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Amateur Radio

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JANUARY 1983 $2.00

CQ

CQ REVIEWS:

Amateur Radio Provides Communications For New York City Marathon . . . Page 13

74820 08241 01

THE RADIO AMATEUR'S JOURNAL

NEW

Digital DX-terity...

General coverage, Superior dynamic range, 2 VFO's, 8 memories, Scan, Notch...COMPACT!

TS-430S

The TS-430S combines the ultimate in compact styling with advanced circuit design and performance. An all solid-state SSB, CW, and AM transceiver, with FM optional, covering the 160-10 meter Amateur bands, it also incorporates a 150 kHz-30 MHz general coverage receiver having a superior dynamic range, dual digital VFO's, 8 memories, memory scan, programmable band scan, IF shift, notch filter, all-mode squelch, and built-in speech processor.

TS-430S FEATURES:

- **160-10 meter operation, with general coverage receiver**
  With 160-10 meter Amateur band coverage, including WARC 30, 17, and 12 meter bands, it also features a 150 kHz-30 MHz general coverage receiver. Innovative UP-conversion digital PLL circuit, for superior frequency stability and accuracy. UP/DOWN band switches for Amateur bands or 1-MHz steps across entire 150 kHz-30 MHz range. Two digital VFO's continuously tuneable from band to band. Band information output on rear panel.
- **USB, LSB, CW, AM, with optional FM**
  Operates on USB, LSB, CW, and AM, with optional FM, internally installed. AGC time constant automatically selected by mode.
- **Compact, lightweight design**
  Measures only 10-5/8 (270) W x 3-3/4 (96) H x 10-7/8 (275) D, inches (mm), weighs only 14.3 lbs. (6.5 kg.).
- **Superior receiver dynamic range**
  Use of 2SK125 junction-type FET's in the Dyna-Mix high sensitivity, balanced, direct mixer circuit provides superior dynamic range.
- **10-Hz step dual digital VFO's**
  10-Hz step dual digital VFO's operate independently, include band and mode information. Different band and mode cross operation possible. Dial torque adjustable. STEP switch for tuning in 10-Hz or 100-Hz steps. A=B switch quickly shifts "B" VFO to the same frequency and mode as "A" VFO, or vice-versa. VFO LOCK switch provided. RIT control tunes VFO or memory. UP/DOWN manual scan possible using optional microphone.
- **Eight memories store frequency, mode, and band data**
  Memories store frequency, mode, and band data. Eighth memory stores receive and transmit frequencies independently. M.CH switch for operation of memory as independent VFO, or fixed frequency.
- **Lithium battery memory back-up**
  Estimated five-year life.
- **Memory scan**
  Scans memories in which data is stored.
- **Programmable automatic band scan**
  Scans programmed band width. Scan speed adjustable. HOLD switch interrupts band or memory scan.
- **IF shift circuit for minimum QRM.**
  IF passband may be moved to place interferring signals outside the passband, for best interference rejection.
- **Tuneable notch filter built-in**
  Deep, sharp, tuneable, audio notch filter.
- **Narrow-wide filter selection**
  NAR-WIDE switch for IF filter selection on SSB, CW, or AM, when optional filters are installed. (2.4 kHz IF filter built-in.)
- **Speech processor built-in**
  Improves intelligibility, increases average "talk-power."
- **Fluorescent tube digital display**
  Indicates frequency to 100 Hz (10 Hz modifiable).
- **All solid-state technology**
  Input rated 250 W PEP on SSB, 200 W DC on CW, 120 W on FM (optional), 60 W on AM. Built-in cooling fan, multi-circuit final protection. Operates on 12 VDC, or 120 VAC, or 220/240 VAC with optional PS-430 AC power supply.
- **All-mode squelch circuit, built-in**
- **Noise blanker, built-in**
- **RF attenuator (20 dB)**
- **Vox circuit, plus semi break-in with side-tone**

Optional accessories:

- PS-430 compact AC power supply.
- PS-30 or KPS-21 AC power supplies.
- SP-430 external speaker.
- MB-430 mobile mounting bracket.
- AT-130 compact antenna tuner, 80-10 m incl. WARC.
- AT-230 base antenna tuner, 160-10 m incl. WARC.
- FM-430 FM unit.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters.
- YK-88SN (1.8 kHz) narrow SSB filter.
- YK-88A (6 kHz) AM filter.
- MC-42S UP/DOWN hand microphone.
- MC-60A deluxe desk microphone, UP/DOWN switch.

More information on the TS-430S is available from all authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.

KENWOOD

...pacesetter in amateur radio

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

Scan the World.

NEW

SSB, CW, AM, FM, digital VFO's, 10 memories, memory and band scan, dual 24-hour clocks...

R-2000

The R-2000 is an all mode SSB, CW, AM, FM receiver that covers 150 kHz–30 MHz in 30 bands. New microprocessor controlled operating features and an UP conversion PLL circuit provide maximum flexibility and ease of operation to enhance the excitement of listening to stations around the world. Key features include digital VFO's, ten memories that store frequency, band, and mode information, memory scan, programmable band scan, fluorescent tube digital display, and dual 24-hour clock with timer.

R-2000 FEATURES:

- **Covers 150 kHz–30 MHz in 30 bands.**
  Uses innovative UP-conversion digitally controlled PLL circuit. UP/DOWN band switches (1-MHz step). VFO's continuously tuneable across 150 kHz–30 MHz.
- **All mode: USB, LSB, CW, AM, FM.**
  Provides expanded flexibility in receiving various signal types. Front panel mode selector keys, with LED indicators.
- **Digital VFO's for best stability.**
  50-Hz step, switchable to 500-Hz or 5-kHz, using front panel pushbutton switches. F. LOCK switch provided.
- **Ten memories store frequency, band, and mode data.**
  Complete information on frequency, band, and mode is stored in memory, assuring maximum ease of operation. Each memory may be tuned as a VFO. Original memory frequency may be recalled. AUTO. M switch for automatic storage of current operating data, or, when off, selective storage of data using M. IN switch.
- **Lithium battery memory back-up. (Est. 5 yr. life.)**
- **Memory scan.**
  Scans all memories, or may be programmed to scan specific memories. HOLD switch interrupts scanning. Frequency, band, and mode are automatically selected in accordance with the memory channel being scanned. The scanning time is approximately 2 seconds per channel.
- **Programmable band scan.**
  Scans automatically within the programmed bandwidth. Memory channels 9 and 0 establish upper and lower scan limits. HOLD switch interrupts scanning. Frequency may be adjusted, using the tuning control, during scan HOLD.
- **Fluorescent tube digital display (100-Hz resolution).**
  Built-in 7 digit fluorescent tube digital display indicates frequency or time, plus memory channel number. DIM switch provided. The display may be switched to indicate CLOCK-2, FREQUENCY, CLOCK-1, and timer ON or OFF by the front panel FUNCTION switch.
- **Dual 24-hour quartz clocks, with timer.**
  Permits programming two different time zones. Timer for ON and OFF programming. Timer REMOTE output on rear panel (not for AC power).
- **Three built-in IF filters with NARROW/WIDE selector switch. (CW filter optional.)**
  6 kHz wide or 2.7 kHz narrow on AM. 2.7 kHz automatic on SSB. 2.7 kHz wide on CW, or, with optional YG-455C filter installed, 500 Hz narrow. 15 kHz automatic on FM.
- **Squelch circuit, all mode, built-in, with BUSY indicator.**
- **Noise blanker built-in.**
  Eliminates pulse-type noise on SSB, CW, and AM.
- **Large front mounted speaker.**
- **Tone control.**
- **RF step attenuator. (0-10-20-30 dB.)**
  Four step attenuator, plus antenna fuse.
- **AGC switch. (Slow-Fast.)**
- **"S" meter, with SINPO "S" scale.**
- **High and low impedance antenna terminals.**
  A high impedance (500 ohm) terminal, and a low impedance (50 ohm) co-axial connector are provided.
- **100/120/220/240 VAC, or 13.8 VDC operation.** (Optional DCK-1 cable kit required for 13.8 VDC.)

Other features.
- RECORD output jack.
- Audible "beeper" (through speaker).
- Carrying handle.
- Headphone jack.
- External speaker jack.

Optional accessories:
- HS-4, HS-5, HS-6 headphones.
- DCK-1 DC cable kit.
- YG-455C 500-Hz CW filter.
- HC-10 World digital quartz clock.

More information on the R-2000 is available from all authorized dealers of Trio-Kenwood Communications
1111 West Walnut Street
Compton, California 90220.

KENWOOD

...pacesetter in amateur radio

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

You've got to get a Santec to get it right!

Compare Santec to anything you like, and you'll see — you've got to get a Santec to get: ■ memory channels which store standard repeater offsets for instant recall ■ less than 10 ma drain in receive to conserve power while you're monitoring ■ extremely wide power options of 0.1 W, 1.0 W or even 3.5 W for varying conditions ■ an accurate 24 hour clock for instant reference ■ and a full two year extended service plan which no one else will match.

When you get a Santec, you also get: ■ the widest frequency range of any handheld ■ odd offsets other than ±600 kHz ■ variable step sizes in bandscan ■ a 500 ma battery with charger ■ a full six digit back-lighted LCD display for full frequency readout plus the memory channel number ■ the easiest keyboard entry of any handheld ■ eight modes of scan, search, manual control and open scan ■ the ability to change batteries without losing memory data ■ easily programmable bandscan ■ a frequency lock switch on the keyboard ■ an automatic low battery indicator ■ and much more.

FEATURE	SANTEC ST-144	YAESU FT-208	KENWOOD TR-2500
Size (mm)	68 x 170 x 47	61 x 168 x 49	66 x 168 x 40
Weight with Batt.	600 gm	720 gm	540 gm
Readout	LCD (full 6 digits)	LCD (4 digits)	LCD (4 digits)
Memory Channels	10	10	10
Memory of Offsets	YES	NO	NO
Memory Backup	YES, Capacitance	Yes, Lithium Batt.	Yes, Lithium Batt.
Scan (mem. & band)	YES	Yes	Yes
Search Mode	YES	NO	NO
Step Size	5-100 kHz	5 or 10 kHz only	Any 5kHz multiple
Battery	Quick Change Pack 500 ma-hr, 9.6 V	Quick Change Pack 450 ma-hr, 10.8 V	Slide-on Pack 400 ma-hr, 8.4 V
Frequency Coverage	142-148.995 Tx (149.995 optional) 142-149.995 Rx	143.5-148.495 Tx/Rx	143.9-148.995 Tx/Rx
Power (max)	3.5 W High 1.0 W. Med. 0.1 W Low	2.5 W High 0.2 W Low	2.5 W High .3 W Low (approx.)
Priority	YES (in Mem/Scan)	Yes (Priority Ch.)	NO
Clock	YES	NO	NO
Computer Current Saver	YES (~10 ma)	NO (20 ma)	NO (27 ma)
Display	6 Digits + Mem. #	4 Digits + Mem. #	4 Digits + Mem. #

New! Affordable Price! See your Authorized Santec Dealer for details.

Competitors' specifications were obtained from published specifications sheets, and they are subject to change without notification to Santec or Encomm, Inc.

Shown with optional SM-3 speaker microphone.

Accessories for SANTEC Handheld Radios
clockwise from upper left
- Leather Case (ST-LC)
- Base Charger & Power Supply (ST-5BC)
- Remote Speaker (MS-505)
- Mobile Charger (ST-MC)
- Speaker Microphone (SM-3)

The ST-144 μP is approved under FCC Part 15

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Repairs, Parts & Service Available

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Plano TX 75074

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CQ The Radio Amateur's Journal

ON THE COVER: Amateurs lead the pack at the 14 mile point in the 1981 NYC Marathon. WA2DHF is in the red truck and WB2ZKX is in the TV truck. Photo by Rick Moran, WA2BBG.

JANUARY 1983 **VOL. 39, NO. 1**

FEATURES

DEPARTMENTS

Zero Bias AN EDITORIAL

Well, November and December *were* quiet months for the intrepid *CQ* travelers. This is being written in early November, and the "*were*" is editorial license. It's been over a week since the last Hamfest, and one full weekend at home plus one complete week here at the office. I have caught up on some of my mail, answered phone calls, and blocked out future issues of *CQ*. I've raked an interminable amount of leaves which fell during my travels and worked on a grounding system. It's good to be home.

January marks the start of the long-awaited Heard Island Expedition. The sixteen men and women are scheduled to leave Perth sometime in January and are bound for the Southern Ocean. This will be a very broad-based scientific expedition and will include several amateur radio operators. They will be using the call VKØHI, and we will have considerably more to report on in the next few months. Those of you who noticed a Heard Island Expedition ad in our December issue will probably surmise that we have entered into an agreement with the group. In exchange for our support of this expedition we have been granted several articles relating amateur radio's contribution to the success of the trip. These articles will be *CQ* exclusives.

Also in the next few months we will be bringing you more pointed and provocative interviews with noted amateurs in industry and government. For amateur radio, 1983 is shaping up to be a very interesting year. Despite the caviling from Peterborough, there are some very positive signs for a brighter amateur radio in the future.

As I have been saying for years, amateur radio just mirrors what is going on in "the real world." After all, we are the very same people who make up the so-called real world, and we bring to amateur radio the same problems, and the same methods of dealing with those problems, as we face every day. If the quick-fix is to always blame others, then we'll do it in amateur radio, too.

It's amazing that in a relatively short time one individual, Dick Bash, can get blamed for so much. If all of the woes of amateur radio are to be laid at his doorstep, then explain why it is that in this same time period, during which we have experienced a stringent FCC crack-down on violators, these accused, indicted, and sometimes convicted violators all have been around a lot longer than Mr. Bash and generally have two letter calls. These are the people who are harmful to amateur radio in the same manner as any law breaker is harmful to society. Do we now want to make a case against the ARRL for supplying these violators with *License Manuals*, or can we just say that if any individual breaks a particular law, he can expect to be punished for that particular violation?

Amateur radio, like society, will change over the next few years because that's what living things do—they grow. Who do you blame for growth? Do you blame the university for turning out the ambitious youngster who is out to take your job, your place on the Honor Roll, your favorite spot on 20, or all of the above? We're all dinosaurs to some future age, no matter what our heritage or language. We can try to grow with it, or like the dying dinosaur, we can practice oblatration to deaf ears. After all, we did survive the growth from tubes to semiconductors . . . or did we?

Speaking Of Tubes

If holiday shopping didn't leave you completely broke this year, or if some kind relative mailed you a modest check (for not quite enough to pick up a new rig), then take heed. For not too much money you can buy yourself a bit of nostalgia or a bit of history (depending on your age). What it is, is a book. However, it's not typical of books that amateurs usually buy or receive as gifts.

Most of the books that attract amateurs have that text-book look and are designed to impart great knowledge (the more formulas the better), while at the same time impress, confound, and possibly bore our families and friends who leaf through them. Let's face it: most of them are not coffee-table-type books nor even in the category of light reading.

At year's end Vestal Press brought out a terrific book that could be classified as a coffee-table-type book, being of large format and very well done. The book is called *70 Years of Radio Tubes and Valves* and is billed as a guide for electronic engineers, historians, and collectors. It is a 256-page hardcover book with between 400 and 500 pictures, drawings, and advertisements that are bound to fascinate almost anyone. The author, John W. Stokes, is from New Zealand, and he takes us from the tube's dawning in 1904 to its eclipse in the early 70s. The book sells for about $22.00 and is sure to entertain just about everyone who reads it.

W1WY Gets Certificate For A Change

Though not quite 70 years as in our previous item, our own Frank Anzalone, W1WY, recently celebrated a 60-year anniversary. The photo shows Anne and Frank Anzalone beaming with pride as they display the QCWA 60th Year Anniversary Award and gold pin presented to Frank. Congratulations, Frank, for your many years in amateur radio. We, too, are proud, proud to include you among the *CQ* Staff as Contest Calendar Editor and Contest Committee Chairman.

73, Alan, K2EEK

For many years Frank has been on the other side of the certificate business, making sure that CQ's contest certificates and trophies are sent out. Anne and Frank Anzalone, W1WY, are shown holding a well-deserved certificate that Frank recently received—the QCWA 60th Anniversary Award. The picture was taken by another CQ Staffer Bernie Welch, W8IMZ, during his visit with the Anzalones.

Introducing Corsair

A New No-Compromise HF Transceiver

The CORSAIR is an extraordinary new HF transceiver. Every function operates without compromise. New unique features make it a delight to operate.

A new front end provides extreme sensitivity, low internal noise and high dynamic range to bring weak signals to life. For even greater overload prevention, the integral rf preamplifier can be switched out. More effective than the usual rf attenuator.

The filtering system, a TEN-TEC exclusive, virtually switches to privacy. It starts with a superb 2.4 kHz 12-pole ladder sideband filter system, standard. It provides variable bandwidth for ssb, great for today's crowded phone bands. A novel pass band tuning circuit allows a received signal to be moved within the pass band to its optimum position with respect to QRM. Optional narrow band filters are available for ssb, cw and RTTY, all switched from the front panel. The ultimate in QRM reduction.

Full cw break-in opens a window on the band while transmitting, turning monologues into conversation. Or, if conditions dictate, just switch to semi-break-in. And no VOX adjustment when changing modes.

A versatile offset tuning system allows the receiver and transmitter to be tuned separately with a ± 1 kHz range for fine tuning or ± 4 kHz for working off frequency. For net operation, both can be moved simultaneously.

Reliability is designed in. The CORSAIR system is so rugged it will operate into infinite SWR. And we guarantee it unconditionally (except for lightning) for one year. The CORSAIR is designed for 100% duty cycle, ideal for RTTY, SSTV and of course, contests.

Beauty is more than skin deep. The contemporary styling with the blackout LED frequency display (last digit in green), the baked-on textured bronze/black finish with aluminum trim will retain its handsome appearance permanently. Beneath its sleek exterior is a carefully crafted chassis packed with performance.

There are many other features, each with superb performance. An effective speech processor, notch filter, adjustable noise blanker, signal spotter, three position AGC, threshold ALC, simplified VOX, all controlled from the front panel. In addition, the CORSAIR has a compression loaded speaker, less than 2% audio distortion, and full accessory connections including remote bandswitch output. It even has a volume equalizing headphone output.

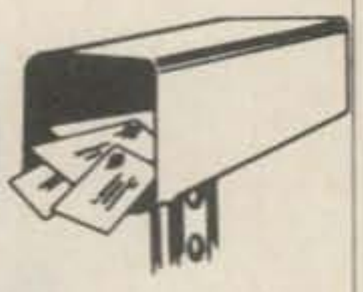
The CORSAIR is a total system of pure operating pleasure—it really must be put through its paces to be fully appreciated. Its smooth controls, comfortable and logically spaced, give it the feel of a superlative transceiver. One that will be a faithful companion for the years ahead.

All TEN-TEC products are completely manufactured in the U.S.A., in the foothills of the Great Smoky Mountains.

Model 560, CORSAIR transceiver . . . . . $1169.
See your TEN-TEC dealer or write for full information.

TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862

Our Readers Say



An Exorcising Exercise

Editor, *CQ:*

In regard to your interview with Mr. Wendell Bailey and the article by my good friend Lew McCoy in the cable TV area *(both CQ, October 1982 issue)*, there is an extremely important point that all readers should be aware of. When a home is put "on cable," some installers, by stupidity or intent, do *not* short out the customer's TV antenna. This is obviously a simple matter, but left undone, it raises hell with TV and FM for the rest of us for the simple reason that an unterminated antenna, at its design frequency, will reradiate said signals at almost no loss, causing "ghosts" and FM multipath that can be a real chamber of horrors. Not being on cable, it took me over three months to drive the stake into the last of them to get decent reception. Explaining this to my neighbors resulted in 100% cooperation to do the one-minute job.

Terry F. Staudt, W0WUZ
Licensed Professional Engineer
Evergreen, CO

QRP—The Only Way

Editor, *CQ:*

I would like to congratulate you on a very fine publication, which I have subscribed to since becoming a ham. Your entire magazine, along with your excellent contests, truly makes *CQ* "The Radio Amateur's Journal."

While I enjoy reading all the articles each month, I must give my special thanks to Ade Weiss. I became interested in QRP operation almost immediately after becoming licensed because of his articles. I now operate QRP exclusively, and needless to say, your June 1982 issue has become a collector's item for me. Continue on with the great job you are doing.

Michael "Fram" Akiki, AD2Y
Tupper Lake, NY

CQ The Best

Editor, *CQ:*

I subscribe to *QST, Ham Radio Magazine, 73,* and *CQ*. I have a 50-year collection of *QST* and I am a loyal member of the League. *QST* and the other magazines have their good features, but *CQ* is the best by a long, long way. Although I have been a ham for 36 years and have my Extra Class license, I especially enjoyed Bill Welsh's recent series of articles on shortwave listening *(May–October 1982).*

Thank you for publishing the best ham radio magazine. Keep up the good work.

Roy S. Williams, W6VON
La Mesa, CA

A Case For 30 Meters

Editor, *CQ:*

In your comments about the 10 MHz band in the November 1982 Zero Bias, you call 160 meters one of the "traditional h.f. amateur bands . . . available to *all* [emphasis yours] amateur radio operators in the world . . . ."

At this writing *(October 1982)*, amateurs in CN8, CT1, CT2, CT3, CE, HA, ON, YO, DM, 7X, I, VU, as well as those in most of the countries of Africa and Asia, are prohibited from operating on 160 meters. Many of the Pacific islands do not allow activity on Top Band. And many of the countries that do permit activity do not do so on a general basis, but rather in the form of a special authorization, similar to an STA from our FCC. Those allowed on the band in Sweden are not permitted to enter contests on 160 meters!

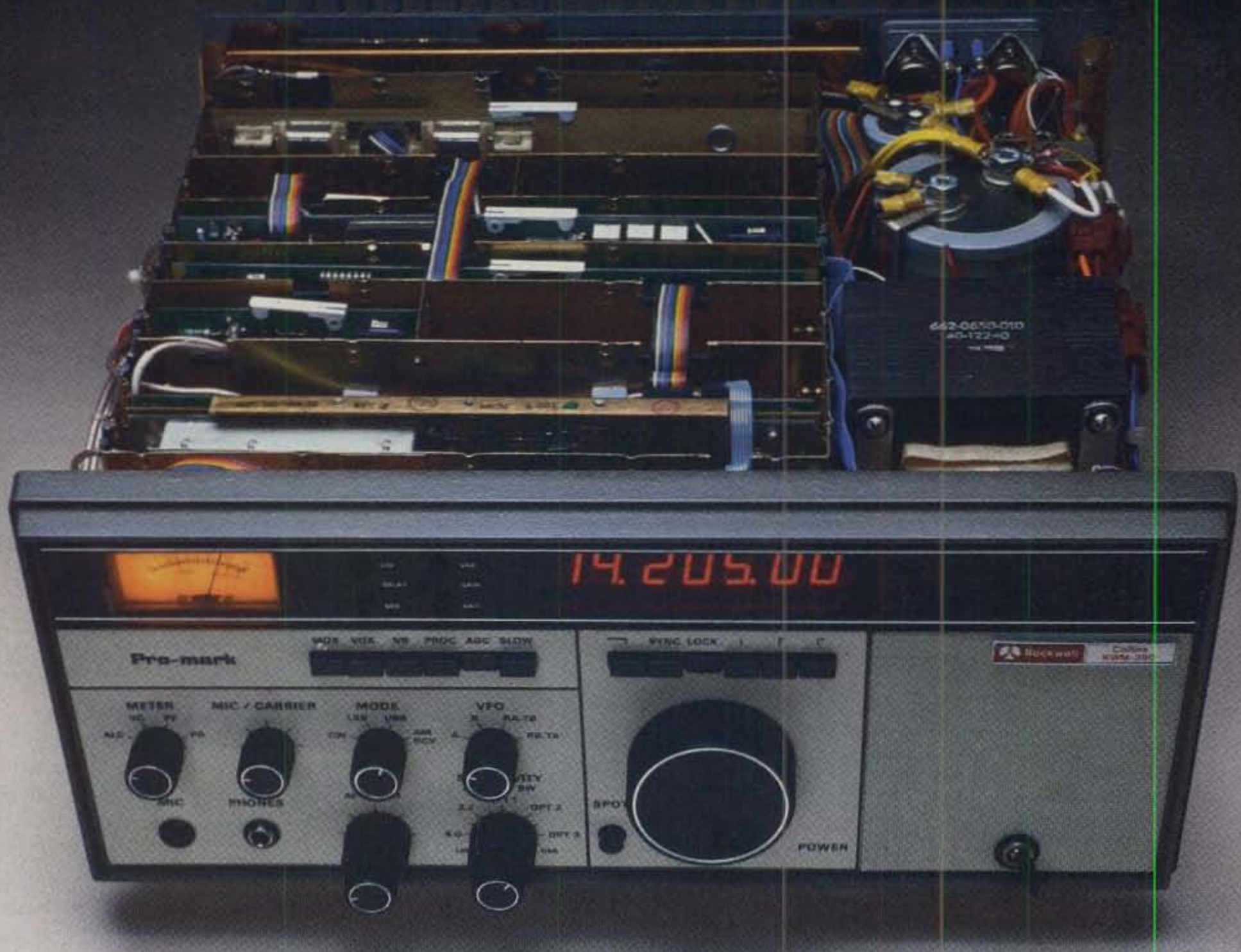
Until last year, hams in most parts of the U.S.A. could only use 50 kHz of the 160 meter band. And most other countries still only allow a segment smaller than that. Yet through all of those years—and at times when there were fewer countries permitted on Top Band than there are today—160 has been a part of the *CQ* WW DX contests.

I *agree* with your decision not to include 30 meters in the 1982 contest, simply because there would not have been enough time to get the word around to everybody. But I think the parallels of this band to 160 meters—both with a narrow bandwidth for most countries and with a great number of countries not permitted on the band—make a better case *for* including 30 meters in future contests.

Jon Zaimes, AA1K
Bear, DE

P.S.: CQ is looking better every issue. Keep up the good work!

The real beauty of the Collins KWM-380 is behind the panel, not on it.



At Collins, we know serious amateurs won't settle for less than professional performance. So we build every KWM-380 to commercial rather than amateur standards. For example, our PC boards are connected by ribbon cables with gold-plated pinfield connectors. The boards themselves are all glass epoxy, and virtually

unaffected by temperature and humidity which cause intermittents in the more commonly used phenolic boards.

Once built, every KWM-380 undergoes 24-hour burn-in, then is aligned and tested to meet or exceed every spec on the data sheet. Which makes us very confident about warranting your KWM-380 for one full year.

The result is a radio with superior performance and lasting quality, not front-panel glitter.

Frequency stability is just one example of its beauty: typically, drift is as low as 10-12 Hz per hour for normal ham shack environments. Other companies haven't matched our performance because they don't match our quality behind the panel.

Add some real beauty to your station. See the KWM-380 at your nearest authorized dealer. Collins Telecommunications Products Division, Defense Electronics Operations, Rockwell International, Cedar Rapids, IA 52498. Phone (319) 395-5963. Telex: 464-435.

Rockwell International

...where science gets down to business

CIRCLE 50 ON READER SERVICE CARD

Announcing

● **50 Year Anniversary of Hamfesters Radio Club** – The Hamfesters Radio Club was formed in 1933 by a small group of amateurs in Chicago. First meetings were held in the members homes, but by 1937 the club had grown to about 200 and they secured a regular meeting room. The famous Hamfesters Picnic has been held almost continuously through the years. During 1983 the club will be celebrating its 50th year of service to amateurs in the Chicago area. Look for the club station, W9AA, on all bands. They will be sending a special QSL card for the anniversary year. QSL to Hamfesters Radio Club, P.O. Box 42792, Evergreen Park, IL 60642.

● **11th Annual Midwinter Swapfest** – A new, larger facility and door prizes are features of the 11th Annual Midwinter Swapfest sponsored by the West Allis Radio Amateur Club. The event will be held on Saturday, January 8, at the Waukesha Co. Expo Center. Starting time is 8 a.m. Tickets are $2.00 in advance, $3.00 at the door. Tables are $2.00 in advance, $3.00 at the door. Write, including s.a.s.e., to WARAC, P.O. Box 1072, Milwaukee, WI 53201.

● **WD2ALL, Frankfort Center, NY** – WD2ALL will operate the Camp Ballou Scout Freezeout from the Camp Ballou Boy Scout Camp from 1400 to 1700, 1800 to 2200, and 2300 to 0100 GMT on Saturday, January 15. Frequencies will be 10 kHz above the lower edge of General 40, 20 and 15 meter bands and 25 kHz above the lower edge of the Novice bands. Also 146.55 simplex operation is planned. QSL with s.a.s.e. to WD2ALL via Callbook.

● **West Virginia QSO Party** – Sponsored by the West Virginia State Amateur Radio Council, this event will be held from 1700Z January 22 until 1700Z January 23. Single operator only. Exchange signal report, serial number, county (WV only), state or country. WV stations multiply total by sum of WV counties, states, and countries worked. Others multiply QSO totals by WV counties worked. Multiply score by 1.5 if you run 200 watts or less. Suggested frequencies: Phone—10 kHz from lower edge of General sub-bands; C.W.—35 kHz from low ends; Novice—35 kHz from low ends. Repeater contacts permissible. Mail logs by February 11 to K8BS, 950 Gordon Road, Charleston, WV 25303.

● **Special Event Station K9EC** – The Eau Claire, Wisconsin, ARC will operate K9EC/9 during the National 70 Meter Ski Jumping and Nordic Combined Championship on January 29 and 30 from 1400Z to 2300Z. Frequencies: C.W.—52 kHz up from bottom edge; Phone—3980, 7277, 14282, 21382, and 28620. For an 8½ × 11 certificate, send s.a.s.e. to N9AIX, P.O. Box 201, Altoona, WI 54720.

● **WB2YQH from Western New York** – The Buffalo Area DX Club will operate WB2YQH from 1800Z January 29 to 2200Z January 30 to commemorate the sixth anniversary of the Great Blizzard of '77 in western New York. Frequencies: 7.245, 14.290, and 21.360 kHz. Certificate for QSL and large s.a.s.e. plus 25¢ to BADXC, 55 Randy Way, Buffalo, NY 14227.

● **PARC to Operate on Groundhog Day** – The PARC, Punxsutawney, PA, will operate on 14.290 and 7.230 from 9 a.m. to 5 p.m. EST on January 30 in commemoration of Groundhog Day 1983. They will also operate 7.230 on February 2 (Groundhog Day). This Special Event Station will operate from Gobblers Know, the home of the groundhog. Certificate for s.a.s.e. and QSL card to Art Sweeney, K3HWJ, RD 1 Box 371, Punxsutawney, PA 15767.

● **Southfield ARC Swap and Shop** – The Southfield High School ARC is sponsoring their 18th annual Swap and Shop on January 30 at Southfield High School, 24675 Lahser, Southfield, MI. Doors open at 6 a.m. for exhibitors. Open to the public from 8 a.m. to 3 p.m. Admission is $2.50. Reserved tables are $18 for two 8 foot tables (paid in advance). Additional reserved tables $9 each. Tables will also be available at the door. All profits from this event go toward electronic scholarships and to support the activities of Southfield High School's ARC. For more information and reservations, write to Robert Younker, Southfield High School, 24675 Lahser, Southfield, MI 48034. Telephone: (313) 354-7372 (8–10:30 a.m.), (313) 354-8210 (10:30–3 p.m.) Monday through Friday.

● **Dayton Hamvention 1983** – Dates for 1983's Dayton Hamvention, the largest of the amateur radio shows, will be April 29 through May 1. Plan early to be at this exciting event, as attendance is expected to be greater than ever this year.

