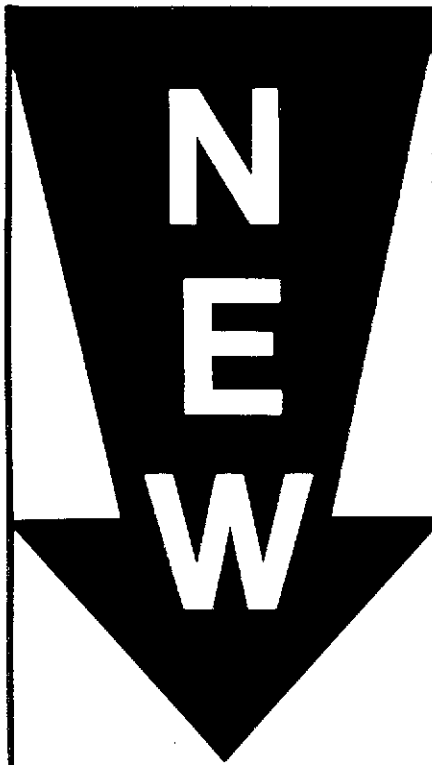
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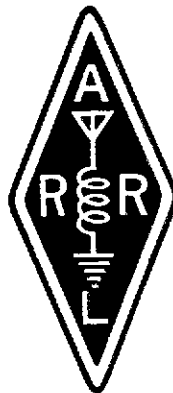
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218, K6LYK 194, WA6OCM 120, KT6D 64, N6DZQ 26, AD9A 24, K6CL 21, WA6LVO 20, N6BCV 9, WB6WV 5, N6HE 3.

**ORANGE:** SCM, Fried Heyn, WA6WZO — ASCM: WA6WZN. SEC: WBUBQ. DECA (by counties): K6GG5 (San Bernardino), W6LKN (Riverside), W66JBI (Orange), W66ZYI (Inyo). With much regret I must announce KA6A resigned as STM because of his move to Illinois. KN6C (new pres. of the United ARC) has been apptd STM. ECs WA6WYP and W6GAE have resigned. K5EDS was appointed EC (& RACES RO) for Dist. 6 and W66QHB EC (& RACES RO) for Dist. 1 in San Bernardino Co. WA6ILQ was appointed OD and OES (as AEC). KA6HNY, because of his additional duties as chmn of the Orange Co. Council ARC (& pres of OCARC) has resigned as EC. W66GUC has been apptd the new EC for North Orange Co. The Disneyland ARC (whose officers are: W66EBT, pres.; WA6BIZ, v.p.; KA6SFZ, secy/treas.) has new rpt on the Matterhorn 146.94 (-8). OES W66DCB reports Placentia Neighborhood Radio Watch (headed by pres W66BCB) provided comms for Tri-City Park 10K Run. Officers of Mt. Wilson RA: W66JPI, pres.; KA6OTX, v.p.; W66FBI, secy.; W66WSX, treas. New EC W66AQK held his first reorganization meeting of So Orange Co. It included AECs WA6BJY, WA6CLJ, W66AWP, WA6TLE, WA6TMN, N6DZY, N6AWQ & WA6GJ. New officers of Catalina RA: W665JK, pres.; W66GCS, v.p.; W66BCV, secy.; K66HY, treas. Mesa Emergency Services Auxiliary Comms officers are: KA6GVV, pres.; W66GXD, v.p.; W66CFY, secy.; KA6MOG, treas. They changed N6FM/R freq to 147.06 (+8). New officers 220 SMA: W66BW, pres.; W66WQR, v.p.; K6KH, secy.; W66YZ, treas. Over 80 hams were awarded the Cert of Appreciation from the Dept of Forestry at the VIP Recognition Banquet. Anza Valley hams N6CFN, N6ETE, W66NMA, W66JRP, KA6LYX, K6VDS & W66NSX were sworn into the Coast Guard Aux. Code practice now by K7HLR on 7098 9:30 A.M. and at 7 P.M. 3898 kHz dy except Th (5 thru 40 wpm). NM WA6QCA reports new NCA W6TKY, K6BAI, W6NTN and new RN6D liaison K6OWA & W66C478 (San Diego) and 213-426-4451 (Long Beach). PSHR: W66CPB, WA6QCA, KN6C, W66QBZ, W66BZZ, N6AED, W66NTN. Traffic: W66EIG 437, KN6C 327, W66NTN 285, N6AED 268, WA6QCA 96, W66QBZ 94, W6RE 62, W66BZZ 52, W66CPB 37, W6TKV 15, K6ZCE 12, WA6WZO 2, KA6DZU 2.

**SAN DIEGO:** SCM, Arthur R. Smith, W6INI — STM: N6GW. SEC: W6INI. Register for the Southwestern Division Convention (Jun 4-5) now. Early registrations expire May 15. Write HAMCOMP, 2174 Foothill Dr, Vista, CA 92083, for info. The second annual ARES picnic is set for May 16 at the Convair Recreational Area. All hams, family and friends are welcome. South Bay ARES officers for 1982 are: K6KPY, pres.; K6QM, v.p.; KA6HVJ, treas.; N6CYG, secy. WA6CUP is new Public Relations Asst. Keep him posted on newsworthy events. Phone 435-2123. New ARES members: WA6CRM, N6DPX, WA7FJJ, WA6SCH. New EC for 220 MHz band is W6THR. Many thanks to W66VSA who held this position for several years. North County Traffic Net held 30 sessions and handled 47 msgs in Jan. Net meets daily on 146.13173 (Palomar ARC rpt) at 2000 hours. Poway ARES gave demonstration of an emergency net in operation for Rancho Bernardo residents at meeting of its Civil Emergency Committee. KA6IEN was in charge. ARC of El Cajon held a "La Noche Mexicana" in Feb. with members of the Tijuana club as guests. Traffic: K6BA 504, W6HUJ 321, N6GW 185, K6BI 72, K6HAP 150, KU6D 85, K6BAI 77, N6AT 18, WA6FY 3, (Dec.) KA6E 10.

**SANTA BARBARA:** SCM, Robert N. Dyruff, W6POU — Teleprompter abandoned in Santa Maria because of strong sections of W66GVO, W6KPS. FCC-Long Beach and Wash DC Area Disaster Planning Workshop drew 240 reps from fed/state/local public/private/vol agencies. Common need: "communications". Incident Command Systems (ICS) now accepted nationally as NIMS for use at any disaster. ECs scheduling ARES for ICS trng in Ventura, SBAR So. Co.; SLO Co. wkg with Cal. Div. Forestry. New Logistic Support Div. (LSD) concept utilizes all non-public safety personnel and additional ARES ops to aid citizens in disaster. SLO Co. AEC WA6KPS leads ARES support in clear facility test of 100 sirens. W66GCH, W66KPS Memorial Fund and Rptr Society formed to carry on W6KPS's good work. Silent Key: K6VPE. Former SBARC editor and v.p. AJBY and YL KA6OGA moved to Santa Maria along with talent! Polinsetta ARC aids Ventura Mission bicentennial Mar. 27/28. Santa Ynez group set 1st Sat monthly breakfast at 9 A.M. Contact: K6EVQ, Traffic: N6FTQ 510, K6YD 127, W6ZRR 109, N6WBP 87, W6JTA 26.

## WEST GULF DIVISION

**NORTHERN TEXAS:** SCM, Phil Clements, K5PC — ASCM: WA5QFD, STM, W5VMP. SEC: W5GPO. New Richardson Wireless Klub officers: KA5Q, pres.; K5LHO, WA1AEL, N5CDB, v.p.; N5ACH, sec./treas.; W5SLX, K5VB, W5LKP, dir.; K5DM, trustee; K5RA, publisher; W5KNE, editor. Thanks to RWK for adding me to "Chewed Rag" mailing list, and congrats to new officers. The NTHFA does it again, with a "Min-expedition to Novice, Texas. On April 17 @ 1800Z until April 18 @ 1800Z. They will be operating in the center of all Novice bands with the call KC5YN (Young Novice), and will work at your calling speed. A nice QSL will be sent to all stns worked for sase. QSL and sase to: KC5YN, Box 77815, The Colony, Texas 75058. Key City, TX, is sponsoring a new Micro-controlled rpt on 146.161/76 in Abilene, on 146.131/73 rpt is now used for local ragchew, and has an open autopatch. New officers for Sabine Valley ARC out Greenville way: W5TX, pres.; N5DEC, v.p.; W5PWL, secy.; W5RIY, treas. Attention DECA and ECs: Please check in (or monitor) the North Texas Section EC Net, which meets on 1st and 3rd Wed at 1900L right after the TTN on 3961 kHz. Topics of interest and notices of happenings and events involving ARES are covered. The goal is for all ARES units to be represented by a stn from each county. Remember, the NTX emergency freqs are 7290 and 3961. If your area is involved in a disaster, please get word via any means possible to W5GPO, or K5PC asap. Traffic: K5BNH 209, W5JYI 175, N5BT 148, K5SUL 89, KA5AZK 86, AJ5F 70, N5DKW 59, K5CFX 55, KA5MAY 54, W5VMP 49, W9OYL 43, KA5IWF 32, KC5NN 24, K5PC 19, K5SB 15, W5ERT 12, KA5MSP 11, WA5QFD 7, K5HGX 5, AC5Z 5, K5SUC 4, W5PBN 2.

**OKLAHOMA:** SCM, Leonard Hollar, WA5FSN — ASCM: W5REC. SEC: W52TB, KV5X, ex-WA5RKU, is new NM for OLZ. KA5CXW, W5DIRB and others did a very commendable job during the Star School disaster, supplying comms for Red Cross. After getting all kinds of "wall paper" K65EK decided that he needs a linear. W5JJ is

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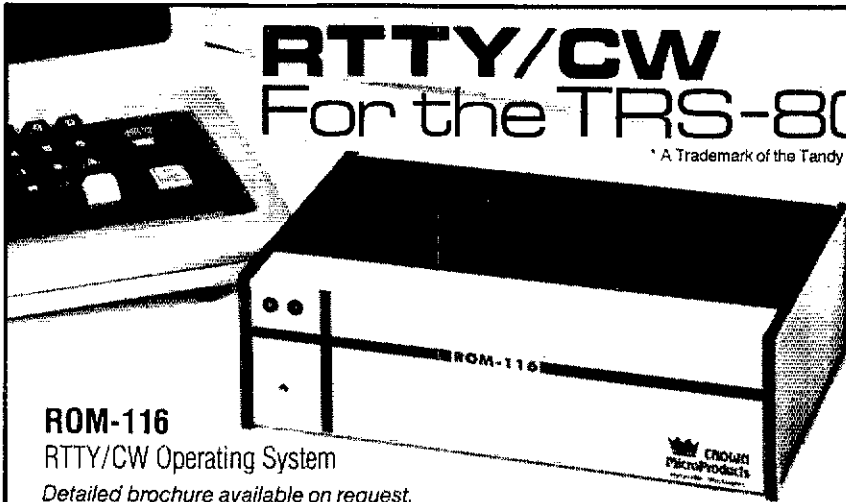
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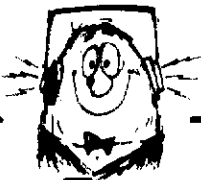
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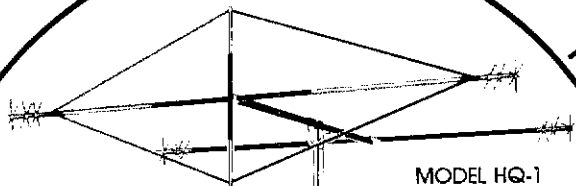
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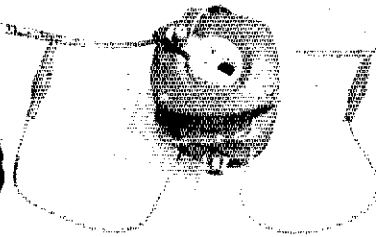
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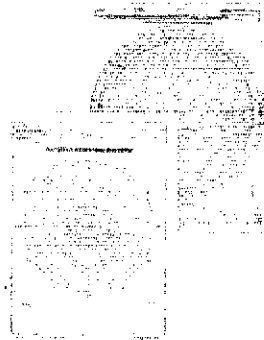
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new chairman of Central Oklahoma QCWA, and has rovd 50 years of cert. Contests. KCSOU doing a FB job helping with QFON. 28 ORS reports, two QD reports and 6 NM reports for January. Not bad. Quite a number attended the winter meeting of the Oklahoma Rptr Soc at Stillwater recently. WD5PFW rovd some good publicity in El Reno paper and gave Amateur Radio a big boost. Pawhuska club rebuilding and will have a rpt on 148.985/385 soon. My list shows 19 affiliated clubs in the section. There should be more. Traffic: K5CXK 214, W5RB 168, KV5X 141, K5CWX 138, W5AS 114, KB5E 110, W5VXU 105, W5AOU 73, W5NKC 68, W5SELG 60, W5RSN 60, W5EC 39, W5STY 33, W5LUG 25, W5BEAY 20, W5VLW 24, W5VOR 24, K5CA 22, W5AZOO 22, W5SFB 17, N5IN 16, W5LSW 8, K5CSOU 8, KA5DRD 6, W5JJ 1.