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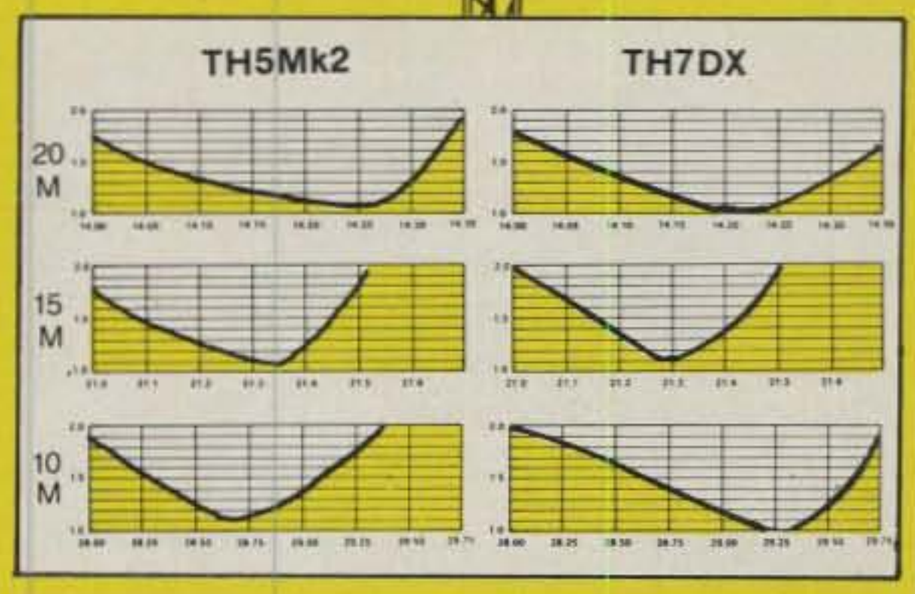

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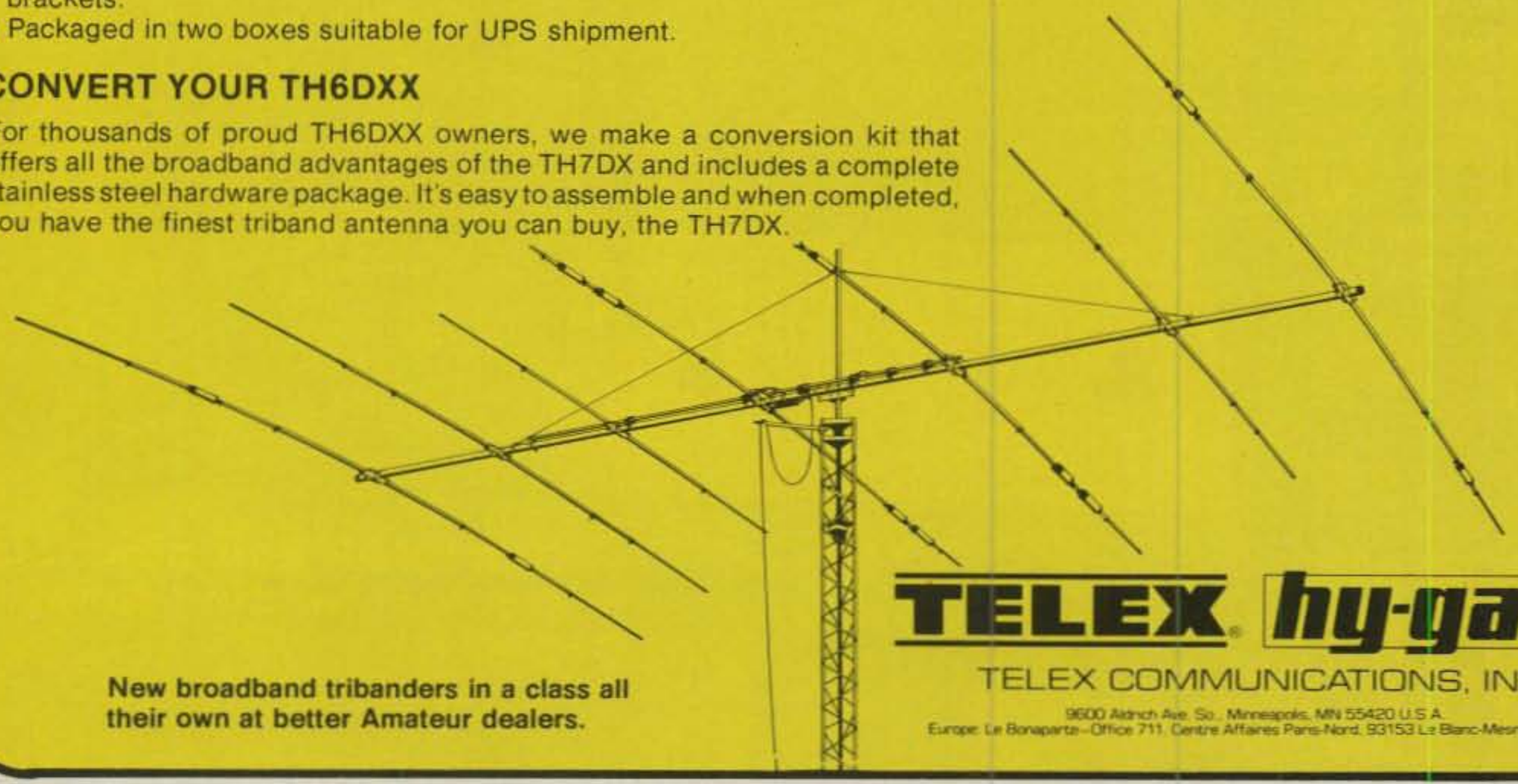

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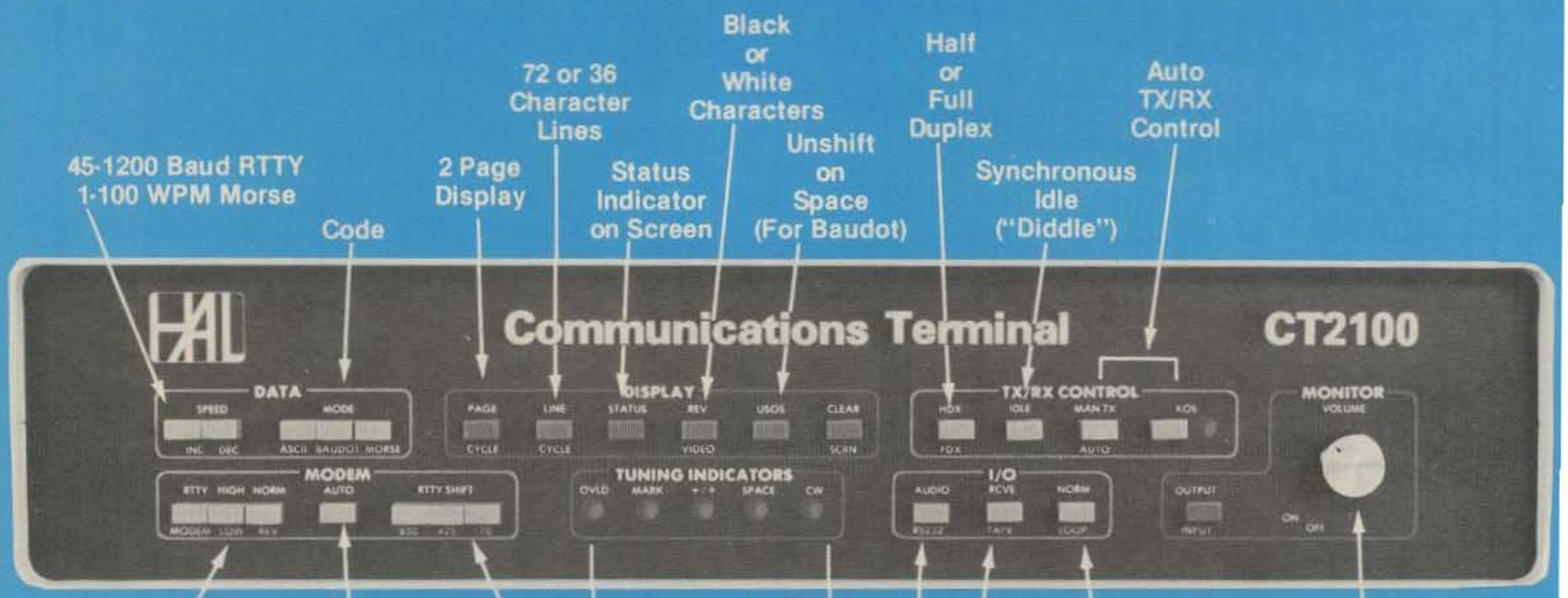

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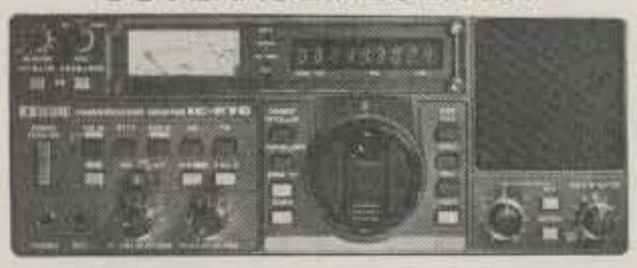

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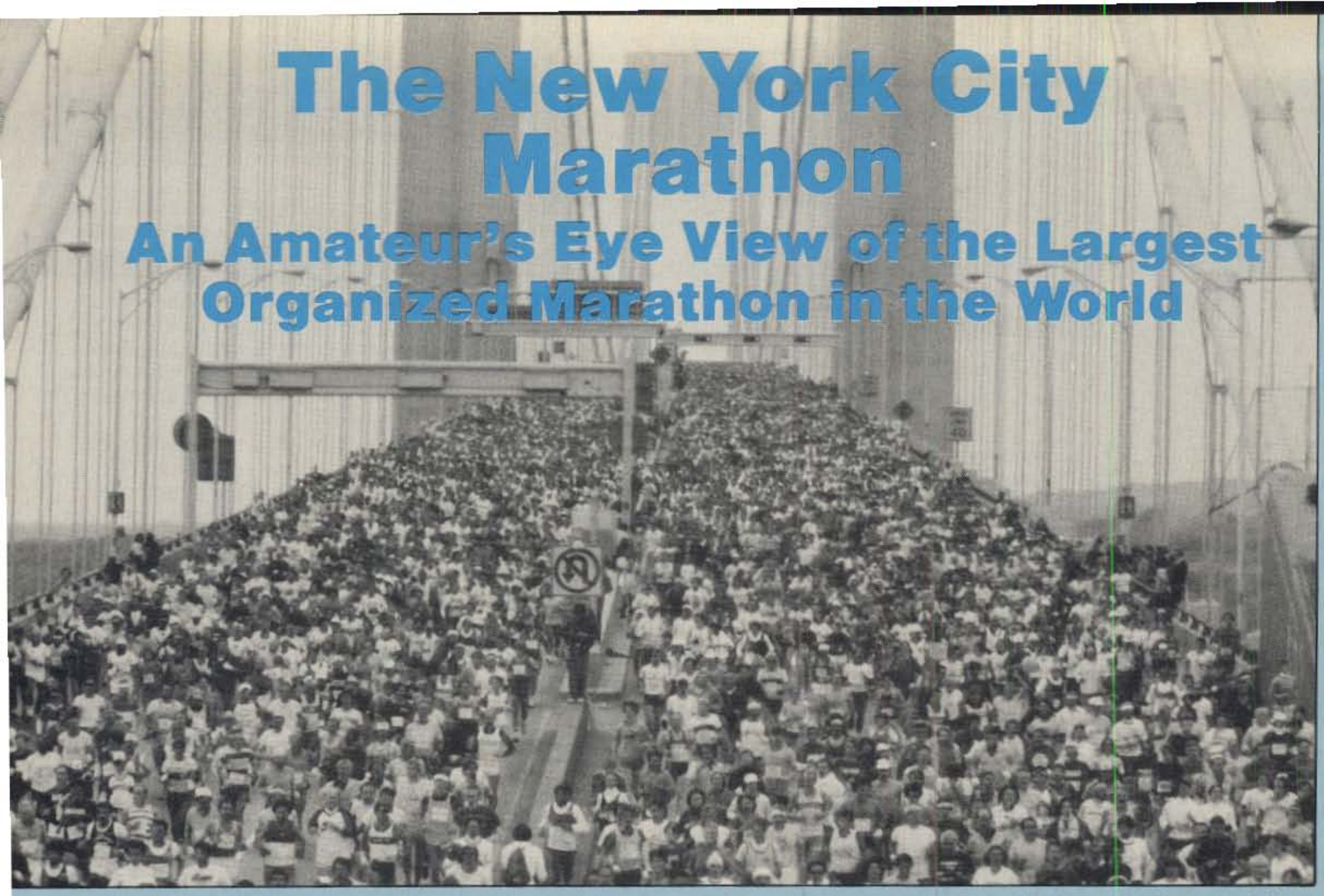
The New York City Marathon

An Amateur's Eye View of the Largest Organized Marathon in the World



Sixteen thousand runners on the Verrazano Narrows Bridge.

The 1982 New York City Marathon was run once again this past October, a major fete to watch let alone coordinate. Amateur radio has played a most vital role in that Marathon and both have grown with each year's experience. To get a sense of the excitement of the race and of amateur radio's very active participation, read WA2DHF's account of the 1981 Marathon.

BY STEPHEN MENDELSOHN*, WA2DHF

In February 1981, Fred Lebow, President of the New York City Road Runners Club, and organizer of the New York City Marathon, conceived the idea of staging the largest organized marathon in the world. He called me, as I am President of the Tri-State Amateur Repeater Council, to ask if the amateur radio community would support such a concept. Fred said that as amateur radio had proven so valuable in prior marathons, all we would have to do was come up with possibly the largest non-emergency communications network in the world. I told Fred I would check with the council.

From 1976 to 1980, TEE-SARC's member clubs provided manpower and repeaters to help the Road Runners Club run their marathon through the streets of the five boroughs of New York City. As the race had grown from 1976's 1300 entrants to 1980's 13,000, the requests for help from the Road Runners Club to the council had also grown. We did the 1976 bicentennial marathon with 30 people and one repeater.

By 1980 our manpower requirements had skyrocketed, but those reliable stalwarts of public service in the metropolitan New York area—the Westchester Emergency Communications Association, the Morris County, N.J. Civil Defense Communications Group, and the Long Island Mobile Amateur Radio Club—turned out over 100 people among them. The amateur radio community was even listed as a supporter of the race in the official program.

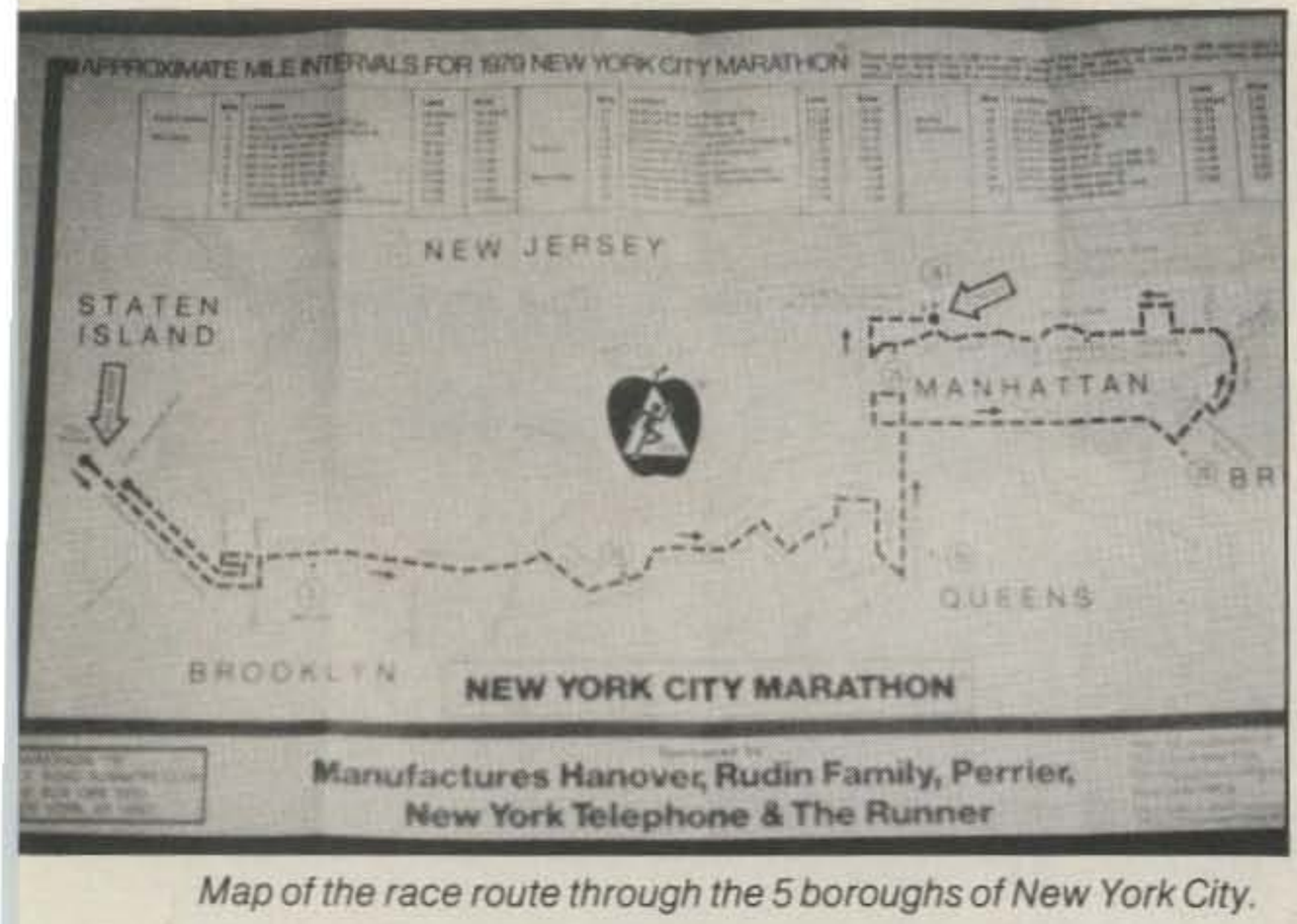
Everybody on the course brought external speakers, enabling the public to listen-in on what was going on. People started to say that the amateurs were the backbone of the race. But these efforts seemed pale in comparison to what Fred proposed. Bob Steinberg, WA2KHR, of the Westchester Group decided that maybe he could devote a few minutes each week to giving some help. I laughed to myself at the "few minutes" phrase, but said that I would be happy to have the help. The planning started.

Bob and I attended the first of the planning sessions soon thereafter. Enter Allan Steinfeld, KL7HIR. Allan was now the race coordinator of the Road Runners Club, and Fred's second in command. He handed us the 1981 requirements list. Requests included everything from waking up the race director at 3 a.m. race day, to following the last runner into the park with a trail vehicle at 5:30 p.m. A solid 14 hours of amateur activity!

The starting line for the NYC marathon is at the western foot of the Verrazano Narrows Bridge on Staten Island. The runner staging area is at nearby Fort Wadsworth. Starting at 5:30 a.m. race day, 175 buses would carry the runners from the Lincoln Center area to the fort. The Road Runners Club felt that the staging area would require communications at the front and rear gates, command operations in the center, and communications at the announcer's stand, at the medical area, and at the information booth.

The course area would be simpler, but would eat up most of

*64 Maiden Lane, Little Ferry, NJ 07643



Map of the race route through the 5 boroughs of New York City.

the manpower. It was requested that two amateurs be assigned per mile for the first 16 miles, and two amateurs per half mile after the 16-mile mark. Additional amateurs would be stationed at the half marathon point and at the water/medical aid stations every 1.6 miles. The finish line was a maze of networks in itself. Here would be the controllers for our three major networks, the liaison with the New York City Police Department's communications division, press liaison, family reunion area, a special spotting link, computer and master scorer's liaison, VIP baggage area, senior officials' network, and a medical network reporting to the medical command trailer with 10 operators.

Then there were the "special assignments." Included in this group was John, K2IZ, New York City–Long Island S.C.M., who would work with the finish line announcer giving that gentleman the information needed to keep the crowd at the finish line informed. Also on the list were the people to travel with the vehicle convoy that precedes the first runner. These buses and trucks would carry the photographers and radio/TV people. To carry the over 200 journalists required 2 three-tiered trucks, 2 electric buses, and 2 pickup trucks. Our manpower requirements now topped at 189.

Phase two, recruiting, then started. Gary, WA2BAU, and Pete, KC2KI, talked to every civil defense group in New Jersey. Paul, WB2VUK, the eastern New York S.C.M., and Willard, K2CFX, of the Westchester group, campaigned harder than Presidential candidates in Westchester County. Rich, N2KO, Lew, W2CMA, and Jerry, WB2ZEX, knocked on doors in Brooklyn. The Long Island Mobile ARC—with the help of Steve, WB2WAK, Bill, KA2EGF, Barbara, KA2HPR, and Duke, K2MZ—turned out a huge list of volunteers.

We all started to notice that marathon fever was building on 2 meters and in the press. Sports writers seemed to sense that this would be quite a race. The list of participants had grown to world-class proportions, as the top 50 runners agreed to run. The Road Runners Club had thought that they might receive as many as 20,000 applications, but the final number was closer to 40,000. The original plans had been to start 15,000 runners, the largest organized start in history, but a computer error brought the size of the starting field to 16,000.

Calls started to come in from other groups. Dwight, KA2CNN, spoke at a Metroplex Communications Association meeting and found volunteers. The gang from the Red Cross ARC, WR2ALS, volunteered and were put into slots in finish-line medical areas. Things at the finish line went along smoothly until it was discovered that there was no place to house the runner position net control. Rochelle Park, New Jersey, Civil Defense ARC volunteered the next evening, and on race day would bring their van. The need for all net controls to talk with the police trailer led to the post of wireline operator. Intercoms modified to avoid r.f.i. were installed between the logistics, medical, and police communications trailers. Jan, KB2RV, was chosen to be the command trailer wireline operator. Stan, K2SJO, ARRL Hudson Division Director, agreed to be the relief NCS, and Greg, WA2GGX, would be the medical assistant NCS. Rich, N2KO, would be in the police trailer itself.

The police commander agreed to give a walkie-talkie to the Road Runners Club command car. This gave instant emergency communications between the race director and the senior police official. The Rochelle Park, N.J., Civil Defense group agreed to take on the trail vehicle task. They had to arrive at the starting line at 9 a.m. and would not reach the finish line until 5 p.m. They packed lunches, snacks, a television, cards, beer and chips, and several radios. They were then set to look at the rear part of some of the slowest runners in the world for over 8 hours.

On race day the 9 a.m. precursor car would contain Jerry, WB2SPE. The course coordinator, George Velossi, Harvey, K2CJP, and Charlie, WA2GUG, would be in the 10 a.m. precursors. I asked the race publicist to include a few words about amateur radio in the press kit. He asked what we did, and after an explanation, he wrote a beautiful three-quarter page release about the amateurs. Newspapers in New York City, including the *New York Times*, used the material, and amateur radio got some free publicity. Prerace festivities began.

Thursday. A crowd of over 6,000 runners was there to register. They were given a package of emergency data, which included what to do if they had to drop out. Among the instructions was to find an amateur radio operator and let him know.

Friday. There was an electric tension in the city. We set up 5 p.m. and were met by a mob of amateurs picking up passes, official jackets, and information.

Saturday. By 10 a.m. the various net controls were in the park setting up for the next day. At 11 a.m. we were told that there was some trouble on the course. Could we provide communications for some of the senior officials going out on the course? We had an instant net. Dwight, KA2CNN, and Sandra, KA2DBW, were rounded up to help with our problem. Tom, WA3GRF, wandered up to the communications van and for the

Race at the 14 mile point. WADHF is in the red jeep and WB2ZKX on the TV truck.

Joe Kolb, W2NL, checks the radios at the half Marathon point.

rest of the day, and during the race on Sunday, he was on the air with us. Dave, N2BCA, heard the early morning activity and rolled into the park asking where his post would be for the day. We were also joined by Mark, KA2NBZ, who was a Novice. The group also included Bob, WA2KHR, Gary, WA2BAU, and John, K2IZ.

Race Day—3 a.m. Time to wake the world. I called Fred Lebow's room to make sure he was up, then Bob, WA2KHR, and Mark, KA2NBZ. The next call was to the man with the second worst job in the race: Duke, K2MZ, TEE-SARC's Frequency Coordinator, who would follow Allan Steinfeld, Race Coordinator, for the entire day and act as his radio shadow. This was like following a butterfly on a spring day!

Everyone then piled into a van and headed for the starting line. It was 4:15 a.m. when we arrived and started the process of setting up for 16,000 runners. The army had erected several tents for runner check-in and medical use, and had given us the use of the gym for an office/control point. At 4:30 a.m. Pete, N2ANC, and Ira, AB2T, arrived and started setting up. With all of the equipment they brought we could have had a small flea market. At 4:45 a.m. a very-tired sounding Dwight, KA2CNN, announced that he was at the bus dispatch area, and that the 175 buses had arrived with more runners than the eye could see. Bob ran around with Fred Lebow, Duke communicated on the run for Allan Steinfeld, the net controls relayed information between the WR2AFS repeater, and our starting-area simplex net, Mark, KA2NBZ, manned the emergency telephone. We were in business.

The next arrivals were our starting-line crew. To act as front gate guard was Irv, WB2AFD. He admitted Bob, WA2DDB, who was to man the runner information booth, Tim, N2BMF, who would communicate for the medical area, and Jack, WA2PAA, who would help control any problems at the rear gate. Minutes later, Steve, WB2WAK, arrived to link up with Chip Barnabei, the starting-line area coordinator.

Dawn came at 5:30 a.m. along with lots of runners. Jeff, WA2LZY's, job was to help the announcer in the starting area. This now gave all important areas access to the senior officials instantly via amateur radio.

Lee, WB2CUW, was no sooner inside the command post than he was dispatched to the station wagon that would go down the course at 8:30. The action was also in high gear on the course logistics network. Net controls Paul, WB2VUK, Stan, K2SJO, and Gary, WA2BAU, were getting lots of people to their assigned posts. By 9 a.m. over 14,000 had been transported to the fort. Also at 9 a.m. trouble-shooter number two went down the course with medical supplies, jackets, cups for the water stations, and Jerry, WB2SPE, as a communicator.

By 10 a.m. 16,000 runners had arrived, and Fred gave the word to let them into the toll plaza of the bridge. In the press trucks, team captain Lew, N2RQ, helped Art, WB2IRA, Bob, K2AMU, Dave, N2BCA, and Alan, WB2BNA, set up in their vehicles. I worked with Bob, WA2KHR, in the official timing car, Phil, WB2BMC, and Mark, KA2NBZ, who would be in the photo press truck, and Gerry, N2BWO, in the press bus. At 10:15 we said goodbye to the starting line crew after complimenting them on a fine job and brought up the front runner position network on WR2AOG. Net control Dwight, KA2CNN, announced that all was in readiness at the finish line area. It would be over this net that people along the course and those at the finish line would hear who was leading. At the finish area, John, K2IZ, would write the information down and give it to the finish-line announcer and to WABC radio, which was broadcasting the event. Also listening in the press center was Fred, WA2PDP, who put the positional information on charts which were put up for the press to see. The amateurs, and their Road Runners timers/spotters, would also record the information on a form that the end-vehicle would pick up as it went by. This additional log keeping would act to keep anyone from entering and winning the race long after the start. Sixteen thousand runners completely filled the toll plaza of the bridge. Over 200 press people mingled with the runners, getting last-minute thoughts and just watching the entire spectacle.

10:37 a.m. The entire course was in place. All nets were operating. They all paused for the start and checked their watches.

10:38. New York City Mayor Ed Koch fired a cannon and the race was on. The start was announced over all nets. It would be 10 minutes after the start of the race before the people in the rear of the pack even started to move. The runners would leave over 7,000 garments to be picked up by volunteers and put into buses for the return trip.

The human carpet now flowed over the bridge past Howie, WB2JST, at the 1 mile point and exited the bridge onto Brooklyn's Fourth Avenue. A lane of runners could be seen for 6 miles. Lew and I juggled the position of the various photo trucks so that each truck had a period of time to take pictures directly in front of the runners. At the 3 mile point, Jerry, WB2ZEX, jumped out and took a Polaroid picture of the runners so he could determine the leader. Then Jerry and Sam, WA2JZN, called in the numbers and times of the rest of the lead pack to Dwight. At the 4 mile point poised at the water station were Steve, WA2OFZ, and Duane, WA2EZV, ready to take runner numbers. Lew, W2CMA, and his wife, Jan, WB2IJK, worked

Dick Aronson, K2RVM (left), and Charlie Gederberg, WA2YII.

with Mark, WA2IZQ, at the 5 mile point. Al, AE2J, and Mina, WA2RSK, worked with Ken, WB2KWC, at 6 miles. The numbers started to fly thick and fast even though runners were still not off of the bridge. WR2AOG sounded like an auction.

The caravan swept past Joe, KB2MU, at 7 and Warren, WA2QBJ, at 8 miles. By then Alberto Salazar had decided that the race was his to win. Joe, WB2DWJ, Gino, WA2DUK, and George, WA2HNM, reported Salazar leading at 9 miles, as did the team of Ron, WA2EIO, Hank, KB2JU, and John, KB2CB at 10 miles. The race then entered the Bedford Avenue leg of the race. Several high school bands played for the runners. Jim, WA2RFB, Bill, KA2AFA, and Doug, KB2TQ, at the 11 mile point got a chance to enjoy some additional entertainment this way.

Into the Greenpoint section of Queens we went. Both Joes, WA2YLU and WA2ONL, and Max, W2TQP, enjoyed working the race from in front of WA2YLU's store at 12 miles. We were almost half way home. The vehicle caravan stopped to watch from the 13 mile point and exchanged greetings with Hank, WB2ALW, and Harry, W2NIP. Minutes later we moved onto the Pulaski Bridge to the half-race point to see the lead pack and give the photographers a chance to snap a few. Included in those shots was one of Joe, W2NL, and Charlie, WA2NIC, calling in the times and numbers of the leaders. We found that these gents had set up an entire mobile radio shop on the Pulaski Bridge.

At this point the race passed the Hudson River, and the city had a fire boat out pumping plumes of water to welcome the leaders. It was a beautiful sight, one enjoyed by us and Sid, K2LJH, Ken, WB2FIA, and Doug, WA2EMP, at the 14 mile point.

The race then headed for New York City's version of Boston's Heartbreak Hill. We call it the Queensboro Bridge. At the 15 mile point Jay, N2FP, Barbara, KA2HPR, and Bill, KA2EGF, worked on a simplex frequency with George, WA2WKV, who was at the center of the bridge span. If he saw a problem on their side of the bridge, he would dispatch a police officer to help. If anything happened on the 16 mile side of the bridge, Dick, K2RVM, or Charlie, WA2YII, would send an officer to investigate. Either way the medical team on the bridge would assist in trying to help any downed runner.

The race then exited the bridge onto the straight "speed" stretch of our course: north on First Avenue with its famous singles area. Here were also the largest crowds to be seen in the event. Over one million people stood 10 to 15 deep in places, or watched from windows and roof tops for 60 city blocks as the top runners sprinted up the avenue. Here is where Salazar would be challenged by the Gomez brothers of Cuba. This was to be the only challenge he would face, and he overcame that easily.

Here, too, is where the medical network would start to get its workout. Runners coming down from the bridge would see the huge crowd and get psyched up to make a dash. Three blocks later they would drop. A medical station was located there with ambulances, doctors, and the team of Al, WA2RLO, and Brian, KA2LIJ. One worked the logistics net, and the other the medical net. As runners dropped out of the race due to injuries, the amateurs on the course would take their numbers and call them in to medical NCS Pete, KC2KI. Also listening to medical was Barbara, KB2HM, at the family reunion area. Barbara would then list the numbers of the drop-outs for families to check. This way an out-of-town family would not wait for hours to see someone finish when they had dropped out on the course. If hospitalization was required, the name of the hospital was also noted by Barbara, allowing a family to know where the downed runner had been taken.

Stuck on First Avenue were Jim, WA2ISX, Tom, WA3GRF, and Charlie, N2BMQ. They patroled a mile-long area, keeping track of any problems. Crowds screamed, Salazar ran like the wind, fire engines blew their whistles in welcome, and Ed, WA2MIF, Ron, K2RO, and Neal, WA2WIM, enjoyed the spectacle of seeing the leaders go by. They then walked to the medical station several blocks down, and got down to the serious business of calling in fallen runners.

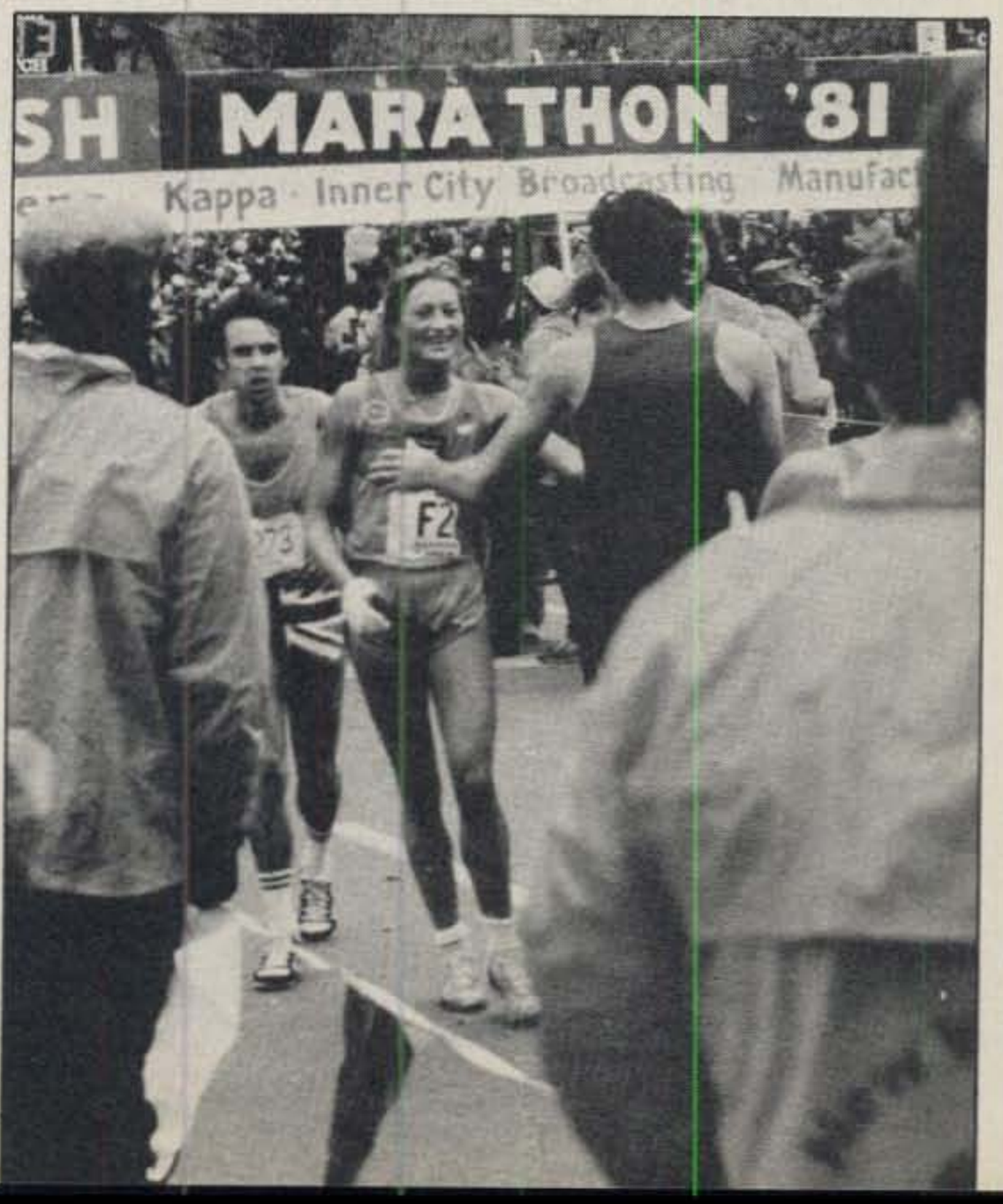
Alberto Salazar breaks the world record for a marathon.

By the time that the front of the race had passed Barry, N2BOP, and Abraham, WB2RGQ, at 18½ miles, it was becoming obvious that Salazar was making good his threat to beat not only the entire field, but also the clock. Alberto also surprised Ken, WA2RYC, Mike, WA2ARC, and Sid, KA2HSM at 19 by waving at them. We were now entering Harlem, up over the Willis Avenue Bridge. To protect the runners' feet on this span, the NYRRC had put huge sheets of rubber over the steel grating. Blake, N2CGH, and Miguel, KA2GNG were stationed at the foot of the bridge.

The race then entered the Bronx and swung past Fred, WA2GNI, and Nick, K2ZVI, and son, Nick Jr., KA2MBP, at 20 miles, and headed into the area known as Fort Apache. At 20.5 miles a large medical area was built to tend to lots of tired runners who "hit the wall," or ran out of endurance at 20 miles. Into this situation went Dave, WA2MZZ, and John, KA2BNG.

At 21 miles the race crossed the Fifth Avenue Bridge and reentered Manhattan. The crowds of well-wishers included Scotty, K2LBG, and Aron, WA2RTV. Salazar then waged a mighty battle with time. All indications coming from the official timing

Allison Rowe of New Zealand breaks the women's record.



car were that if the pace was kept up it would result in 15 seconds being shaved off of the world record. Somewhere in the distance we could see the rest of the pack. At 22 miles we started to listen to the rest of the amateurs on the runner position net. It seemed that Allison Rowe of New Zealand had been told that a world record might be set as she passed the 14 mile point, and had decided that two were better than one. Paul, N2BJB, and Chris, KA2CEC, at 22 were then needed just to see who was number two in the men's race. Salazar was at least one quarter mile ahead of anyone else. Unfortunately, the medical network was giving the leader network a run for the most numbers passed. Ten and fifteen runners were reported down and either resting or being taken to aid every few minutes. More serious problems were being sent to the emergency medical service via amateur radio for extended diagnosis. A grim picture behind the crest of the race was beginning to form.

We then sped down Fifth Avenue past some of the most expensive real estate in the world. At the 22.5 mile point, Willard, K2CFX, swore that he saw a butler serving brunch to race watchers dressed in mink on a terrace. At 23 miles the race entered its last stretch inside Manhattan's Central Park. There to make sure that all made the proper turns were Bill, K2YJE, Mike, AJ1J, and Stan, WA2NRV. This dangerous turn also claims its victims, so we stationed John, WA2OUU, at 23.5 miles for runner safety.

We were then only 2.5 miles from the finish line. It was not a case of would he, but by how much would Salazar break the world record. The crowds were back up to the 10 deep level, and at the 24 mile point we were waved at by Julio, W2XV, and George, W2NHZ.

The press convoy had sped ahead of the leaders, and headed for the finish line. Traffic direction to help us from getting killed in the 20 deep mob was given by Gil, KA2GJI, at 25 miles. There are few thrills to compare with the finish line of this marathon. For 1 mile people were 20 deep on each side of the road. The press convoy's arrival signaled the time for the finish line nets to start operations.

The chute captain, David Pearlman, checked with NYRRC finish line coordinator Deb Green via Harvey, WA2JHT, and Sandra, KA2DBW, their radio shadows. Everything was ready. TV and still photographers were on a bridge over the finish line to record both the winner and time. The official timer and his watch were quickly escorted to the ribbon at the finish line. Fred, Allan, David Pearlman, lots of police for protection, and the crowd waited and watched the seconds tick by. A wave of sound rolled toward the finish line. First the motorcycle escort and then Salazar. The world record time was 2 hours 8 minutes and 31 seconds for a marathon. He came into view as the clock was just registering 2 hours 8 minutes. The crowd was at its feet cheering. He looked up and saw the clock at 2 hours 8 minutes and 5 seconds and sprinted for the finish.

At 2 hours 8 minutes and 13 seconds Alberto Salazar proved himself a prophet. He had broken the world record! He, Fred, and David Pearlman jumped into the air with elation. One of the chute crew later remarked that he did not understand where all that energy came from after 26 miles of running at world pace.