SOUTHERN TEXAS: SCM, Art Ross, W5KR - ASCM/TM: N5TC, SEC: W5SRV. OVS reports this month: W5SOCP, ORS K5HZR back on the air after a short absence. ORS N5GRU enjoyed eyeball ctc with first grandson. ORS/OBS N5FN has been busy designing new ctt circuit for Brazosport ARC rptr. ORS K5RG rpts 4-cycle plan for NTS adopted by W1XX, to activate Cycle 1 on PAN; he is optimistic. W5EHB rpts Austin ARC handled traffic from 4 nursing homes at Xmas. SEC W5SRV rpts that he, with W5AAH N5FN K5GEX K5MJ, assisted many Houston hams under direction of W5CKC in providing communication for Houston Marathon Jan 24. OBS W5KLV gave 191 readings of 45 bulletins on 10 nets! EC N5DZT rpts Tideland's Emer ARS (TEARS) has cv training net Tue and Thur at 9 P.M. CT, N5EHO (ex-K5MFG) upgraded from Novice to Advanced in 4 months! N5AKJ rpts K5JTT went from student to KVBP in 14 mo! CONGRATULATIONS TO BOTH. EC/ORS W5AAH rpts seven graduates of Novice class rovd licenses, two more still watching mail box. W5AAH made PSRR for 12th straight month with his Dec total. Great going! W5ROE rpts Big Bend ARC elected otrs for 1982: K5PD, pres.; W5GHQV, v.p.; W5ROE, secy/treas. This section had 12 ops who made BPL in Dec. The number adjusted upward because some rpts rovd too late to be included in regular rpt. Traffic: W5YDD 449, W5KLV 409, W5TFB 332, W5CTZ 207, N5TC 156, N5AMH 130, KV5N 88, W5SRV 75, W5MMI 74, W5SEFJ 72, N5DAA 68, N5CRU 68, K5SNX 52, W5AAH 52, W5KR 34, K5RG 26, N5EFG 21, N5FN 15, W5DGHK 13, N5DZT 12, K5AKRI 6, K5RVF 3, K5HZR 2. (Dec.) N5CDN 366, K5ADOP 254, K5FPV 238, N5IF 134, W5AAH 107, N5EJ 94, K5MFG 65, W5EHB 26.



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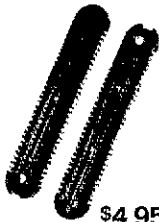
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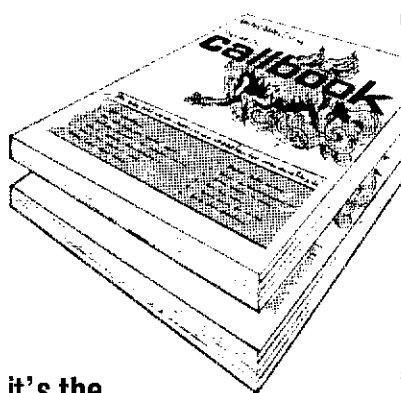
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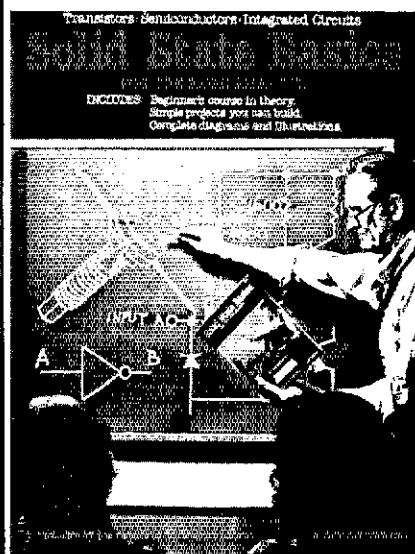
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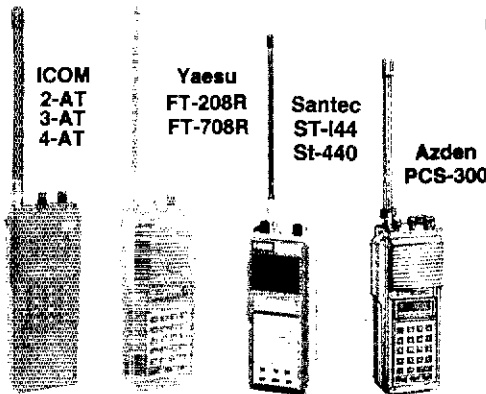


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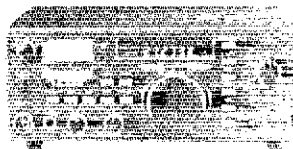
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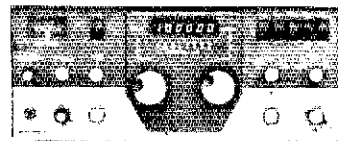
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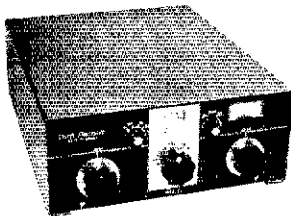
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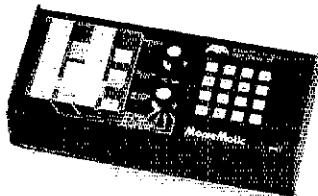
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# Ham-Ads

(1) Advertising must pertain to products and services which are related to Amateur Radio.

(2) The Ham-Ad rate is 85 cents per word. A special rate of 25 cents per word applies to hamfest and convention announcements, to individuals seeking to dispose of or acquire personal equipment, and to other advertising which, in our opinion, obviously qualifies for the individual rate.

(3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8-1/2" x 11" sheet of paper.

(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received August 21 through September 20 will appear in November QST.

(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

### Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded in 1947. You are eligible for membership if licensed 25 or more years ago, and presently licensed. It is not necessary to have been licensed the entire 25 years. Members receive QCWA publications and participate in QCWA activities. Come grow with us! Write QCWA, Inc., 1409 Cooper Drive, Irving, TX 75061.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't., police etc. invited to join Society of Wireless Pioneers — W7GAQ/8 Box 530, Santa Rosa CA 95402.

QO and QST 1950-1982 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 SASE, chronological order and payment to W6LS, 2814 Empire Avenue, Burbank, CA 91504. Available issues and refund sent within one month.

YAESU OWNERS — join your International Fox-Tango Club — now in its eleventh year. Calendar year dues still only \$8 US, \$9 Canada, \$12 airmail elsewhere. Don't miss out — get 1982 top-rated FT Newsletters packed with modifications monthly, catalog of past modifications, free advertisements, technical consultation, FT Net (Saturdays, 1700Z, 14.325MHz), more. Go Fox-Tango! To join, send dues to FT Club, Box 15944, W. Palm Beach, FL 33406.

IMRA-International Mission Radio Association Helps missionaries by supplying equipment and running a net for them daily except Sunday, 14,280 MHz, 1900-2000 GMT. Br. Bernard Frey, 1 Fryer Manor Rd., Larchmont, NY 10538.

THE Veteran Wireless Operators Association, a nonprofit organization of communications people founded in 1925, invites your inquiries and application for membership. Write V.W.O.A., 118 River Drive — Bay Ridge, Annapolis, MD 21403.


INTERESTED IN QRP? Full information for large s.a.s.s. QRP/ARCI, Box 12072, Capitol Station, Austin, TX 78711.

WARREN Amateur Radio Association Inc. will host their 25th annual Hamfest Sunday August 15, 1982, at Kent State University (Trumbull Campus). Beginning at 8:00 A.M., including Forums, Programs, Dealers Exhibits inside, Giant Flea Market, XYL Suite, 5 acres of space. For further information QSL: Warren Hamfest P.O. Box 809 Warren, OH 44482.

OVERPRINTED — 1981 Fox-Tango Club Newsletters. Sixty loose-leaf pages packed with modifications and information on Yaesu rigs — only \$6 while they last. Also a few 1980 sets at \$5. (Overseas add \$3 each, airmail.) N4ML, Box 15944, W. Palm Beach, FL 33406.

HAMFEST May 23rd, LIMARC, Long Island Mobile Amateur Radio Club sponsors the 27th ARRL Hamfair '82 at the Islip Speedway, Islip, NY. Located on Islip Ave. (Rte. 111) just South of Exit 43, Southern State Parkway or South at exit 56 of the L.I. Expressway. No reservations needed, over 350 exhibitors. Information call at night Sid Wolin, K2LJH 516-379-2881 or Hank Wener, WB2ALW 516-484-4322. Talkin on 146.85, a 4Z PL will extend your range if you have one. Many awards will be made during the Hamfest 9AM to 4PM General admission \$2., exhibitors \$5 per car space.

JOINING the League may be one of the best ham investments you can make. Besides receiving QST, you can avail yourself of many membership services and have a voice in the national and international direction of Amateur Radio.



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For postal purposes, fifty percent of dues is allocated to QST, the balance for membership.

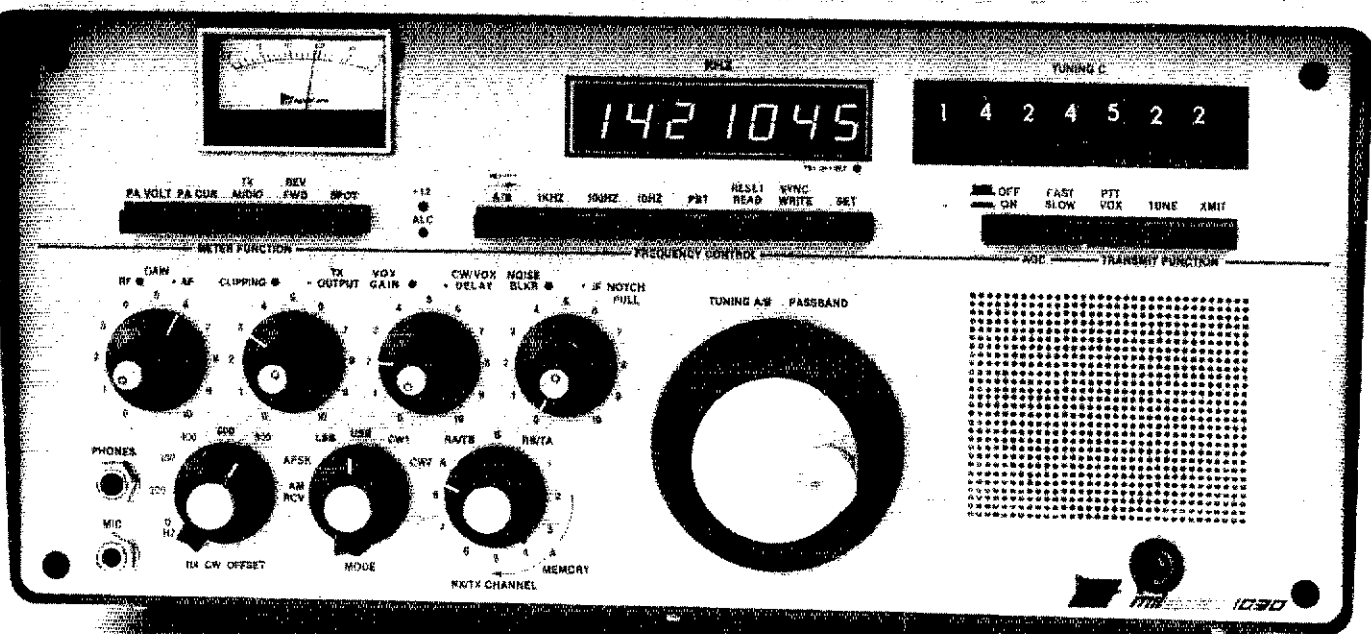
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## MILSPEC 1030



The Signal One Corporation continues its leadership with the introduction of the MilSpec 1030, a NEW concept in synthesizer technology. \*Combining the entire digital frequency control system, including PASSBAND TUNING and BFO FREQUENCIES, with the main tuning, frequency preset and remote computer control... we have achieved an ultra fast, real time frequency controlled, high performance, military grade, fully synthesized communications system that will out perform any HF transceiver ever offered in the amateur and commercial market.

### Featuring:

- **Fully Synthesized General Frequency Coverage:** 10 kHz — 30 MHz in 1kHz, 100 Hz or 10 Hz steps. Tunable with encoder or thumbwheel preset; stability of 1 Hz/C°
- **Lever Switch Frequency Pre-Sat:** Provides instantaneous band change sets to within 10 Hz; automatically returns to Tuning A/B. The latest and most convenient method of frequency entry and recall with additional digital display and memory. **TUNING C**, make this superior to keyboard systems
- **Now Synthesizer Technique:** 120 dB/Hz phase noise close to carrier; extensive CMOS circuitry used for improved spectral purity and great reduction of digital noise—a problem that plagues other HF transceivers causing unwanted mixing products—that insures weak signals will not be covered by internally generated noise due to adjacent strong signals
- **Real Time Frequency Acquisition:** Not multiplexed unique synthesizer design allows frequency jumps of 30 MHz in 10 milliseconds, useful in military surveillance applications that demand ultrastat synthesizer switching
- **Remote Control and Programmability:** Permits transceiver use in computer based communication systems (Optional interface req.)
- **Unequal Receiver Dynamic Range and Front End Selectivity:** + 20 dBm, 3rd, order intercept point and 25 uV sensitivity offer the best immunity to strong signal overload currently available to the commercial and amateur market. Specially developed high level monolithic, double quad balanced mixers combined with low synthesizer phase noise and up-conversion to 40 455 MHz 1st. I-F thru 8 pole Crystal Cross Mod. Filter with a ± 4 kHz bandwidth—designed for low intermodulation distortion products, makes this performance possible
- **Synthesized Passband Tuning:** 1st. and 2nd. I-F tune in 10 Hz steps over ± 5 kHz range with respect to 1st. and 2nd. I-F filter passbands, a unique dual passband feature for maximum interference rejection. Controlled by tuning A/B.
- **Collins/Rockwell™ Mechanical Filters:** For maximum selectivity and ultimate rejection performance. Demanded in most military/commercial applications. 2.1 kHz (USB/LSB), each selected for optimum performance on SSB, cascaded with front end VHF 8 pole crystal filter, active I-F notch filter, passband tuning and noise blanker deliver 16 pole 1.4:1 performance (6/50 dB) and add up to the most powerful anti-QRM system available
- **Noise Blanker:** Pre I-F blanker with adjustable threshold and 80 dB dynamic range; gating effectively placed in receiver RF path and triggered by pulsed noise such as over-the-horizon radar
- **I-F Notch Filter:** Active 300 Hz notch in 2nd. I-F. Adjustable ± 1.5 kHz with 40 dB rejection. Receiver AGC not affected by notched signal.

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- **High Power Transmit System:** Motorola™ high power lineal amplifiers with 150 watt CW/SSB output or 200 watt option
  - **RF Speech Processing:** Clipped transmit RF signal is passed through mechanical and crystal filters for unequalled SSB talk power and elimination of unwanted intermodulation distortion products. This is a preferred process and considered superior to audio type processors
  - **QSK CW Full Break-In:** Vacuum relays and 200 Hz filter offer a superb full break in CW System
  - **Construction:** All circuit boards, including synthesizer modules, plug-in; ribbon cable interconnection and Miniserf™ sockets for transistor and IC replacement insure ease in self servicing military and computer grade components used exclusively
- ### RECEIVER PERFORMANCE
- Sensitivity:** 25 uV (—118 dBm or better) for 10 dB S/N ratio at antenna input 1.6-30 MHz (2.1 kHz width in SSB)
- Selectivity:** 1st. I-F 40 455 MHz ± 4kHz @ -6 dB, 1 dB ripple, 8 pole crystal filter  
2nd. I-F 455 kHz mechanical filters @ -3 dB Standard
- Optional:**  
USB 2.1 kHz CW 2 375 Hz AM 5.8 kHz  
LSB 2.1 kHz CW 2 300 Hz 4FSK/LSB 300 Hz  
CW 1 9 kHz (extra sleep skirts) (CF high tone pair)
- Mixers:** Specially developed, high-level, monolithic double balanced mixers with hot carrier diodes used in first and second mixer stages
- Intermodulation Distortion:** (typical) 3rd order input intercept point + 20 dBm for separated signals of 20 kHz;  
2nd. order IMD is —80 dB
- Cross Modulation:** Unmodulated wanted signal of 100 uV together with a modulated (30% at 1 kHz) unwanted signal of 100 mV spaced 30 kHz apart produces 10% Cross Mod.
- Blocking:** Attenuation of a wanted AF signal of 50 uV and caused by an unmodulated unwanted signal of 1V spaced 30 kHz apart then produces 3 dB blocking.
- IF and Rejection:** 80 dB
- Synthesizer Phase Noise:** Mean S/N ratio of 1st. I.O (typical, reference to 1 Hz bandwidth), 90 dB measurement 1 kHz from carrier 135 dB measurement 20 kHz from carrier

### TRANSMIT PERFORMANCE

**Power Amplifier:** Solid state, broadband 1.6 — 30 MHz 150 W or 200 W (high power option) CW/PEP output keydown all bands and modes. Automatic power outback under excessive VSWR conditions. Heavy duty Hypersil™ transformer for exceptional regulation and power. For continuous full power "key down" operation, blower option required.

**Third Order Intermodulation Distortion:** 25 dB below each of two tones at full PEP output.

**Unwanted Signal Suppression:** Carrier —50 dB min. undesired sidebands, 1 kHz —55 dB min; harmonic fall: —40 dB 10 log of mean power output; mixer products, —50 min.

### GENERAL

**Frequency Coverage:** 10 kHz to 29,999 MHz receive, 10 kHz to 1.6 MHz at reduced sensitivity, 1.6 to 29,999 MHz transmit.

**Frequency Control:** Memory provides split tuning A/B — using opto-electrical shaft encoder tuning in increments of 1 kHz 100 Hz and 10 Hz (180 kHz, 18 kHz, and 1800 Hz/360° respectively), selectable with front panel push buttons. **Tuning C** — preset frequency settable to 10 Hz with front panel lever switch; frequency entered by set button display and BCD registers updated.

**Memory:** — frequencies stored in any of 9 memories, recalled for Tuning A/B frequencies with read push buttons. Frequencies from Tuning A/B or C entered into memories with Auto Write or Write push button.

**Stability:** 1 ppm/month, 1 Hz/C°; 1 ppm after 15 min. warm-up at 25°C typical. For more demanding requirements, high stability reference oscillator option available — will meet military and commercial standards for specialized data transmissions

**Modes:** USB, LSB, CW, AFSK, AM — receive USB, LSB, CW AFSK/LSB — transmit.

**Remote Computer Control:** via rear panel 60 pin connector

1 BCD (1-2-4-8) 12 V CMOS parallel command for:  
A. Frequency / handshake 2 Pulse input to drive shaft  
B. Mode detection encoder counters  
C. Bandpass tuning 2 AGC output  
D. BFO tuning 4 Receiver mute command

**Power Supply:** Built-in heavy duty AL/DC supply, 115/230V ± 5% 50 to 400 Hz, 12 to 15 VDC at 40 AMPS max., negative ground, 12W max. in receive, 60W peak at full transmit input. Thermal and current overload protection


**Size:** 16.2" wide, 7.8" high, 17.8" deep. **Weight:** 50 lbs.

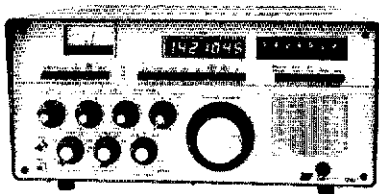
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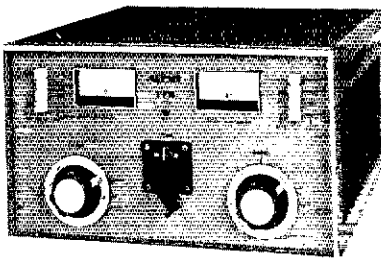
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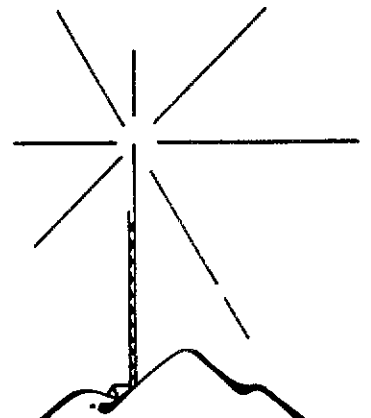
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5 copies or more, \$1.75 each.

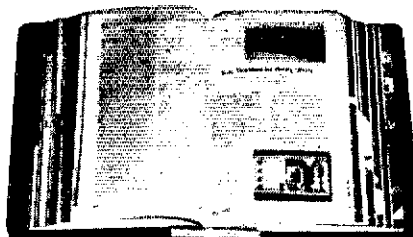
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QST

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**STARVED ROCK Hamfest** - June 6 - ARRL-approved. Princeton, Illinois. S.A.S.E. for complete info SARC/W9MKS, RFD 1 Box 171, Oglesby, IL 61348 815-667-4614.

**THE WABASH County Amateur Radio Club Inc.** will hold its 13th Annual Hamfest Sunday, May 10, from 5AM until 3 PM at the Wabash County 4H Fairgrounds, Wabash. Admission will be \$3 at gate or \$2.50 advance. Food and parking. Camping spaces available Saturday night. Talk-in on 147.83/03 or 146.52. For tickets or info send an S.A.S.E. to Dave Spangler, N9ADO, 45 Grant St., Wabash, IN 46992.

**WORLD CLASS** competition contest and DX-pedition club desires sponsor for assaults on world record scores! If you would like a championship score for your station, please contact The Rubber Circle Contest Club, P.O. Box 73, Redmond, WA, 98052. Confidential Reply.

**SEE WORLD'S FAIR** while attending 1982 Knoxville Hamfest and ARRL Delta Division Convention, Memorial Day Weekend (May 22-23). DX, computer, and technical forums; air-conditioned exhibit area; and large indoor/outdoor flea market make this Tennessee's largest hamfest. More information? (dealers, tickets, reservations) N4BAQ, 5833 Clinton Hwy., Suite 203, Knoxville, TN 37912.

**NJ COMPUTER Show/Fleamarket** (third year). Sat. May 22 - Holiday Inn (North) - Newark - Exit 14 NJ Turnpike. Buyers \$3, sellers \$6 (advance), \$7. In case of rain - held indoors (150 tables). W2TGH, 201-297-2526, Kengore, 3001 Route 27, Franklin Park, NJ 08823. (Fall Show - Sept. 11-12.)

**QSL Cards/Rubber Stamps/Engraving**

**TRAVEL-PAK QSL Kit** — Converts Post Cards, Photos to QSLs. Stamp brings circular. Samco, Box 203, Wynantskill NY 12198.

**DELUXE QSLs**, Samples 25c. Petty, W2HAZ, P. O. Box 5237, Trenton NJ 08638.

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**DISTINCTIVE QSL's** — Largest selection, lowest prices, top quality photo and completely customized cards. Make your QSL's truly unique at the same cost as a standard card, and get a better return rate! Free samples, catalogue. Stamps appreciated. Stu, K2RPZ, Box 412, Rocky Point, NY 11778 516-744-6260.

**QSLs**, Catalog 50c N&S Print, 2523 West Orangewood Avenue, Phoenix AZ 85021.

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**QSLs by W7HUL**. Samples 50c. 8511 19th Ave. N.W., Seattle, WA 98117.

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**QSLs & rubber stamps**. Top quality. QSL samples and stamp information 50c. Ebbert Graphics D-3, Box 70, Westerville, OH 43081.

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**QSL samples** — 25c Samcards - 48 Monte Carlo Dr., Pittsburgh, PA 15239.

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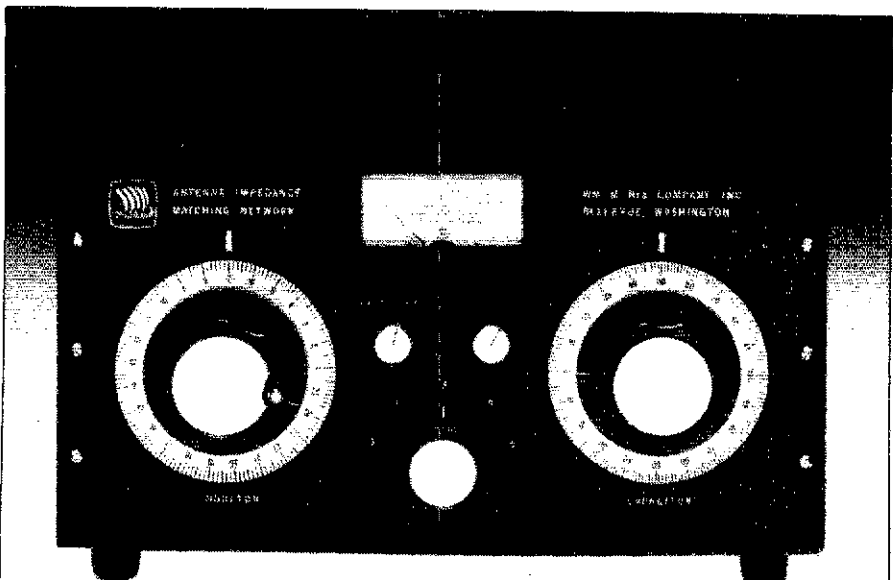
**QSLs** — Custom designs for railroad employees and railfans. Send addressed business envelope with double first class postage for free samples and catalog. Marv W0MGI, 2095 Prosperity Ave., St. Paul, MN 55109.