It was the most astonishing performance ever seen: a world record set in front of thousands in Central Park, and millions who saw it on television. Everyone then turned their attention to the lead runner net which was finishing up the lead men and keeping tabs on Allison Rowe. She was quickly coming to the finish line. Would it be possible that she would not only win, but also turn in a world record performance? The NYRRC people were saying that the current record was 2 hours 25 minutes 41 seconds. Allison had been running at a pace considerably under that. We would know within seconds if she was about to set a new record. Again the wave of sound, the motorcycles, and the screaming crowd. Alberto Salazar cheered with the other thousands watching her come across the line in a record time of 2 hours 25 minutes and 29 seconds. Something new had happened in the New York City Marathon. A men's and women's record had been set on a certified course. After kissing her husband, Allison was taken to the TV area with Alberto and interviewed. They were then led to the Mayor's stand, where he placed a wreath of laurel on each of their heads. Lots of pictures with local officials, and then on to the general interview area. But the race was not over for the rest of the field.

The chute net with John, WA2ITT, spotting at the 26 mile point went into business. Paul, WB2ITW, watched from the overhead structure and called down to Al, WB2AVT, and Silvio, WB2ITS. As the top 50 runners crossed the 24 mile point, they were spotted by a NYRRC official, and that number was relayed by Rich, N2ANM, to Mark, N2CBO, in the elite baggage area. As they came across the finish line their bags were waiting for them. Out on the course the operators were keeping the medical net hot. Over 2,000 downed runners were reported. In the family reunion area, Barbara, KB2HM, and Charles, N2HA, were logging downed runners for the families. Preparations for the mobs of runners to follow would soon pay off.

It was time for the finish line medical net to start perking. Net control Greg, WA2GGX, would communicate for the doctors within the finish area, and Pete, KC2KI, would link the rest of the course to the finish line. Two medical tents had been set up to work as complete operating rooms if necessary, and a third tent to take care of exhaustion problems was also in place. In addition to stationing of amateurs at the critical tents, we were requested to have two on patrol in the chutes to spot fallen runners, and two in the post scoring areas. Many runners find that at the finish line their legs cramp badly.

To prevent the possibility of a human pile-up, we had Stu, N2AUK, and Glenn, WB2BAL, watch the pre-chute area. For those who couldn't make it in the post finish chute area, we had Gerry, WB2UCV, and John, WB2DZC. In the tent area we stationed Warren, WB2UCQ, George, WB2ZTH, Phil, WB2AYQ, Kathryn, WB2CVN, and Isreal, WA2OPA. Following the senior medical staff was Tim, WB2CMK, Ed, WA2AHF, and Mark, N2MH. Mark could also be seen administering first aid to his walkie talkie. Murphy was there!

The logistics net controls worked to wind up the last of the problems on the logistics net and close down the early course positions. The medical NCS had their hands full with medical traffic. The number of downed runners reported continued to rise, but it was nothing that we amateurs couldn't handle. George, WA2WKV, was taken down from the Queensboro Bridge and defrosted. Those waiting for friends at the 16 to 20 mile marks were all that was left of the mob on First Avenue. And way in the back of the pack, John, WA2VTV, Paul, WB2UDY, and Joe Dejesso, the driver of the Rochelle Park C.D. van, continued to plod along. Doctors, nurses, and hams at the medical areas headed home after a thank you and good night from Pete on the medical net.

It was truly a day for records: world records set by the winners, a record number of runners started, a record number of spectators on the course and at the race via television. And our own record, the greatest number of amateurs at a race. Everyone agreed that amateur radio had done plenty of public service that day. Over 2100 calls for medical assistance plus 75 ambulance dispatches had been accomplished.

Finally, the last few mile points were shut down, and the crews were sent on their way home. The final vehicle arrived, and John, WA2VTV, jumped out to hand us the sheets with the top 10 runners that amateurs along the course had given him. Our day was complete. Fred and Allan were also there to thank us for our efforts.

Those of you who have watched the 1982 Marathon will certainly know that our lessons were well learned. Each year as amateur radio coverage of the Marathon gets greater and greater, the visible display of Public Service is something we can all take pride in.

Acknowledgement

Rick Moran, WA2BBG, who owns Photo Associates News Service, assigned six photographers to cover the race and amateur radio's participation in it. We thank him and his crew for the great shots shown in this article and on the cover. HQ

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CIRCLE 34 ON READER SERVICE CARD

CQ Reviews:

The ICOM IC-730 H.F. Transceiver

BY JOHN J. SCHULTZ*, W4FA

A somewhat flippant description of the IC-730 might be to say that it is an economy or stripped-down version of the IC-720A. But, although the IC-730 certainly borrows certain design ideas contained in the IC-720A, it builds upon those ideas rather than merely duplicating them. So, the IC-730 is certainly worth reviewing as a transceiver by itself regardless of whether or not the IC-720A exists.

One area in which the IC-730 certainly "borrows but builds" on the IC-720A concept is obvious from the physical layout of the IC-730. The IC-730, like the IC-720A, has its digital frequency readout display directly above the main tuning knob, but both have been shifted towards the center of the transceiver's front panel, while the front panel meter has been given an obvious but not overly dominant position compared to the meter in the IC-720A. The IC-730 obviously has numerous front panel push-button controls, but they do not dominate the front panel, while regular knob-type controls are used for functions for which push-button controls are not absolutely necessary. The foregoing points are certainly small ones seen in the overall concept of looking at a transceiver, but they do illustrate the idea that the IC-730 is a bit more than simply a cosmetically reworked IC-720A.

Physically, the IC-730 is small (94 × 240 × 275 mm) and lightweight (6½ kg). However, its construction is quite rugged. The front panel is die-cast aluminum, and the various covers are of rolled steel with a baked wrinkle-type paint finish. Threaded holes are provided on the side for attachment of the transceiver to a mobile mounting bracket. Aside from lacking some protective metal runners on the front panel, the outside construction of the unit reminds one of the solid construction associated with military radio communication's equipment.

Front view of the IC-730 and associated optional equipment.

Features

Well, what are the features of the IC-730? Table I gives a summary of its specifications. Basically, it's an 80–10 meter transceiver (including the WARC bands) operating in the s.s.b, c.w., and a.m. modes with a power input of 200 watts on s.s.b. and c.w. and 80 watts on a.m. It is completely solid-state and completely "no-tune" for either receive or transmit. Its special features make up a rather long list, but they are highlighted by a dual v.f.o. system, one frequency memory per band, three-speed tuning selection, built-in noise blanker, built-in a.f. speech processor, digital frequency readout, i.f. shift or optional passband tuning, provisions for optional s.s.b. and c.w. filters, and optional up/down/scanning frequency control.

Circuitry

The first area of interest might be to look at the general circuitry of the IC-730 to see how it performs its various functions. A block diagram of the IC-730 is shown in fig. 1. On the receive side, signals are first routed to an r.f. preamplifier stage, as shown in the upper right-hand corner of fig. 1, via the low-pass filter block to the first double-balanced mixer stage. This stage converts incoming signals to the first i.f. at 39.7315 MHz. The i.f. signal is then amplified, passed through a broad crystal filter and a noise blanker gate, and then arrives at a second double-balanced mixer stage where it is converted to the second i.f. of 9.0115 MHz. These stages can all be seen in the second line of blocks from the top in fig. 1.

The 9.0115 MHz i.f. signal is then translated to 455 kHz, passes through a standard 455 kHz mechanical filter (an optional 455 kHz crystal filter for s.s.b. is available), and then is retranslated to the 9.0115 MHz i.f. This frequency translation/retranslation maneuver serves the purpose of allowing i.f. shift operation by varying slightly the frequency of the oscillator stage that injects a signal to the mixer stages associated with the translation/retranslation. It also provides passband tuning if an optional s.s.b. or c.w. filter is inserted in the first 9.0115 MHz i.f. chain. The second 9.0115 MHz i.f. signal is further amplified, then goes through various detector stages for s.s.b./c.w. or a.m., and the detected audio is amplified up to the 2 watt level for use with a built-in speaker.

If one looks at the block outlines in fig. 1 and the legend, it will be seen that most blocks function in both receive and transmit. On transmit, the signal paths are essentially reversed. A balanced modulator at the 9 MHz i.f. produces a d.s.b. signal. The signal is translated to 455 kHz and uses the 455 kHz mechanical filter to produce an s.s.b. signal. The s.s.b. signal is retranslated to the 9 MHz i.f., then to the 36 MHz i.f., and finally to the output frequency. The power amplifier chain Q1, Q2/Q3, and Q4/Q5 builds up the low-level signal on transmit to the 200 watt input level.

Anyone really interested in detailed circuitry might well spend several hours being intrigued by the features of the IC-730. It's certainly not possible to comment on all the circuitry in the IC-730 in this article, but it might be of interest to highlight a few areas.

Fig. 2, for instance, shows the r.f. preamplifier stage and the bandpass filters following that stage. The r.f. preamplifier stage uses two FET transistors (Q1 and Q2) in a push-pull amplifier configuration with broadband input and output transformers (L3 and L4). The stage is not designed to provide too much gain (6–10

*c/o CQ Magazine

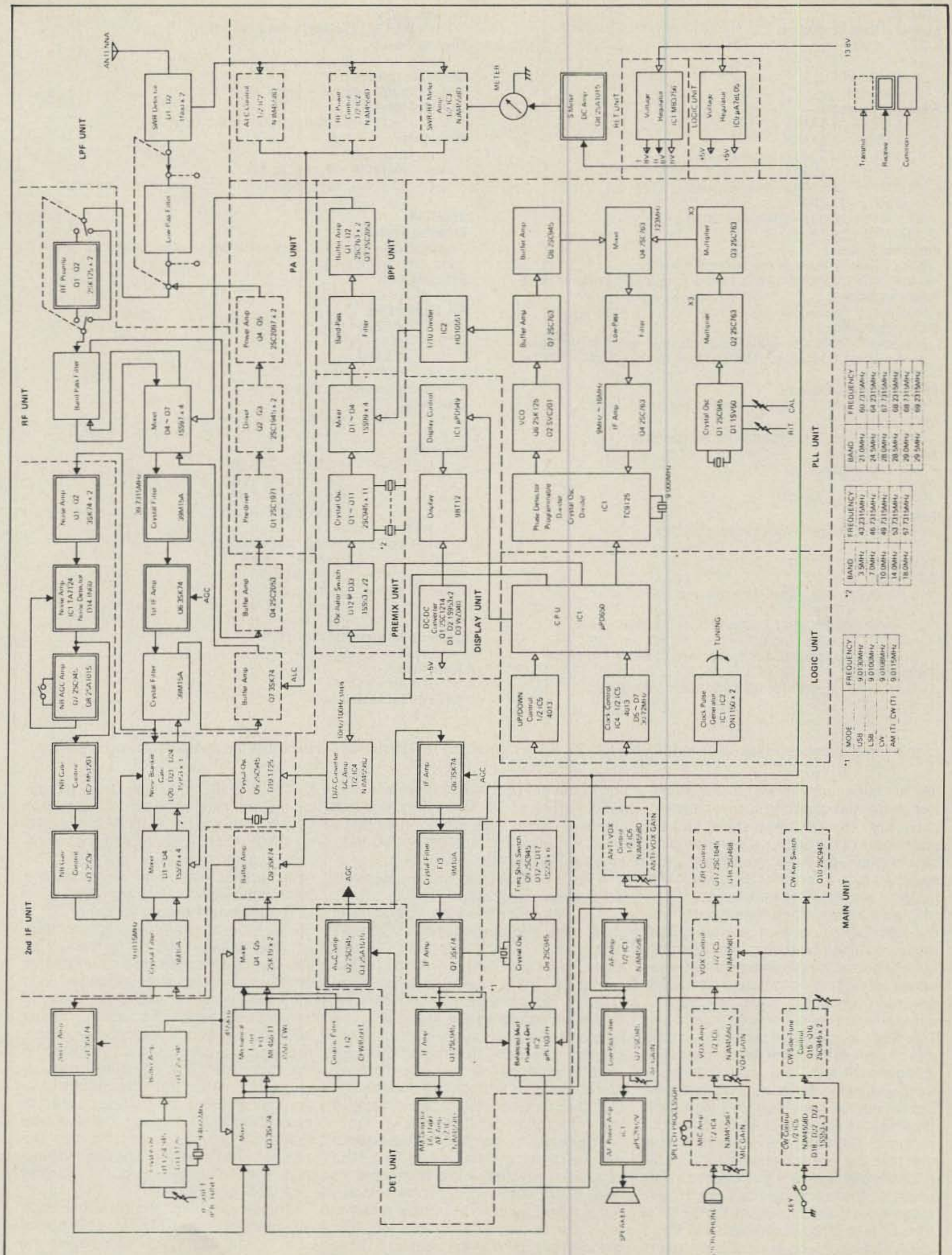

Fig. 1–Complete block diagram for the IC-730. Note symbol legend in the lower right-hand corner.

GENERAL

Number of Semi-Conductors:

Transistors	71
FET	15
IC (Includes CPU)	25
Diodes	212

Frequency Coverage:

3.5 MHz ~ 4.0 MHz
7.0 MHz ~ 7.3 MHz
10.0 MHz ~ 10.5 MHz (Receive Only)
14.0 MHz ~ 14.35 MHz
18.0 MHz ~ 18.5 MHz (Receive Only)
21.0 MHz ~ 21.45 MHz
24.5 MHz ~ 25.0 MHz (Receive Only)
28.0 MHz ~ 29.7 MHz

Frequency Control:

CPU based 10 Hz step pre-mixed synthesizer.
Independent transmit-receive frequency available on same band.

Frequency Readout:

6 digit 100 Hz readout.

Frequency Stability:

Less than 500 Hz after switch on 1 min. to 60 mins., and less than 100 Hz after 1 hour. Less than 1 kHz in the range of −10°C to +60°C.

Power Supply Requirements:

DC 13.8V ±15% negative ground current drain 20A max. (at 200w input)
AC power supply is available for AC operation.

Antenna Impedance:

50 ohms unbalanced

Weight:

6.4 kg

Dimensions:

94 mm (H) × 241 mm (W) × 275 mm (D)

TRANSMITTER

R.F. Power:

S.S.B.(A_3J) 200 watts PEP input
C.W.(A_1) 200 watts input
Continuously adjustable output power 10 watts ~ max.
AM(A_3) 40 watts output
Continuously adjustable output power 10 watts ~ 40 watts

Emission Mode:

A_3J S.S.B. (upper sideband and lower sideband)
A_1 C.W.
A_3 A.M.

Harmonic Output:

More than 50 dB below peak power output

Spurious Output:

More than 50 dB below peak power output

Carrier Suppression:

More than 50 dB below peak power output

Unwanted Sideband:

More than 55 dB down at 1000 Hz a.f. input

Microphone:

Impedance 1300 ohms
Input level 120 millivolts typical
Dynamic or electret condenser microphone with preamplifer

RECEIVER

Receiving System:

Quadruple conversion superheterodyne with continuous pass-band shift control.

Receiving Mode:

A_1, A_3J (u.s.b., l.s.b.), A_3

I.F. Frequencies:

1st	39.7315 MHz
2nd	9.0115 MHz
3rd	455 kHz
4th	9.0115 MHz

With continuous passband shift control.

Sensitivity:

S.S.B., C.W.	Less than 0.3 microvolts for 10 dB S + N/N
A.M	Less than 0.6 microvolts for 10 dB S + N/N

Selectivity:

S.S.B., C.W.	2.4 kHz at −6 dB
	4.8 kHz at −60 dB
A.M.	6.0 kHz at −6 dB
	18.0 kHz at −60 dB

C.W.-N
(when optional crystal filter installed)
600 Hz at −6 dB
1.5 kHz at −60 dB
(when optional a.f. filter installed)
150 Hz at −6 dB
1100 Hz at −40 dB

Spurious Response Rejection Ratio:

More than 60 dB

Audio Output:

More than 2 watts

Audio Output Impedance:

8 ohms

Table I– Manufacturer's specifications for the IC-730. Tests showed the IC-730 met or exceeded all the measurable specifications.

dB), but rather is designed for reasonably low noise and a strong signal-handling capability. The complete stage can be switched in or out of the r.f. signal amplification chain, so there is no need for a switchable r.f. attenuator as found in the majority of solid-state transceivers.

The bandpass filters, one for each of the eight bands covered, are all double tuned and diode switched. They illustrate at least one of the advantages of a transceiver dedicated to amateur-band-only coverage, since the filters need not include any general-coverage frequencies. The first double-balanced mixer stage can be seen in the lower left corner of fig. 2 (diodes D4–D7). This stage receives a local oscillator injection frequency as high as approximately 69 MHz to provide the first i.f. frequency at 39.7315 MHz.

The IC-730 design is rather unique in that both the first and second local oscillator signals can vary in frequency. For example, the first double-balanced mixer stage is designed to produce the 39.7315 MHz i.f. In order to accomplish this, it has to receive an injection frequency that is 39.7315 MHz above the desired reception frequency (e.g., 43.2315 MHz for the band starting at 3.5 MHz). The required injection frequencies are not generated directly, but rather are generated indirectly in the manner shown in fig. 3.

A PLL circuit is used which is controlled by a microprocessor. The PLL has an internal reference oscillator operating at 13.66 MHz, and by means of a VCO loop puts out a 132–139 MHz signal in 10 kHz steps. This signal is then divided by 10 to produce a 13.2 to 13.9 MHz signal which in turn is fed to a double-balanced mixer. The mixer combines this signal with the output of one of 11 crystal-controlled oscillators, operating from about 29 to 56 MHz, to produce the final output signal. The output goes through one of eight double-tuned bandpass filters before going to the mixer for the 39.7315 MHz i.f.

The oscillator which feeds the balanced mixer that translates the 39.7315 MHz i.f. to a 9.0115 MHz i.f. is also variable. Its basic 30.72 MHz crystal oscillator is varactor tuned by control signals received from the microprocessor section. It is stepped in 100 Hz steps from 30.7191 to 30.7200 MHz and in 10 Hz steps from 30.71901 to 30.72000 MHz. Thus, by having the first local oscillator signal vary in 10 kHz steps and the second local oscillator in 100 Hz or 10 Hz steps, three selectable tuning rates are possible. The scheme is an elaborate one, to say the least, but it works extremely well.

The logic unit (lower middle of fig. 1) containing a programmed microcomputer is the "master control" for the IC-730. The dial clock signals are generated by two photochoppers directly connected to the tuning knob (two being necessary to sense the direction of rotation). The up/down control circuit detects the rotational direction and puts this information into the computer. The computer also accepts information from the various function switches (e.g., tuning rate desired, to store or recall a frequency, to lock-out the dial, etc.). In turn, it puts out control signals required to perform the desired function to the PLL unit, frequency display unit, and other blocks.

The i.f. shift circuit is shown in fig. 4. When the optional 9 MHz i.f. s.s.b. and/or c.w. crystal filters are not installed, the circuit operates as a straightforward i.f.

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TELEX 953050 CUSH SIG

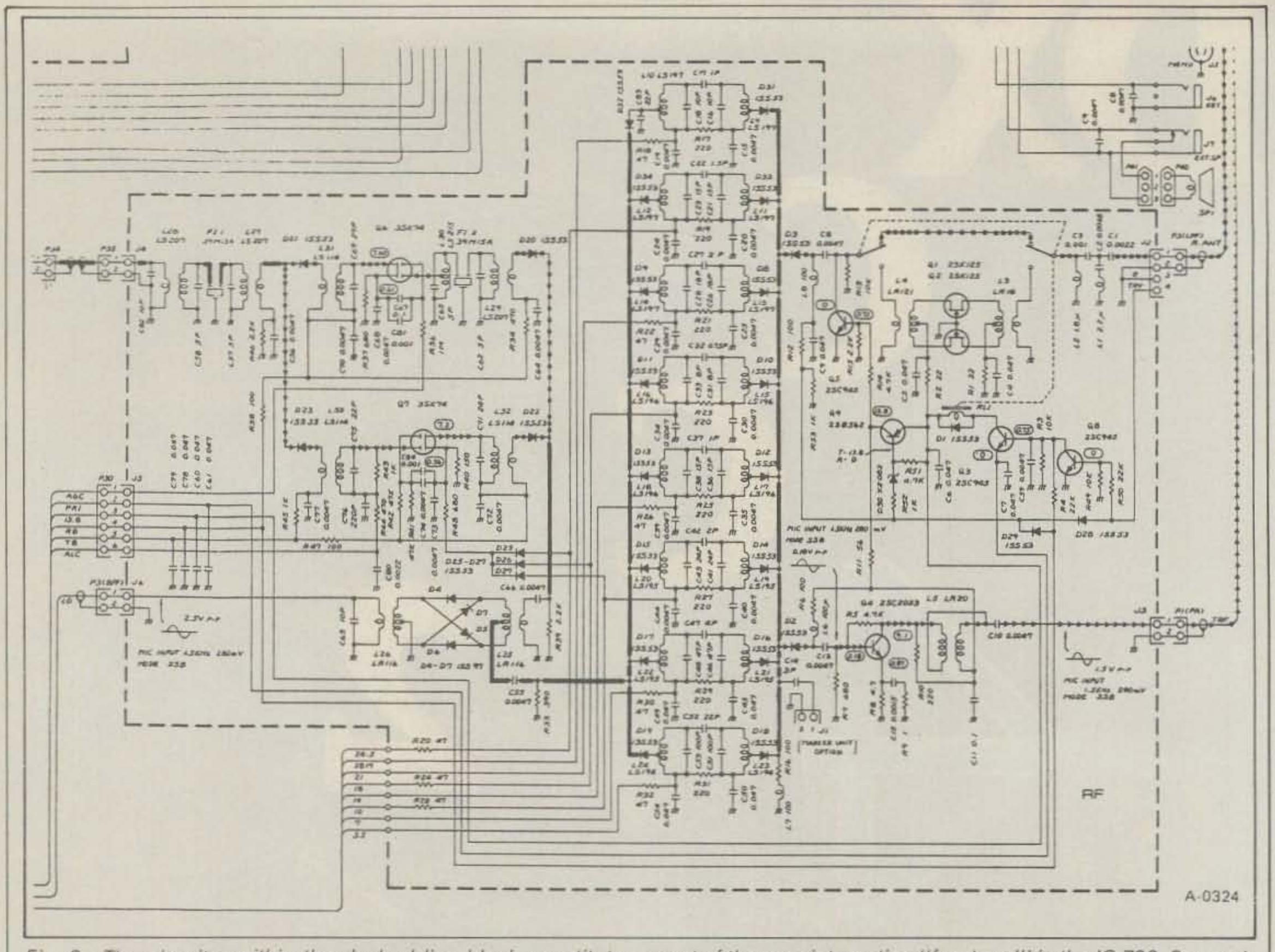

Fig. 2– The circuitry within the dashed line block constitutes most of the very interesting "front end" in the IC-730. Some circuit details are covered in the text.

shift arrangement. That is, the passband is determined by the 455 kHz mechanical filter for s.s.b. and remains constant. To try to eliminate an interfering signal, the frequency of the 9.4665 MHz oscillator is varied slightly. The effect is that the passband of the 455 kHz filter can be shifted up or down from the i.f. center frequency. This will mean that the frequency response of a desired incoming signal will change, since some of the high or low sideband energy will be attenuated. However, if an interfering signal is not too close to the desired signal, it can effectively be suppressed by moving it outside the upper or lower edge of the filter bandpass. When one or both of the optional 9 MHz filters are installed, true variable bandwidth passband tuning is possible. In this mode, the passband of the 455 kHz filter is moved across that of the optional 9 MHz filter. So, the actual i.f. bandwidth is varied either above or below the i.f. center frequency down to a minimum bandwidth of about 800 Hz. The chances of eliminating an undesired signal close to a desired signal are thus increased as long as one can still understand the desired signal as the i.f. bandwidth is made smaller.

Bench Checks

Test bench checks on the IC-730 came out extremely well as compared to the claimed specifications. A few points might merit going over in some detail.

The method of generating the first two local oscillator signals for the 39 MHz and 9 MHz i.f.'s, as previously described, is rather complicated. A combination of digital and digital/analog techniques is used, and a multitude of crystal oscillators are involved in the logic unit, PLL unit, premix unit, etc. One would imagine that all of this would generate a bit of noise and perhaps even some overall instability. Quite the opposite is true. The noise level is down at least 100 dB and the stability is excellent—less than 50 Hz drift/hour after 10 minutes "on" time at room temperature. The low noise level means, among other things, that the full potential of the skirt selectivity of the i.f. filters can be realized. The IC-730 synthesizer circuit certainly has to be among the best available in amateur radio equipment.

The "front-end" of the IC-730 is noteworthy in several respects. The sensitivity is easily adequate, being between 0.2 to 0.25 microvolts for a 10 dB S + N/N ratio on s.s.b. on all bands. But, what is more interesting is the large signal-handling capability. With the preamplifier switched out, the third-order intercept point can range up to +17 dBm for 20 kHz spaced signals. This is better even than in the IC-720A which was considered a standard in this respect. Also, the idea of being able to switch the preamplifier in and out is a far more practical approach than inserting an input attenuator. The gain of the preamplifier is rather moderate (7 to 10 dB) and it really deserves to be termed a "preamplifier" rather than the r.f. amplifier stage. The receiver portion of the IC-720 can function quite well under most circumstances without the preamplifier being used. The idea of being able to switch it in for somewhat extra sensitivity at the sacrifice of losing a bit of large signal-handling capability allows one to have the best of both worlds.

The a.g.c. range of the IC-730 is excellent, producing a 3 dB variation in output for an input signal range of 3 microvolts to 3 volts.

The image and i.f. rejection values were all very good, ranging from −65 to −90 dB!

Using an optional 9 MHz crystal filter in order to convert the i.f. shift feature into

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Independent Dot & Dash (Full) Weighting	Yes	Yes	Yes
Calibrated Speed, 1 WPM Resolution	Yes	Yes	Yes
Calibrated Beacon Mode	Yes	N/A	No
Repeat Message Mode	Yes	N/A	Yes
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Instant Start From Memory	Yes	N/A	Yes
Message Editing	Yes	N/A	Yes
Automatic Stepped Variable Speed	No	No	Yes
2 Presettable Speeds, Instant Recall	No	No	Yes
Automatic Trainer Speed Increase	Yes	Yes	N/A
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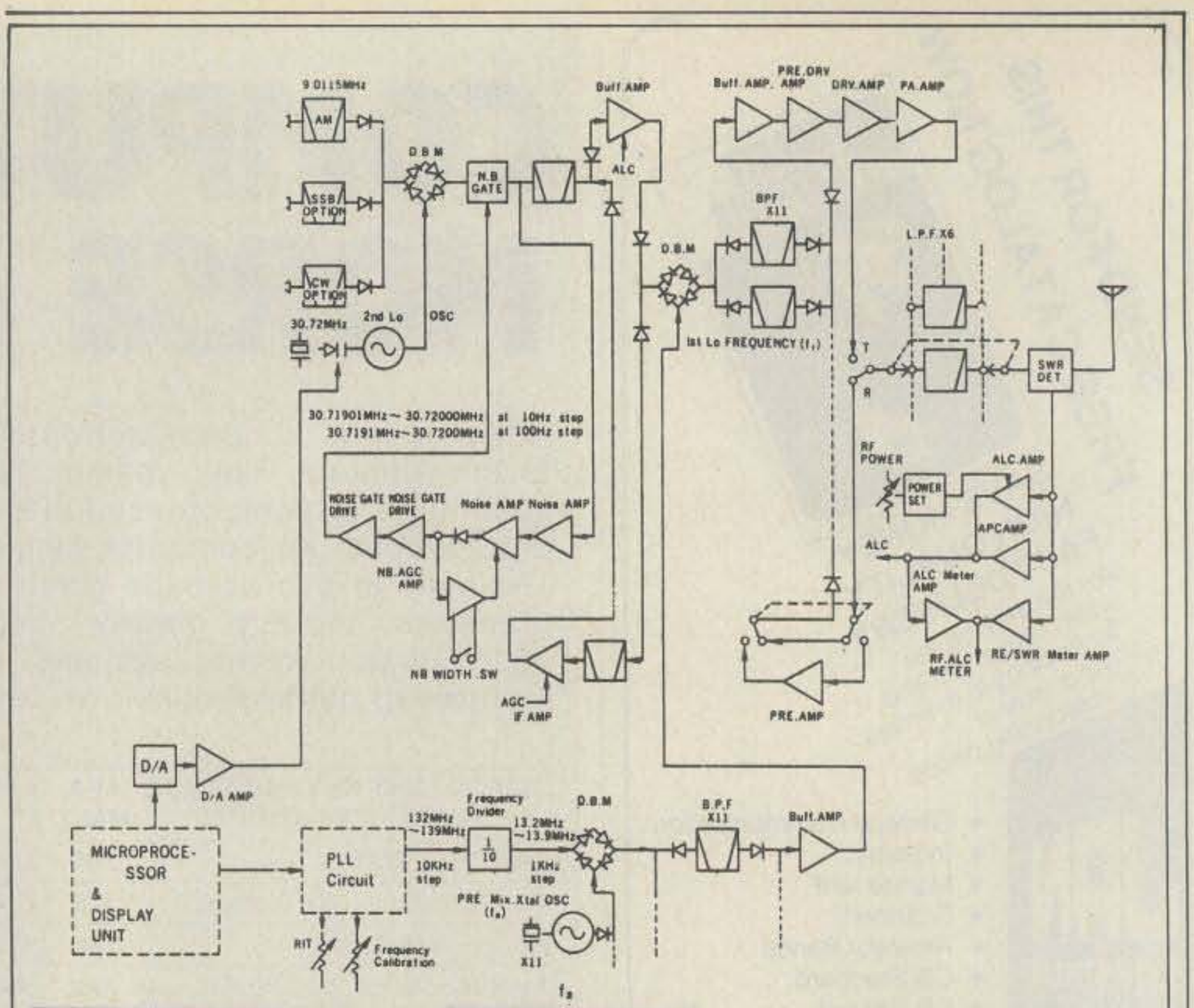


BAND	MHz	BAND	MHz
3.5	43.2315	24.5	64.2315
7.0	46.7315	28.0	67.7315
10.0	49.7315	28.5	68.2315
14.0	53.7315	29.0	68.7315
18.0	57.7315	29.5	69.2315
21.0	60.7315		

BAND	(MHz)	BAND	(MHz)
3.5	29.9315	24.5	50.9315
7.0	33.4315	28.0	54.4315
10.0	36.4315	28.5	54.9315
14.0	40.4315	29.0	55.4315
18.0	44.4315	29.5	55.9315
21.0	47.4315		

Fig. 3– This block diagram more clearly indicates the microprocessor control of the oscillators for the first and second mixer stages.

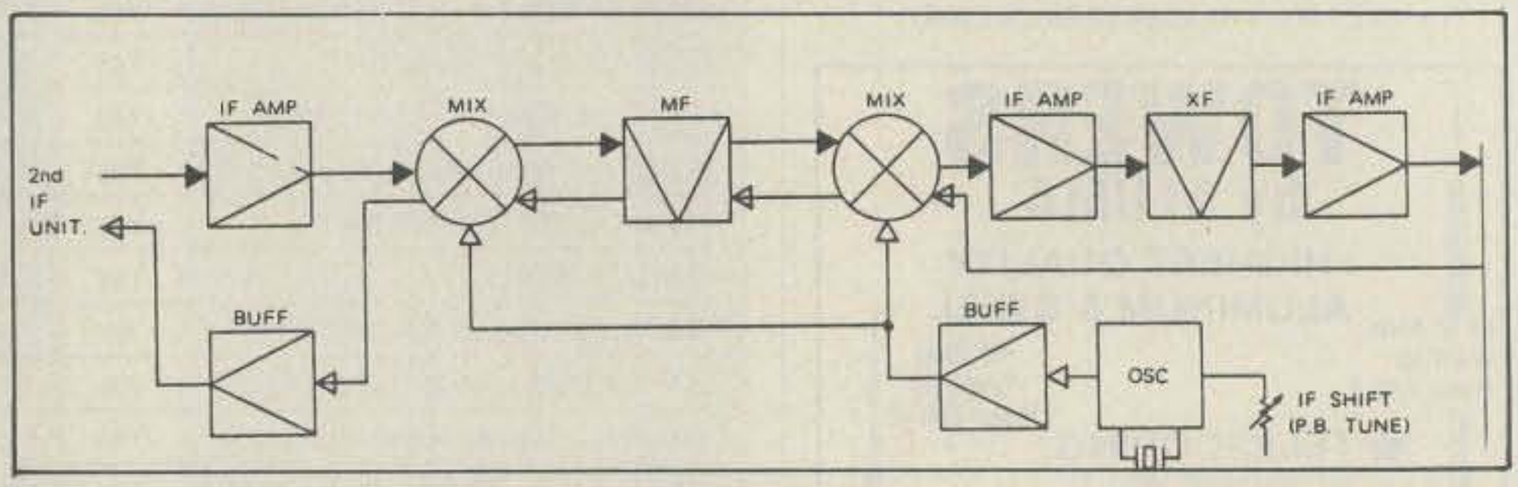


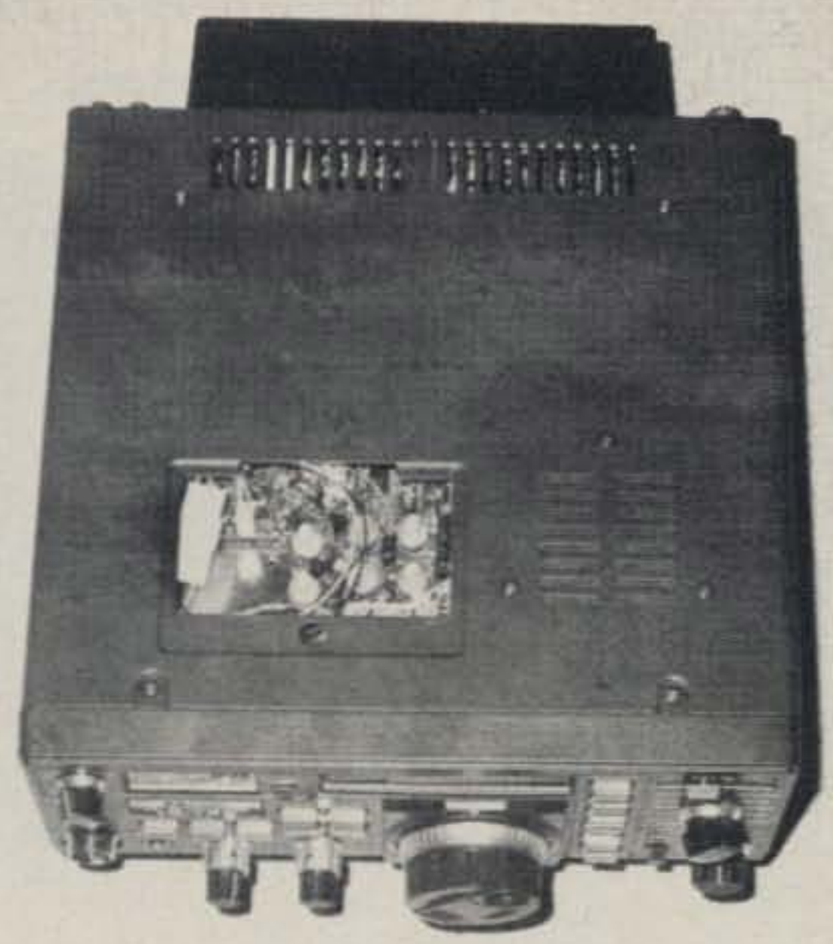
Fig. 4– This arrangement provides either for i.f. shift or variable bandwidth passband tuning on receive. The latter requires an optional 9 MHz crystal filter to be installed before the i.f. stage on the left. The 9.4665 MHz (± 1.5 kHz) local oscillator converts the incoming 9.0115 MHz i.f. signal to 455 kHz and then back again to 9.0115 MHz after it passes through a mechanical filter.

variable bandwidth passband tuning, the bandwidth could be reduced down to slightly less than 700 Hz from its nominal s.s.b value of 2.4 kHz. If the optional 455 kHz crystal filter is used, the −6 dB to −60 dB bandwidth on s.s.b. is modified to be about 2.2 kHz and 3.5 kHz, respectively, for a shape factor of 1.6 or better. Using the optional narrow c.w. crystal filter, the −6 dB bandwidth is about 600 Hz and can be reduced down to about 170 Hz using the variable bandwidth passband tuning feature.

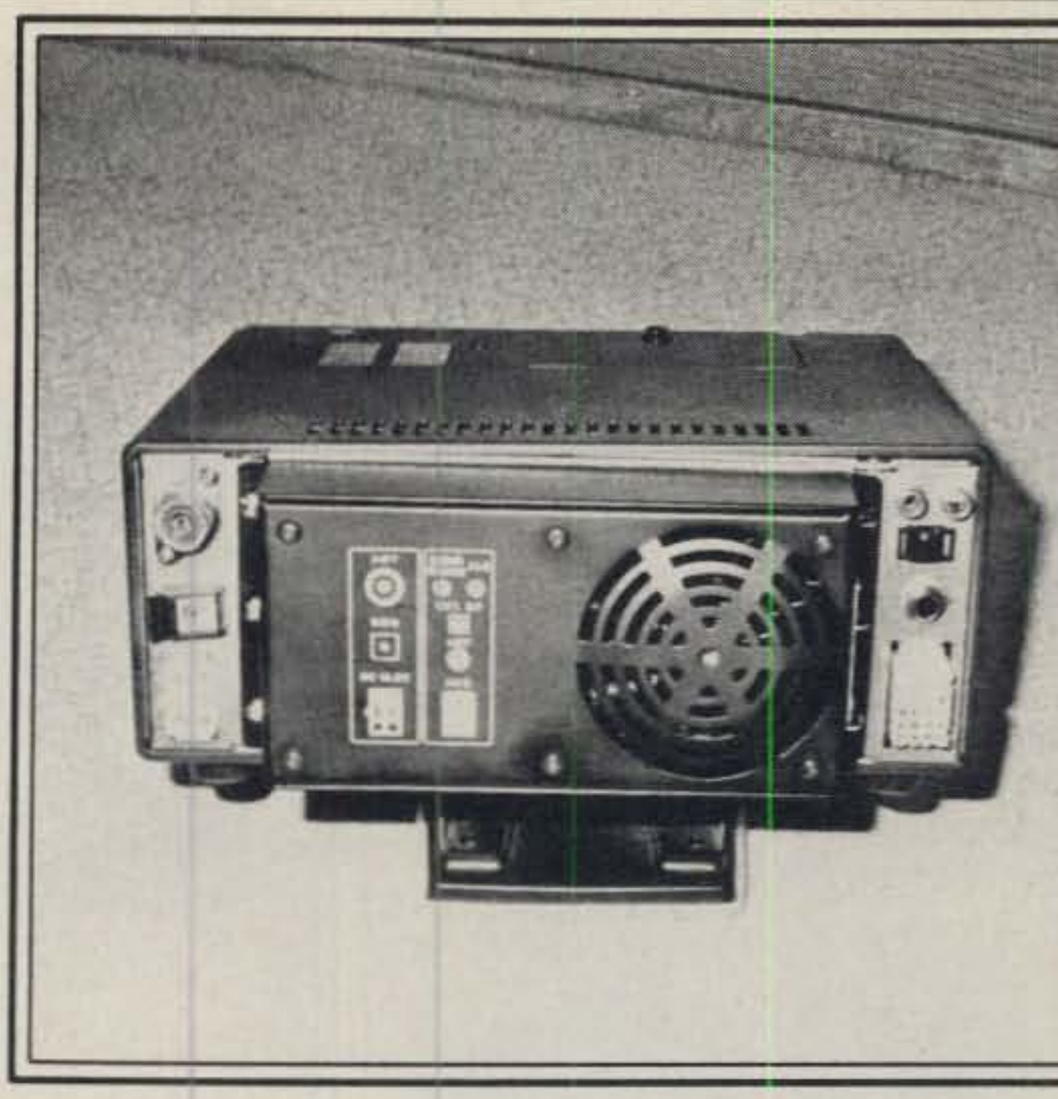
The receiver portion of the IC-730 gets exceptionally high marks considering the price range of the transceiver. Its performance is only flawed by a rather unfortunate surface blemish—the S meter response. It's absolutely "scotch" on the low end (about 5 microvolts for an S1 reading) and a bit too generous on the high end (about 150 microvolts for S9 plus 20 dB).

On the transmit side, the IC-730 continues to demonstrate excellent design. The power output, under matched load conditions, varied only from 90 to 95 watts across all the bands tested. The power output with an s.w.r. of 2.5 to 1 varied from 45 to 65 watts. The third-order IMD products were better than −35 dB from the peak output, and this is quite comparable to that obtainable from tube-type finals.

C.w. fans will be pleased to note that the IC-730 has an excellent c.w. wave-



This top view shows the access panel removed so one can manipulate various controls for setting the VOX, c.w., sidetone, noise blanker bandwidth and s.w.r. measurement range.



Rear of the unit. There isn't too much room left for connectors, but everything that is necessary is there. Standard connectors (SO-239, phone jacks or ¼-inch jacks) are used except for the power connector (d.c. power cord is furnished) and the accessory connector on the lower right.

shape. The rise time is about 5 milliseconds and the fall time about half that.

The measured spurious, harmonic, carrier suppression, and unwanted sideband suppression figures for the IC-730 all easily exceeded the claimed values. At times some of the values significantly exceeded those claimed. For instance, the second harmonic attenuation ranged from 62 to 72 dB, a mighty good value.

Operating the IC-730

As mentioned, the IC-730 is a completely no-tune transceiver. So, putting it into operation on a given frequency and in a given mode is just a matter of setting the tuning knob and the switch position.

Tuning of the IC-730 is very smooth (the tuning knob tension is adjustable). By means of the 1 kHz, 100 Hz, or 10 Hz pushbuttons, one selects a tuning rate of 100 kHz, 10 kHz, or 1 kHz per knob revolution. The first rate is very handy just to scan through a band like 15 or 10 meters for general activity. Most often one will use the 10 kHz rate for in-band tuning, while the 1 kHz rate is mainly useful for c.w. The RIT tuning range is about ± 1.5 kHz and is a good compromise for both s.s.b. and c.w.

The two separate v.f.o.'s can be used in a variety of ways: for split frequency operation within a given band or for temporary frequency storage. One can also store in memory any one frequency per band to which v.f.o. "A" was tuned. Getting to learn to use the **VFO A/B**, **Write**, and **Memo** pushbuttons quickly and in the right sequence takes a bit of practice, but operation can be made very versatile. One can store a net frequency of interest on each band and still use the **VFO A/B** feature for monitoring and operating on two other frequencies in a band being operated. Or, one can simply devote all the memory available to storing frequencies of temporary interest within a band (three frequencies) with the capability of being able to transceive immediately on any chosen frequency.

Frequency scanning can also be done using the optional IC-HM10 microphone (or some home-brew circuitry to duplicate its action). Scanning can start up or down from any displayed frequency. The scanning rate will depend upon the setting of the 1 kHz, 100 Hz, or 10 Hz pushbuttons, and will be about 500 kHz, 50 kHz, or 5 kHz per *minute* for the respective pushbuttons. There is only a single control line in the IC-730 which controls the scanning function, so one needs more than a few external switches to control the scanning function. For instance, fig. 5 shows the internal circuitry of the IC-HM10 scanning microphone. Although perfectly usable with the IC-730, note that the pin 4 connection does not apply to the IC-730, but rather only applies to some ICOM v.h.f. transceivers with a scan-top capability.

The various knobs and switches on the IC-730 are very logically placed so they

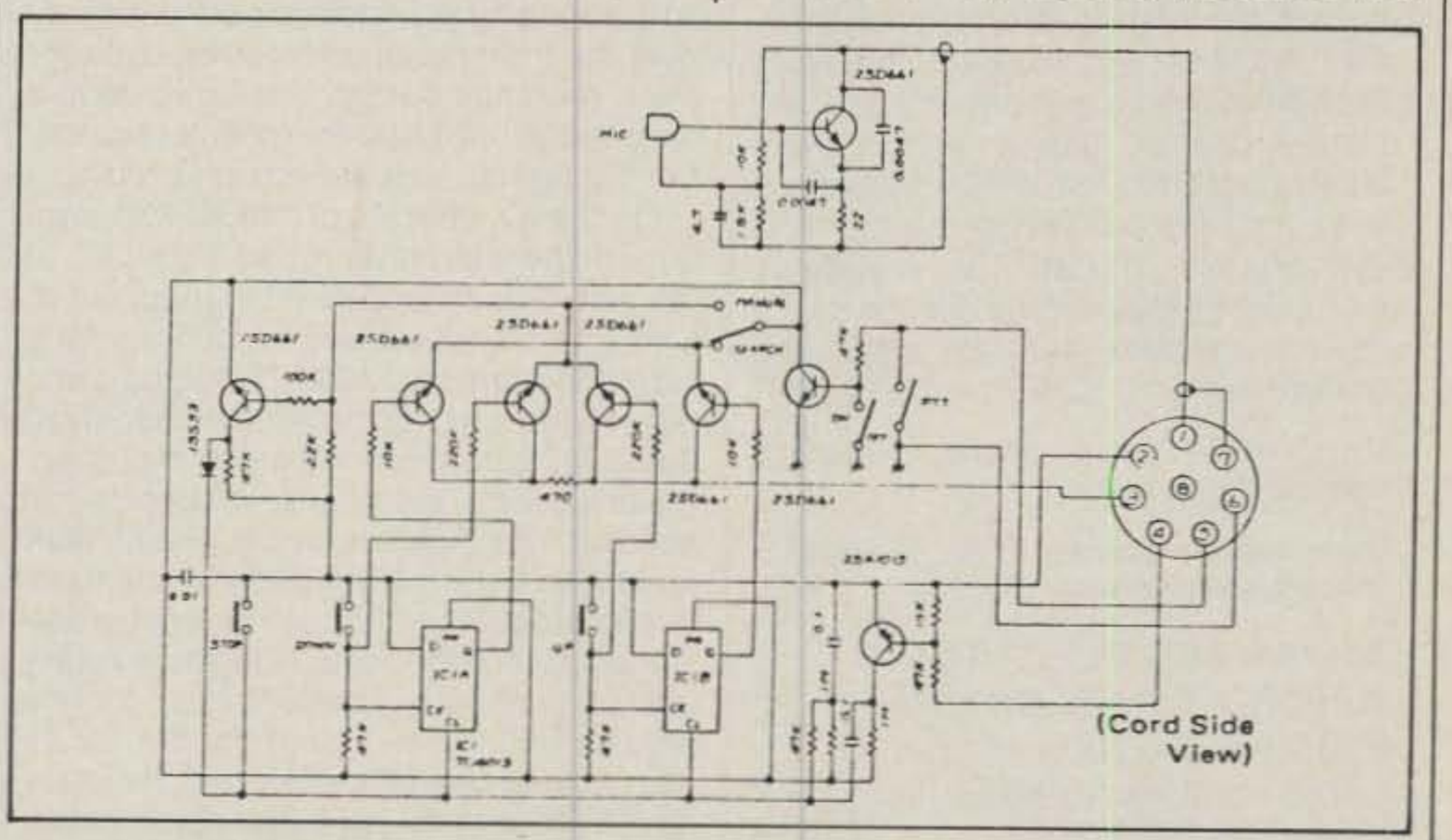
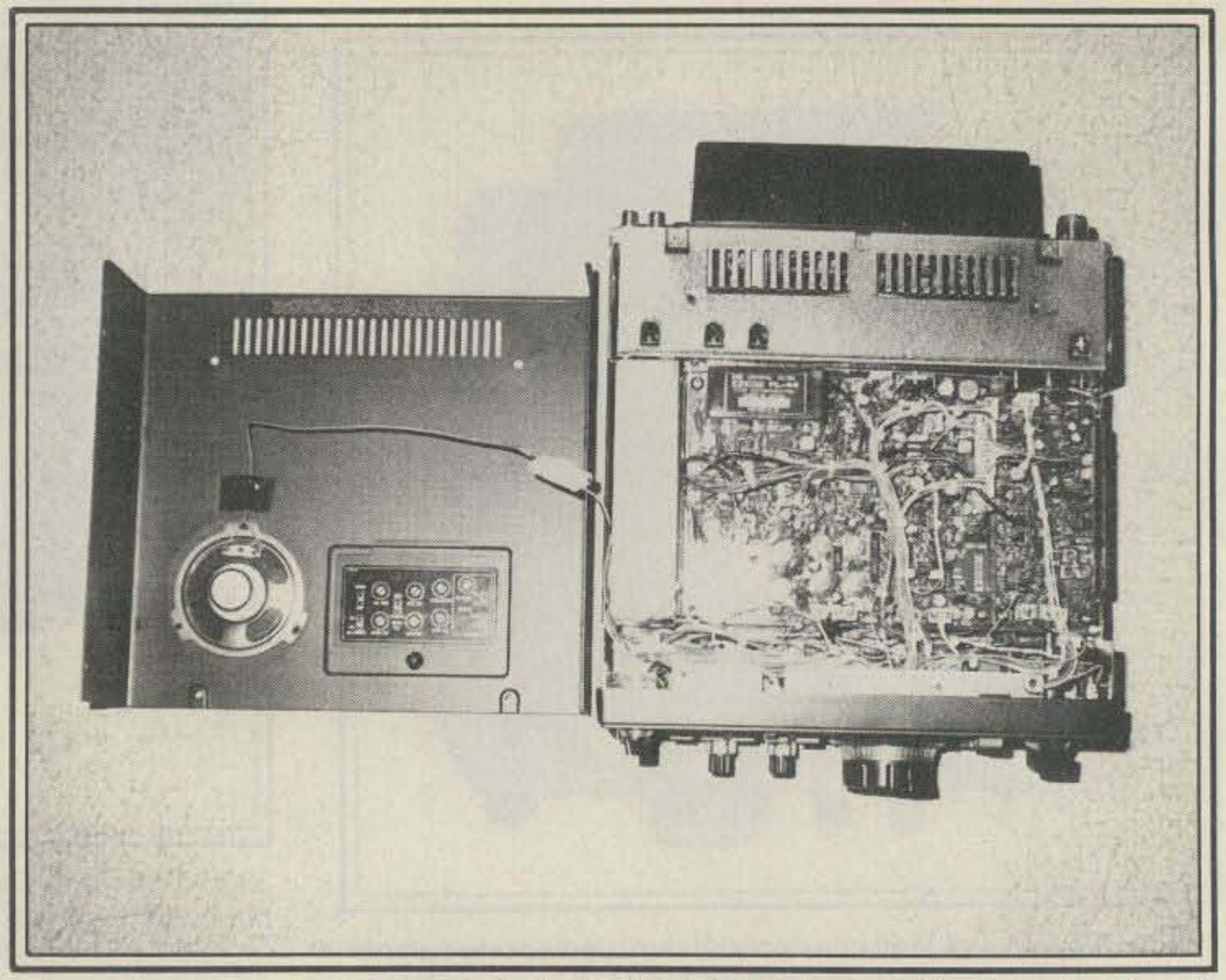


Fig. 5– One can get the IC-730 to frequency scan either by use of an optional IC-HM10 scanning microphone or by duplicating its circuitry as shown above. the IC-730 does not supply the information to pin 4 in the diagram to automatically stop scanning as is featured in some v.h.f. equipment which also utilizes the scanning microphone.



A view with the top cover removed. The PC boards are fastened in place, but there is generous use of connectors so the removal of a board, if ever necessary, should not be unduly difficult.

can be used easily. However, in order to keep them to a reasonable number, some controls were placed under a top cover hatch. The latter are mainly the controls for the VOX circuitry, the noise blanker narrow/wide selection, and the s.w.r. switches for "set" or s.w.r. "read."

Tune-up of the IC-730 is fairly simple because of the inclusion of the a.m. mode. With the **RF PWR** control initially set at minimum, one can set the mode switch to **AM** and then depress the **Transmit** pushbutton. The output power can then be brought up with one hand while adjusting an antenna tuner. Another pushbutton allows the front panel meter to be used for s.w.r. readings during tune-up while it is returned to read ALC for modulation control during transmit periods on s.s.b.

On-the-air checks of the IC-730 confirmed the extremely good "specs" of the unit. Signals appeared to jump out of a quiet background, and the only startling experience was to "hear" S7 signals and not see the S meter move at all. Received audio using the built-in speaker was of adequate quality, but the use of an external speaker improved the audio. The i.f. shift (or variable bandwidth) slide tuning functioned smoothly, although a strictly personal preference would be for a rotary control to provide a better "feel" for fine adjustment. If the i.f. shift control, for instance, had been dimensioned the same as the RIT control knob, the combination would have been perfect. The noise blanker functioned very smoothly and, at times, was effective against the "woodpecker." The digital display was absolutely stable and flicker-free.

Audio reports on transmit were quite good (note that one has to use an ICOM microphone or "power" microphone producing about 120 millivolts across 1200 ohms). The built-in a.f. speech processor is definitely effective. It brings up the background noise somewhat and its use would not be warranted on S9+ contacts. However, on DX contacts it "buys" one about 3 dB or a half S unit. It is not, however, as totally effective as an r.f.-type speech processor. Careful checks comparing the IC-730 a.f. processor against the MFJ Model 525 RF Speech Processor still showed the latter to provide another 3 dB more effective signal punch. Of course, the 3 dB doesn't sound like much, but it is equivalent to doubling a transmitter's output power.

Final Comments

The IC-730 has to be considered as one of the most compact, full-featured mobile transceivers ever seen on the amateur market. It does lack some little "niceties" such as a notch filter, but then again, how much can one possibly pack into a mobile-size transceiver?

The manual supplied with the IC-730 compares to that supplied with the IC-720A. That is, it takes a very balanced viewpoint in supplying simple "how to" instructions for those who just want to "plug-in" and "tune-up" the transceiver, yet it provides enough PC board diagrams and test information for those with good technical knowledge who are capable of taking initial trouble-shooting steps in case of equipment failure.

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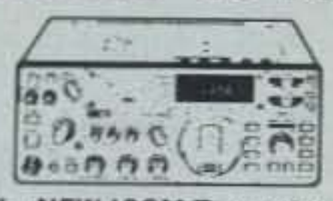

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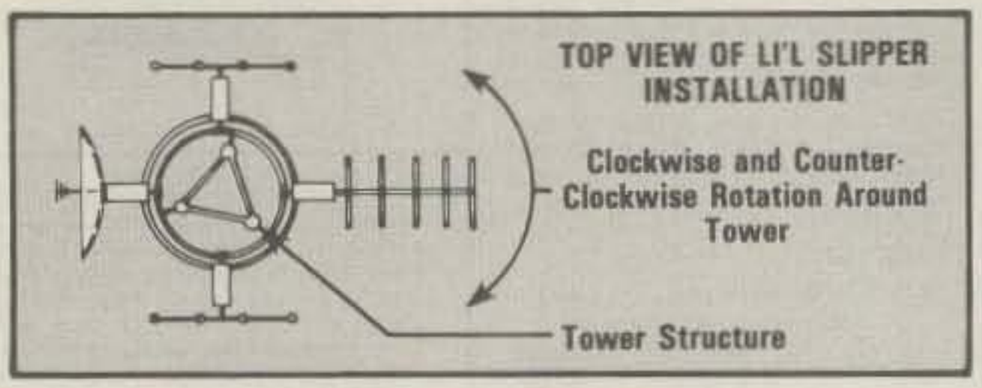

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Here's an idea for adding the tilt-over feature to your tower setup.

FIRST YOU GET A WELDER

BY DICK RICE*, W5HMU

It all started a few months ago when, after 33 years in the same home, the XYL and I decided to buy a new one. The decision was made with mixed emotions, as the two boys had grown up in the old place, and many memories of joys and heartaches were attached to it. It was here, at the age of 14, that my older son, Rene, became enamoured with amateur radio. A young fellow his age by the name of Frank Shattuck, who must have weighed every bit of 100 pounds, moved to Baton Rouge from Georgia. He was a ham, and he used the very unlikely phonetics of W5 Big Masculine Guy! To make a long story short, Rene soon became WN5DOQ, and by the time he dropped the "N" about six months later, I, at his insistence and encouragement, became WN5HMU. (For the benefit of you youngsters who have calls like K5IG and KK5K, the FCC really did issue calls like that back in the 40's and 50's.)

I think Rene must have reached maturity early, because after a year of hamming, living and eating it, his thoughts turned to cars and gals, but not necessarily in that order! No, sir! Talking to some guy on the old Viking II had lost its enchantment. Oh, he'd come in sometimes and try to pick up a new state for his WAS, but the old enthusiasm just wasn't there anymore. However, instead of waning, mine increased. I made friends with all the local hams (well, at least most of them), joined the local club and served various posts in it, and attended the local hamfests. My younger son, Rory, became a Novice for a very brief time, but never really got into the swing of things. I've always hoped that the phonetics I threw at him, WN5 Care Free Idiot, had no influence on his losing interest. He was far from an idiot, however, getting his Ph.D. in Physical Chemistry at LSU. He is now with Advanced Micro Devices (semiconductors) in Silicon Valley.

So-o-o-o, I struggled along as the only ham in the house. The XYL put up with it, never objected to my buying equipment, and would even talk to my sister in California via phone patch.

So what do we need a welder for? Well, the move to the new QTH required extensive changes in my tower setup. The Wilson crank-up was mounted against my house at about the 18-foot mark, and when it was lowered, I could remove the beam, rotor, the whole works, by myself while standing on my roof. However, the new home has a hip roof—in other words, no gables—which necessitated my coming up with some kind of tilt-away for the tower. I was discussing my problem with Rene and lamenting the high cost of buying things such as tilt-over bases, when he up and said, "Heck (or something similar), I can build you one a lot cheaper than that!" Well, the wheels started turning, and he came up with the idea which you probably already have noticed, because everybody always looks at the pictures first.

Rene is a first-class machinist at Ethyl Corporation here in Baton Rouge, as well as a welder. He builds things at home with his own equipment and often lends a helping hand when someone needs a little job done (like the 40-foot long grape arbor made of angle iron at my old home).

He procured two lengths of 6-inch pipe. On a 3½-foot length of pipe he welded a flange, and on the bottom of it he arranged a network of reinforcing rods and flat stock as shown in the picture. This was buried in a yard of concrete with the flange sticking up about 2 inches above the surface. (Incidentally, when you're 68, a hole 30″ × 30″ × 4′ deep is big enough to put a couple of elephants in—big ones!)

On a 7-foot length of pipe, another flange. Near the top at a 45° angle he welded on each side a piece of flat stock with a hole drilled through each one out toward the end. A hole was burned

*7642 No. Coventry Circle, Baton Rouge, LA 70808

(1) Author stands in the 30" × 30" × 4' hole dug for the concrete and base.

(2) You can buy concrete by the yard in Baton Rouge if you haul it yourself. (They furnish the trailor.) The network of reinforcing rods and flat stock was buried in the concrete with the flange sticking up about 2 inches above the surface.

(3) The base network, which was sunk into the concrete.

(4) W5HMU checks to make sure the setup is level, while son Rene, who designed and built the tilt-over base, looks on.

(5) The completed arrangement. Tower is poised at about 35° from vertical.

through each side of the pipe near the bottom, and a pulley was installed on each side for the cable to slide through and on.

The winch, mounted on the opposite side from the erect tower, is a worm-gear type, so wherever you stop cranking, the tower stays in that position.

You will note a clamp around the tower itself. This clamp has nuts welded on each side to accept the bolts through the holes in the flat stock welded to the top of the pipe (whew!).

It takes about 12 days for concrete to cure, or set, and we decided to visit our son Rory and his family in California for Christmas. We had a delightful time, but being a true ham, I often thought of things back home, especially the new tower arrangement. We were met upon our return at the airport, and I picked up my car to drive home. When we drove up the hill into the driveway, by the car's headlights I could see my tower standing majestically beyond the carport and hamshack. Rene had driven over to the house with a friend and installed it during our absence. No doubt it was one of the nicest Christmas presents I've ever received! Incidentally, I am drawing up a detailed sketch of the tilt-away arrangement, and will be glad to share it with anyone who is interested enough to send me an s.a.s.e. 73 and good hamming!

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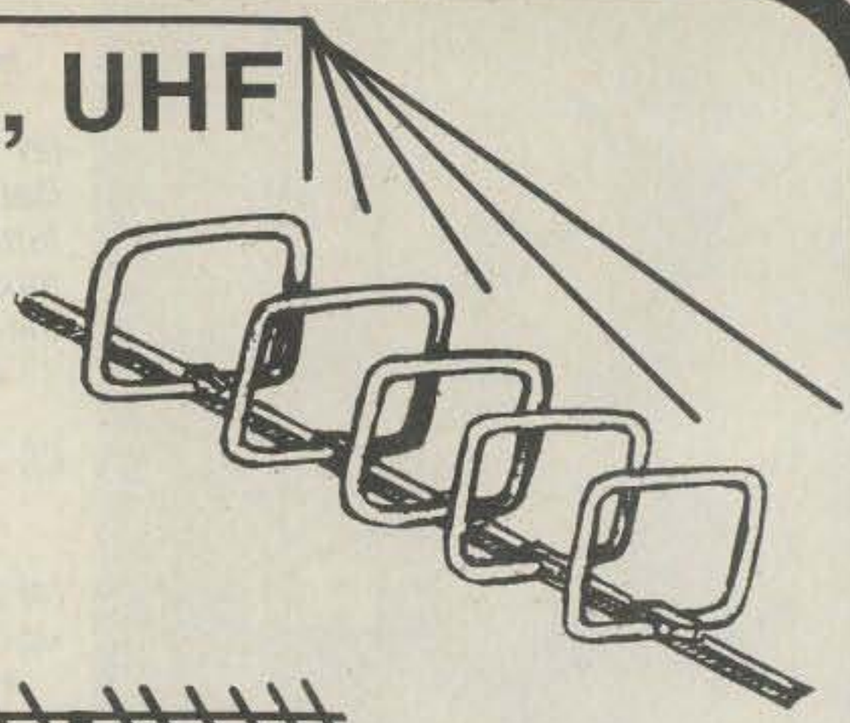

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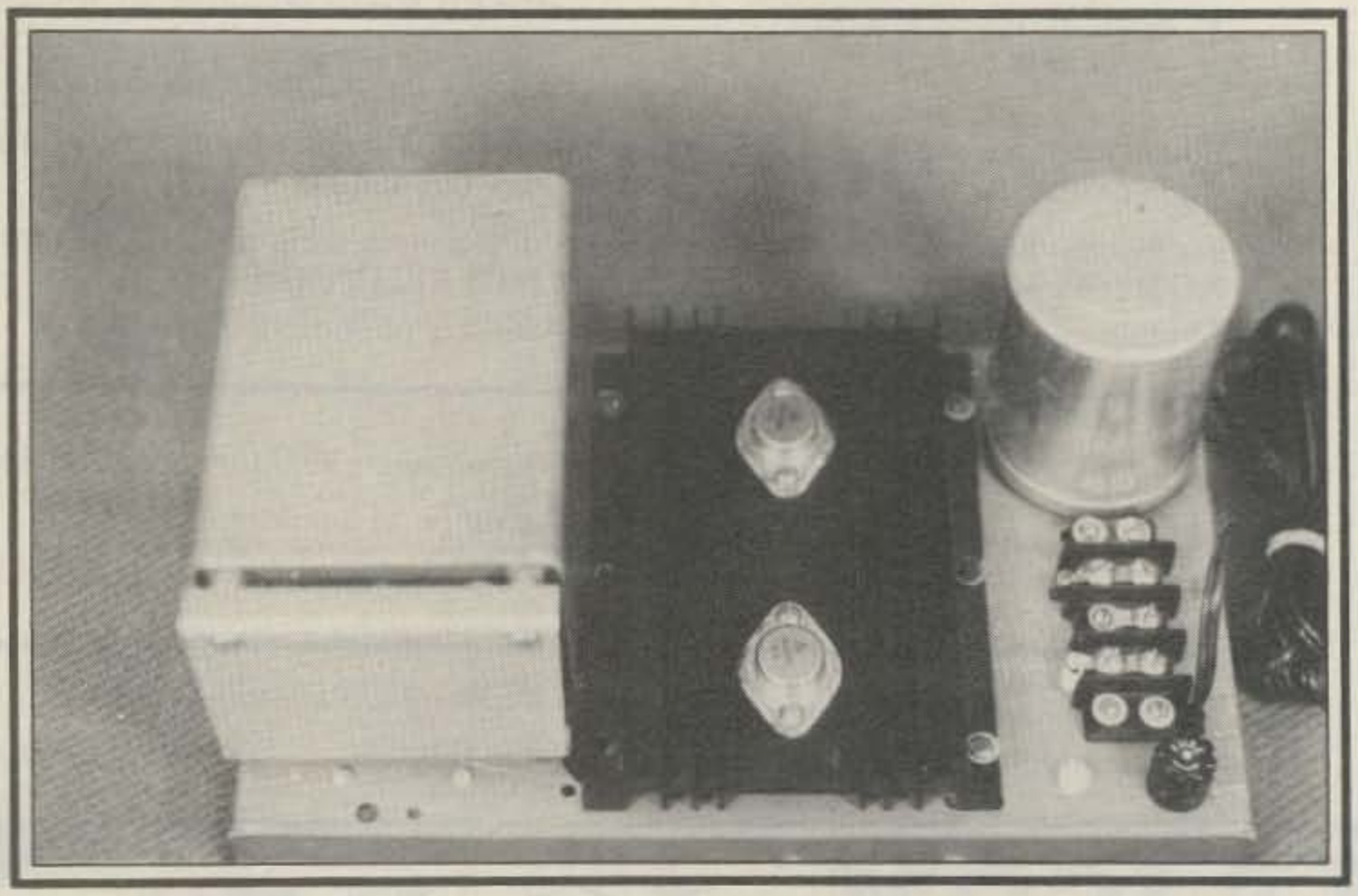
A HEAVY-DUTY POWER SUPPLY

BY BYRON H. KRETZMAN*, W2JTP



Top view of the heavy-duty power supply.

Projects like these are always brought on by a specific need. This one is no exception. It was brought on by the acquisition of an all solid-state, 25 watt (output), commercial, surplus, 6 meter f.m., "2-way radio" transmitter/receiver—namely a Motorola "Mocom-10." Like all such "bargains," it had problems, necessitating a workbench test setup with a 12-volt d.c. power supply capable of 4 to 5 ampere capacity. Of course, it had to be a regulated power supply; the receiver drew only 100 mA. It was not considered acceptable if the input voltage changed when going from receive to transmit. And, it was deemed necessary that a small range of output voltage adjustment be provided. We wanted to be able to set the output precisely at 13.8 volts, the specified input voltage for this radio, so that other operational parameters given in the instructions could be checked.

Basically, our power supply uses two hefty pass transistors—Motorola MJ-3000's. An LM723 voltage regulator IC provides the required precision and regulation of the pass transistors. To provide a higher input voltage to the IC than the power supply output voltage and in order to maintain regulation, a separate transformer, T_2, bridge rectifier D_2, and a 220 mF filter capacitor C_2 supplying 19.5 volts d.c. were used. This is completely independent from the main part of the supply. Output voltage is adjusted, once, by the under-chassis PC board pot R_5. It is adjusted so that 13.8 volts appear at the terminals, with no difference in output voltage between no load and full load, in our case "full load" being 5 amperes.

Circuit Components

Fig. 1 is the schematic diagram of the heavy-duty power supply. While we used two 150 watt Motorola MJ-3000 pass transistors, the 120 watt Radio Shack #276-2042 can be substituted. A good-size heat sink, such as the Radio Shack #276-1361, should be used along with a silicone grease, such as Radio Shack #276-1372.

*431 Woodbury Rd., Huntington, NY 11743

The main power transformer used, T_1, was military surplus, providing about 20 volts a.c. Ampere capacity was unknown, but the power supply operates at 5 amperes with no heating of T_1 whatsoever. A suitable substitute would be the Radio Shack #273-1514, rated for 18 volts at 4 amperes. The main bridge rectifier used, D_1, was a Motorola MDA952-1 block. A satisfactory substitute would be the Radio Shack #276-1180, rated for 50 p.i.v. at 6 amperes.

The power transformer, T_2, for the IC regulator chip is rated for 12 volts at 300 mA. The bridge rectifier, D_2, is a single unit rated for 50 p.i.v. at 1.4 amperes. Four separate 1N4000 or 1N4001 silicon rectifier diodes, connected as a bridge, could also be used.

The filter capacitor used, C_1, was 30,000 mF rated at 20 volts and was obtained from one of the many electronic surplus stores on Canal Street in New York City. Almost any value above 20,000 mF can be used at any value of working voltage above 20 volts. Right now a large quantity of these high-capacity electrolytic capacitors, in a variety of values and voltage ratings, appear to be available on the surplus market at very reasonable prices, from about $3 to $5.

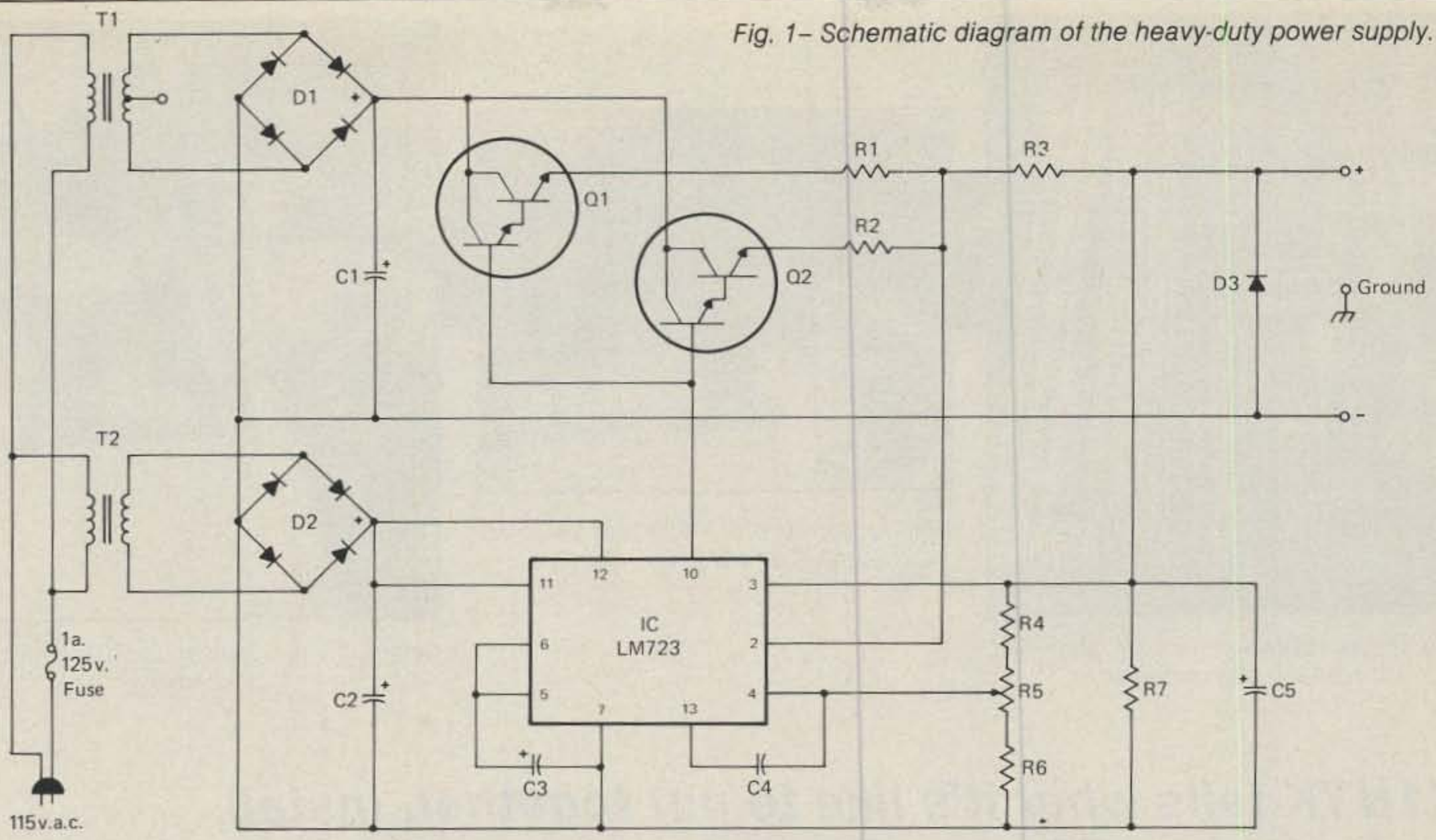
While the voltage-adjust pot R_5 specified is 2.5 K, a 5 K Radio Shack PC pot (#271-217) can be used if it is shunted by a 4.7 K ½ watt 10% fixed resistor (Radio Shack #271-030). The 2.7 K resistor R_6, if not available, can be substituted by a 2.2 K ½ watt 10% resistor (Radio Shack #271-027) in series with a 470 ohm ½ watt 10% resistor (Radio Shack #271-019).