**QSLs** Samples 30c (stamps OK) Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, MA 02151.

**RUBBER Stamps** return address \$4 includes postage. NJ residents add tax. Clinton Hoar, W2UD0, 32 Cumberland Ave., Verona, NJ 07044.

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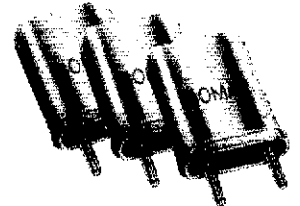
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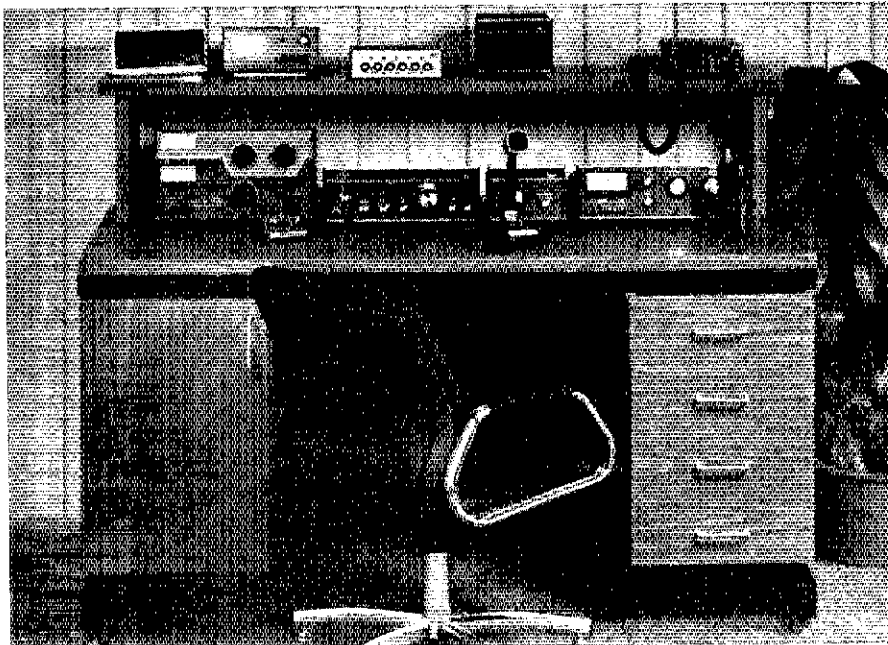
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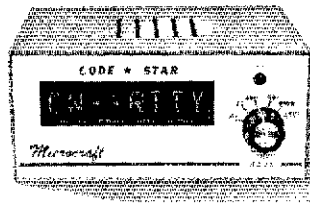


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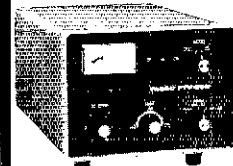
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SAVE \$50



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Regular \$275 - **Closeout \$225**

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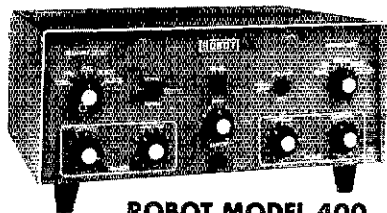
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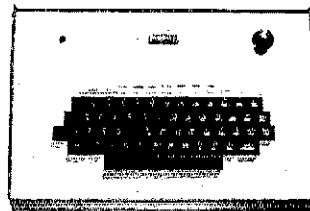
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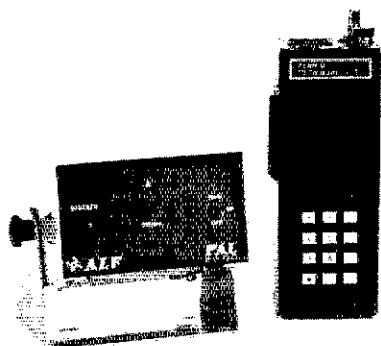
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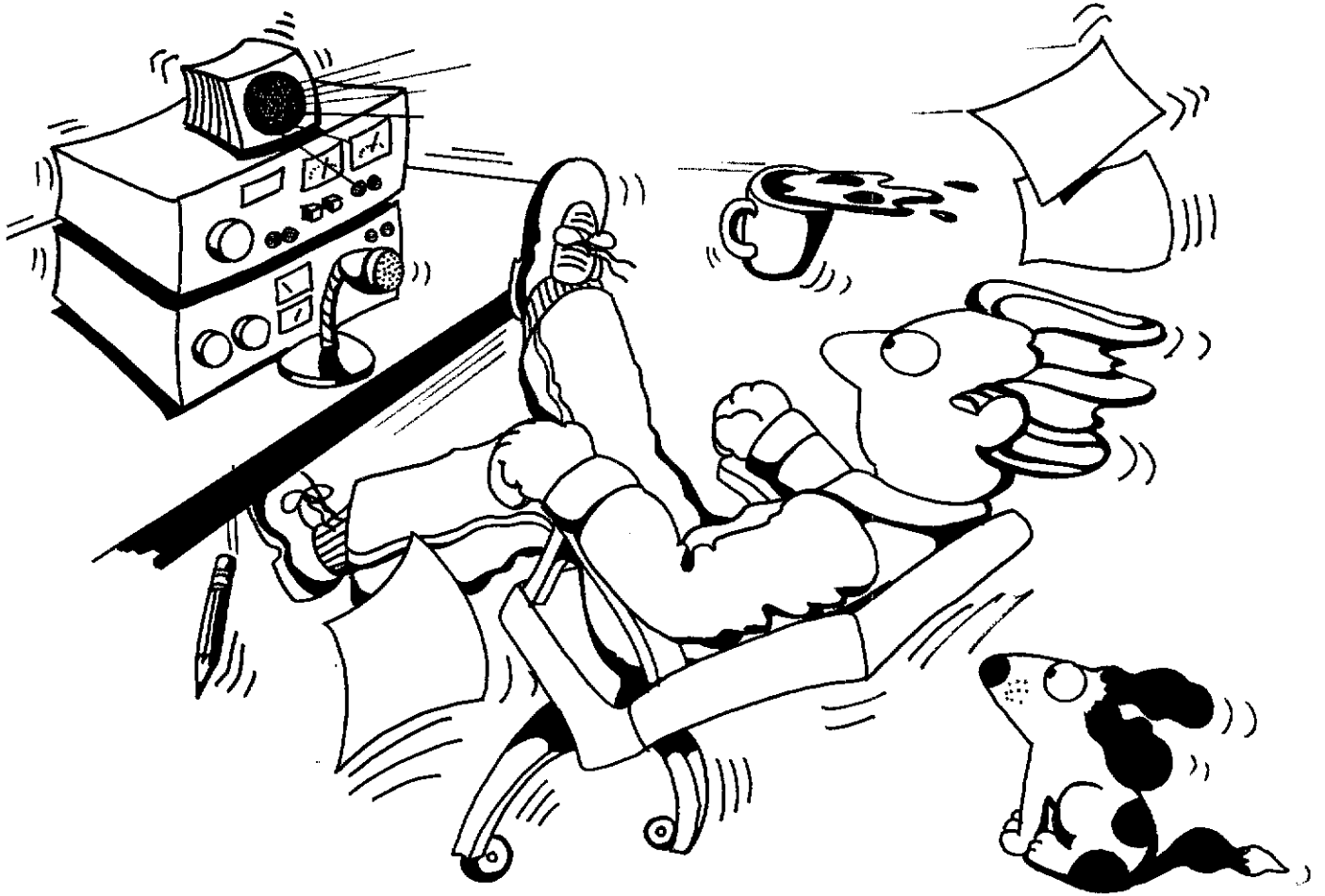
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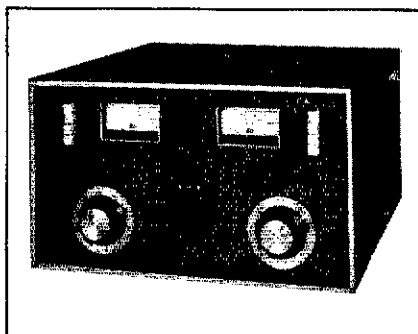
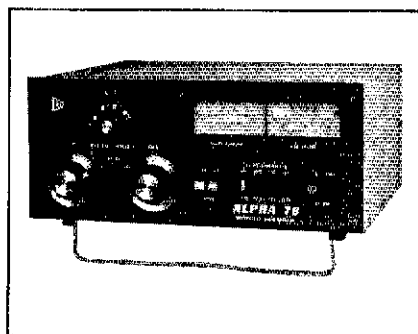
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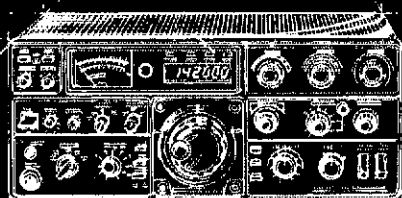
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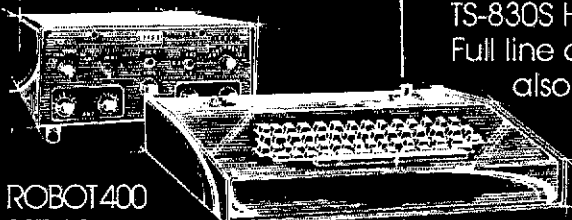
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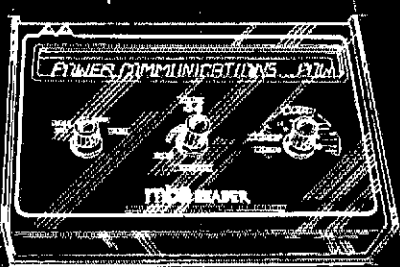
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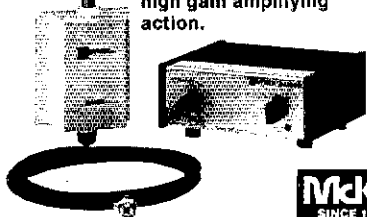


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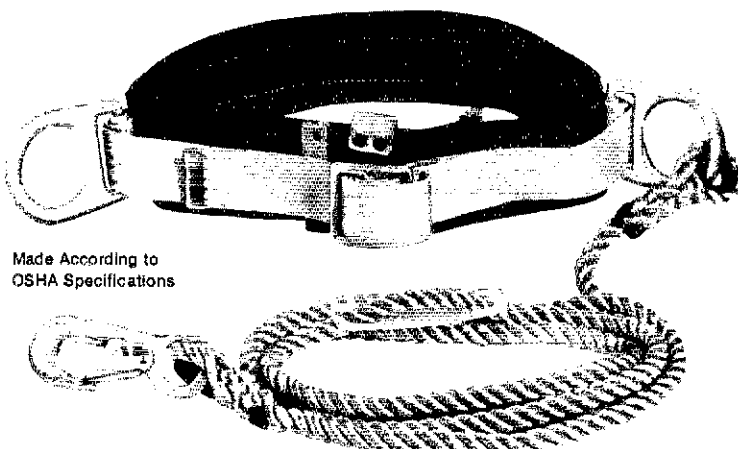
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- FREQUENCY COVERAGE: 131.000MHz to 179.995MHz
- MAXIMUM FREQUENCY COVERAGE: 8.995MHz without any degrading
- RECEIVING MODE: Frequency Modulation, 16F3
- RECEIVER SYSTEM: PLL Frequency synthesized dual conversion superheterodyne
- USABLE SENSITIVITY: 0.2uV across 50-ohm at 12db SINAD
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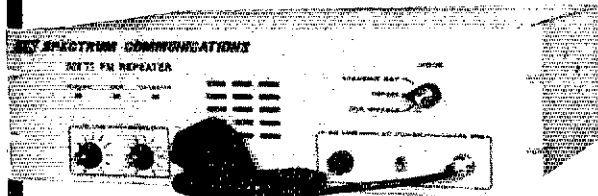
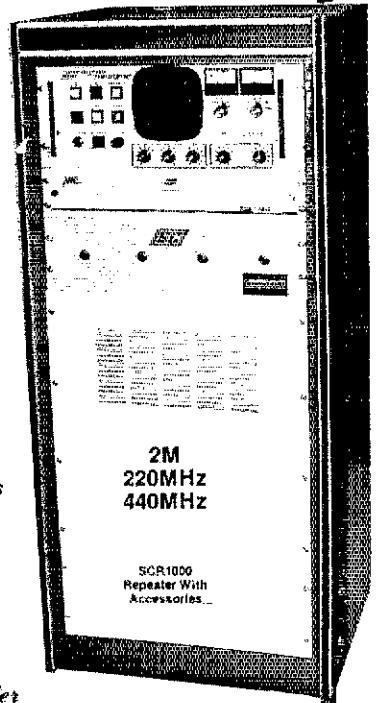
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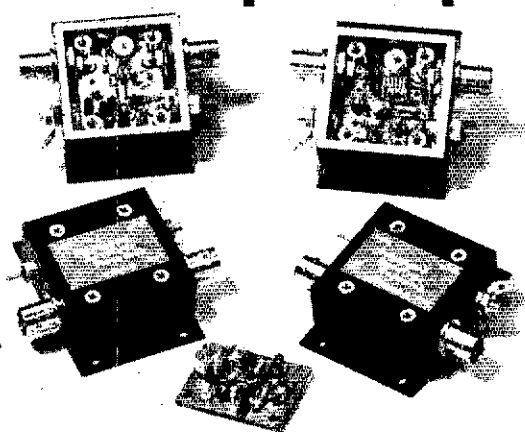
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P144VDA	144-148	<1.0	15	0	DGFET	\$37.95
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25AG4	8' flat top section	\$51.00
45G	10' section	\$85.50
BX-40	40' self supporting [6 sq. ft.]	\$159.00
BX-48	48' self supporting [6 sq. ft.]	\$199.00
BX-56	56' self supporting [6 sq. ft.]	\$269.00
HBX-48	48' self supporting [10 sq. ft.]	\$259.00
HBX-56	56' self supporting [10 sq. ft.]	\$339.00
HDXB-40	40' self supporting [18 sq. ft.]	\$249.00
HDXB-48	48' self supporting [18 sq. ft.]	\$309.00

#### ROHN STEEL TOWER ACCESSORIES

3/16	EHS guy wire [3990 lbs.] 1000'	\$130.00
1/4	EHS guy wire [6650 lbs.] 1000'	\$155.00
5/32	Cable - 100'	\$36.00
RG8X	Bertex mini 8 low loss foam per ft.	\$0.17
	500' roll.	\$79.00
RG8U	Columbia Super Flex - \$26/100' - 450'	\$120.00

Complete Line of Rohn Access. Available

#### ROTORS

Alliance HD-73 [10.7 sq. ft.]	\$95.00
Alliance U-100	\$39.50
CDE-CD45-2 [8.5 sq. ft.]	\$99.00
CBE Ham 4 [1.5 sq. ft.]	\$169.00
CDE Tallwater [30 sq. ft.]	\$239.00
Hygain HDR300 [25 sq. ft.]	\$379.00

#### ROTOR CABLE - 8 COND.

[2-18 & 6-22] 4080 per ft.	\$0.18
[2-16 & 6-20] 4090 per ft.	\$0.35

Shipping not included  
Prices subject to change without notice

#### HYGAIN ANTENNAS

V-2S	New 2 mtr. Vertical	\$34.00
18AVT/WBS	80-10 mtr. Trap Vertical	\$87.00
TH5DX	5 Element Triband Beam	\$215.00
TH7DX	7 Element Triband Beam	\$329.00
TH6DX	Conversion kit to TH7DX	\$139.00
TH3MK3S	3 Element Triband Beam	\$199.00
TH3JRS	3 Element Triband Beam	\$149.00
18HTS	Hy-Tower 80-10 mtr. Vertical	\$319.00
105BAS	5 Element 10 mtr. "Long John"	\$115.00
155BAS	5 Element 15 mtr. "Long John"	\$159.00
28DQ	40 & 80 mtr. Trap Doublet	\$45.00
204BAS	4 Element 20 mtr.	\$209.00
205BAS	5 Element 20mtr. "Long John"	\$269.00
402BAS	2 Element 40 mtr. Beam	\$179.00
BN86	10-80 mtr. ferrite balun	\$14.00



**BC20/20 - \$279.00**  
20 ch, aircraft, program

BC350- 7 band, 50 ch, aircraft, program \$369.00  
BC300- 7 band, 50 ch, aircraft, program \$339.00  
BC250- 6 band, 50 ch, programmable... \$269.00  
BC210XL- 6 band, 18 ch, program... \$219.00  
BC 4/6 T.S.-4 band, 6 ch, hand held... \$124.00  
BC100- 16 ch, programmable hand held... \$299.00



Trade in Program Extended-call!



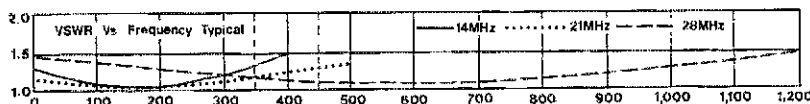
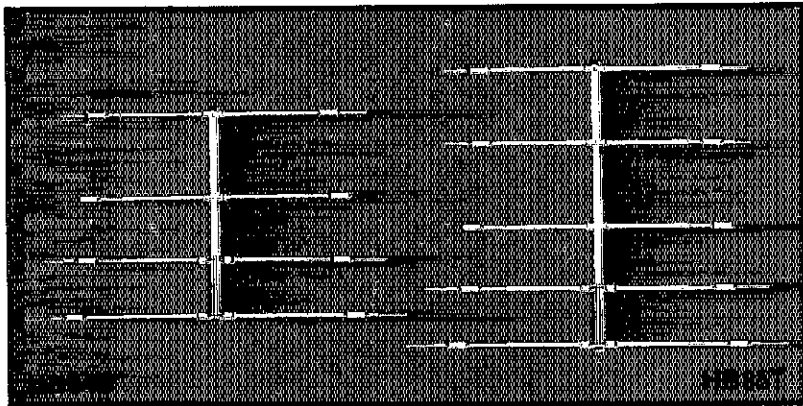
**D810 - \$309.00**  
50 ch, aircraft, prog.

D300- 30 chan ..\$209.00  
D100- 10 chan ..\$159.00  
M400- 30 chan ..\$249.00  
M100- 10 chan ..\$209.00  
R1040- 10 chan ..\$139.00  
H604- 6 ch.H.H. \$124.00

Rebates are back April 1st call!

April 1982 167

# DUAL-DRIVE TRIBANDERS BROAD BANDWIDTH



SEND STAMP OR LEGAL SIZE S.A.S.E. FOR OUR COLOR CATALOG DESCRIBING MORE THAN 60 PRODUCTS DESIGNED EXCLUSIVELY FOR THE DISCRIMINATING AMATEUR. TET OFFERS A WIDE RANGE OF DUAL DRIVE BEAMS AND SWISS QUADS COVERING FROM HF THROUGH 70CM, ROOF MOUNTED TOWERS AND ACCESSORIES FOR LIMITED SPACE APPLICATIONS, AND THE POPULAR KR500 ELEVATION ROTATOR.



### 4 Models to Choose from:

	HB35T	HB43sp	HB34D	HB33sp
Bands	10/15/20	10/15/20	10/15/20	10/15/20
Elements/Band	5/4	4/4	4/3	3/3
Max Pwr PEP	3KW	3KW	3KW	3KW
VSWR	1.5	1.5	1.5	1.5
Impedance				
Ohms	50	50	50	50
Max E1 Length	27'	27'	27'	27'
Boom Length	24'-2"	19'-8"	16'-5"	13'-2"
Turn Radius	18'-10"	16'-9"	15'-10"	16'
Wind Area Ft <sup>2</sup>	7.93	6.52	6.04	4.73
Wind Load (lbs.) @ 80mph	160	132	121	102
Boom Diameter	2"	2"	2"	2"
Mast Size	1 1/2"-2"	1 1/2"-2"	1 1/2"-2"	1 1/2"-2"
Weight Lbs	50	38	34	27
Max Wind MPH	100	100	100	100
Balun	Furnished	Yes	Yes	Yes
Gain dBd		CALL FACTORY	CALL FACTORY	
F:R Ratio		CALL FACTORY	CALL FACTORY	
Price	\$329.95	\$239.95	\$209.95	\$174.95

## WE'VE MOVED!

NOW SERVING YOU FROM OUR NEW ESCONDIDO CA, FACILITIES

1309 SIMPSON WAY, SUITE F  
ESCONDIDO, CA 92025

ORDER DIRECT

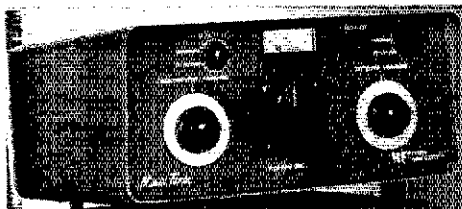
# TET

# 800-854-1953

CALIFORNIA RESIDENTS CALL: (714) 743-7025

## ANTENNA SYSTEMS

### RF POWER COMPONENTS



Maxi without SWR — \$259.95  
Maxi with SWR — \$299.95  
(Balun Optional ... \$19.95)

FOR COLOR BROCHURE  
OPERATING HINTS

Write or call **RF POWER COMPONENTS**

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NIAGARA, WIS. 54151  
(715) 251-4118

★ MADE IN AMERICA

# MAXI

## ANTENNA TUNER

Continuous 1.7 - 30 MHz Coverage  
Rotary Inductor (28 μ H)  
Rugged Cast Aluminum Turns Counter  
Handles 3 KW PEP 2 KW with Balun  
Velvet-Smooth 6 to 1 Vernier Tuning  
0 - 100 Logging Scale on 500 pF Capacitors

CALL Toll-free 800-327-7798. Ask for Bob Hoffman. Jaro Electronics Corp. We buy all types of tubes. Top prices paid for Varian, Elmac, Amperex, RCA, Western Electric, Raytheon, in Florida Call toll free: 800-432-8524. Address 412 27th St., Orlando, FL 32802.

**COLLINS** Wanted: Original sales literature for early 30K-1 transmitter, ca. 1946; 30L-1 clean, manual, input cable; SC-101 Station Control, 68Y-1 Antenna Selector and cabling duct; knob for on-off switch on 75A-1; Electro-Voice 605-8 mic (vertical grille slots) with '428 PTT stand. Must sell: Linear for converter CB rig, 100 Watts input or so, works FB #75; Lafayette SSB-50 CB converted to 10, works FB #50; D-104 with PTT stand \$25; Model 15 Teletype for parts, pick up only \$25. A. Gerli, ACTY, 35 Brookmoor Road, Avon, CT 06001 203-673-3662 keep trying til 10 PM EST.

**IMPROVE** Morse interpretation — automatically. Fully integrated microelectronics hardware software. Unusual features. \$169. Telecraft Laboratories, Box 1185, E. Dennis, MA 02641.

**ETCHING SOLUTION** (Fe CL3), 8 oz. bottle (concentrate) with application, \$2.20 plus shipping. Kramer, POB 8242, St. Petersburg, FL 33738.

**TOWER** Design, permit problems, stress calculations: Civil Engineer, Jesse Ball, W6BFO, 213-340-4411.

**FOR SALE:** Icom 551-\$250, Swan 250 w/pa - \$250, Cushcraft ATB-34 tribander unused - \$120, Icom 245/SSB - \$220, Yaesu FRG-7 - \$180, Wilson TT-45B tower and FB-45B base - \$350, Advanced Receiver Research 432/435 converter - \$30, Advanced Receiver Research 28 MHz preamp - \$15 Buyers pay freight. Contact H. Theobalt, K9IJQ, 330 E. Olivewood Circle, Porterville, CA, 93257 after 6:00 P.M., 209-781-8034.

**SELL:** Kenwood TR-2400, speakermic, mobile charger wallcharger: \$270. (601)-327-6154. Like new condition. N5CIH.

**ATLAS 215X, A.C. P.S.,** mic, mobile bracket: \$350. Bill, KC8T 213-368-5645.

**SIGNAL** Generator, TS-479B, military unit, similar to Measurements Model 80. \$150.00 plus shipping. Hewlett-Packard 410B VTVM \$50 plus shipping. W6OZG, 418 Lake Forest Dr., Vicksburg, MS 39180.

**WANTED:** Drake SSR-1 SW rcvr in good condition, R.A. Matias KP6GO, 12627 Ellenville, Houston, TX 77089, 1-713-484-3230.

**SP-600** rcvr, late model, excellent. \$200. K6EWM. 408-867-6796.

**COLLINS 51S-1** wanted for my collection, must be very late round emblem and near perfect. Please help. Tnx. Gary, WB6GIV, 213-431-8931, 213-852-7455. Call collect.

**YAESU FT-901DM, mint!** \$800. K8VYY, 419-395-1949.

**KWM-2** with Waters Rej. Tun. 516-2 PS. 312B-4 Station Console - Magnum Six Speech Processor complete \$725. Electro-Voice 665 Mike \$25. W9EKD.

**WANTED:** Atlas 210X or Yaesu FRG-7B. W6RQZ, 415-528-7345 or letter.

**FOR SALE:** Yaesu FT-101 E, FV-101, speaker YM-844 desk mike and hand mike included. Rig has built in AC-DC power supplies. \$675 KA6LRR. Will ship UPS, 218-768-3331.