Diode D_3 is connected across the output of the power supply to short any negative spikes or transients to prevent damage to either the high-gain pass transistors or to the LM723 regulator IC. The primary input to the supply is fused with a 1.0 ampere 125 volt fuse. If this blows, you then had better find out what in terms of your load caused it to blow. (Do not use a slow-blow type of fuse.)

Mechanical

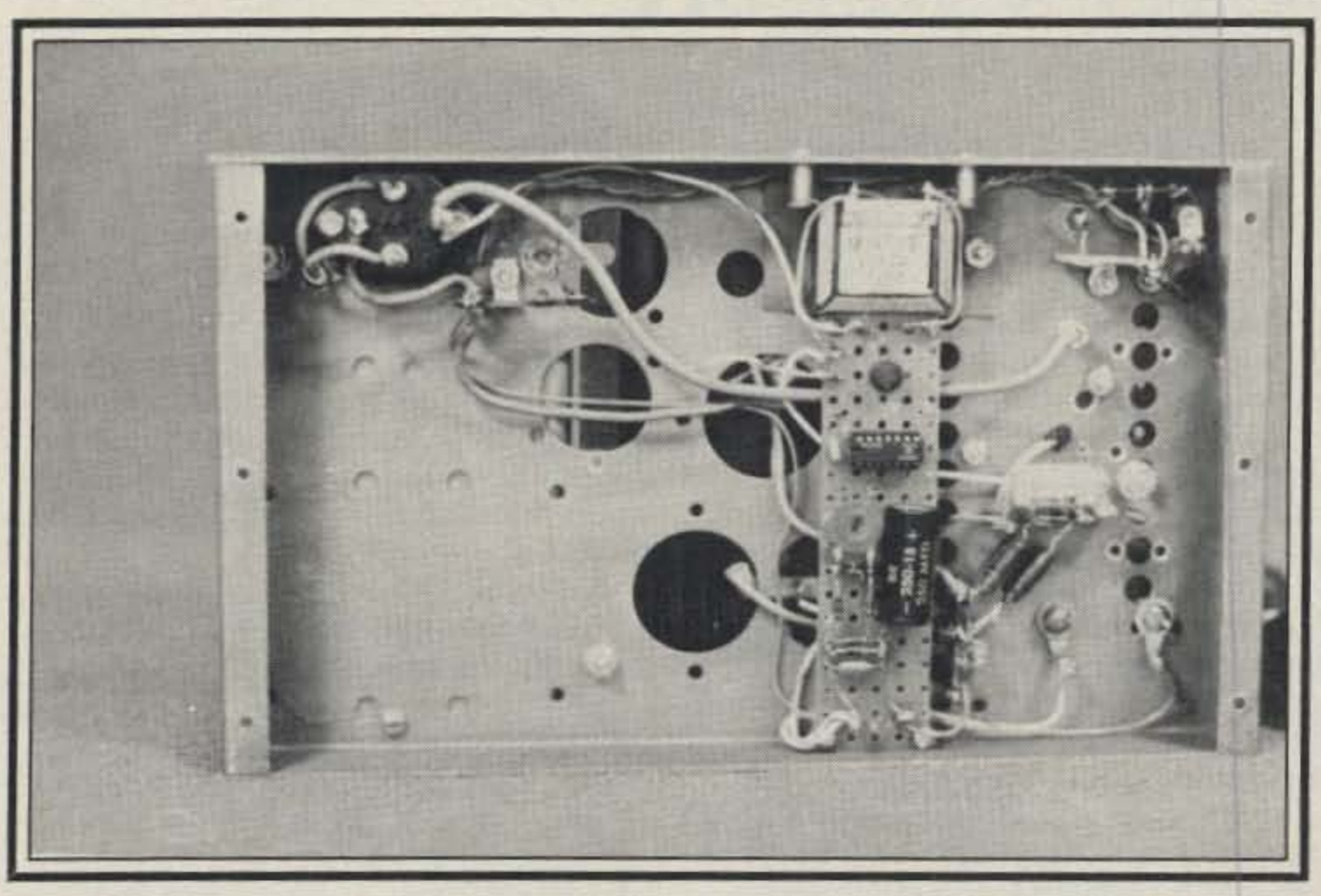
The heavy-duty power supply was built on an old aluminum chassis, one with many holes from previous projects. Actually, with the heat sink mounted over them, the holes aid the cooling of the pass transistors. The IC and associated

Fig. 1– Schematic diagram of the heavy-duty power supply.



Parts List

Symbol	Description	Radio Shack Cat. No.	Symbol	Description	Radio Shack Cat. No.
C_1	30,000 mF, 20 v, min. Electrolytic	(see text)	R_1, R_2, R_3	0.1 ohm, 5 watts, 10%	271-128
C_2	220 mF, 35 v Electrolytic	272-1017	R_4	1.8 k, ½ watt, 10%	271-026
C_3, C_5	1 mF, 16 v Electrolytic	272-1419	R_5	2.5 K PC Potentiometer	(see text)
C_4	220 pF, 50 v Ceramic Disc	272-124	R_6	2.7 K, ½ watt, 10%	(see text)
D_1	6A, 50 p.i.v. Bridge Rectifier	276-1180	R_7	1.5 K, ½ watt, 10%	271-025
D_2	1.4 A, 50 p.i.v. Bridge Rectifier	276-1151	T_1	18 V CT, 4 A Sec., 120 V Pri.	273-1514
IC	LM723 Regulator IC	276-1740	T_2	12 V, 300 mA Sec., 120 V Pri.	273-1385
Q_1, Q_2	NPN Darlington, 120 watt transistor	276-2042	D_3	1.0 A, 400 p.i.v.	276-1103



Under-chassis view of the heavy-duty power supply.

resistors and capacitors, along with the bridge rectifier D_2 and the voltage adjust pot R_5, are mounted on a 1″ × 5″ scrap piece of perforated board. The output of the power supply is connected to a three-terminal barrier-type block. Both negative and positive connections are floating, in respect to the chassis, so either one (or neither) may be grounded.

While the under-chassis photograph might give the impression of not-so-neat wiring, understand that heavy gauge (#16) insulated wire is used to minimize the IR drop in the wiring when heavy currents are being drawn. Therefore, unnecessary wire lengths in fancy cabling are avoided.

Performance

The heavy-duty power supply delivers 13.8 volts at 5 amperes continuously with barely noticeable heating of the pass transistors. An intermittent drain of 10 amperes will result in more heating, but still within the capability of the components, assuming that reasonably good ventilation is provided. (A good reason for not enclosing the supply inside of a box.)

If frequent "intermittent" drain of 10 amperes is contemplated, *two* Radio Shack #273-1514 transformers, with their secondary windings connected in parallel, should be used for T_1.

The basic circuitry for this power supply was developed by Craig Anderton[1] and considerable helpful advice was had from Dick Townes, W2INJ. DX

[1]*Anderton, Craig, "A Hefty 12 Volt Supply," 73, May 1975, p. 85.*

The parts compliment for the TET HB43sp yagi antenna.

Getting started with the help of WA1YEC (center) and WB1GIF (right).

Close-up of a typical radiator/reflector assembly.

K1NYK tells what it's like to put together, install, and use this antenna. Operational considerations will, of course, vary with installation sites.

The TET HB43sp Yagi Antenna

A User's Report

BY DAVE MALLEY*, K1NYK

There comes a time in the lives of many hams when they make the decision to buy their first beam antenna. For others, the decision might involve purchasing a larger replacement. Recently, I found myself in the latter category. For several years, a close-spaced 3 element tribander sat on top of a 40 foot tower in the backyard. This antenna had been rather a revelation compared to the 20 meter dipole it replaced. However, needs can change, and an increasing interest in DX and contesting suggested that upgrading the station would help some. An amplifier would have helped a lot, but our neighbors are quite close, and the possibility of t.v.i. encounters wasn't in the game plan. Consequently, the decision was made to install a better antenna. The extra performance in the receiving area would also be beneficial.

Antenna designers seem to agree that wide element spacing (longer booms) is the most important factor, with the number of elements coming in second. A glance at the literature shows that there are a variety of beams on the market that offer triband capability. These antennas have boom lengths ranging from 14 to 24 feet and between 3 and 6 elements. One might think that more elements would be universally better. Wrong. It seems that many antennas do not use all elements on all three bands. Typically, 20 meters is the band that gets shortchanged, while 10 and/or 15 meters may use all of the elements. It seemed to me that 20 meters was the most important band and that the antenna's elements were not available where they would do the most good. Therefore, having all elements active on all bands became the first consideration.

Another factor was the standing wave ratio offered by the various modes. S.w.r. curves typically show that as an antenna's overall performance increases, its bandwidth decreases. This fact generated a second requirement that the selected beam should provide as maximum frequency coverage as possible to avoid the necessity to use an antenna tuner (transmatch).

A review of all of the literature and advertisements that were on hand shows that both requirements could theoretically be met quite easily. TET-USA offers a variety of wide-spaced yagis with all elements active on all three bands. The dual-driven element approach results in full coverage of 20 meters and 15 meters, along with most of 10 meters, with an s.w.r. under 2:1. Wind loading considerations for my free-standing tower suggested that TET's 4 element (19'8" boom) HB43sp model would fit my needs. The manufacturer's literature for this model indicated a 10–11 dB gain along with good front-to-back ratios (22 dB). The power rating is set at the standard 2 kw

*132 Lydall St., Manchester, CT 06040

Close-up showing coaxial balun attached to the radiator with the phasing line (parallel tubing) in the background.

WB1GIF checks the block and tackle prior to lowering the tower to replace the beam and rotor.

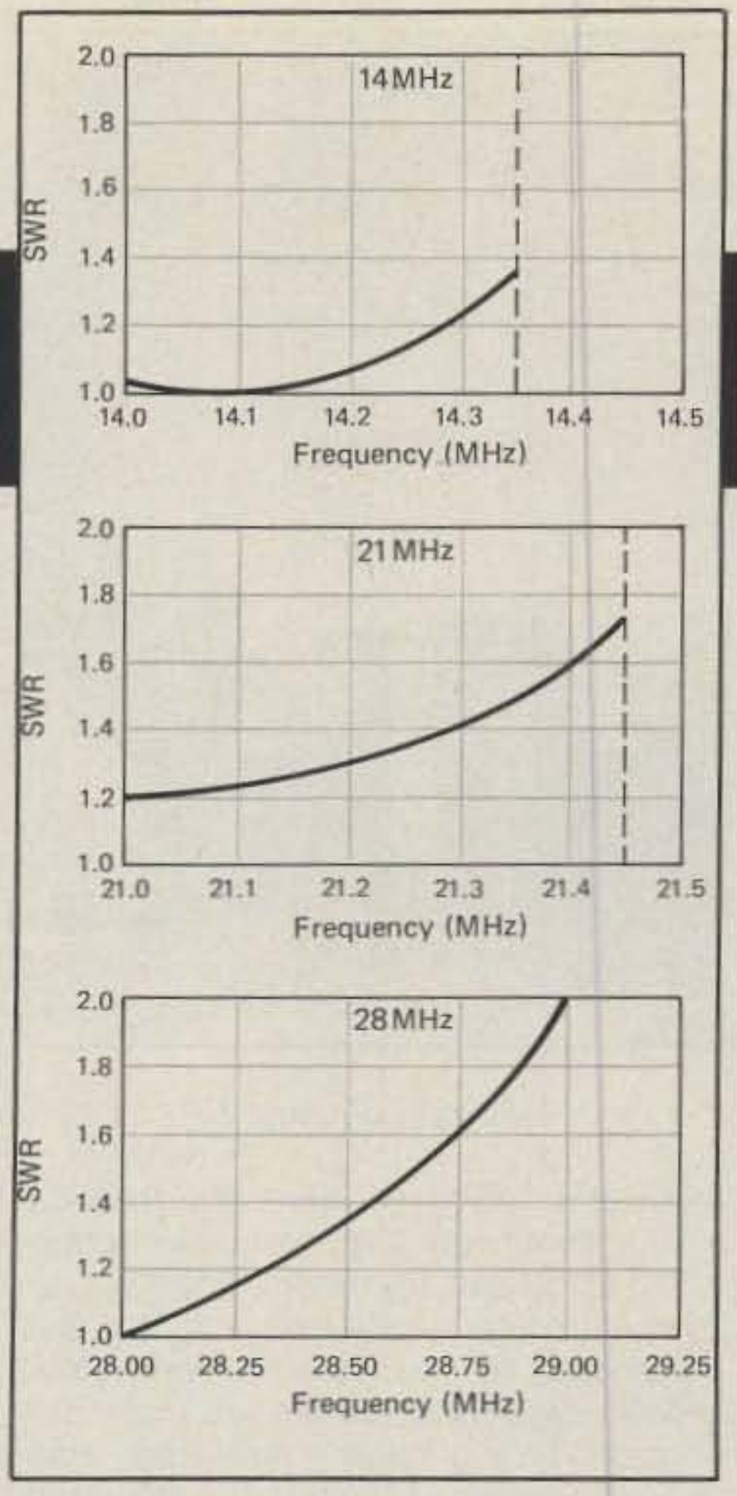
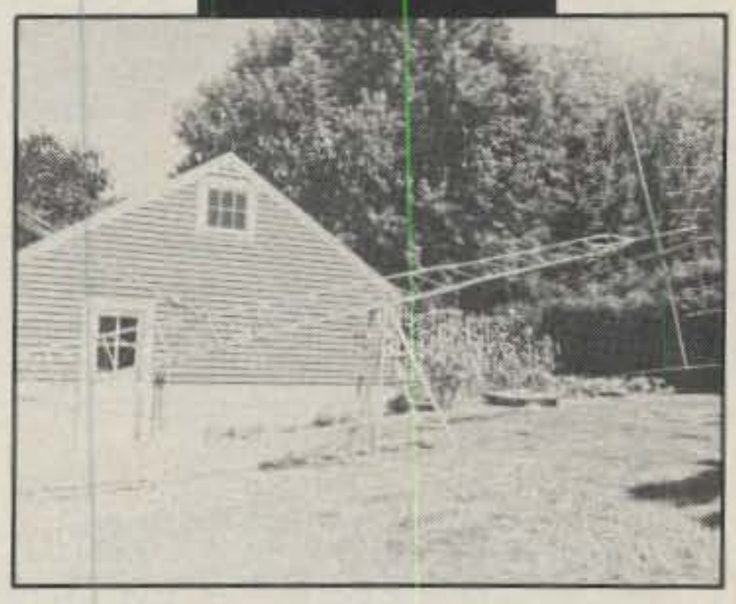


Fig. 1– S.w.r. curves plotted from data at the author's QTH.

Slowly now; I hope we unhooked the 80 meter vee at the top of the tower.



After the old yagi was removed, the new antenna was mounted onto the tower with its reflector just above the ground for initial s.w.r. checks. The 2 meter beam is a few feet above the new antenna.

p.e.p. level. The tubing is produced from the ubiquitous 6061-T6 aluminum alloy which offers a balance of strength and corrosion resistance. Stainless steel is used for all the electrical connections, while cadmium-plated steel was selected for the U-bolts and other mechanical hardware.

Almost as soon as UPS delivered the HB43sp, I was on the phone enlisting the help of several friends for the latest of our antenna parties. Saturday morning brought the arrival of some sleepy bodies that were woken up with a couple of cups of coffee as standard procedure. Afterwards, we went outside to examine the contents of the TET carton. As shown in the first photo, there are quite a number of parts involved. However, all of the tubing sections are identified as to which element they belong to. The assembly instructions presented a step-by-step procedure and several sketches that were generally quite satisfactory. Both English and metric dimensions are given.

Construction begins with assembly of the two driven elements (radiator and reflector). The highlights of this work are shown in the photo sequence. We coated the slip joints of each tubing section with a corrosion-inhibiting compound. Penetrox® or silicone greases work well and also ensure good electrical contact, as well as allowing the sections to be disassembled after being up in the weather.

All pieces fit together very well. The overall antenna assembly went along smoothly with one or two exceptions resulting from typographical errors in the instructions. The outermost sections of the reflector were listed as being longer after assembly than the total lengths of the sections themselves. A discrepancy was found in the lengths of two director sections presented in the bill of material. Both situations were brought to the manufacturer's attention, who indicated that appropriate corrections would be made.

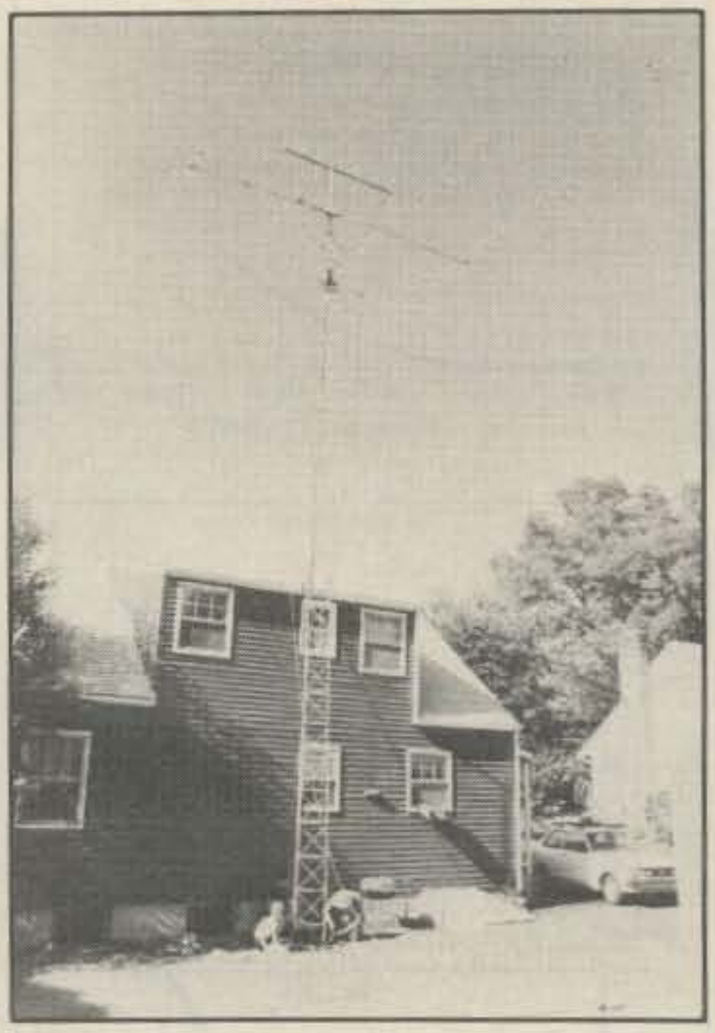
After the element assembly was completed, installation on the boom was straightforward. As mentioned earlier, both the radiator and reflector are driven. The phasing method for these elements consists of two lengths of ⅜ inch diameter tubing with a double-sided circuit board serving as the crossover. This phase shift board is located approximately midway between the two driven elements. The tubing is supported at each end of the 78 inch length. To prevent this tubing from swaying, *we added* a couple of ceramic spacers between the boom and the circuit board.

The antenna's 50 ohm impedance does allow it to be directly attached to the coaxial transmission line. However, this can result in current flowing on the outside of the braid and possible t.v.i. problems. Consequently, TET includes a 1:1 balun to prevent this situation. The balun is fabricated from coaxial cable similar to RG-8U. This approach eliminates the saturation problems that sometimes occur with toroidal ferrite baluns. Incidentally, since the input and output windings of a balun are connected together, an ohmmeter check across the two pigtail leads should show zero ohms (short). Because of this, the TET instructions call for checking the phasing line for unwanted shorts before attaching the balun. The balun is terminated in a PL259 which is attached to a

male-male (barrel) connector. A silicone sealant was applied to the phasing line connections to prevent moisture from seeping in. Likewise, the outermost ends of each element should also be sealed.

After the antenna was assembled, the tilt-over tower was lowered to the ground with the help of a block and tackle. The rotator was also being changed at this time. To ease installation, the rotator was the first to be installed into the tower. At first, we were surprised to find that the rotator brake would not disengage. However, it soon was apparent that this was simply due to the unit being horizontal. It worked fine after the tower was raised and the rotator was back in the usual vertical position.

The boom lengths of both the old and new antennas were such that they could be slipped in or out of the tower while standing on a 6 foot stepladder. Just before the tower was lowered, the antenna was rotated so that its reflector would be closest to the ground when the tower was tilted over. With this arrangement, preliminary s.w.r. measurements can be obtained to see if any major assembly errors were made. Consequently, the aggravation of repeatedly raising and lowering the tower to adjust the beam can be avoided. In our case, the reflector was about a foot or so above the ground, and a 7 element 2 meter yagi was located a few feet above the HB43sp on the same mast. S.w.r. measurements at the manufacturer's indicated resonant frequencies showed low s.w.r. readings (under 1.5:1) on 10 and 15 meters. The s.w.r. on 20 meters was a little over 2:1. This was considered to be in the ballpark, since ground capacitive effects are more pronounced on the lower frequencies. Having gained the confidence that the antenna was functioning properly, the tower was raised back into its original position.



Mission completed!

A quick run down to the shack showed that the s.w.r. readings had indeed come down now that the beam was some 43 feet up in the air. Readings across all three bands showed that all of 20 and 15 meters were covered, as well as a full MHz of 10 meters with an s.w.r. of under 2:1. This should be well received by those who have all solid state rigs, since these units typically have protection circuits that reduce power as the standing wave ratio climbs over about 2:1. The s.w.r. curves obtained for my installation are shown in fig. 1.

On-the-air performance of the antenna has been very encouraging. European signals are usually strong here on the east coast. However, a 90° (side lobe) or 180° (rear lobe) rotation attenuates them to the point that the S-meter no longer registers and copy becomes poor. This is a significant improvement relative to the previous three-element close-spaced yagi. Other observations indicated that the antenna's beamwidth is fairly narrow (about 50°) which also helps reduce QRM and helps out the forward gain.

All in all, the antenna has been performing very well, and I am looking forward to the upcoming contests. Now if I could convince my wife, Jan, that we need a bigger lot, I could get a bigger tower and the amplifier and . . .

(As a final note, I would like to thank George, KA1BMB, for his photography.)

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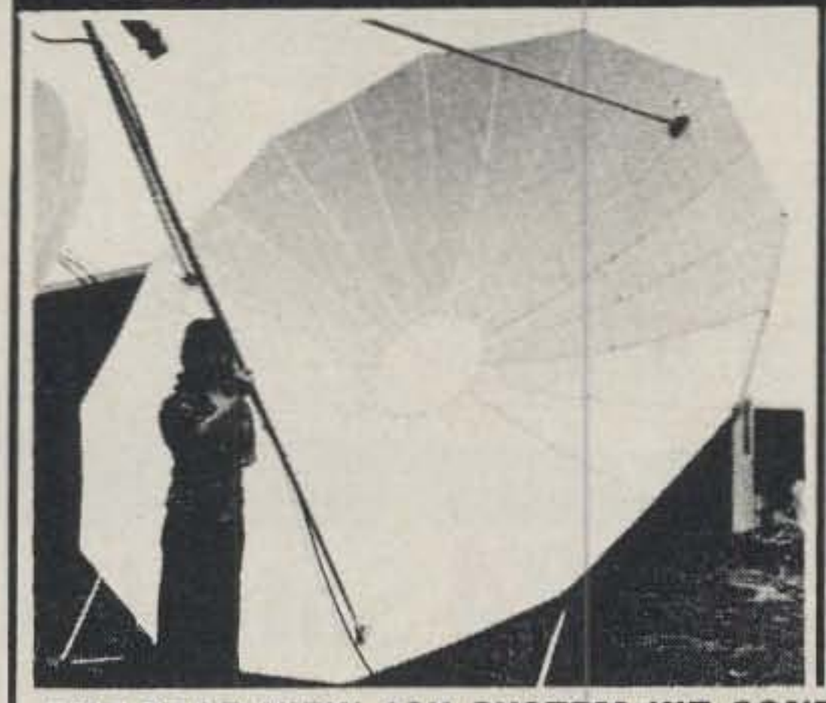

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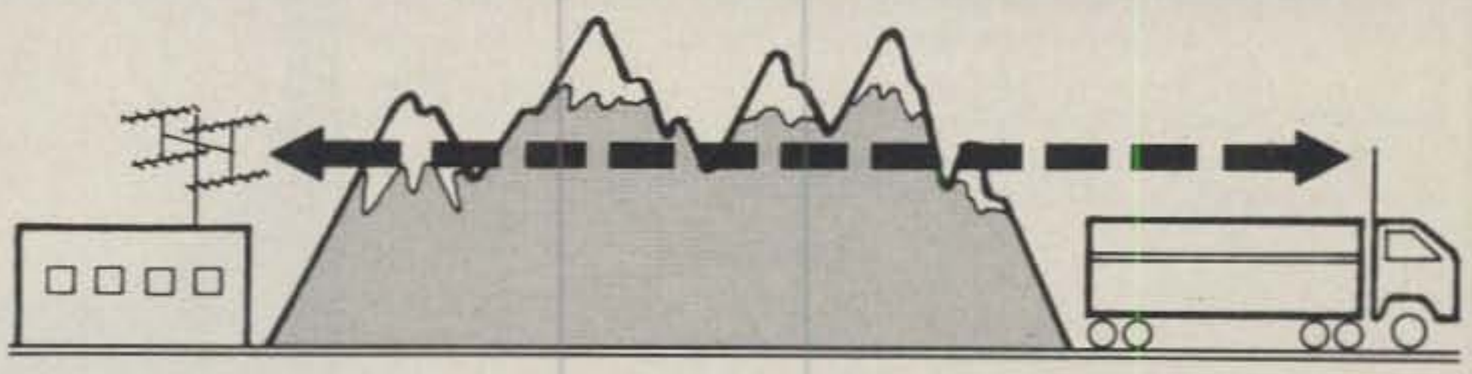

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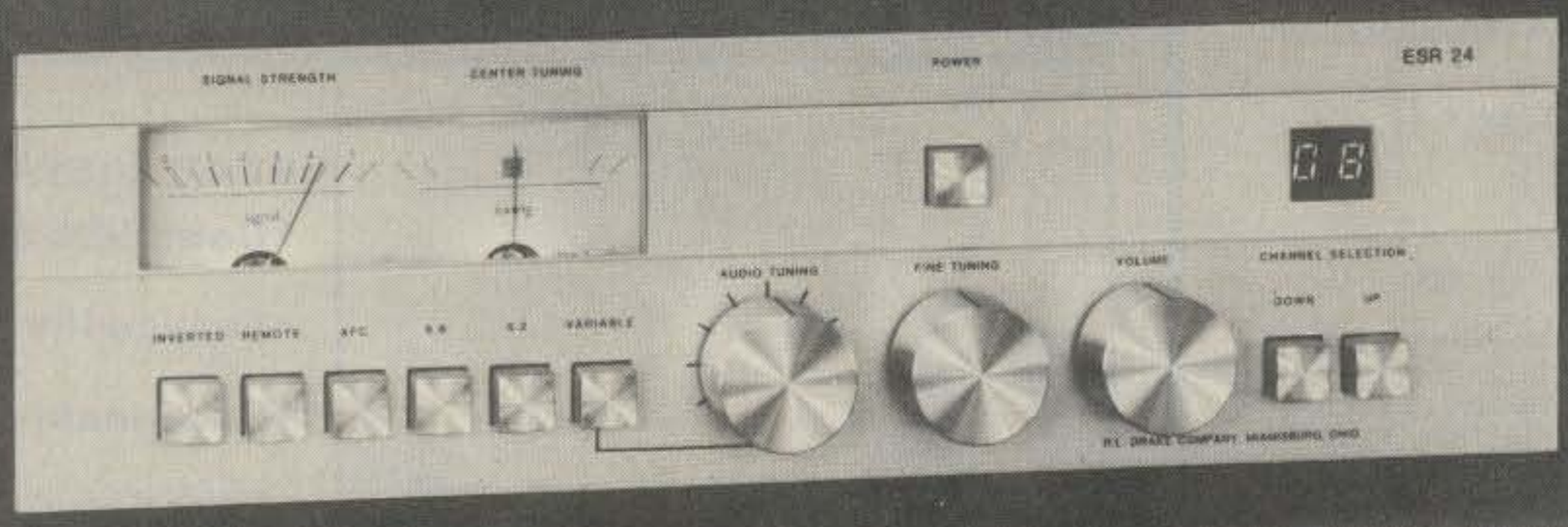

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MD-11B Specifications:

ANTENNA

Diameter	11' or 3.35m
Construction	12 panels, 18 ga. steel
Finish	Tan, zinc primer
Weight	225 pounds
Wind-operational	50 mph steady load
Survival	100 mph steady load
Temperature range	-60 to +125°
Frequency	3.7 to 4.2 GHz
VSWR	1.25 or less
Gain	41 dB
F/D Ratio	.44
1/2 power beamwidth	1.5°

MOUNT

Type	True polar, rotatable base
Construction	1/4" - 3/8" steel
Weight	300 pounds
Finish	Brown
Foundation	4 holes 6" × 4'
Azimuth Sweep	91°
Elevation	66°

MISCELLANEOUS

Total shipping weight	660 pounds
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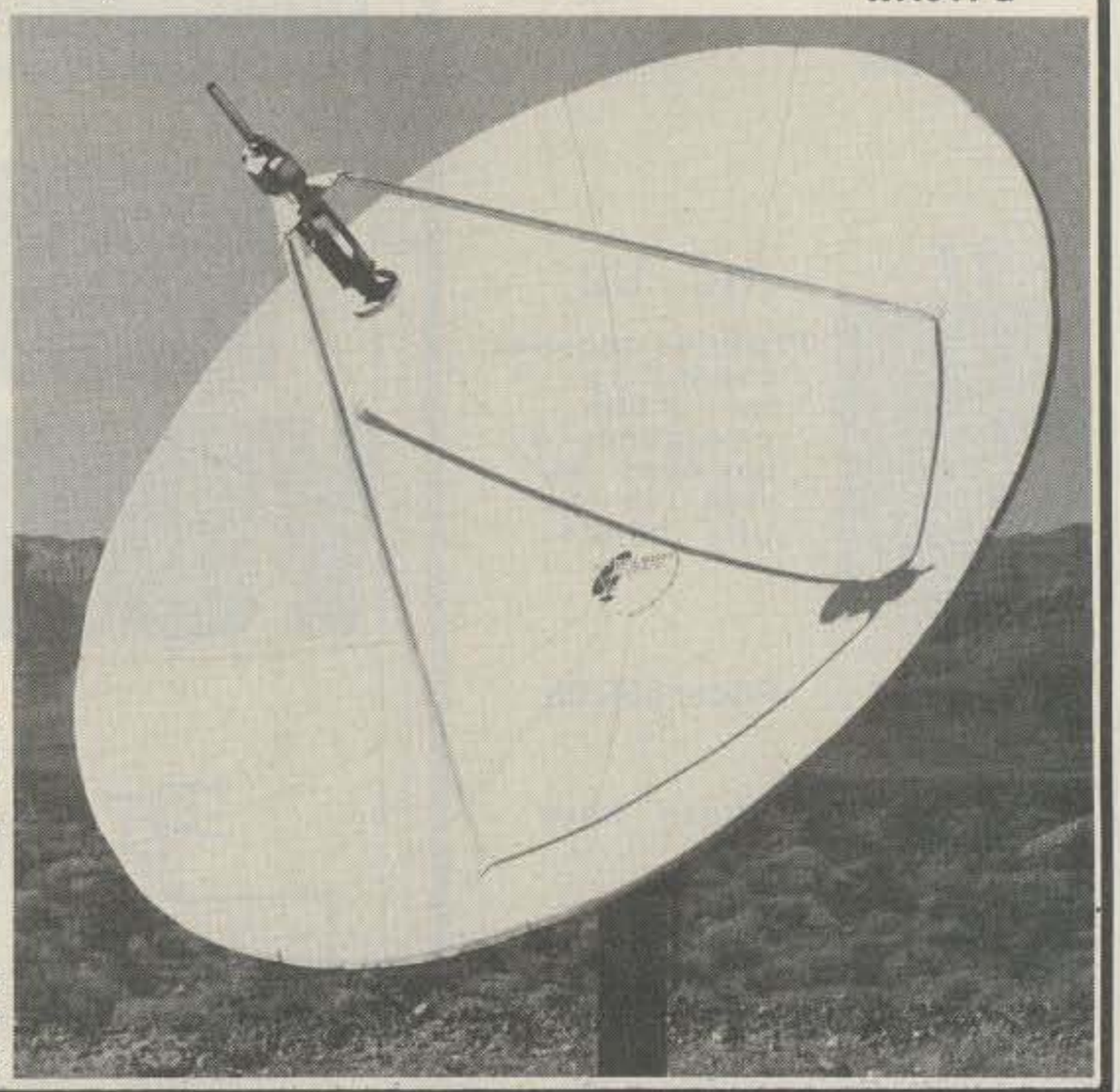
Warranty	6 months



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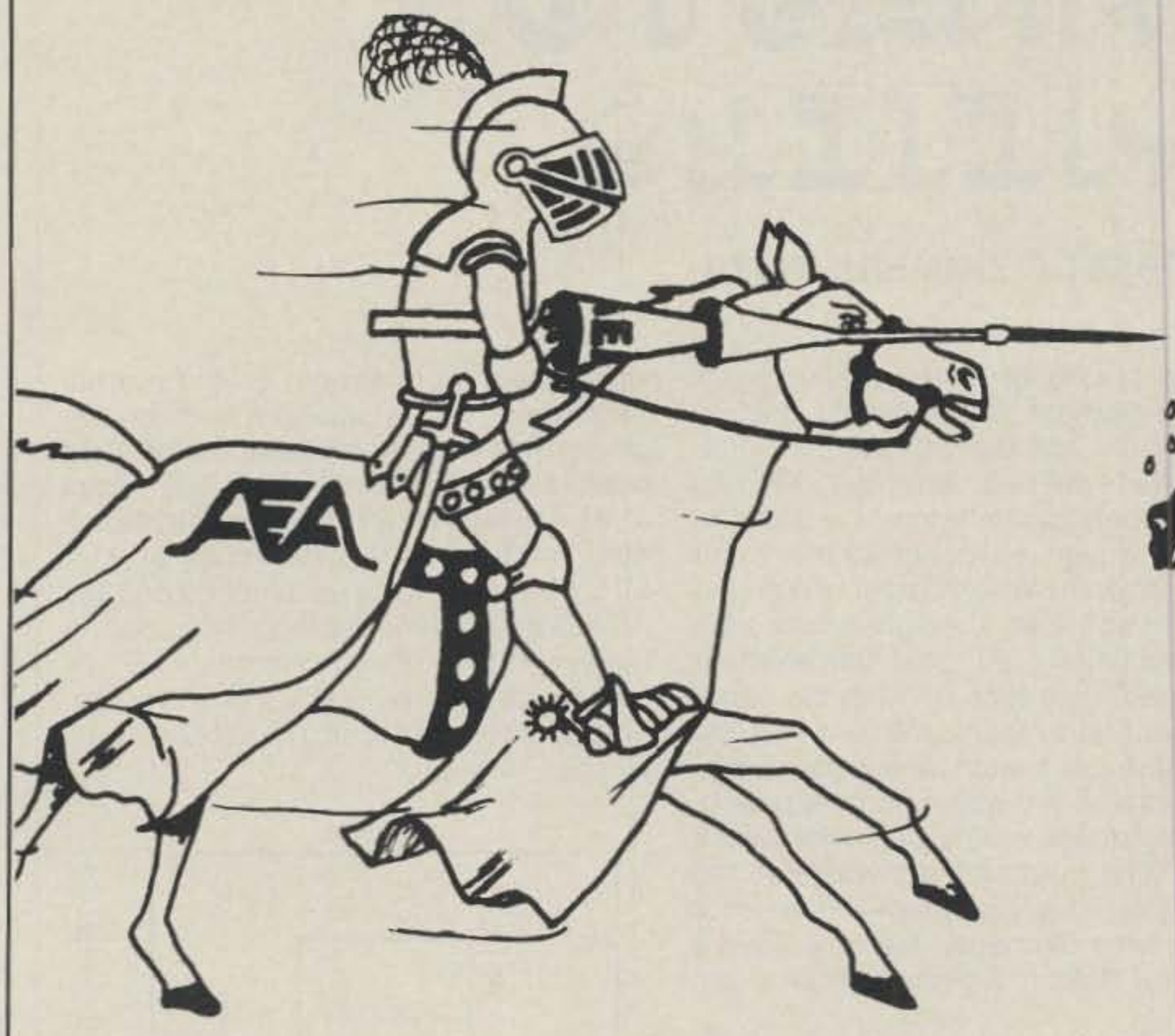