**YAESU YO-101** Scope, new, \$150, Yaesu FTV-650B 6-meter transverter \$100, Yaesu FT-2 AUTO 2-meter scanning transceiver \$100, GLB-300 2-meter synthesizer \$50, Hallicrafters R-42 speaker \$40, Vibroplex "Original" \$20, W6PVL, 316-624-3988 after 6 P.M.

**AMATEUR** microwave receiver system with power supply, down converter, 2.1-2.6 GHz. \$195 to N. Keith, Box 2644, Cir., E. 33517, WAHEN. Mint condition.

**DRAKE C-Line, R-4C, 14XC, AC-4, MS-4,** Sherwood 600 Hz IF, 500 Hz, 250 Hz, 125 Hz, N.B. \$325. G. Zielinski, W9OA 312-361-0969.

**WANTED.** Riders diagram, Zenith R36798, WB5FXI, 5024 Oakwood, Moss Point, MS 39563.

**FT-101B,** mint, many extras. \$500 delivered. W6NEY, 415-842-5639.

**FOR SALE:** Heathkit HW-2036A, HWA 2036-3 power supply and Micoder mike. Excellent condition. Tom Gallagher, 711 W 9th, Claremont CA 91711. 714-628-9882.

**COLLINS KWM-380,** 300 Hz, 140 Hz filters, Control Interface, WARC bands, \$2375. G. Zielinski, W9OA, 312-361-0969.

**HEATH HW101, HP23A,** cw filter, new finals excellent \$295 plus UPS. KA9JYO 219-464-9207.

**CONTESTERS,** dx'ers, investors: Want to own the Midwest's largest antenna farm? For sale: three bedroom all brick custom contemporary house on 20 acres overlooking a 3 acre stocked lake. Six towers including four 150'ers with 7el Yagi band crushers. Would you believe a 7el 10m on 42', 7el 15m on 57', 7el 20m on 88' and a 4el 40m on a 100' boom! Includes tractor, mower, machine shop, welders and all peripherals. A lifetime opportunity. Contact AB9I, Rt. 1 Box 587, Holt, MO 64048. 816-635-6906.

**FOR SALE:** Robot 400, r.f. modulator board, Zenith JC500 video camera, lens, cabling, manuals, almost new \$695. You ship. WB7NLM 602-333-4441.

**YAESU FRG-7.** Excellent condition. Hardly used, \$200 or best offer. KA6PYZ 415-673-9572.

**MOTOROLA,** three clean Sillimline VHF HT-220's. Two dual freq. carrier squelch with CES TouchTone pads. One single freq. PL. With chargers, Antennas. \$300. ea. Dick, K9IFF, 414-442-5105.

Owners of the TEN-TEC OMNI say it all and much better than we here at the factory could...

Had Century 21 and was more than happy with performance—am upgrading soon so I decided to stay with an excellent American made product.

**KA4FJE**

As present owner of TEN-TEC 544, I have been very happy with it. Now that I need a rig for a 2nd QTH—it, of course, must be a TEN-TEC.

**WA2YHF**

This is my third TEN-TEC rig. This new one is best yet! Triton IV is now back-up to new Omni C.

**AD1P**

This is a wonderful rig with all the serious Ham should need. All reports remark of clean keying and good quality SSB.

**N4LS**

It is a well thought out piece of equipment. I especially like the QSK and the convenient controls.

**W8NOT**

I was impressed with your reputation for providing good service and satisfying the customer.

**W4JSP**

In almost 27 years of Hamming, this is the best rig I've ever owned. Thank you all very much!

**W7WKH**

Super piece of equipment!!

**N3RG**

The transceiver has been on the air for 5 days, and I am more than satisfied. It is in my estimation a superb product and does exactly what I expected it to do. Signal reports are most flattering.

**N2CER**

Fantastic Rig, and I use on SSB ONLY.

**KB9VB**

I decided on TEN-TEC because of the excellent service policy of your company.

**WA4RRC**

I'm impressed! Will need time to take proper advantage of all of its good features. This should give the "Rice Burners" a real goal to shoot for!

**W8UGT**

Very fine Radio, I'm proud to be an Omni-C owner.

**WD4SFY**

The Omni is a beautiful transceiver. Worth every penny!

**KJ5G**

The Omni C is a joy to operate. My first contact was Romania.

**W4REW**

Numerous comments over the air pertaining to product and quality of service were very complimentary.

**W5VYT**

A prominent local amateur told us, "I have never met a man who bought a TEN-TEC and didn't like it." Also we wanted to buy American.

**AJ0S N0CEQ**

I have many friends on the air (cw) that are well pleased with TEN-TEC equipment. Especially favored among

I am extremely pleased with the OMNI-C. I have owned the best (Collins, Drake, etc.) but this product has them all beat for sheer performance and operator convenience. You are to be congratulated for producing such an outstanding piece of equipment—right here in the U.S.A.!

**W9SC**

I'm very pleased. after 14 years of DX'ing and contest operations and many more different rigs, this one tops them all. Super RX!

**KJ2H CX1BBV**

I've owned the Triton 1, then the Triton 4, now the Omni-C. Is there any other rig?

**W1ZQI**

Have had a Triton IV the past four years. I would not own anything but TEN-TEC. Super rigs and fantastic service.

**W5TI**

Had Omni-C, then tried most other rigs on market—went back to the best—The American made Omni-C.

**KC5WC**

I have previously owned Triton IV. Now have Omni-D Series B, your prompt and courteous attention to minor problems in the past together with fine equipment induced me to buy this one.

**N5CN**

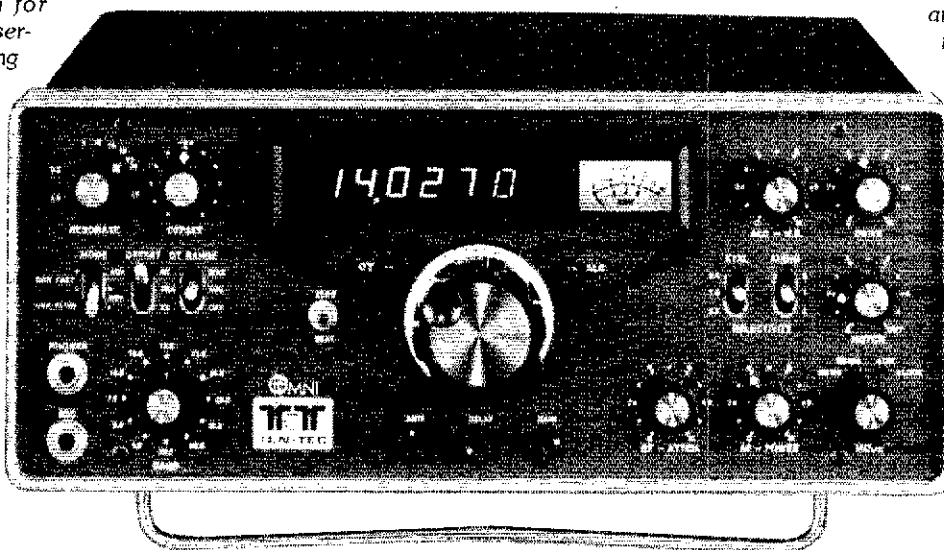
Decision was on previous experience. Traded in a 544 on this rig & the only thing I would have traded that one for is another TEN-TEC—Great rig!

**WD4NZP**

Fantastic rig!! Mark me down as a TEN-TEC fan for life!!

**KA5GKO**

## Straight talk from owners of TEN-TEC OMNI...



## the rig that filters the crowd.

cw operators is the QSK full break in feature.

**W5QNT**

This XCVR has to be the ultimate "rig." I am waiting for the matching amp (the Hercules) it is on order.

**K8IST**

I owned a TEN-TEC Triton IV which was a sweet rig. It was natural to upgrade to another TEN-TEC.

**KA4GYU**

My decision was based mainly on over the air reports of TEN-TEC owners and also reported good factory service if any troubles with rig did occur.

**W7GOY**

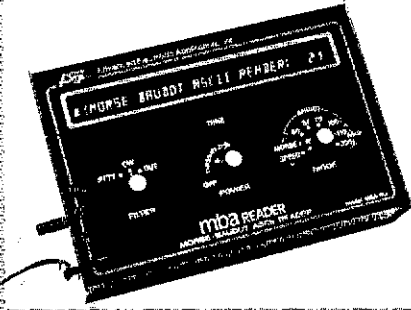
OMNI has these features:

- All 9 HF bands • All Solid-State • Broad-banded • 2-Range Offset Tuning of Receiver, Transmitter or Transceiver • Optimized Sensitivity • Optimized Bandwidth • Built-in Notch Filter • Built-In Noise Blanker • 2-Speed Break-In • WWV reception • Separate Receiving Antenna Capability • Built-in VOX and PTT • Built-in Phone Patch Jacks • Built-In CW Zero-Beat Switch • Built-in Adjustable Sidetone • Adjustable Threshold ALC • Front Panel Control of Linear or Antenna • Automatic Sideband Selection • Superior Audio • High Stability

Model 546 OMNI-Series C..... \$1289  
See your TEN-TEC dealer or write for details.

**TEN-TEC, INC.**  
SEVIERVILLE, TENNESSEE 37862

# MBA READER,<sup>TM</sup> A NAME YOU SHOULD KNOW



What does MBA mean? It stands for Morse-Baudot and ASCII. What does the MBA Reader do? The RO model (reader only) uses a 32 character alphanumeric vacuum fluorescent display and takes cw or tty audio from a receiver or tape recorder and visually presents it on the display.

The copy moves from right to left across the screen, much like the Times Square reader board. Is the AEA model MBA Reader different from other readers? It certainly is! It is the first to give the user 32 characters of copy (without a CRT), up to five words at one time. It can copy cw up to 99 wpm and Baudot at 60-67-75 and 100 wpm. Speeds in the ASCII mode are 110 and hand typed 300 baud. The expanded display allows easy copy even during high speed reception.

The AEA model MBA has an exclusive automatic speed tracking feature. If you are copying a signal at 3-5 wpm and tune to a new signal at 90 wpm, the MBA catches the increased speed without loss of copy.

The MBA Reader allows a visual display of your fist and improves your code proficiency. It is compact in size, and has an easily read vacuum fluorescent display.

The Reader operates from an external 12 VDC source. This allows for portable/mobile or fixed operation.

Check the AEA model MBA Reader at your favorite dealer and see all the features in this new equipment. If your dealer cannot supply you, contact **Advanced Electronic Applications, Inc.**

P.O. Box 2160, Lynnwood, WA 98036 Call 206/775-7373

Prices and specifications subject to change without notice or obligation

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### FL-2 MULTI-MODE AUDIO FILTER

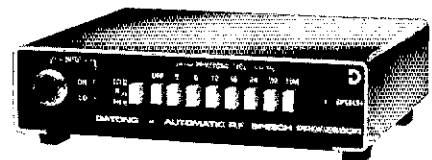
Installs in speaker line. Provides independently adjustable Lo-Pass and Hi-Pass cutoff frequencies between 200-3500 Hz in CW mode. Shape factor apx. 1.4:1 on a 5:50 db scale. Peak/notch mode provides up to 45 db action.



**\$199.95**

### ASP — RF SPEECH PROCESSOR

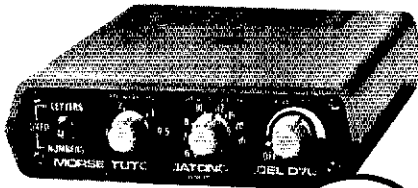
Installs in MIC line. RF clipping with speech shaping from 0 to 30 db in 6 db steps. Frequency response 400-3400 Hz ± 3 db. Total harmonic distortion at 1 KHz, at 30 db clip level — 1/2%. Accepts Hi or Lo impedance MICs.



**\$169.95**

### D-70 CODE TUTOR

Teaches morse code. Programmed for random letters and numbers. Sends random 5 character groups between 6-37 wpm with adjustable character spacing from normal to 3 seconds.



**\$99.95**

### PLUS THREE EXCITING NEW PRODUCTS:

- **RFA PRE-AMP** — provides RF switched, broadband (5-200 MHz) Pre-Amp for improved receiving sensitivity. **\$64.95**
- **CODECALL** — adds 4096 selective tones for call facilities to any FM, AM or SSB transceiver. **\$64.95**
- **DF-1 DIRECTION FINDER** for any FM transceiver. 16 LED compass point readout (32 pts interpolated) **\$379.95**

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WANTED Heath SB500 Transverter. Call collect N8CGH 513-851-1554.

SELLING my surplus amateur radio equipment, including antennas and antenna parts, station accessories, RTTY equipment, test equipment and much more. Send SASE for complete list. Jack Mathias, W9FMW, 721 S. Meadow Rd., Evansville, IN 47715.

SWAP-SELL: Heath HX-1681, Fanon scanner. TV-502S for general coverage receiver. K2VGV.

TRADE: Vibroplex like new standard Vibrokeyer for iambic paddle. W3OA Box 78 RD 2, Tarentum, PA 15084.

COMPUTERS, peripherals and supplies. Cleaning house. Send for long list. Greg LaRocque, Process Automation, Box 4156, East Providence, RI 02914.

VERTICAL Buffs: Our book "Vertical Users: Novice to Extra" deals with the comparative relative efficiencies of all types of installations and has been complimented by Hustler, Butternut, 73, Worldradio, Ham Radio, Bill Orr, Barry Goldwater. \$4.95 postpaid. Danrick Enterprises, 211-Q Dayton Ave., Clifton, NJ 07011.

HUNDREDS of transmitter, receiver, telephone, surveillance and other products, kits, and plans. Catalog \$1. Intertech, P.O. Box 54853, Atlanta, GA 30308.

SALE: Drake TR3, MS3, AC3, 729SRD mic. \$300. Hy-Gain 12AVG, Elco324 sign. gen., 2 meter IC22s, IC3PA \$150. WA9WHZ, 515-332-1613.

HALLICRAFTERS HT-32A tx clean original owner, with manual \$175. Pickup only: Waters phone patch Hybrid coupler model 3001 \$35 mint; Precision Sig. Gen. E-200-C mint; Cornwell-Dubilier Cap-Res Bridge BF-60 \$35; RCA Scope WO-91A mint \$75; Lambda Power Supply Mod. 25 regulated mint \$45. All with manuals. W3HQO, 215-676-9427.

SELL: Collins KWM-380, SM-280, and service manual. Checked by Collins June 1981. \$2900. WB9Wuuls. W3HQO, 215-676-9427.

SELL: Collins KWM-380, SM-280, and service manual. Checked by Collins June 1981. \$2900. WB9WuLl. 2810 Gray St., Denver, CO 80214. 303-232-0620.

WANTED: Collins 30L1, 30S1, KWM2A, RCA uhf TacTec. W9QYH 1605 Ridge Rd., Green Bay, WI 54304.

MADISON 2M Heaven: New Kenwood TR9130-call; TR7730, TR7850-stock; Icom IC25A \$309; new 220-450MHz versions-shortly; IC2AT \$239; IC3AT/IC4AT \$269. ea; Santec HT1200 \$269; ST144UP \$299; FT208R/708R \$289. ea; FT480R \$449. accessories-stock; HF specials: Dentron AT1K \$125; Jr. Monitor \$69; new Station One \$169; Kenwood R600-call; FRG7700 \$449; IC720A/AC \$1298; boxed demo T6830S \$800; TR7A \$1495; R7A \$1450; TR5 \$995; Belden coax-stock; Beam bargains: TH7DX \$349; KT34A \$309; KT34XA \$469; 144-148-16C \$99; all items guaranteed. Prices FOB Houston, send sufficient postage. Madison Electronics, 1508 McKinney, Houston, TX 77010. 1-713-858-0288; night 1-800-231-3057 7-10 PMCT MWF.

COLLECTORS: General Radio 1100A frequency standard to 1000 Mc 75" rack cabinet contains 1101A 1102A 1107A 1112A 1112B reasonable send SASE for details plus large list of old test equipment and builders parts Joe W8VSK 47270 Main, Northville, MI 48187.

WANTED: Books: Northern Radio VFO Model 1, TS413C/U. For sale: National SW3 32 coils, Slinky antenna. W2RHQ, 315-451-0190.

KENWOOD TR7600 \$200, PS20 \$50, SP120 \$30, used less than 3 hours. Like new. 1 ship. KB7UU 602-534-5992.

WANTED - expired Ham plates. Collector needs DE, DC, ME, NJ Ont to complete all state collection. Offering \$1. each plus postage. Joe Franko, 1101 Evamar, Midland, MI 48640.

WANTED to rent: DX location in Southwestern Connecticut, Ron K1BW/1 203-222-0866.

SIGNAL Corps Freq Meter BC-221-C, built in wpr sply. Accurate. \$75 or B.O. + shipping. Fred, WA2VJL, 442 Englewood, Buffalo, NY 14223.

WANTED: SB800 speaker, HW-8, Vibroplex iambic. Greg, WA1JHW, 164 Hunts Ave., Pawtucket, RI 02861.

COUNTER: Good DS1 3550 \$80 Robb, AF6W, Bird Island, MN 55310.

FOR SALE - Swan 500 with mic, AC supply, DC supply, manual, extra finals. VE3ILW/W4 Lyman Duggan 7104 Seabury Ct., Tampa, FL 33615.

APPLE owners - code practice with built in speaker make tapes-key transmitter. Uses screen for memory. Cassette \$10, disk \$12.50 Postpaid USA. SASE for full info. Hart (W5HZF) 7720 Bogart, Ft. Worth, TX 76118 817-498-1899.

TS820S, cw filter, mint \$595. Bob KQ7J 509-529-4350 9-9 Sun-Thurs 1121 S. College Ave., College Place, WA 99324.

COLLINS wanted for collection, must be mint, original 75S-1, 75S-2, 75S-3A, 75S-3C, 312B-3's, Collins microphones, very late or new 51S-1, 50-101. Thanks, Gary WB6GIY 213-652-7455 collect.

RTTY - 2 model 28RO: 28KSR w/reperf \$450 lot; 914-657-6237 or 212-838-5182 M. Stutterheim (near Kingston NY).

KENWOOD TS820S with digital. Carton and manual. Excellent \$750 W7YHS, 3101 Buttercup, Billings, MT 59102, 406-656-3225.

WILSON System 36 six-element tribander, less than 1 year old. Local pickup preferred \$150 WA9JDF 1-612-686-3402.

KEYERS - \$39.95 SASE for information, Webco, Box 740211, Houston, TX 77274.

# 10GHz GUNNPLEXER transceiver



TR10GA

- Complete ready to use 10 GHz fm voicew transceiver
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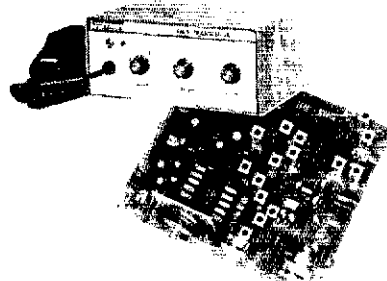


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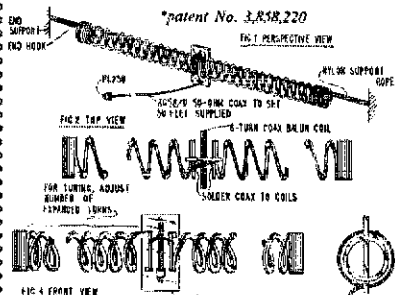
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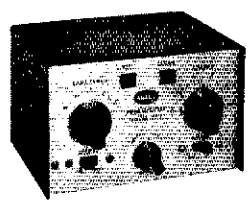
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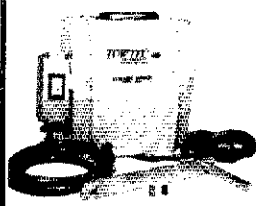
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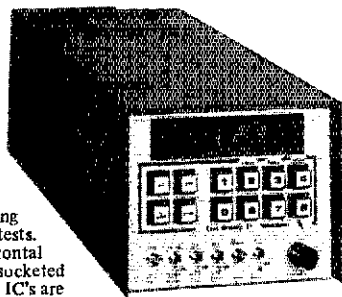
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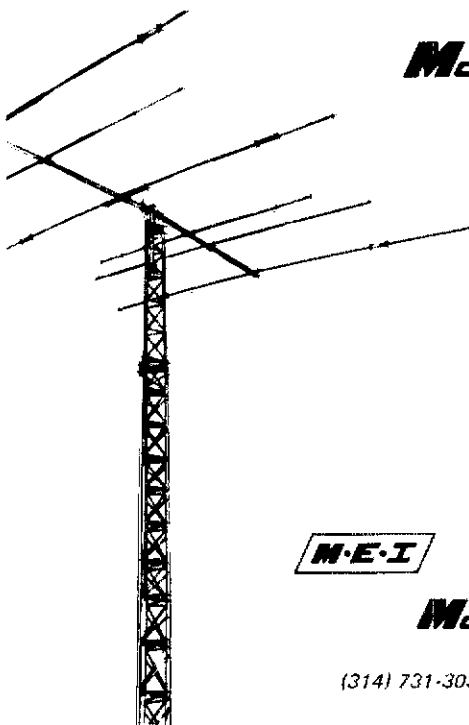
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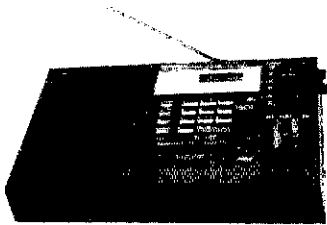
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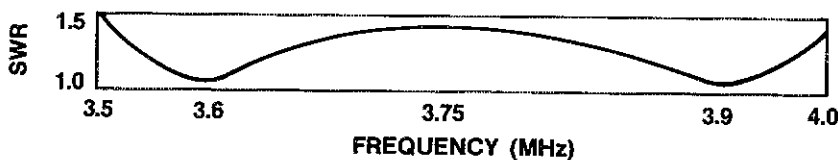
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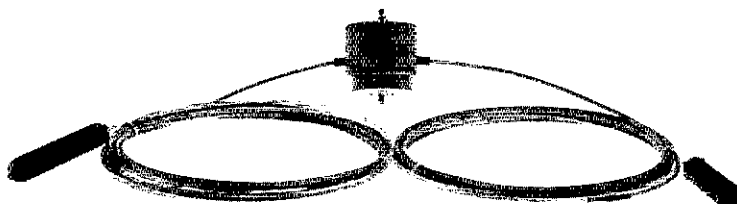


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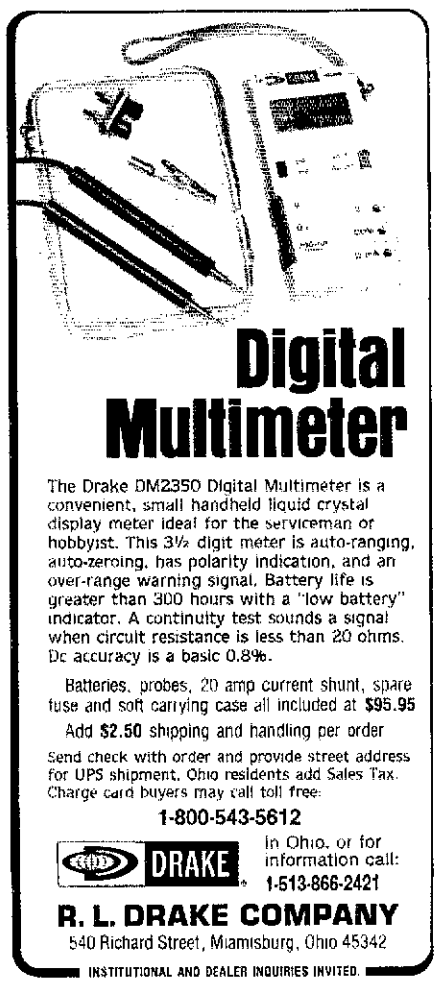
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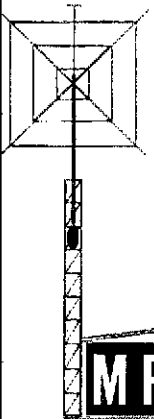
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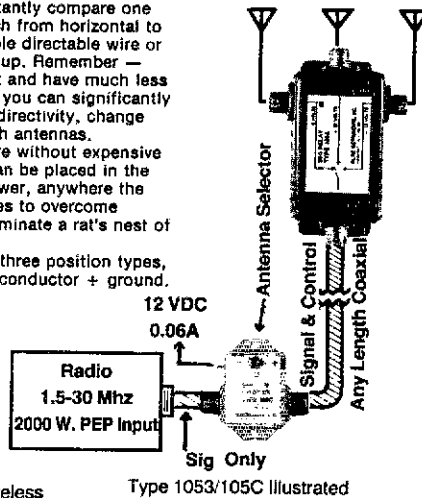
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**TRS-80** cw/RTTY Interface Macrotronics M-80 extras \$85, SB-220 linear \$500, SA-2040 antenna tuner \$90, more SASE, shipped postpaid USA, N8NN, 385 Bellaire Dr. Fairborn, OH 45324, 513-878-7559.

**WANTED** Heathkit - HW-101 Anthony Szklany, Danbury, CT 203-746-3884.

**KENWOOD TS-820S** with cw filter. AT-200 Antenna Tuner/SWR/Power Meter. With manuals and original containers. Perfect condition. No modifications or alterations. \$695. KD9D, 430 West Main, Decatur, IL 62522 or phone 217-422-6124 after 5 PM CST.