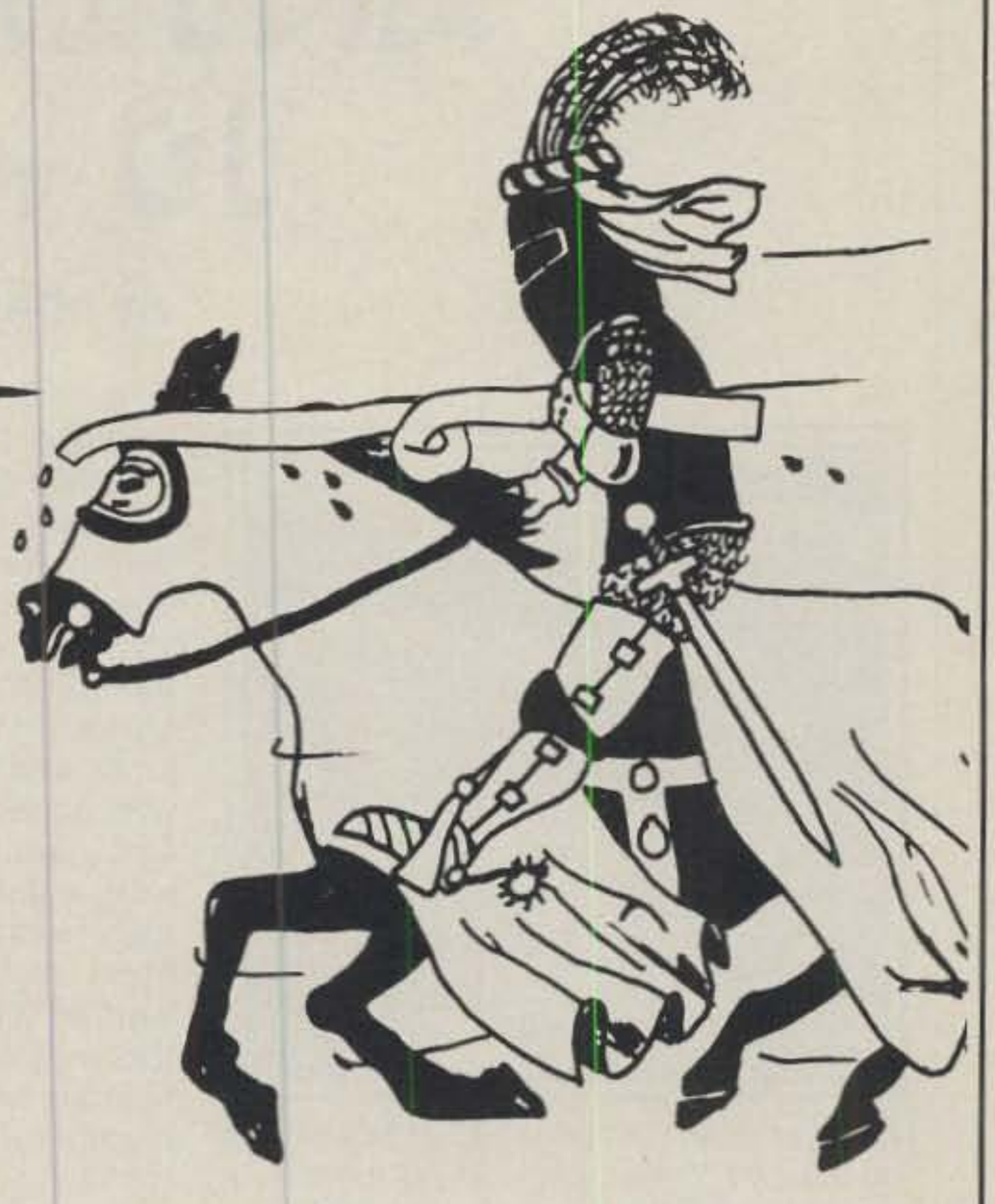

It sounds ridiculous..doesn't it? Amateur Radio advertising is not exempt from exaggeration. When facts are distorted by fabrication you may be induced to buy a product that ultimately is incapable of meeting the performance claimed by the manufacturer. Caveat Emptor (buyer beware)!

The **AEA IsoPole™** antenna has 3 db gain over a dipole in free space. This is an honest and supportable claim. Yet other manufacturers claim as much as a 7 db gain for their antennas using no reference standard or a 1/4 wave antenna as reference. The 1/4 wave is not a recognized reference used by **reputable** antenna engineers because it is most difficult to properly decouple in a repeatable fashion.

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In the meantime, we would like to expose you to some of the comments we have received from customers that are using the **IsoPole**.

Seattle, WA — Compact & easy to install, quality & keeps XYL happy -looks good!!

Half Moon Bay, CA — Found repeaters I only heard about before from my QTH — Excellent. Amazed at light weight and low cost...

Sturgis, SD — The Isopole Antenna has exceeded my expectations.

Lumberton, NC — You really do what you say! The best 2 mtr. antenna I have ever owned!

La Habra, CA — Hooked up today, and it was a perfect match throughout the entire band. For the money, you can not go wrong.

Tok, AK — Truly a fine antenna, working better than the five element yagi it replaced.

Sacramento, CA — Assembly was remarkably easy. I needed an efficient, low profile antenna & your product fit the bill to a "T".

Warsaw, IND — AMAZED!!! Antenna ground mounted on required mast & outperforming a (R.R.) at 55' on top of tower.

Loris, SC — I'm a commercial radio salesman, and the Isopole is THE antenna I recommend.

Seattle, WA — Works well — excellent. Had (R.R.) at 80'. With the Isopole at 20 ft. I now hear repeaters and simplex I never heard with (R.R.) The Isopole will soon be at 80'.

Freehold, NJ — It is everything your ad says and more.

Great Neck, NY — Amazing difference between (R.R.), 10 db or better, raise rept. never heard before — SUPER, 73 and thanks.

Richfield, OH — Works extremely well, broke a repeater at 100 mi using 150 mw !

Vernon, TX — (The dealer) said the antenna WAS THE BEST ON MARKET and I AGREE! It IS AN EXCELLENT antenna & works to specs -Thanks.

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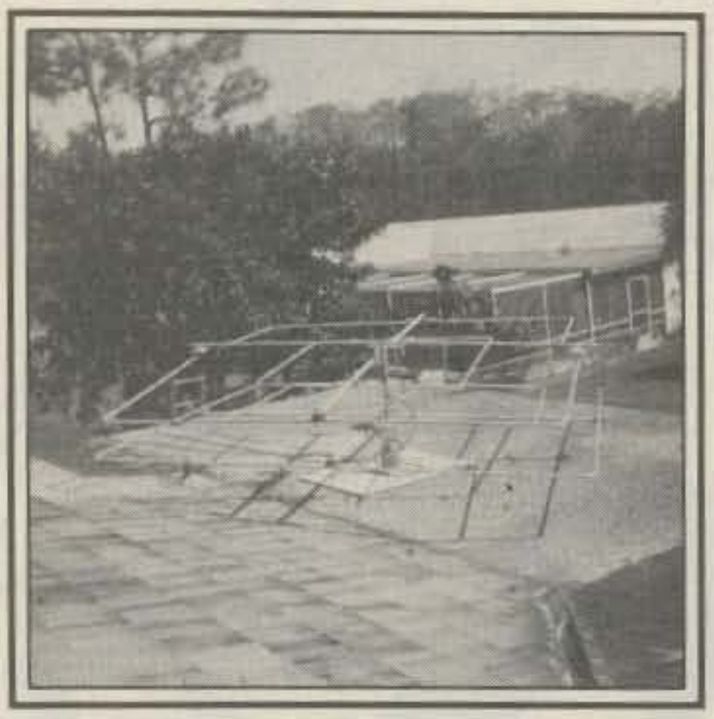
BY ROBERT F. ZIMMER*, K4JZB



The first antenna consisted of 3 elements on 15 and 2 elements on 20 meters. It makes a low profile to the roof.

After moving into a home in a city that forbid any antennas (including TV), the urge to get back on the air became overwhelming. As a result, a vertical antenna was installed in a tree next to the house, and many contacts were made on 21 MHz, c.w. and phone. However, as my real love is working DX, I found I needed a beam to really work the new ones. This presented a real dilemma, as the powers that be would certainly threaten court action if any antenna was discovered. After checking with the neighbors, it was determined that I could possibly mount a small beam on the flat patio roof, as long as the antenna was not over 14 feet high.

Planning began, and the half-wave square loop was constructed, and a semi-square reflector and director was added to it (see fig. 1). It made a very compact beam and worked quite well; over 150 countries were worked with it with only 200 watts PEP input.

It was evident, however, that long-haul DX was not being worked. I simply was not getting the low angle of radiation needed for DX at this low antenna height. More research was indicated, and after securing a load of aluminum tubing, a normal 3-element Yagi was built. It worked well, but I felt that something a little better was needed, so after reading about log-periodic antennas, I decided to try more driven elements in the same band. That did it! When the second driven element was added, the signals took a big jump, and when the third driven element was added, they took another big jump. Since the first antenna element was fed with a gamma match, the second element was also fed with a gamma match, only out of phase as used in the log, and it worked. The third element was also fed this way, and it worked also—no need for split antenna elements. We now have a plumber's delight log-periodic type antenna.

About now I wanted to try tilting the elements forward 30° to 40°, so back to the workbench! As the work progressed, I first tried the effect on a 3-element beam and found that the gain increased, the horizontal beam width decreased, and the front-to-side and front-to-back ratios increased (see fig. 2). This indicated that folding the elements 40° forward is a very worthwhile improvement on the normal Yagi beam. Upon adding the other two driven elements, I now have the finished beam. Driven element No. 1 is 266 inches at 21.4 MHz, No. 2 is 268 inches at 21.2 MHz, and No. 3 is 270 inches at 21.0 MHz. The director is 252 inches and the reflector is 288 inches long. The spacing between the driven elements is 24 inches, director to first DE is 52 inches, and reflector to DE is 78 inches, which

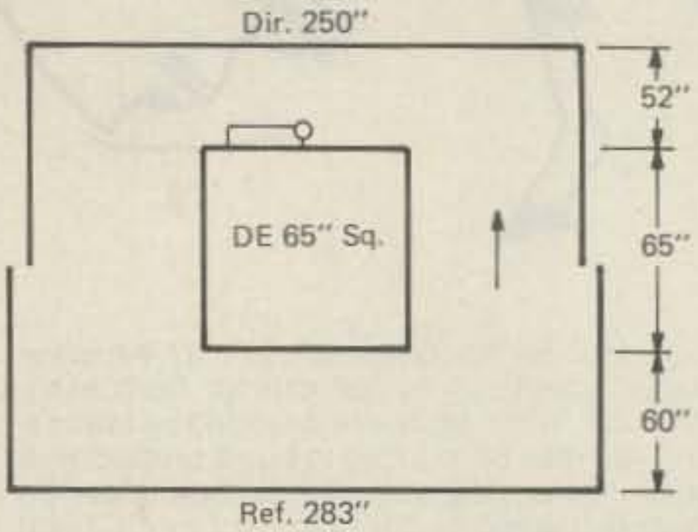
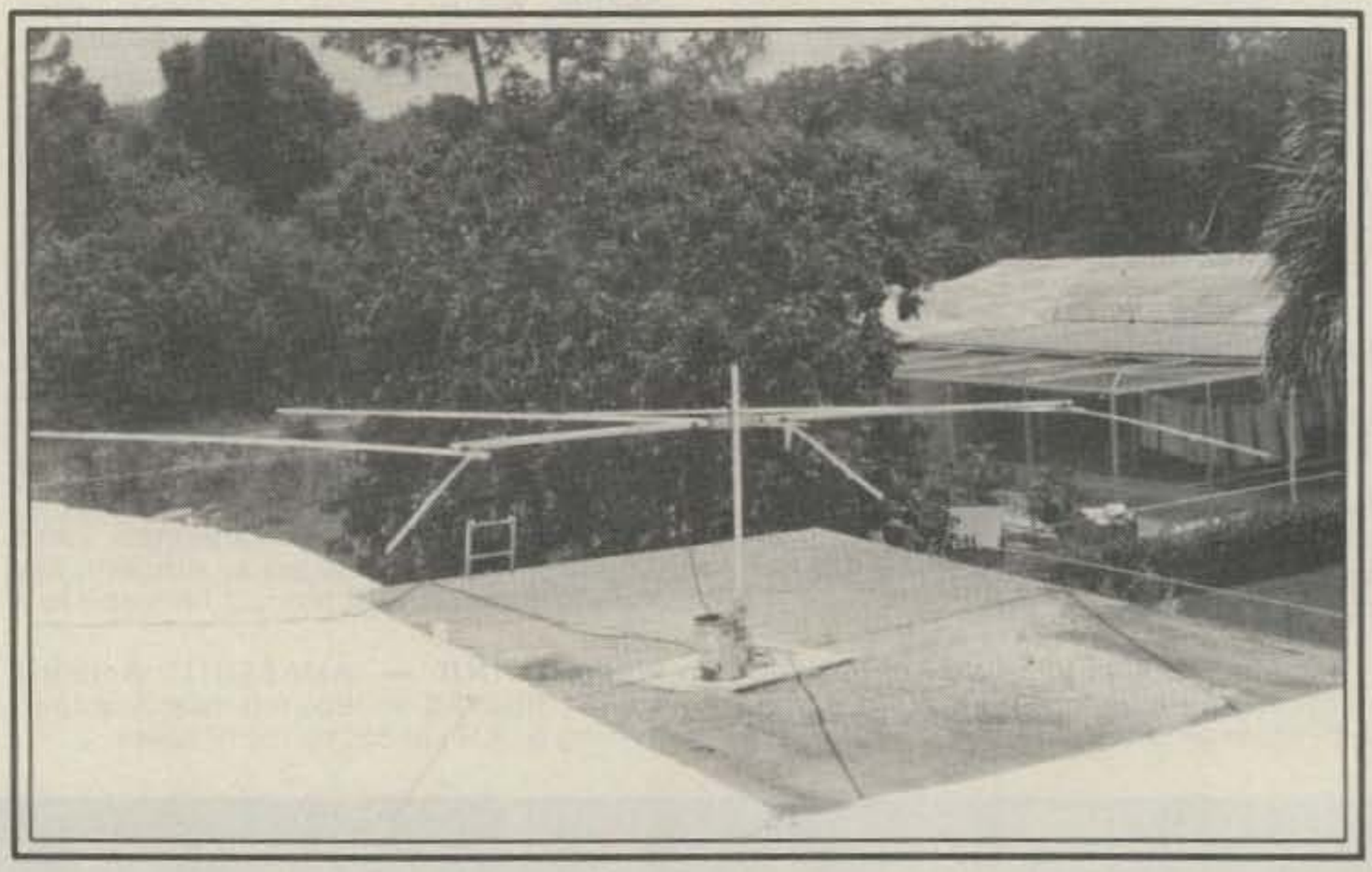


Fig. 1– A half-wave square loop with semi-square reflector and director.



The second antenna features 3 elements on 15 meters at a height of 14 feet. Elements are swept forward at a 40° angle.

*P.O. Box 232, Land O'Lakes, FL 33539

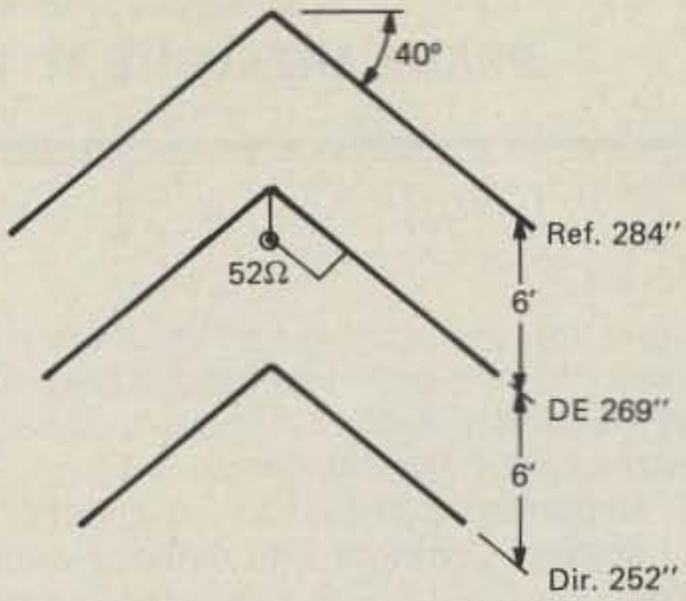


Fig. 2– By tilting the elements forward, gain as well as front-to-back and front-to-side ratios increased. Horizontal beam width decreased.

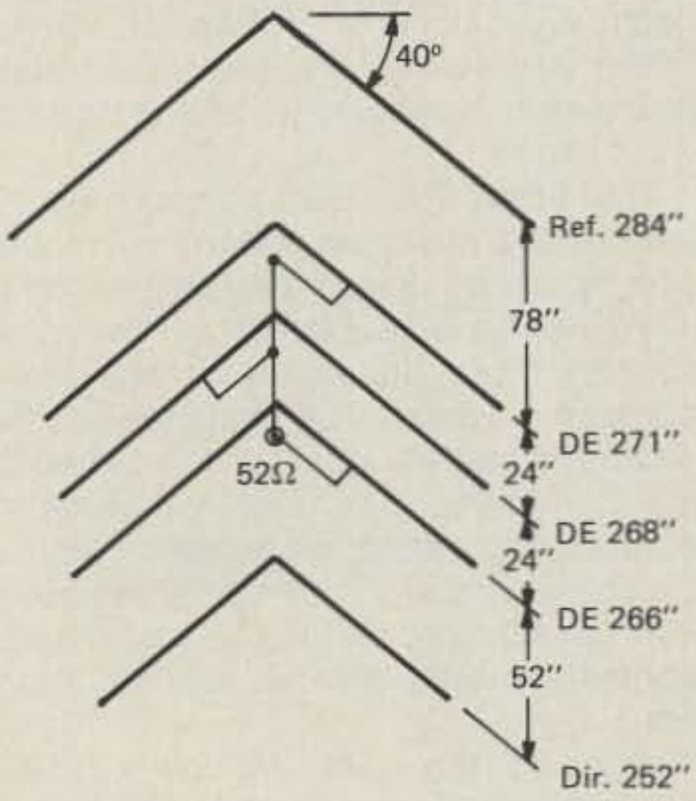


Fig. 3– The completed 5-element beam plan as evolved from experimentation.

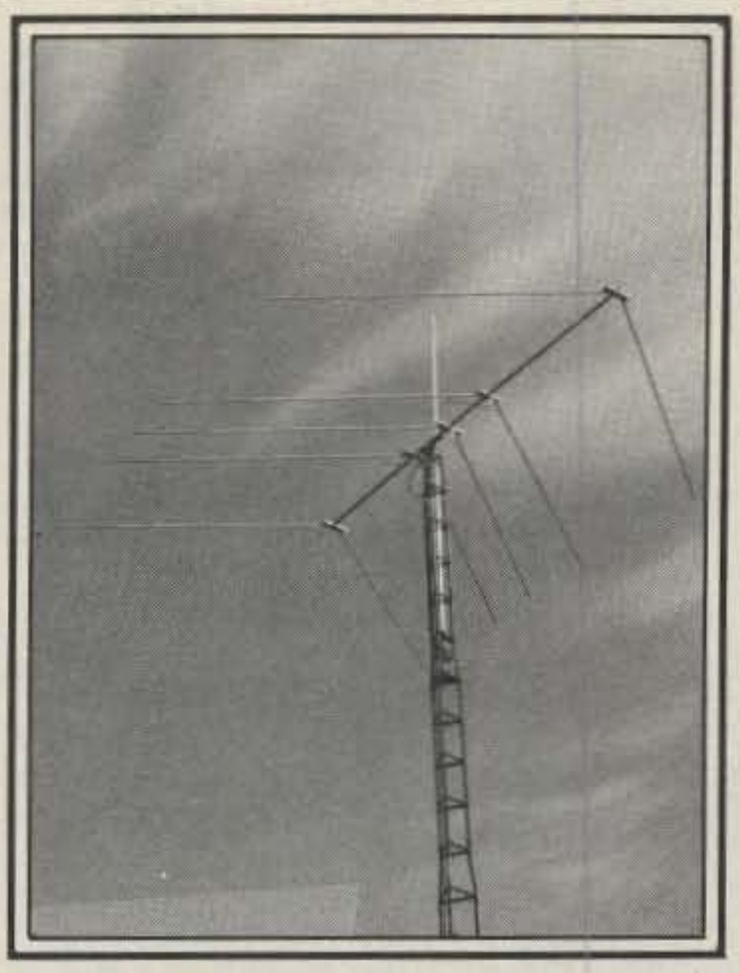
puts a 5-element beam on a 15 foot boom (see fig. 3).

I also tried three reflectors: one 2 feet above the normal one, and one 2 feet below it. The front-to-back ratio was so great that an S-9 signal off the front could not be copied off the back. It was not used in the final antenna because of construction problems, and it made net operation impossible.

Results

With the antena at a 14 foot height, I could now work anything on the band. Reports of loudest signal on the band to the only "W" coming through were common.

After using this antenna for over two years, I moved to my present location, which is a 10½ acre farm. The same antenna is now installed on a 50 foot tower. The results are fantastic, and many reports of pegging the "S" meter are received. Pile-ups are no problem now. As I cannot measure the gain accurately, I can only report what my "S" meter shows. At times I note gain of 15–17 dB, but on long haul it seems to go as high as 25 dB.



The final version as shown in fig. 3 now sits atop my 50 foot tower and has 5 elements on 15 meters.

If this antenna is built as described, don't be too surprised to find that it loads up on 28 MHz and 14 MHz, and one can work DX through pile-ups on these bands also.

One might gather that I am completely sold on this type antenna, and I hope that this article will spark other builders to try it and report their results to me. CQ

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Din Hoogma, PA0DIN, and yours truly in front of the American Hotel in Amsterdam after a most enjoyable meeting.

The first week of October was a very busy one for me. I had a fantastic visit to the Netherlands. Got to meet Din Hoogma, PA0DIN, who made the two-hour trip from Nijmegen to Amsterdam to see me. We had a most enjoyable meeting. Din writes the "Traffic Nieuws" column in *Electron*, the VERNON magazine, so we had something in common. Didn't get to see any of the other PA0's. Those I tried to contact were not available during my very busy schedule.

This was not just a routine visit to the Netherlands, but a well-organized program sponsored by a group of Dutch business and government representatives, promoting U.S. and Dutch relations in celebration of 200 years of diplomatic and trade relations between the two countries. I was very fortunate to be one of 50 winners from the New York metropolitan area. The contest, entitled the "Incredible Dutch Experience," required a short, 50-word essay on "Why I want to go to the Netherlands." Having contacted many PA0's, but never actually having visited the country, it was quite obvious what the subject of my winning essay was all about.

There was a total of 325 winners from all areas of the U.S., plus the additional 325 guests, and an additional 350 picked at large—1,000 guests of the Dutch government and KLM airlines.

We received a royal welcome wherever we went. We were divided into 8 to 10 groups and taken to different sections of the country. Our group was assigned to the northern-most province of Groningen in which we visited half a dozen or more communities which we found most interesting, since we got to see the real Netherlands; windmills, canals, dairy farms, and areas dating back to the 15th century. Coming back to Amsterdam, the last few days were spent visiting museums, night clubs, the beautiful Floriade flower show, the Heineken party, and finally a gala farewell reception and party hosted by Her Majesty Queen Beatrix.

Unfortunately, my wife, Anne, was unable to make the trip, but my son Joe took a week off and had a ball. I shall always have fond memories of the friendly Dutch, the knowledgeable (and pretty) hostesses assigned as our guides, and our own stateside companions who shared the "Incredible Dutch Experience" with me. Next month I should be back to normal and be able to write about radio matters. Hi!

Deadline for material for the April issue is January 15th, and February 15th for the May issue. Please send all announcements to my home address.

73 for this time, Frank, W1WY

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	Jan. 1-	Dec. 31	U.B.A. SWL Competition
	Jan.	8&9	"73" 40 & 80 Meter Phone
	Jan.	8-10	ZERO District QSO Party
	Jan.	15	WCY Activity Contest
	Jan.	15-16	"Hunting Lions" QSO Party
	Jan.	15-16	Michigan QRP C.W. Contest
	Jan.	15-16	"73" 160 Meter Phone
	Jan.	15-16	AGCW-DL QRP C.W. Contest
	Jan.	22-23	Texas QSO Party
	Jan.	22-23	North Dakota QSO Party
	Jan.	**28-30**	**CQ WW 160 Meter C.W. Contest**
	Jan.	29-30	White Rose SWL Contest
†	Jan.	29-30	French C.W. Contest
	Jan.	30-31	Classic Radio Exchange
	Feb.	5-6	RSGB 7 MHz Phone Contest
	Feb.	5-6	South Carolina QSO Party
	Feb.	12-13	QCWA C.W. QSO Party
	Feb.	12-13	YL-OM Phone Contest
	Feb.	12-13	Dutch PACC Contest
	Feb.	19-20	ARRL DX C.W. Contest
	Feb.	19-20	YL ISSB Phone QSO Party
	Feb.	26	"73" RTTY Contest
	Feb.	26-27	RSGB 7 MHz C.W. Contest
	Feb.	**26-27**	**CQ WW 160 M. S.S.B. Contest**
	Feb.	26-27	YL-OM C.W. Contest
†	Feb.	26-27	French Phone Contest
	Mar.	5-6	ARRL DX Phone Contest
	Mar.	12-13	QCWA Phone QSO Party
	Mar.	12-13	YL ISSB C.W. QSO Party
	Mar.	**26-27**	**CQ WW WPX S.S.B. Contest**
	Apr.	6-7	DX-YL to NA-YL CW Party
	Apr.	9-10	CARF Commonwealth S.S.B. Contest
	Apr.	13-14	DX-YL to NA-YL Phone Party

** Covered last month.*
† Not official.

CQ World Wide 160 Meter Contest

C.W.: Jan. 28–30 S.S.B.: Feb. 25–27
Starts: 2200 GMT Friday
Ends: 1600 GMT Sunday

Complete rules will be found in the December issue. Again, I advise that you review the new scoring format which is a modified version of that used in previous years, and the QSO number has been eliminated in the Exchange.

Repeating the new scoring system:

Scoring: Contacts with stations within own country, 2 points. Contacts with stations in other countries but in the same continent, 5 points. Contacts with stations in other continents, 10 points. (KH6 and KL7 are considered countries.)

Multiplier: Each U.S. state, VE province, and DX country. (U.S. and Canada are not country multipliers for W/K or VE/VO. There are three VE1 provinces: New Brunswick, Nova Scotia, and Prince Edward Island.)

Final Score: Total QSO points times the sum of the multiplier. (Maritime mobile scoring will be determined by location.)

We hope the new format will make the scoring more equitable for worldwide competition and will be acceptable to the writers of many suggestions received by the Committee. There will be some inequities that cannot be avoided due to a lack of 160 activity in certain areas. However, worldwide, and this is a worldwide contest, scores should now be more equalized.

Keeping the "DX Window" (1825–1830 kHz) clear of U.S. and VE activity is still a must. Operating on the edge of 1825 and 1830 should also be avoided now that U.S. stations are allowed a full kw input. Remember, some of the overseas stations are limited to 10 watts.

As I have previously suggested, extending the Window to 1835 kHz might not be a bad idea rather than having a second Window higher in the band to accommodate certain Europeans who are not allowed below 1830 kHz.

Mailing deadline for c.w. entries is Feb. 28th, and Mar. 31st for the s.s.b. section. Logs can be sent to Don McClenon,

Transportation facilities in the Netherlands are very modern and efficient, but this is what greeted us to take us from the hotel to the railroad station in Gorningen for our trip back to Amsterdam.

N4IN, 3075 Florida Ave., Melbourne, FL 32901, or to *CQ* 160 Meter Contest, 76 North Broadway, Hicksville, NY 11801. *(Please indicate c.w. or s.s.b. on the envelope.)*

"73" 40 & 80 S.S.B. Contest

40 Meter: Saturday, January 8
80 Meter: Sunday, January 9
0000Z to 2400Z each day

This is the second time around for both contests. Each band is treated as a separate contest and requires separate entries.

There are two classes: single operator and multi-operator single transmitter. Single operator stations are limited to 16 hours of operation. Multi-operator stations can operate the full 24 hours. Off periods must be no less than 30 minutes each and must be indicated on your log and summary sheets.

Exchange: RS and QTH. State, province, or territory for U.S. and Canada; country for DX (including KH6 and KL7).

Points: One point per contact made within the continental U.S. and Canada, or within own country. Two points for all other contacts.

Multiplier: One for each U.S. state (48), each Canadian prov./terr. (13), and each DX country worked.

Final Score: Total QSO points times the total multiplier points.

Awards: Awards will be issued to the winners in each class, in each U.S. state, Canadian province/territory, and each DX country. (A minimum of 5 hours and 50 QSO's are required to be eligible.)

Duplicate contacts in excess of 2% of the final score and other infractions are considered grounds for disqualification. Include a dupe and summary sheet and the usual signed declaration.

Entry forms are available by sending a large s.a.s.e. to the address below. Mailing deadline for contest entries is February 12th to: Billy E. Maddox, 468 Century Vista Dr., Arnold, MD 21012. (Indicate 40 or 80 Meter Contest on envelope.)

ZERO District QSO Party

Starts: 2000Z Sat., Jan. 8
Ends: 0200Z Mon., Jan. 10

This year's party is again being sponsored by the Mississippi Valley Radio Club. The Zero District covers a lot of territory, so a lot of activity can be expected, hopefully from some of the rare counties.

Stations outside the Zero District may work Zero stations only, but Zeros may work both in and out of district stations. The same station may be worked once on each band and mode, and mobiles in each county change.

Exchange: RS(T) and QTH. ARRL section and county for Zeros, ARRL section only for others.

Scoring: *For Zeros*—Total QSO's multiplied by (Zero counties + ARRL sections + DX countries) worked.

For others—Total QSOs multiplied by Zero counties worked.

Frequencies: C.W.—3560, 7060, 14060, 21060, 28060. S.S.B.—3900, 7270, 14300, 21370, 28570. Novice—3725, 7125, 21125, 28125.

Awards: Certificates will be issued to all entrants who submit a log and include an s.a.s.e. Endorsements will be given for high score in each ARRL section, DX country, and Novice/Tech. class.

Mailing deadline is February 15th to: Mississippi Valley Radio Club, WØSI, 3518 W. Columbia, Davenport, IA 52804. Log forms and a copy of the results are available for s.a.s.e.'s.

"Hunting Lions" QSO Party

Starts: 1200 GMT Sat., Jan. 15
Ends: 1200 GMT Sun., Jan. 16

Sponsored by Lions International and coordinated by the Lion Club of Rio de Janeiro, Brazil, this activity is between Lions and non-members. The objective: "to create and foster a spirit of international understanding and cooperation" among Lions and amateur radio operators.

Exchange: Call, QSO no., and RS(T). Lions or Leos will also include club name.

The same station may be contacted once on each band, 10 through 80 meters, both phone and c.w., but each mode is scored separately.

Scoring: One point for contacts between stations within the same continent, 3 points if between different continents. There is a bonus of 1 additional point if QSO is with a member of a Lion or Leo club, and 5 extra points if you contact a member of the Rio de Janeiro Arpoador Club.

Total QSO points is your score.

Awards: Will be made for both phone and c.w. A Trophy for 1st, 2nd, and 3rd place. There are also plaques for the 4th through 10th places. Each participant will receive a certificate.

It is suggested that you write to Lions International, Att: Robert Cywinski, 300 22nd Street, Oak Brook, IL 60570, or the Arpoador Club for additional information.

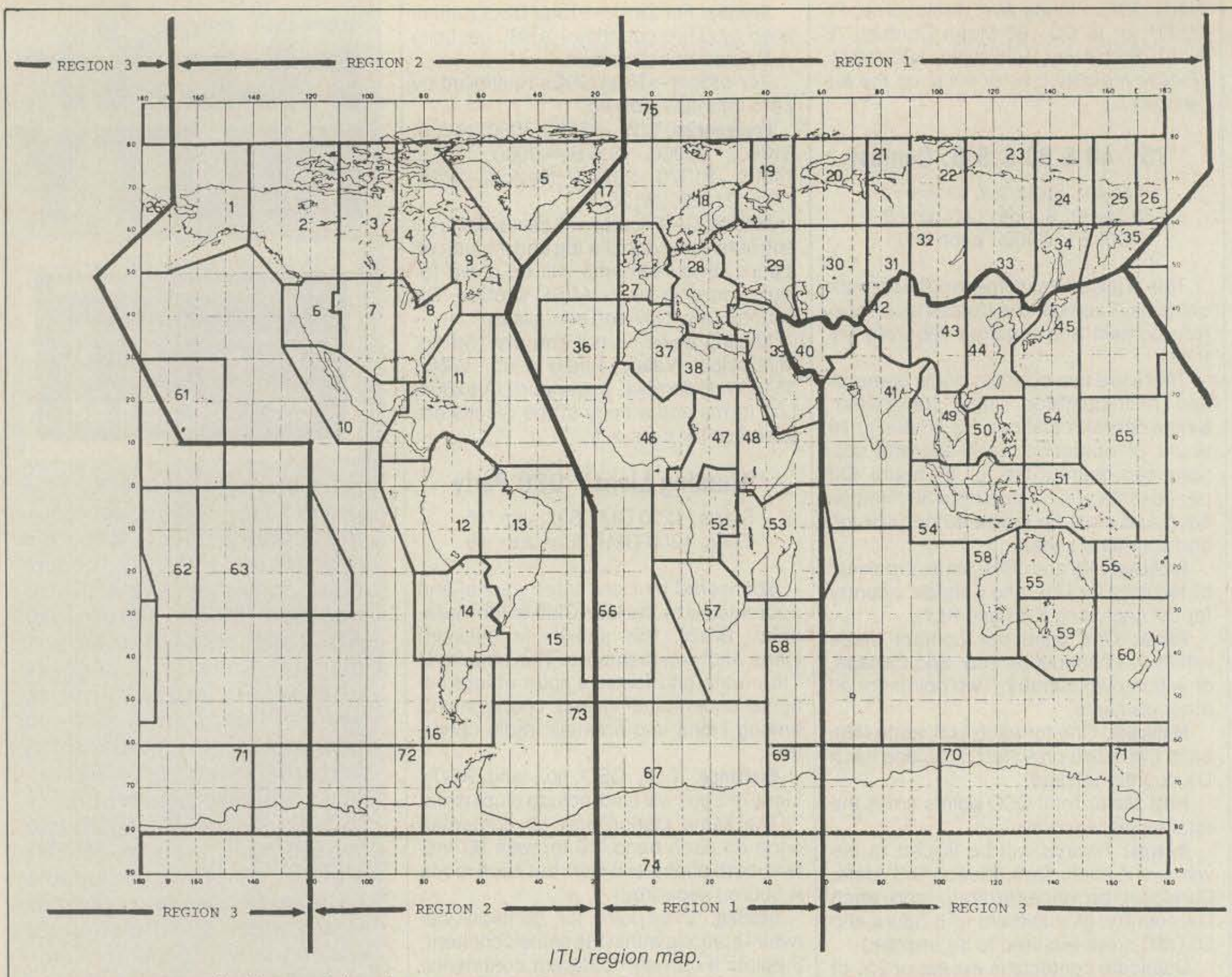
Logs must be submitted no later than 30 days after the end of the party to: Lion Club of Rio de Janeiro Arpoador, Rua Souza Lima 149, Apt. 402, Rio de Janeiro 22081, Brazil.

World Communication Year Activity

0001 to 2400 UTC Sat., Jan. 15

To support the resolution made by the United Nations General Assembly proclaiming 1983 as World Communication Year, The Potomac Valley Radio Club is sponsoring this activity.

The object of the contest is to contact



ITU region map.

other amateurs worldwide on all bands, 1.8 MHz to 275 GHz, including the new 10, 18, and 24 MHz bands.

Categories: Single operator and multi-operator, single transmitter and mixed modes.

Exchange: Your ITU Region and ITU Zone (i.e., DL1AA 128, W1AA 208, JA1AA 345).

Points: Contacts within own Zone, 1 point. Own Region but other Zones, 2 points. Outside own Region, 4 points.

Multiplier: ITU Zones worked on each band.

Final Score: Total QSO points from all bands times the total Zones worked on each band.

An s.a.s.e. or one IRC to the PVRC address listed below will get you an ITU/Region map and list of country prefixes.

The same station may be worked once on each band and each mode (phone including SSTV and c.w. including RTTY).

Make up your own log forms with separate columns for the QSO points and Zone multiplier. Dupe sheets are required if more than 200 QSO's are made on any band. A summary sheet is also requested. Show the scoring per band, Region, Zone, name and address in block letters, and other essential information, including equipment description.

Penalties: There will be a penalty of 8 points for each duplicate QSO or miscopied call removed from the log by the Committee. Entries with a reduction of more than 2% in the overall score will be disqualified.

Awards: Plaques to the top scorers in each category in each of the three Regions, and certificates in each of the 75 ITU Zones. Additional certificates to u.h.f./microwave stations.

Mailing deadline for all entries is February 28th to: Potomac Valley Radio Club, P.O. Box 337, Crownsville, MD 21032 USA.

Michigan QRP Club C.W. Contest

1500Z Sat. to 1500Z Sun., Jan. 15–16

This is the third annual contest sponsored by the Michigan QRP Club. It's a c.w.-only affair on all six bands, 160–10 meters.

Each station will compete within own U.S. state, VE province or DX country in one of three categories: (1) 1 watt or less output; (2) 5 watts or less output; (3) over 5 watts output.

Exchange: RST, QSO no., and power output. *(I would suggest that the QTH also be included—ed.)*

Scoring: Each contact is worth 1 QSO point. Multiply total QSO points from all bands by number of states, provinces, and DX countries worked per band for final score.

There is also a bonus multiplier of 1.5 times the final score if emergency power supply is used (generator or battery supply).

Awards: Certificates to the highest scorers in each category, in each state, province, and country.

Use a separate log sheet for each band, a summary sheet showing the scoring, equipment used, and power output, and your name and address in block letters.

Entries must be received no later than 6 weeks after the end of the contest. Include a large s.a.s.e. (or 2 IRC's) if results are desired. They go to: Michigan QRP Club, Contest Manager, 281 Crescent Drive, Portland, MI 48875.

"73" 160 Meter S.S.B. Contest

0000Z Sat. to 2400Z Sun., Jan. 15–16

This is the fourth annual top band activ-

Table of prefix verses ITU Region-Zone:

A2	157	HB,HB0	128	OK	128	VE6,7	202			17 July 1982	
A3	362	HC,HC8	212	ON	127	VE8	202-	ZK2	362		
A4	139	HH, HI	211	OX, XP	205		204	ZL	360		
A5	341	HK1-9	212	OY, OZ	118	VE8	275	ZM	362		
A6,7,9	139	HK0:		P2	351	VK1,2,3,	359	ZP	214		
AP	341	Malpelo	212	PA	127	5,7		ZS, ZS3	157		
BV	344	BN,SAnd	211	PJ	211	VK4,8	355	1S	350		
BY	333	Prov,Sw	211	PY1-9	213	VK6	358	3A	127		
BY	342-	HL, HM	344	PY8,9	212	VK9:		3B6,7,8	153		
	344	HP, HR	211	PY0:		L Howe	360	3B9	353		
C2	365	HS	349	FdN,P&P	213	Chri,Coc	354	3C	147		
C3	127	HV	128	Tr & Ma	215	Willis	355	3C0	152		
C5	146	HZ, 7Z	139	PZ	212	VK0:		3D2	356		
C6	211	I,IT,IS	128	S2	341	Macqua	360	3D6	157		
C9	153	J2	148	S7	153	Heard	368	3V	137		
CE1-6	214	J3	211	S9	147	V2, V3	211	3X	146		
CE6-7	216	J5	146	SM	118	VP2,VP5	211	3Y	167		
CE0A	263	J6,7,8	211	SP	128	VP8:		4S	341		
CE0X,Y	214	JA-JS	345	ST	148	Falklnd	216	4U1ITU	128		
CM, CO	211	JT	332	SU	138	SGa,SOr	273	4U1UN	208		
CN	137	JT	333	SV	128	SSa,Sh	273	4W,4X,4Z	139		
CP north	212	JW, JX	118	T2	365	VP9	211	5A	138		
CP south	214	JY	139	T30,31	362	VQ9	341	5B, ZC	139		
CR9	344	W east	208	T32	361	VR6	363	5H	153		
CT	137	W center	207	TA	139	VS5	354	5N	146		
CT2,3	136	W west	206	TF	117	VS6	344	5R	153		
CX	214	KC6 east	365	TG, TI	211	VS9	341	5T,5U,5V	146		
D2, D3	152	KC6 e&w	364	TJ, TL	147	VS9K	139	5W	362		
D4	146	KG4	211	TN, TR	152	VU	341	5X, 5Z	148		
D6	153	KG6/KH2	364	TT	147	VU7:		6O	148		
DA-DL	128	KH0	364	TU	146	And,Nic	349	6W	146		
DU	350	KH1:		TY, TZ	146	Laccadi	341	6Y	211		
EA,6,9	137	Bakr,Ho	361	UA1,3,	119-	XE, XF	210	7O	139		
EA8	136	Phoenix	362	4,6	120	XT	146	7P	157		
EI	127	KJ/KH3	261	UA1,3,	129-	XU, XW	349	7Q	153		
EL	146	KL	201	4,6	130	XZ	349	7X	137		
EP	340	KM/KH4	261	UA2,UK2F	129	Y2-9	128	8P	211		
ET	148	KP4	211	UA9,0	120-	YA	340	8R	212		
F	127	KP6/KH5:			126	YB	354	9A; M	128		
FB8W	168	Pal,Kng	361	UA9,0	129-	YI, YK	139	9G, 9L	146		
FB8X,Z	368	Jarvis	363		135	YJ	356	9H	128		
FC	128	KS6/KH8	362	UB5,UC2	129	YN, YS	211	9J	153		
FG, FS	211	KV/KP2	211	UD6	129	YO	128	9K	139		
FH, FR	153	KW/KH9	365	UF6,UG6	129	YU	128	9M2,6,8	354		
FK	356	KX	365	UH8-UJ8	130	YV	212	9N	342		
FM	211	LA	118	UL7	130	YV0	211	9Q,9U,9X	152		
FO Clip	210	LU A-V,Y	214	UM8	131	ZA	128	9V	354		
Polynes	363	LU V-Y	216	UO5	129	ZB	137	9Y	211		
FP	209	LX	127	UP2-UR2	129	ZD7,8,9	166				
FW	362	LZ	128	VE1	209	Z2	153	ANTARCTICA:			
FY	212	OA	212	VE2	204	ZF	211	163 167 169			
G,GD-GW	227	OD	139	VE2	209	ZK1:		369 370 371			
H4	351	OE	128	VE3	204	Palmers	362	372 272 174			
HA	128	OH, OJ	118	VE4,5	203	Cook	363	274 374			

ITU country prefixes.

ity sponsored by *73 Magazine*. There are two classes; single operator and multi-operator single transmitter. Single operator stations are limited to 30 hours of operating time. Multi-operators may operate the full 48-hour contest period.

Exchange: RS and QTH. State for the U.S., province or territory for Canada, and country for DX stations.

Points: Each contact is worth 5 QSO points.

Multiplier: One for each U.S. state (48), Canadian prov./terr. (13), and each DX country worked.

Final Score: Total QSO points times the sum of the multiplier points.

Awards: Will be issued in both classes in each U.S. state, Canadian prov./terr., and DX country. A minimum of 5 hours and 50 QSOs must be worked to be eligible for an award.

U.S. and Canadian stations are expected to observe the "gentleman's agreement" and not transmit in the 5 kHz segment between 1825–1830 kHz.

Disqualification may result for irregularities in logging and for failing to omit duplicate contacts that would reduce your score by more than 2% of the final score.

Include a summary sheet, multiplier check list, and a dupe sheet for logs with 100 or more contacts. Log forms are available by sending a large s.a.s.e. to the address below.

Mailing deadline for all entries is February 19th to: 160 Meter Contest, Att: Billy E. Maddox, 468 Century Vista Dr., Arnold, MD 21012.

AGCW-DL QRP Contest

Starts: 1500Z Sat., Jan. 15
Ends: 1500Z Sun., Jan. 16

This is the winter edition of this Contest organized by the AGCW-DL. It's a c.w. only, all bands 10 through 160. The same station may be worked on each band for QSO credit.

There are 5 classes as follows:
A–Single Opr., 3.5 watts or less.
B–Single Opr., 10 watts or less.
C–Multi-Opr., 10 watts or less.
D–QRO stations, over 10 watts.
E–S.w.l.'s

Multi-opr. stations may operate the full 24 hours; all others must take a 9-hour break.

Exchange: RST, QSO no., and power input. Add X is transmitter is crystal controlled (559001/5X) (579001/QRO).

Points: QSO with own country, 1 point. Other countries own continent, 2 points. DX outside other continent, 3 points. Crystal-controlled stations double above. Crystal-controlled stations are limited to 3 crystals for each band.

Multiplier: One for each country and each DX contact.

Final Score: Total QSO points times the multiplier on that band. Add the sum of scores from each band for final score.

For scoring purposes call areas in JA, PY, VE, VK, W/K, and ZS are counted as multipliers.

Awards: Certificates to the first three places in each class and each band.

Special log sheets are available from the Contest Manager (s.a.s.e. and 2 IRCs). Include one IRC with your entry for results.

Your log must be received no later than 6 weeks after the end of the contest by Contest Manager, Siegfried Hari, DK9FN, Spessartstrasse 80, D-6453 Seligenstadt, Fed. Republic of Germany.

Texas QSO Party

Starts: 0000Z Sat., Jan. 22
Ends: 1800Z Sun., Jan. 23

This one is again organized by the West Texas ARC. The same station may be worked on each band and each mode, and mobiles upon each county change.

Exchange: QSO no., and QTH. County for Texas. State, VE province, or country for others.

Points: Texas stations score 1 point per phone contact, 2 points if on c.w.

Non-Texans same as above. However, Texan phone mobiles are worth 5 points, c.w. mobiles 7 points.

Multiplier: Texans use states, VE provinces, and DX countries worked for their multiplier. Non-Texans use Texas counties (maximum of 254).

Frequencies: C.W.—3565, 7065, 14065, 21065, 28065. Phone—3940, 7260, 14280, 21370, 28600. Novice—3710, 7110, 21110, 28110.

Awards: Certificates to the top scores in each state, VE province, and DX country, and top 10 Texans. There are also plaques for the overall winners in 7 different categories: U.S., U.S. Novice, VE, DX, Texas fixed, mobile, and Novice.

All logs must be received by March 15th and go to: WTARC, P.O. Box 9944, Odessa, TX 79762-0041.

North Dakota QSO Party

0000–0800 & 1600–2400 Sat., Jan. 22
0800–1600 UTC Sun., Jan. 23

This is the second time around for this party sponsored by the Red River Amateurs. The same station may be worked on each band and mode for QSO points.

Exchange: RS(T) and QTH. County for ND stations; state, province, or country for others.

Scoring: Phone contacts count 10 points, c.w. 20 points, and RTTY 50

points. ND stations can add 100 points for working 5 Novice stations.

Final Score: ND stations multiply total QSO points by number of states, provinces, and countries worked; others use ND counties for their multiplier (maximum 53).

Frequencies: Phone—1835, 3905, 7280, 14295, 21380, 28580. C.W.—1810, 3540, 7035, 14035, 21035, 28035. Novice—3725, 7125, 21125, 28125.

Awards: Certificates to state, province, and country winners. Plaques to top ND scorer and top out-of-state winner.

Mailing deadline for logs is February 28 to: Bill Snyder, WØLHS, P.O. Box 2784, Fargo, ND 58108-2784. (Include a large s.a.s.e. for copy of results.)

White Rose SWL LF Contest

1200 to 1200 GMT Sat./Sun., Jan. 29–30

We often receive requests from shortwave listeners for information as to what contests have an s.w.l. category. Here's one all your own sponsored by the White Rose Radio Society of England.

Use any 18 consecutive hours in the 24-hour contest period. There are two separate sections, phone and c.w., no mixed mode entries. You are limited to the three l.f. bands: 1.8, 3.5, and 7 MHz.

Points may only be claimed for stations heard in contact with another station. Both stations may be logged, but the practice of logging a series of QSO's made by one station is not allowed. Log entries must not include the same call in the "station worked" column more than 10 times on each band.

Scoring: One point for each station heard on each band from one's own continent. Five points on each band if the station is on another continent.

Multiply total points by the number of different countries heard on each band. Add three band totals for final score.

Each call area of the U.S., Canada, Australia, and New Zealand will be considered a separate multiplier. The ARRL country list is the standard.

Certificates of Merit will be awarded at the discretion of the Society. Comments on the contest, details of the equipment used, etc., will be appreciated. Include an s.a.s.e. (or 2 IRC's) for copy of results. Entries should be received by March 24th and go to: Contest Manager, David McGregor, G4IDJ, c/o White Rose Radio Society, 8 Manor Court, Shadwell, Leeds LS17 8JE, England.

Classic Radio Exchange

Starts: 2100Z Sun., Jan. 30
Ends: 0400Z Mon., Jan. 31

This is the winter edition of this unusual event. Rules are the same as for previous events. Object is to restore, operate, and enjoy older equipment with likeminded hams.

A classic radio is defined as any equipment at least 10 years old, an advantage in the scoring, but not required in the contest. *(It would seem to me that at least 25 years old would be more appropriate for a classic rating—ed.)*

The same station may be worked on each band and mode and with different equipment combinations. Non-contestants may be worked for credit.

Exchange: Name, RS(T), state, province, or DX country, and receiver and transmitter type (*i.e.*, home brew, 807 final, etc.). Also any other interesting comments or information.

Scoring: Add number of different transmitters, receivers, and state, provinces, and DX countries worked on each band. Multiply that total by the number of QSO's made on all bands. Multiply that total by your classic multiplier (total years old of all transmitters and receivers used; 3 QSO's minimum per unit). If your equipment is a transceiver, multiply age by 2.

Frequencies: C.W.—60 kHz up from low band edge. Phone—3990, 7290, 14290, 21390, 29050. Novice—3720, 7120, 21120, 28120.

Awards: None were specified, but I'm sure all leading scorers will be rewarded.

Send logs with comments, pictures, anecdotes, etc., to: Stu Stephens, K8SJ, 1407 Hollyrood Road, Sandusky, OH 44870. Include a large s.a.s.e. for a copy of the *Classic Newsletter* with the results.

French DX Contest

C.W.: Jan. 29–30 Phone: Feb. 26–27
Starts: 0600 UTC Saturday
Ends: 1800 UTC Sunday

We have not received any official announcement of this year's contest, but following are last year's rules, which have been in use the past few years.

The exchange is still limited to contacts with French Europeans, Belgian, and French speaking countries and territories as per the following list: C3, CN, D6, DA1/2, F, FC, FB8, FG, FH, FK, FM, FO, FP, FR, FW, FY, HB, HH, J2, LX, OD, ON, TJ, TL, TN, TR, TT, TU, TY, TZ, VE2, XT, YJ, 3A, 3B, 3V, 4U (ITU), 5R, 5T, 5U, 5V, 6W, 7X, 9Q, 9U, 9X.

There are two classes, single and multi-operator. Single operator stations are limited to 26 hours of operation. The 10 off hours may be taken in 3 periods.

The same station may be worked on each band for QSO and multiplier credit.

Exchange: RS(T) plus a 3 figure QSO number starting with 001. French and Belgian stations will include 2 figures or letters to identify their QTH.

Points: One point per contact.

Multiplier: One point for each department and country/territory as follows: 96 French European departments, 29 French overseas departments and territories, 25 DUF countries, 9 Belgian provinces and DA2/FBA, and 14 DNF countries. *(Quite an assortment!)*

Final Score: Sum of QSO points multiplied by the sum of the multipliers from each of the five bands.

Awards: Certificates to the top scorers in each class in each country (minimum of 100 QSO's).

The usual disqualification rules will be in effect.

Official log and summary sheets are available from the REF headquarters. Include an IRC and s.a.e. with your request.

Send logs to this year's traffic manager, Bernard Francillon, F6BDN, REF Contest, square Trudaine 2-75009 Paris, France.

SWD-1 VIDEO CONVERTER

FOR CABLE TV

The SWD-1 Video Converter is utilized on cable TV systems to remove the KHz's signal from a distorted video (channel 3 in/out) and also pass thru the normal undistorted/detected audio signal. Rocker switch selects operating mode to remove KHz's distortion from the video or pass all other channels normally. Simple to assemble—less than 30 minutes. Pre-tuned. Input/output Channel 3. Impedance 75 ohms. 117VAC.

SWD-1 Video Converter Kit **$69.95**

VTR ACCESSORIES

SIMPLE SIMON VIDEO STABILIZER

Simple Simon Video Stabilizer, Model VS-125, eliminates the vertical roll and jitter from "copy guard" video tapes when playing through large screen projectors or on another VTR. Simple to use, just adjust the lock control for a stable picture. Once the control is set, the tape will play all the way through without further adjustments. Includes 12V power supply.

SPECIAL

VS-125 Video Stabilizer, wired . . . . . Reg. 54.95 . . . **$39.95**

NEW VCR Quality

MODULATOR

Not a Game Type Modulator

The MPS-1 Kit converts Video/Audio signals to a crystal controlled RF output for TV Channels 3 and 4. The MPS-1 Modulator inputs are designed to match all TV Cameras and VCR's and features a voltage regulated power supply, power switch and LED indicator. No Tuning Required. Operates on 117VAC.

Assembly Time Approximately 5 Minutes

MPS-1 Kit. $39.95

UHF ANTENNAS and ACCESSORIES

MDS-AMATEUR-ETV 32 ELEMENT YAGI ANTENNA

- Not A Kit
- 1.9-2.5 GHz
- 38½" Long
- 23dB Average Gain
- Commercial Grade
- Die Cast Waterproof Housing with 4¼" x 2½" Area for Electronics
- Includes P.C. Probe, F-61 Connector and Mounting Hardware

MAE-2 32 Element YAGI Antenna **$23.95**

Kato Sons' Down Converter Kit ★1.9 - 2.56Hz★

Designed for Simple Simon by former Japanese CQ Amateur Magazine's UHF Editor/Engineer. Unit utilizes new ingenious Printed Circuit Probe for maximum gain. Circuit board fits inside MAE-2 antenna housing. Requires 1 hour assembly. IC and capacitors pre-soldered.

Model KSDC-KIT 1.9 - 2.5GHz Down Converter Kit **$34.95**

Kato Sons' Regulated Varible DC Power Supply

For use with KSDC-KIT 1.9 - 2.5GHz Down Converter. Completely assembled with Attractive Cabinet, TV/Converter Mode Switch, Frequency Control and LED Indicator.

Model KSPS-1A Assembled Power Supply **$23.95**

SPECIAL INTRODUCTORY SAVINGS

ORDER ALL THREE ITEMS

MAE-2, KSDC-KIT and KSPS-1A for Only. **$74.95**

Regular price if ordered separately $82.85

— CO-AX CABLES ARE NOT INCLUDED —

ZYZZX VHF-UHF Wideband Antenna Amplifier

Revolutionary New HYBRID IC Broadband Amplifiers

50 MHz - 900 MHz

Model ALL-1 12dB Gain
Model ALL-2 35dB Gain

These units are not available anywhere else in the world. Each unit will serve many purposes and is available in Kit or Assembled form. Ideal for outdoor or indoor use. I/O impedance is 75 ohms. Amplifiers include separate co-ax feed power supply. Easily assembled in 25 minutes. No coils, capacitors to tune or adjust.

ALL-1 Complete kit w/power supply $24.95 — ALL-1 Wired/Tested w/pwr supply $34.95
ALL-2 Complete kit w/power supply 34.95 — ALL-2 Wired/Tested w/pwr supply 44.95

Our New STVA 14.5dB GAIN, 14 ELEMENT CORNER REFLECTOR YAGI ANTENNA

STVA-3 Yagi Antenna, 14.5dB Gain, Selectable 75 or 300 ohm Channel 60-80. . . . . **$19.95**

STVA-4 Yagi Antenna, 14.5dB Gain, Selectable 75 or 300 ohm Channel 44-52. . . . . **$19.95**

RG-59/U 75 ohm Low Loss Coax Cable. . . **$.12p/ft.** **F-59** Coax Connector. . . **$ .39 ea.**
MT-1 Special UHF 75-300 ohm Matching Transformer . . . . . **$1.45 ea.**

Switch to Bambi™!

Electronically

Bambi Electronic Video Switch ... makes switching of your VCR/VTR, Pay TV Decoders, Cable TV, Video Discs, Video Games, Closed Circuit TV, Antennae and Microcomputer as easy as pushing buttons.

The Bambi Electronic Video Switch is an electronic switching network which can accept up to six different sources of video signals and provide the flexibility of directing the inputs to any or all of the three outputs.

Now you can eliminate ... the drudgery of disconnecting and reconnecting your video equipment each time you use it ... the tangled mess of cables which are impossible to trace out ...not being able to use more than one function at a time.

Bambi lets you enjoy using your video equipment the way it should be ... electronically and on line at the push of a button.

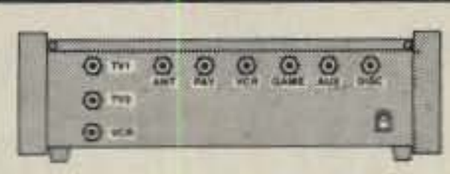
Model BEVS-1 Completely Wired and Assembled. Includes comprehensive Instruction/Operation Manual and Decal Set for customizing your Video Switch installation.

$129.95

FREE Bambi Poster with any purchase

Bambi's front panel was designed with the user in mind. Computer styled construction, with soft-touch keyboard (rated for over 10 million operations), arranged in matrix form allows easy input/output selection without refering to charts. Functions selected through the keyboard are immediately displayed on the 18 LED status indicators.

Check the quality of Bambi against that of much higher priced competition. All solid state electronic switching provides low attenuation (3dB), wide frequency response (40-890 MHz), and excellent isolation between signal sources (each I/O section individually sheilded for 65dB min. isolation).



Bambi's Specifications:

Input/Output Impedance	75 ohm
Signal Loss	3dB ±1dB
Noise	4dB ±1dB
Input Return Loss	12dB min.
Isolation	65dB min.
Power Req.	117VAC 60 Hz, 2W
Dimensions	10¾ W x 6⅝ D x 3⅛ H
Weight	4½ lbs

7+11 SWD PARTS KITS

MITSUMI VARACTOR UHF TUNER

Model UES-A56F

$24.95

Freq. Range UHF470 - 889MHz
Antenna Input 75 ohms
Channels 14-83 Output Channel 3

ITEMS 1-14 SPECIAL $119.95

Kit No	PART No	DESCRIPTION	PRICE
1	1VTI-SWD	Varactor UHF Tuner, Model UES-A56F	$24.95
2	2CB1-SWD	Printed Circuit Board, Pre-Drilled	18.95
3	3TP7-SWD	P.C.B. Potentiometers, 1-20K, 1-1K, and 5-10K ohms, 7-pieces	5.95
4	4FR35-SWD	Resistor Kit, ¼ Watt, 5% Carbon Film, 32-pieces	4.95
5	5PT1-SWD	Power Transformer, PRI-117VAC, SEC-24VAC, 250ma	6.95
6	6PP2-SWD	Panel Mount Potentiometers and Knobs, 1-1KBT and 1-5KAT w/Switch	5.95
7	7SS14-SWD	IC's 7-pcs, Diodes 4-pcs, Regulators 2-pcs, Heat Sink 1-piece	29.95
8	8CE9-SWD	Electrolytic Capacitor Kit, 9-pieces	5.95
9	9CC33-SWD	Ceramic Disk Capacitor Kit, 50 W.V., 33-pieces	7.95
10	10CT-SWD	Variable Ceramic Trimmer Capacitor Kit, 5-65pfd, 6-pieces	5.95
11	11L4-SWD	Coil Kit, 18mhs 2-pieces, .22μhs 1-piece (prewound inductors) and 1 T37-12 Ferrite Toroid Core with 3 ft. of #26 wire	5.00
12	12ICS-SWD	I.C. Sockets, Tin inlay, 8-pin 5-pieces and 14-pin 2-pieces	1.95
13	13SR-SWD	Speaker, 4x6" Oval & Prepunched Wood Enclosure	14.95
14	14MISC-SWD	Misc. Parts Kit Includes Hardware, (6/32, 8/32 Nuts, & Bolts), Hookup Wire, Ant. Terms, DPDT Ant. Switch, Fuse, Fuseholder, etc.	9.95

When Ordering All Items, (1 thru 14), Total Price 139.95

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3	3TP11-PWD	PCB Potentiometers 4-20K, 1-.5K, 2-10K, 2-5K, 1-1K, and 1-50k. (11 pieces)	8.95
4	4FR-31-PWD	Resistor Kit, ¼W, 5% 29-pcs, ½ W 2-pcs	4.95
5	5PT1-PWD	Power Transformer, PRI-117VAC, SEC-24VAC at 500ma	9.95
6	6PP2-PWD	Panel Mount Potentiometers and Knobs, 1-1KBT and 1-5KAT with switch	5.95
7	7SS17-PWD	IC's 7-pcs, Diodes 4-pcs, Regulators 2-pcs Transistors 2-pcs, Heat Sinks 2-pcs	29.95
8	8CE14-PWD	Electrolytic Capacitor Kit, 14-pieces	6.95
9	9CC20-PWD	Ceramic Disk Capacitor Kit, 50 WV, 20-pcs	7.95
10	10CT5-PWD	Varible Ceramic Trimmer Capacitor, 5-65pfd, 5-pieces	4.95
11	11L5-PWD	Coil Kit, 18mhs 3-pcs, .22μhs 1-piece (prewound inductors) and 2 T37-12 Ferrite Toroid cores with 6 ft. #26 wire	6.00
12	12ICS-PWD	IC Sockets, Tin inlay, 8 pin 4-pcs, 14 pin 1-pc and 16 pin 2-pcs.	2.95
13	13SR-PWD	Enclosure with PM Speaker and Pre-drilled Backpanel for mounting PCB and Ant. Terms	14.95
14	14MISC-PWD	Misc. Parts Kit, Includes Hardware, (6/32, 8/32 Nuts & Bolts), Hookup Wire, Solder, Ant. Terms DPDT Ant. Switch, Fuse, Fuseholder, etc	9.95
15	15MC16-PWD	Mylar Capacitors, 14-pcs and Silver Mica Capacitors 2-pieces	7.95

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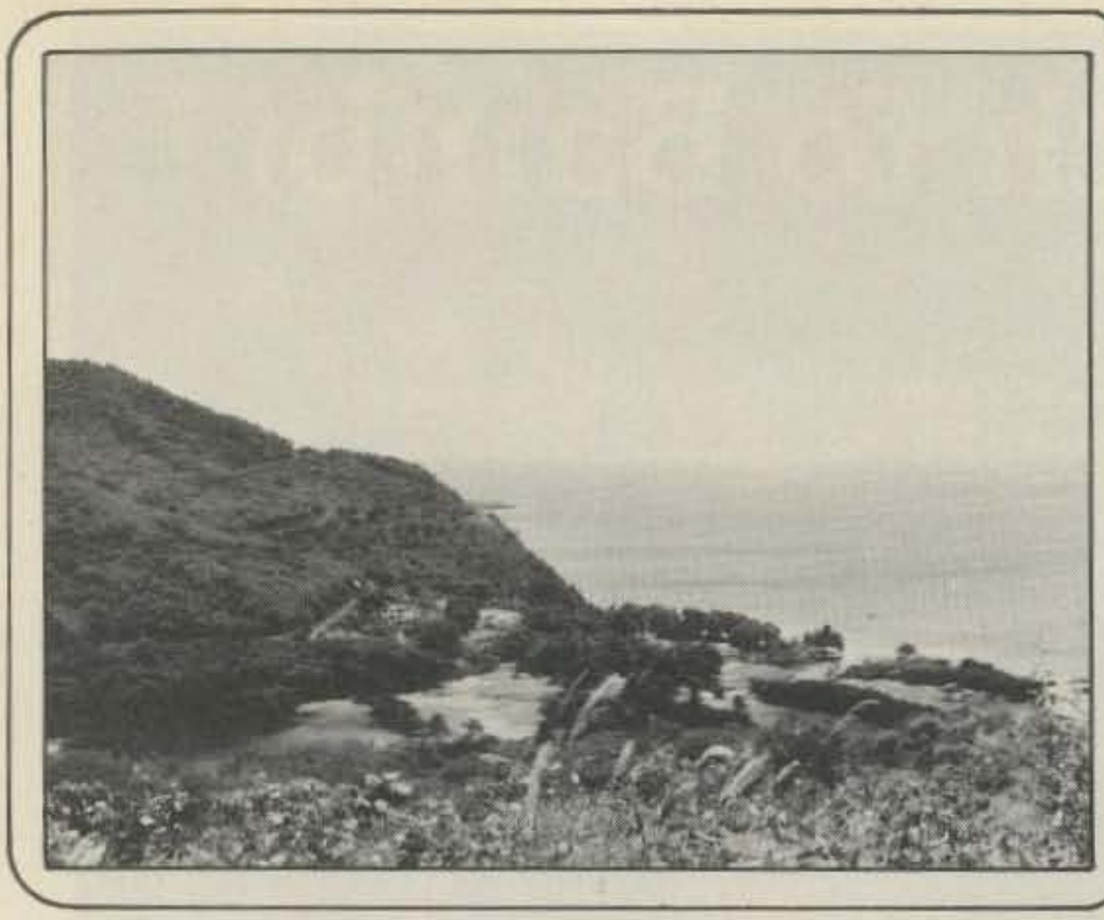


The "lagoon" on Montserrat.

Chance Peak as seen through the not so easy to see path.

Nestled in the Leeward Islands of the Caribbean is the island of Montserrat. VP2MM gives us a rundown of their new 2 meter f.m. repeater and its use for public safety.

VP2M/R(epeater)

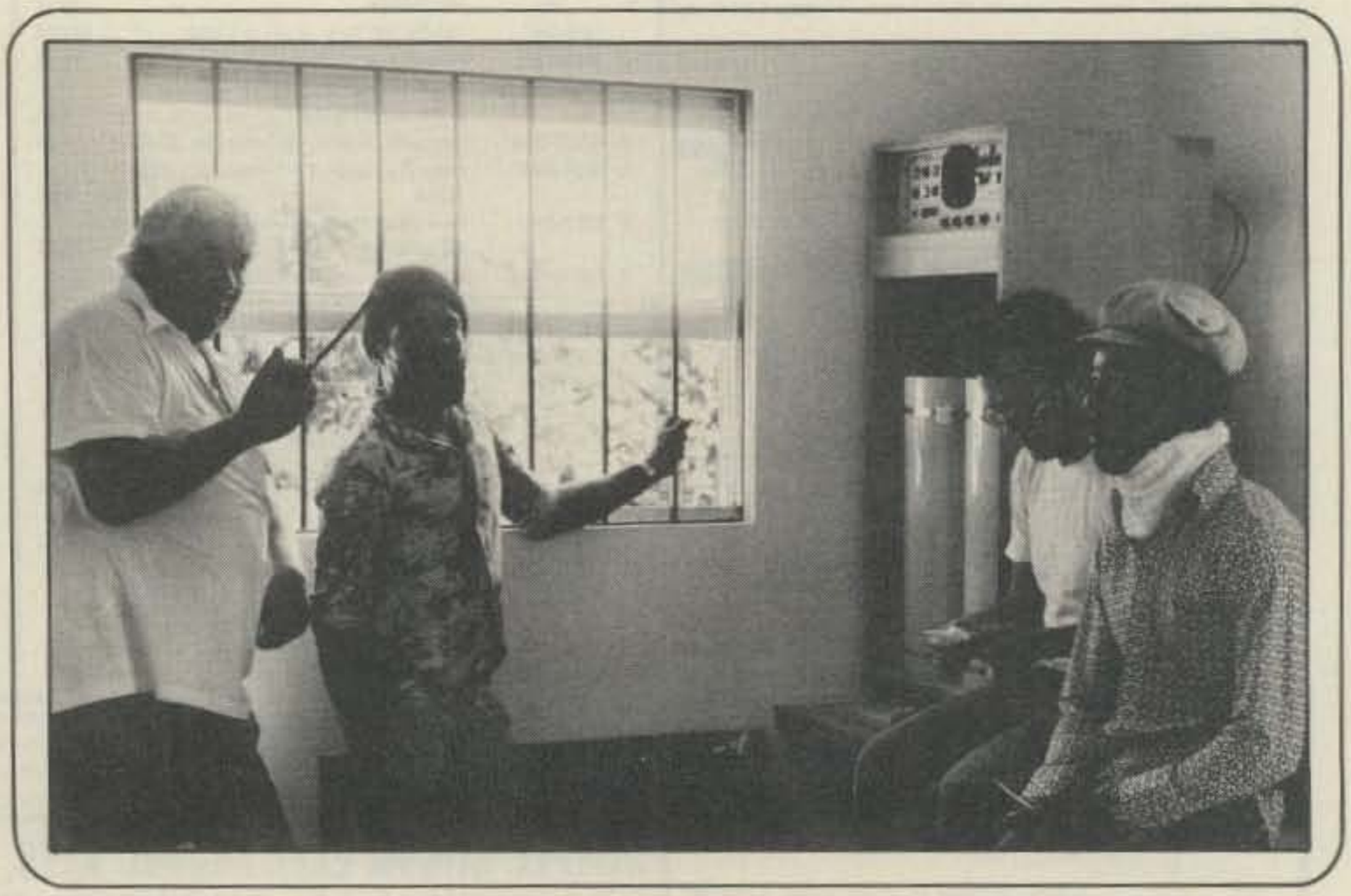
The Inter-Island Repeater Network

BY ALEX M. KASEVICH*, VP2MM

After many months of hard work, the Montserrat Amateur Radio Society has completed putting the final touches on its 2 meter f.m. repeater. This repeater is the mainstay of the island's amateur radio emergency system.

The equipment consists of a commercially-built repeater unit with a 30 watt power rating. Prior to the installation recently of a large Sinclair antenna, the repeater, with its temporary antenna, proved its worth during an unexpected flood caused by very heavy rainfall. The repeater is located approximately 1000 feet above sea level in a central spot, which should make this setup one of the finest in the eastern Caribbean.