**WANT** Mosley two element quad 10-15-20 meter antenna. W2IV Richards, Argyle, NY 12809.

**PROCEEDINGS I.R.E., I.E.E.E. Spectrum.** Transactions of professional groups on component parts, national convention records, 1946-1974. 572 issues \$300. Plus shipping. W9RPL, 6152 Murray Rd., Whitehall, MI 49461. 616-694-8369.

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**KENWOOD TR7850** \$340, Autek QF-1 (old style) \$10. Lunar PA11440 2-meter in-line preamp \$40. Drake KWLPF \$20. MMT432/285 432 MHz transverter \$225.00 TI-58 calculator with EE and STATS modules \$60. You ship. KE5C Calbook 817-774-8376.

**WANTED - TenTec Delta** or Argosy with A/C supply. Tryout a must. KA1IEK, 401-884-9314.

**YAESU FT-101E**, fan, Shure 444, 1978 model, stored 4 years. Less than 10 hrs use. Absolutely mint. \$650. I ship. KB4SS, 404-476-5644.

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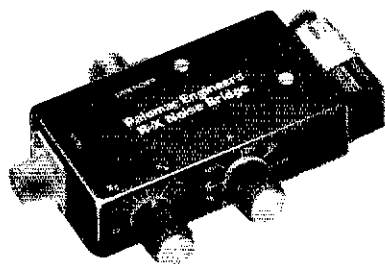
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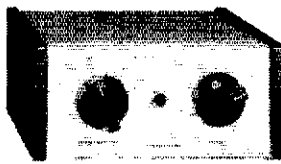
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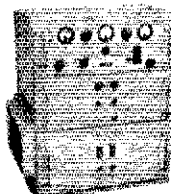
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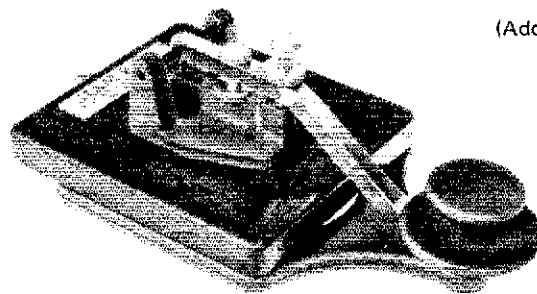
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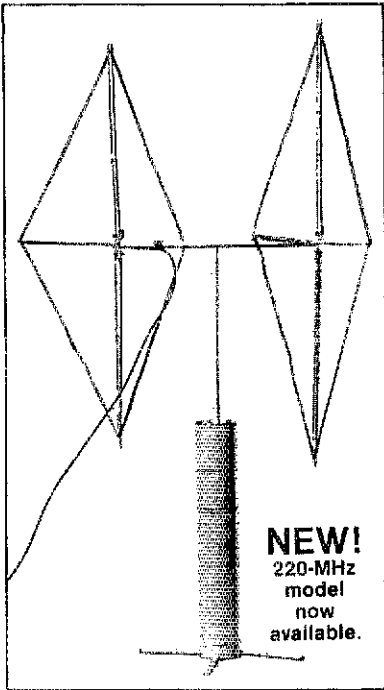
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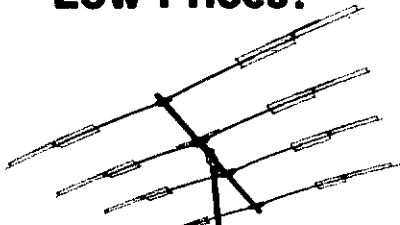
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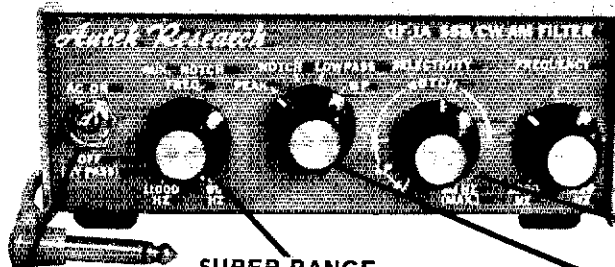
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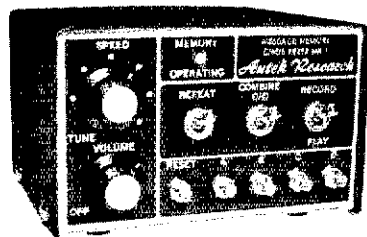
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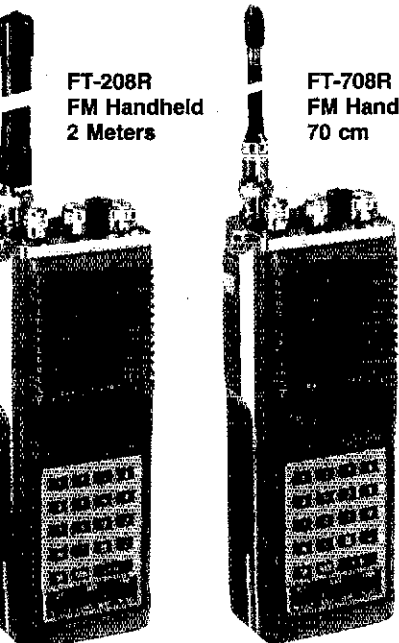
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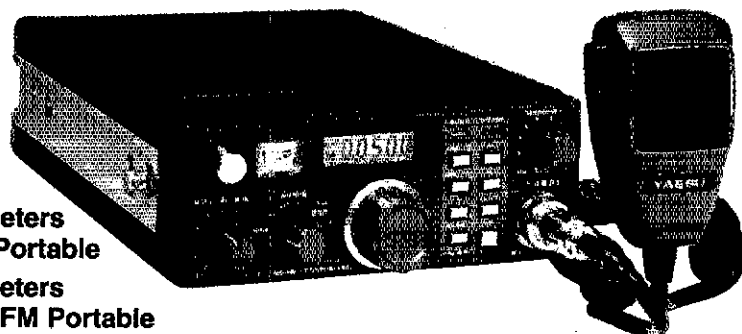
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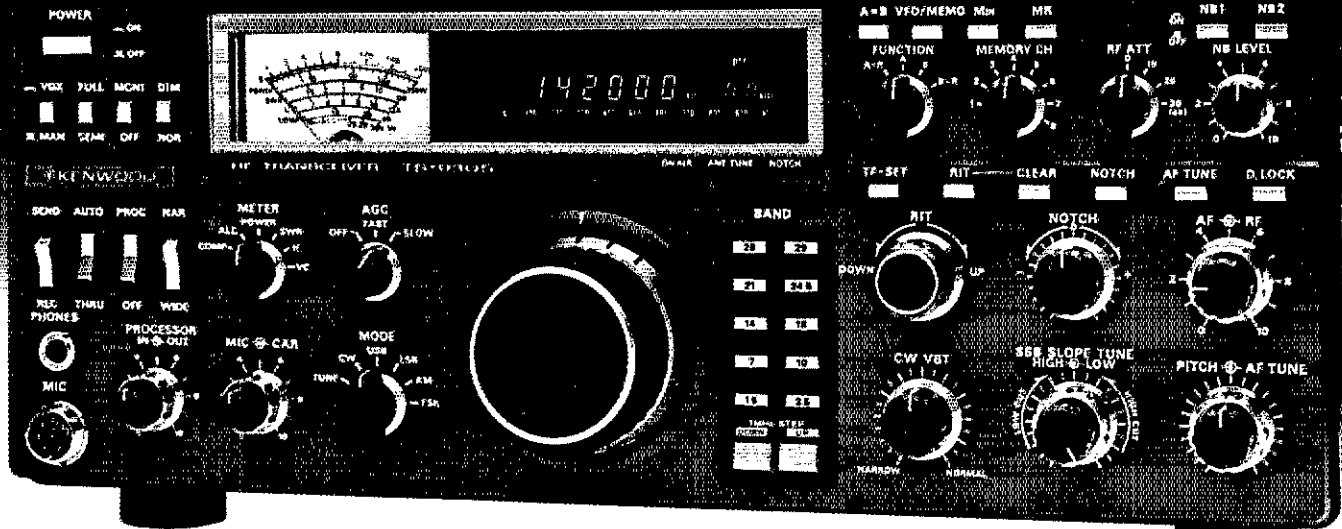
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Among its other important features are, SSB slope tuning, CW VBT, IF notch filter, CW pitch control, dual digital VFO's, CW full break-in, automatic antenna tuner, and a higher voltage operated solid state final amplifier. It is available with or without the AT-930 automatic antenna tuner built-in.

### TS-930S FEATURES:

- **160-10 Meters, with 150 kHz - 30 MHz general coverage receiver.**

Covers all Amateur frequencies from 160-10 meters, including new WARC, 30, 17, and 12 meter bands, on SSB, CW, FSK, and AM. Features 150 kHz - 30 MHz general coverage receiver. Separate Amateur band access keys allow speedy band selection. UP/DOWN bandswitch changes in 1-MHz steps. A new, innovative, quadruple conversion, digital PLL synthesized circuit provides superior frequency accuracy and stability, plus greatly enhanced selectivity.

- **Excellent receiver dynamic range.** Receiver two-tone dynamic range, 100 dB typical (20 meters, 500 Hz CW bandwidth, at sensitivity of 0.25  $\mu$ v, S/N 10 dB), provides the ultimate in rejection of IM distortion.

- **All solid state, 28 volt operated final amplifier.**

The final amplifier operates on 28 VDC for lowest IM distortion. Power input rated at 250 W on SSB, CW, and FSK, and at 80 W on AM. Final amplifier protection circuit with cooling fan, SWR/Power meter built-in.

- **Automatic antenna tuner, built-in.** Available with AT-930 antenna tuner built-in, or as an option. Covers Amateur bands 80-10 meters, including the new WARC bands. Tuning range automatically

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- **CW full break-in.**

CW full break-in circuit uses CMOS logic IC plus reed relay for maximum flexibility, coupled with smooth, quiet operation. Switchable to semi-break-in.

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10-Hz step dual digital VFO's include band information. Each VFO tunes continuously from band to band. A large, heavy, flywheel type knob is used for improved tuning ease. T.F. Set switch allows fast transmit frequency setting for split-frequency operations. A-B switch for equalizing one VFO frequency to the other. VFO "Lock" switch provided. RIT control for  $\pm 9.9$  kHz receive frequency shift.

- **Eight memory channels.**

Stores both frequency and band information. VFO-MEMO switch allows use of each memory as an independent VFO, (the original memory frequency can be recalled at will, or as a fixed frequency. Internal Battery memory back-up, estimated 1 year life. (Batteries not Kenwood supplied).

- **Dual mode noise blanker ("pulse" or "woodpecker").**

NB-1, with threshold control, for pulse-type noise. NB-2 for longer duration "woodpecker" type noise.

- **SSB IF slope tuning.**

Allows independent adjustment of the low and/or high frequency slopes of the IF passband, for best interference rejection.

- **CW VBT and pitch controls.**

CW VBT (Variable Bandwidth Tuning) control tunes out interfering signals. CW pitch controls shifts IF passband and simultaneously changes the pitch of the beat frequency. A "Narrow/Wide" filter selector switch is provided.

- **IF notch filter.**

100-kHz IF notch circuit gives deep, sharp, notch, better than -40 dB.

- **Audio filter built-in.**

Tunable, peak-type audio filter for CW.

- **AC power supply built-in.**

120, 220, or 240 VAC, switch selected (operates on AC only).

- **Fluorescent tube digital display.**

Fluorescent tube digital display has analog type sub-scale with 20-kHz steps. Separate 2 digit display indicates RIT frequency shift.

- **RF speech processor.**

RF clipper type processor provides higher average "talk-power," plus improved intelligibility. Separate "IN" and "OUT" front panel level controls.

- **One year warranty.**

The TS-930S carries a one year limited warranty on parts and labor.

### Other features:

- SSB monitor circuit, 3 step RF attenuator, VOX, and 100-kHz marker.

### Optional accessories:

- AT-930 automatic antenna tuner.
- SP-930 external speaker with selectable audio filters.
- YG-455C-1 (500 Hz) or YG-455CN-1 (250 Hz) plug-in CW filters for 455-kHz IF.
- YK-88C-1 (500 Hz) CW plug-in filter for 8.83-MHz IF.
- YK-88A-1 (6 kHz) AM plug-in filter for 8.83-MHz IF.
- MC-60 (S-8) deluxe desk microphone with UP/DOWN switch.
- TL-922A linear amplifier.
- SM-220 station monitor.
- HC-10 digital world clock.
- HS-6, HS-5, HS-4 headphones.

More information on the TS-930S is available from all authorized dealers of Trio-Kenwood Communications 1111 West Walnut Street, Compton, California 90220

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Specifications and prices are subject to change without notice or obligation.