The repeater is made available to everyone, but its primary functions are to serve as the island's communication link and to assist the local government in case of emergency. Montserrat is locat-



(Left to right) Doc Hollatz, VP2MF, with hand-held, Victor James, VP2MQ, Mike Gundy, VP2MBO, and Bobbie Martin, VP2MO, all in the shack after completing final adjustments on the repeater.

*P.O. Box 364, Plymouth, Montserrat, West Indies

The antenna-raising party for the 2 meter repeater.

The antenna-raising party got into full swing with much enthusiasm as club members handled the ground work, while up on the pole two fellows from a local utility company donated some of their time to help place the 2 meter Sinclair antenna in position. The site for the repeater is about 1000 feet above sea level, and use of it was donated by a local business

Erecting the antenna.

ed in the Leeward Islands, an area of the Caribbean known for its tropical storms and hurricanes.

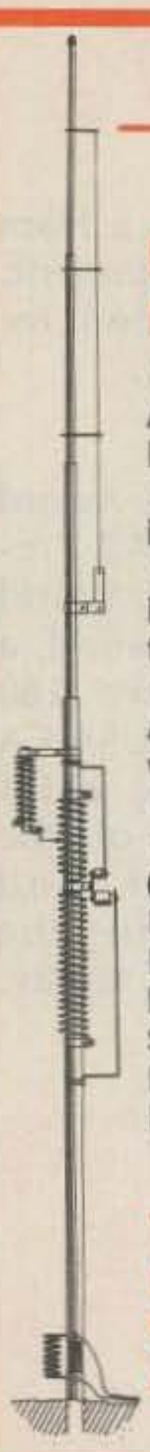
Club officers E. "Bobbie" Martin, VP2MO, President, and K. "Doc" Hollatz, VP2MF, Vice-President made a super effort in obtaining and setting up the equipment. Assistance from other club members, and stateside liason work by Perry Brittain, VP2MR/W5STI, all contributed to the success of the VP2M/R repeater.

Those with beams and amplifiers previously were the only ones who enjoyed the convenience of contacting many repeaters on neighboring islands. Now with the presence of a local repeater, everyone can enjoy using 2 meters with just a small, low-powered, hand-held HT. It can put you in contact from almost anywhere on the island.

Having made many trips to Montserrat, and being so familiar with the climate and terrain, I must say that this repeater project is quite an accomplishment. The convenience and fun of 2 meter f.m. has arrived. "This is VP2MM listening 97."

No-53-54

ANTENNA SYSTEMS/TOWER HARDWARE



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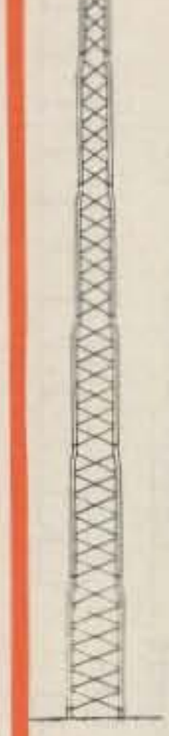

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HBX40	40 ft	10 sq ft	164	BXB6	269	24	293
HBX48	48 ft	10 sq ft	303	BXB7	349	26	375
HBX56	56 ft	10 sq ft	385	BXB8	419	30	449
HDBX40	40 ft	18 sq ft	281	BXB7	313	26	339
HDBX48	48 ft	18 sq ft	363	BXB8	399	30	429

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20-4CD	4-El. 20 mtr. Beam	$239
15-3CD	3-El. 15 mtr. Beam	$ 99
15-4CD	4-El. 15 mtr. Beam	$109
10-3CD	3-El. 10 mtr. Beam	$ 76
10-4CD	4-El. 10 mtr. Beam	$ 89
A50-5	5-El. 6 mtr. Beam	$ 65
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ARX450B	450 Mhz "Ringo Ranger II"	$ 38
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155BAS	5-El. 15 mtr. "Long John"	$179
105BAS	5-El 10 mtr. "Long John"	$119
204BAS	4-El. 20 mtr. Beam	$229
203BAS	3-El. 20 mtr. Beam	$139
153BAS	3-El. 15 mtr. Beam	$ 79
103BAS	3-El. 10 mtr. Beam	$ 59
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64BS	4-El. 6 mtr. Beam	$ 55
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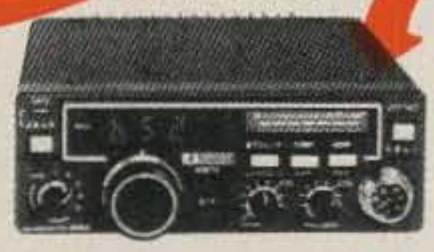

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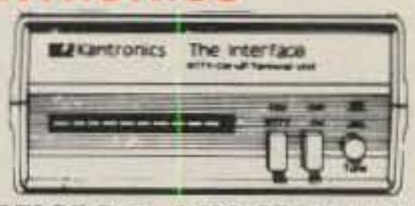

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AN OUTBOARD VOLUME CONTROL FOR YOUR RECEIVER

BY ED SOLOV*, K2SE

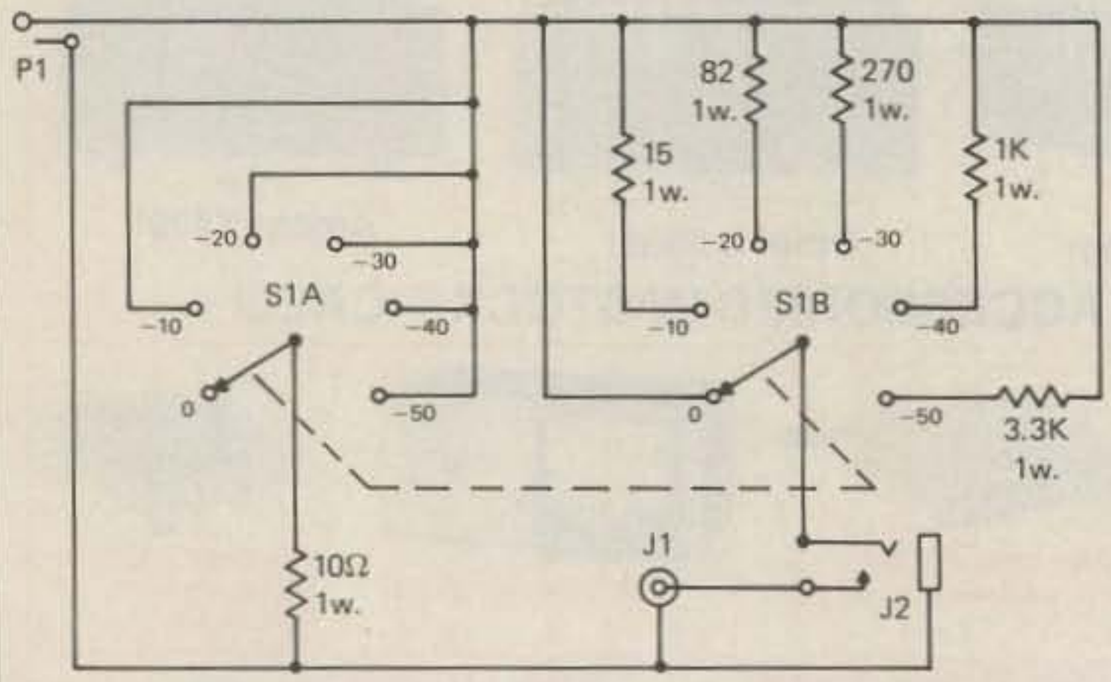
Recently, when I replaced my venerable old high-impedance headphones with a new pair of 8 ohm jobs, I learned why the manufacturer of my rig recommended high-impedance phones in the first place. With the new phones everything was way too loud. Attempting to lower the volume with the audio gain control resulted in all kinds of unpleasant hum and a side-tone that was loud enough to knock the "cans" off my ears. The hum resulted from the fact that the audio gain (or volume) control is two audio stages up from the output and does nothing to reduce the hum and noise originating in the final two stages.

What was needed was a way to reduce the audio output level after the final stage of amplification—outboard of the rig. That would reduce the hum in proportion to the signal. It had to be done while maintaining a low-impedance load (in the neighborhood of 8 ohms for my tube-type rig and for most other tube and solid-state receivers) for the receiver to drive. To ignore this constraint would result in severe audio distortion. (For a solid state rig, damage to the final audio amplifier could also result.)

Resistor Value (ohms)	Attenuation (dB)	Resistor Value (ohms)	Attenuation (dB)
10	8.0	470	34.7
15*	9.8	560	36.2
22	11.8	680	37.8
27	12.9	1000*	41.1
33	14.1	1.2K	42.7
47	16.5	1.5K	44.6
68	19.1	1.8K	46.2
82*	20.5	2.2K	47.9
100	22.0	3.3K*	51.4
150	25.2	3.9K	52.9
180	26.7	4.7K	54.5
220	28.4	5.6K	56.0
270*	30.0	6.8K	57.7
330	31.7	10.0K	61.0
390	33.1		

**Values recommended in the text.*

Table I– Standard resistor values and corresponding attenuation levels when used in the circuit of fig. 1 (based on an 8 ohm amplifier output impedance).



S1 = 2-pole 6-position switch (Radio Shack 275-1386).
P1 = Suitable plug to mate with speaker jack on the rig.
J1 = Same type of jack as on the rig—mates with P1.
J2 = ¼-inch closed-circuit phone jack (Radio Shack 274-255).

Fig. 1– Schematic of the outboard volume control.

The simple circuit of fig. 1 does the job nicely and at very low cost—about $5. It provides two other advantages: it provides a place to plug-in the headphones where they completely cut off the speaker (the headphone jack in my rig simply puts the phones in series with the speaker); and it allows me to adjust the side-tone volume somewhat independently of the signal volume. The 10 ohm resistor assures the existence of a suitable low-impedance load for the output stage in all attenuating positions. Actually, the resulting load impedance varies from about 7 ohms in the −10 dB position to very close to 10 ohms in the −50 dB position. This range of load resistances should make any 8 ohm amplifier happy.

The resistors selected are standard value and will give about a 10 dB step between any pair of adjacent switch positions. If you want coarser or finer steps, you can pick your own values from Table I. All gains are in decibels (dB) stated with respect to the straight through (0 dB) position. Remember that the ear perceives loudness in proportion to the number of decibels. That means that the reduction in loudness that occurs when you switch from 0 dB to −10 dB will seem the same as when you switch from −10 dB to −20 dB or from −30 dB to −40 dB. In my own experience, I have found that a change of less than about 10 dB is not perceptible and is therefore not worthwhile to wire into the switch.

I wired up my attenuator with a phono plug that plugs into the speaker phono jack on the rear apron of my rig. I plug the speaker into jack J1 on the attenuator. When I want to use headphones, I plug them into J2, a standard ¼-inch closed-circuit phone jack. That disconnects the speaker and gives total silence in the room for anyone not using the headphones. Most important, though, is that I then hear just the right amount of amateur radio in my phones.

**247 Andover Drive, Wayne, NJ 07470*

Awards

a monthly feature by
A. EDWARD HOPPER, W2GT

NEWS OF CERTIFICATE AND AWARD COLLECTING

The January Story of the Month as told by Barry is:

J. Barry Brewer, WA5DTK
All Counties #330, 6-1-81

"When I was first licensed in 1962, I never believed that I would work All Counties in the U.S., but, by golly, I did. Besides learning a lot about geography, I met a bunch of great people in the process.

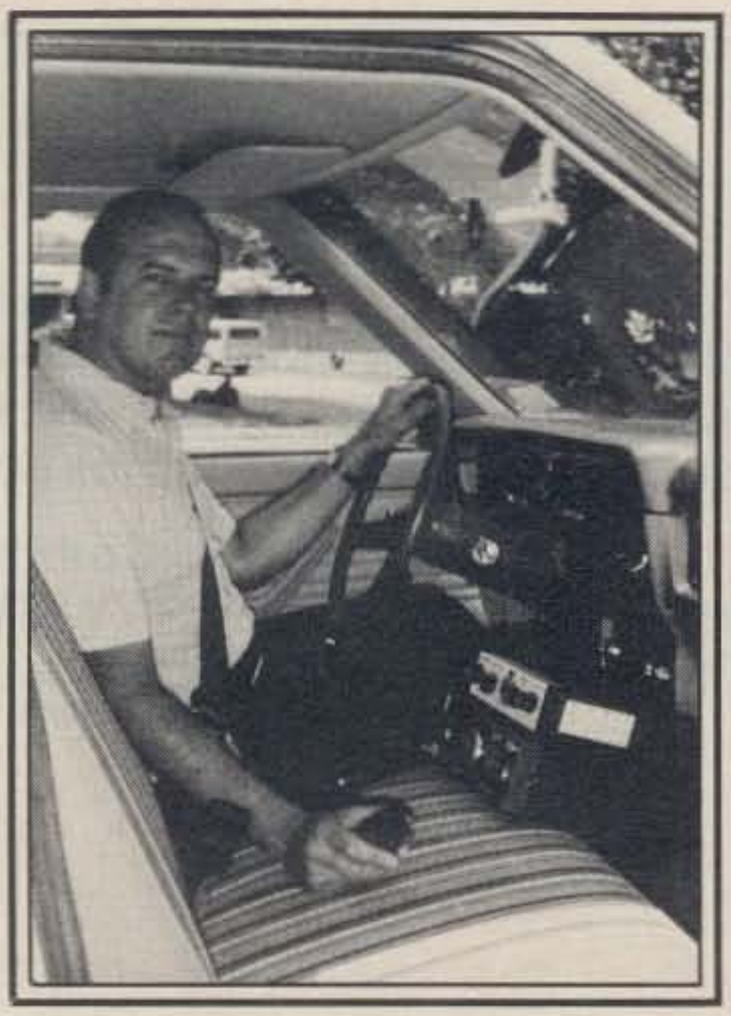
"I hunted counties by the normal QSO method until late 1979 when I joined in on the ICHN. After that my radio might as well have been crystal controlled. At the very least, my dial got rather worn at 14.336.

"Perhaps more than receiving counties, I enjoyed giving them out. I especially had a good time straddling some of the county lines in mountainous north-western Arkansas. I even got to meet several Arkansas state troopers in the process! Have you ever tried to explain County Hunting to one of those guys as your car sat on top of a snow-covered cliff by a county line sign?

"When I joined the gang on 14.336, I was employed by the State of Arkansas, and I gave out all 75 Arkansas Counties at one time or another. In the spring of 1980, however, I became employed by the Air Force and now live in Texas. There is no way that I'll ever give out all 254 counties in Texas. It could be a challenge, though.

"I do quite a bit of traveling by car (with the rig!). I take special pride in being one of the select group of people who see county-line signs before seeing the scenery.

"For my success, I should thank many people for helping me along the way, but this column couldn't hold that many names. I must at least express my deep appreciation to my wife, Mary, whose tolerance and patience must exceed even my own desire for County Hunting. There should be a USA-CA Tolerance Award available somewhere."



Barry Brewer, WA5DTK, all set to give out some counties.

The WA5DTK Mobile Unit at Wichita County, Texas.

Sebastian Roig Obrador, EA6DE, won USA-CA-500 endorsed All S.S.B. (32 to EA6).

Wilson Trevillion, KA8JHD, was issued USA-CA-500 endorsed All S.S.B.

I almost overlooked the fact that Vic Fitzgerald, WB0LOU, upgraded his All Counties #390 to be endorsed All 2XS.S.B., All 20, All Mobile. (Sorry!)

Special Honor Roll
All Counties

#399 Pete Heftler, N8BLO 9-20-82.
#400 Dave Lott, VE3BHZ 9-23-82.

Awards Issued

Pete Heftler, N8BLO, added to his nice collection USA-CA-3000 endorsed All S.S.B., All 14, All Mobiles, and All Counties endorsed Mixed.

Dave Lott, VE3BHZ, added USA-CA-3000 and All Counties endorsed Mixed to his fine collection.

"Cal" Weyant, WA2PFF, continues to plug away and requested USA-CA-3000 endorsed Mixed.

Gerald Pollard, N0CKN, applied for USA-CA-500 through USA-CA-2000 endorsed All S.S.B., All 20, All Mobiles, and USA-CA-2500 endorsed Mixed.

"Jerry" Walsh, WA2LSU, obtained USA-CA-500 through USA-CA-2000 endorsed Mixed.

Duane Musgrave, WB5CWI, upgraded the endorsement for his All Counties to read All S.S.B., All 20, All Mobiles.

Dave Popkin, W2CC, also continued to plug away and accepted USA-CA-2500 endorsed Mixed.

Jim Cook, KF0G, picked up USA-CA-500 through USA-CA-2000 endorsed All S.S.B.

Jack Sherman, VE4AT, claimed USA-CA-500 through USA-CA-2000 endorsed All 2XS.S.B.

Antonin Blaha, OK1APV, collected USA-CA-1500 endorsed All A-1 (#2 to OK).

William Semperst, K8OHC, received USA-CA-500 through USA-CA-1500 endorsed Mixed.

Randall Sherman, KH6MD, qualified for USA-CA-500 endorsed Mixed.

Awards

Jack Scroggin, W0SJE, Memorial Award: This new Award is being issued by MARAC (the Mobile Amateur Radio Awards Club) in memory of Jack Scroggins, a co-founder and first Awards Chairman of MARAC. It is awarded for working holders of the MARAC Worked All Counties Second Time Award in the following classes: Basic Award, 10 contacts; Class D, red seal, 25 contacts; Class C, blue seal, 50 contacts; Class B, gold seal, 75 contacts; and Class A, second gold seal, 100 contacts. Only contacts made after the effective date of the Second Time Award will be counted. Submit list showing stations worked, date, and Second Time Award number in numerical order. MRCs not needed as log data will be accepted. This Award is available to all licensed amateur radio stations (s.w.l. on a heard basis) throughout the world. Endorsements, all one band, mode, or mixed on the basic award only. Free to B/P. Fee $1.25. S.a.s.e. mandatory for seals. Apply to: Thomas E. Storm Sr., KB0MS, MARAC Awards Chairman, 409 S. Mt. Carmel, Wichita, Kansas 67213 *(this is new QTH!).*

USA-CA Honor Roll

3000		1500		500	
N8BLO	429	WA2LSU	606	KH6MD	1772
VE3BHZ	430	OK1APV	607	WA2LSU	1773
WA2PFF	431	N0CKN	608	N0CKN	1774
		KF0G	609	KF0G	1775
2500		VE4AT	610	VE4AT	1776
N0CKN	488	K8OHC	611	EA6DE	1777
W2CC	489			KA8JHD	1778
		1000		K8OHC	1779
2000		WA2LSU	742		
WA2LSU	542	N0CKN	743		
N0CKN	543	KF0G	744		
KF0G	544	VE4AT	745		
VE4AT	545	K8OHC	746		

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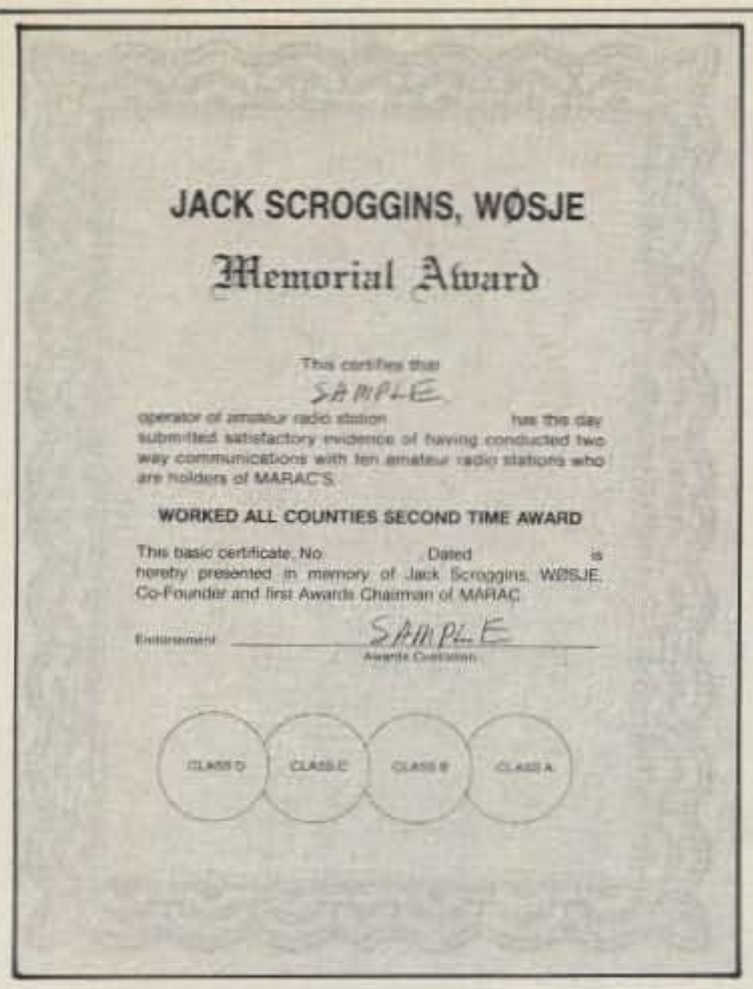

The Jack Scroggin, WØSJE, Memorial Award.

The Buffalo Sesquicentennial Award.

Buffalo Sesquicentennial Award: Sponsored by the Radio Association of Western New York (RAWNY). On April 1, 1982, Mayor James D. Griffin of Buffalo, NY, and the RAWNY kicked off RAWNY's special operating event celebrating Buffalo's Sesquicentennial (150th) birthday. For each contact or s.w.l. report a multicolored Award Certificate was offered, along with a special Buffalo Wooden Nickel; 25¢ in stamps or coin and a business-size s.a.s.e. was requested. The operators are found mostly about 10 kHz up from the bottom edge of the General bands from 160–10 meters, including the Novice bands, using their own calls. The plans were to take the event through the month of April, but due to its popularity, it has been extended to March 31, 1983. RAWNY has been involved in public demonstration of amateur radio aboard the *USS Little Rock*, which is permanently docked at the Buffalo Naval and Servicemen's Park. For those who worked the club station, W2PE, during those setups, a special endorsement will be added to the main Award. (*Note:* They delayed sending out the first group of Awards until all requests for the endorsements stopped, thus saving duplicate mailings.) Other endorsements were given for contacting W2PE on May 8th, commemorating

The Special Event Station W2PE/2 QSL.

the launching of the *USS Buffalo*, a Nuclear Attack Submarine, at Newport News, VA, and also during their Ham-O-Rama '82 Hamfest on September 11th. There they set up a simplex 2 meter station to operate those on the grounds. Requests for the Award (ham or s.w.l.) should be sent to: Buffalo 150th ARS, P.O. Box 190, Tonawanda, NY 14151.

50 Country Six Meter Award: Sponsored by the Six Meter International Radio Klub (SMIRK), this Award will be issued to anyone sending proof that they have worked at least 50 countries on 6 meters. You do not have to be a member of SMIRK. Apply to: Dick Lent, W5NKG, 5634 Seacomber, San Antonio, Texas 78242. *(Thanks to KA2MHT/5 for this data.)*

Fifty County Six Meter Award.

Six Meter Invitational Net Award: Here is the new v.h.f. certificate being offered by S-I-N of Colorado to anyone who can provide log extraction proof of contacting at least four other S-I-N members worldwide or state-wide. The only cost is the submission of an s.a.s.e. when applying for the Award. Apply to: Walter N. Gardiner, KØCLJ, S-I-N Secretary, 701 Lima Street, Aurora, Colorado 80010.

Six Meter Invitational Net Award.

OZ Prefix Award: The Copenhagen Division of the Danish EDR on the occasion of the 50th anniversary of its founding issues this award which is available to licensed amateurs and s.w.l.'s anywhere in the world under these rules.

OZ: Stations must work 3 stations with each prefix OZ1 to OZ9 (27 QSL cards).

EU: Stations must work 2 stations with each prefix OZ1 to OZ9 (18 QSL cards).

DX: Stations must work 1 station with each prefix OZ1 to OZ9 (9 QSL cards).

A QSL card from the club station, OZ5EDR, can be a joker to replace a missing QSL card. All amateur bands and modes are allowed. Special endorsements are available for C.W., 2XS.S.B., one band, etc. Please do not send QSL cards, but send certified list with the fee of 10 IRCs to: Allis Andersen, OZ1ACB, Kagsaavej 34, DK-2730 Herlev, Denmark.

The First Award: This "fun" Award is meant to commemorate that unforgettable first QSO for every ham, new and old alike. All that is needed to qualify is the date and call of the first station contacted. The fee is $3.00. Apply to: Max H. Adams, KA9JKK, 1335 N. Harbison Avenue, Indianapolis, Indiana 46219.

National Capital Award: Sponsored by the Ottawa Amateur Radio Club, this Award is issued upon proof of contact with stations located in the National Capital Region of Canada. The Award is issued to s.w.l.'s on a "heard" basis. The National Capital Region consists of the cities of Ottawa (Ontario), Hull (Quebec), and the

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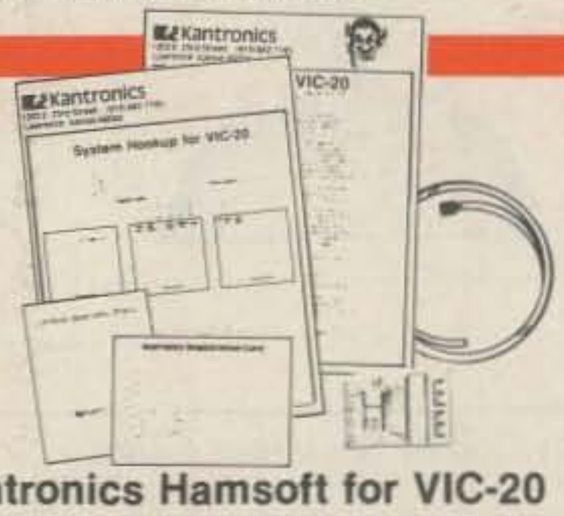

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The Canadian National Capital Award.

surrounding area. Stations in Canada and the lower 48 United States require 20 contacts, while all others require 10 contacts. The Award will be endorsed for band or mode upon request. Fee for stations in Canada and the United States is $2.00, and $3.00 (or 8 IRC's) for overseas stations. *Do not* send QSL cards. Send list of contacts giving callsign and QTH of station worked, date, band, and mode to: Award Manager, Ottawa Amateur Radio Club, P.O. Box 8873, Ottawa, Ontario K1G 3J2, Canada.

Caterpillar Employees Amateur Radio Club Award: Issued to anyone who successfully works at least five members of this group. The first five contacts will qualify you for the basic certificate. Upgrade stickers, to be placed in the upper right-hand corner, will be issued for each two additional members worked from the same facility. This sticker will state the location of that facility. All Peoria area plants will be considered as one. This will leave 36 facilities worldwide. The required exchange will be plant, call, RST/RS, and date. Apply with $2.00 U.S. or 3 IRC's to: Ronald Morgan, KB9NW, 408 Bess Street, Washington, Illinois 61571. Certificate Nets are being activated on 3.957 at 1430Z on Sundays using the call K9ZGJ; 28.750 at 0200Z on Wednesdays using the call WD9IBM; and 28.750 at 1700Z on Sundays with WD9IBM as Net Control. Verification will be by the honor system. Contacts can be made on all frequencies and all modes. Each certificate is numbered, and QSO's after March 1, 1982 qualify. All upgrades will be sent free upon confirmation from certificate holder.

Moose Jaw Amateur Radio Club Award: The Moose Jaw Amateur Radio Club is proud to announce the 60th Anniversary Award, which requires the applicant to work or hear (s.w.l.) two Moose Jaw Club members after September 1, 1982, on h.f. only, all modes accepted. Send complete log data and $1.00 to award manager, Murry Button, VE5ACM, 1105 14th Avenue, Moose Jaw, Saskatchewan, Canada S6H 7S4.

Canadian Moose Jaw ARC Award.

Five Band WAP: As part of NZART activities for World Communications Year 1983, a Five Band WAP will be made available.

Required: QSO 30 eligible Pacific Countries (as those which count for Oceania for WAC), each on 5 different bands, making a total of 150.

Action: Send list of log extracts (QSL's not required to be held) to NZART, Awards Manager, 152 Lytton Road, Gisborne, New Zealand with $6.00.

Reward: Appropriately inscribed wooden shield with NZART badge mounted on it. Send $3.00 for extra postage if airmail is required overseas.

IARU Region III Operating Award: The Award is available to licensed amateurs and s.w.l.'s to publicize Region III. Contacts made after 5 April 1982 are eligible, but certificates will date from 1 January 1983 as part of WCY. QSL cards are *not* required. Send certified list of eligible contacts from log book. Cost is $1.00 surface ($2.00 airmail) for postage charges only. The basic Award requires 7 countries; Silver Star endorsement requires 12 countries; Gold Star endorsement requires 17 countries. Eligible countries are Japan, Australia, New Zealand, Korea, Philippines, Hong Kong, Thailand, Papua/New Guinea, Fiji, Singapore, India, Indonesia, Malaysia, Sri Lanka, Tonga, Western Samoa, and Solomon Islands. Send applications to: NZART Awards Manager, 152 Lytton Road, Gisborne, New Zealand.

Notes

Sad to report the loss of two more County Hunters: Donald W. Hussey, WA6LBO, All Counties #243, who left us July 9, 1982, and Arthur A. Jablonsky, W0BK, who as W0MCX received USA-CA-500 #1-C in 1961, and All Counties #2 in 1965. His foto was in November 1965 *CQ* and his story and photos in June 1966 *CQ*. A nice letter received from Arthur's wife, May, indicates he left us September 9, 1982, and although he accomplished many things, he failed in two he desired. He wanted to operate from all the U.S. counties and had but 249 yet to go. He also wanted to find 80,000 coins with his metal detector; he had found 79,214. Vivian, WD0EMS, is helping with answering Art's QSLs. Our sincere condolences.

More and more questions/complaints are being received about the three and four County Lines. I can easily see that we will soon have to limit them to two County Lines!

I'll try again to explain about National Parks, Reservations, etc. (not properly within a county). One should be permitted to claim *one* adjacent county as long as it is within the same state (but only one and only once). *But* this does *not* prevent the Mobile from stating he can count for more than one in case another person needs a different adjoining county.

This starts my 18th year with *CQ*, and I happily realize that *new* County Hunters are being added all the time. Because I realize that they cannot know all the rules, I'm always happy to help.

As 1983 is World Communications Year, I hope we all have lots of communications, needed equipment, counties, countries, and QSLs. Happy 1983 to All!

73, Ed, W2GT

Diploma "All Band CE." (Rules in November '82 CQ.)

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Boom Dia.:	2"	2"	1-5/8"
Weight, lbs. :	50	38	27
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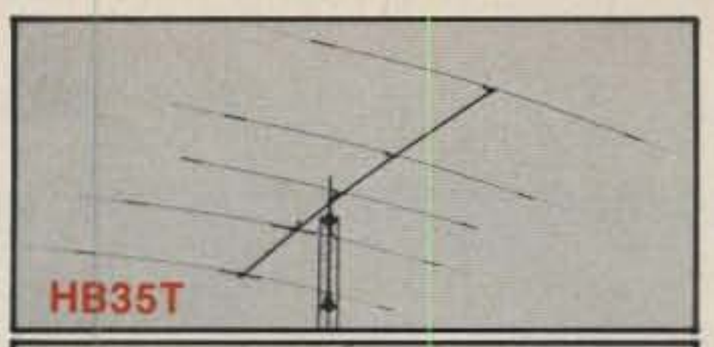

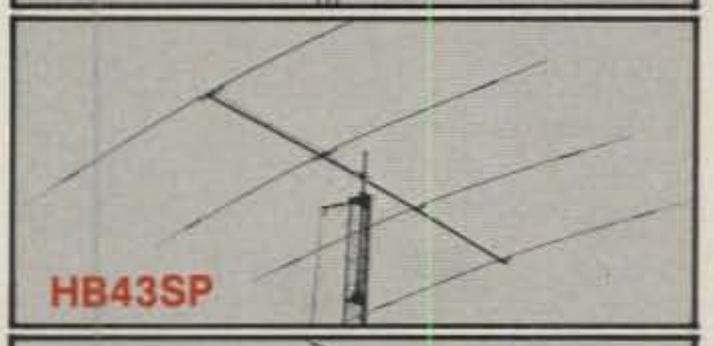

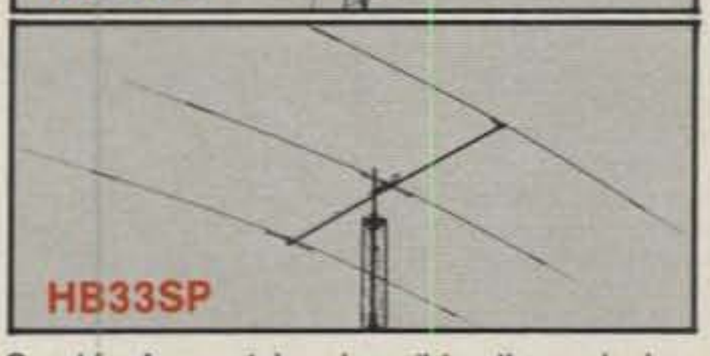

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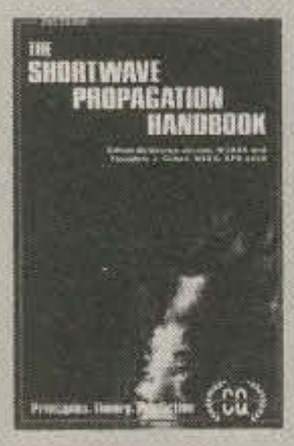

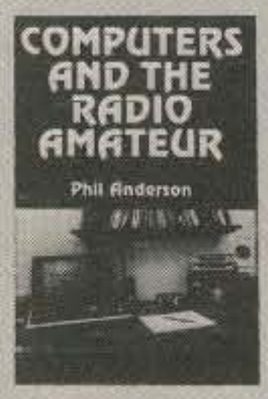

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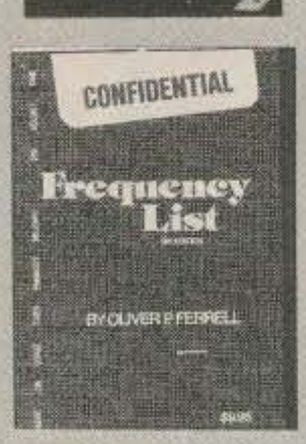

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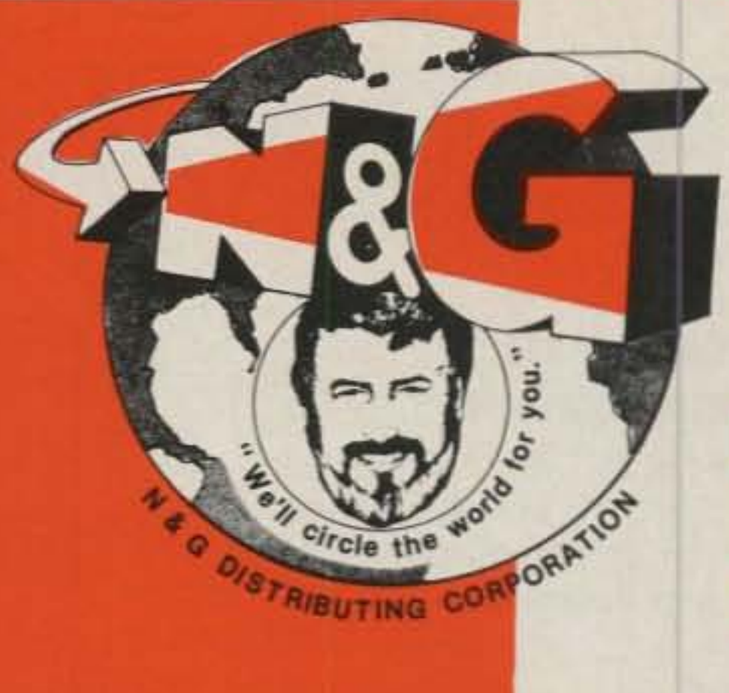

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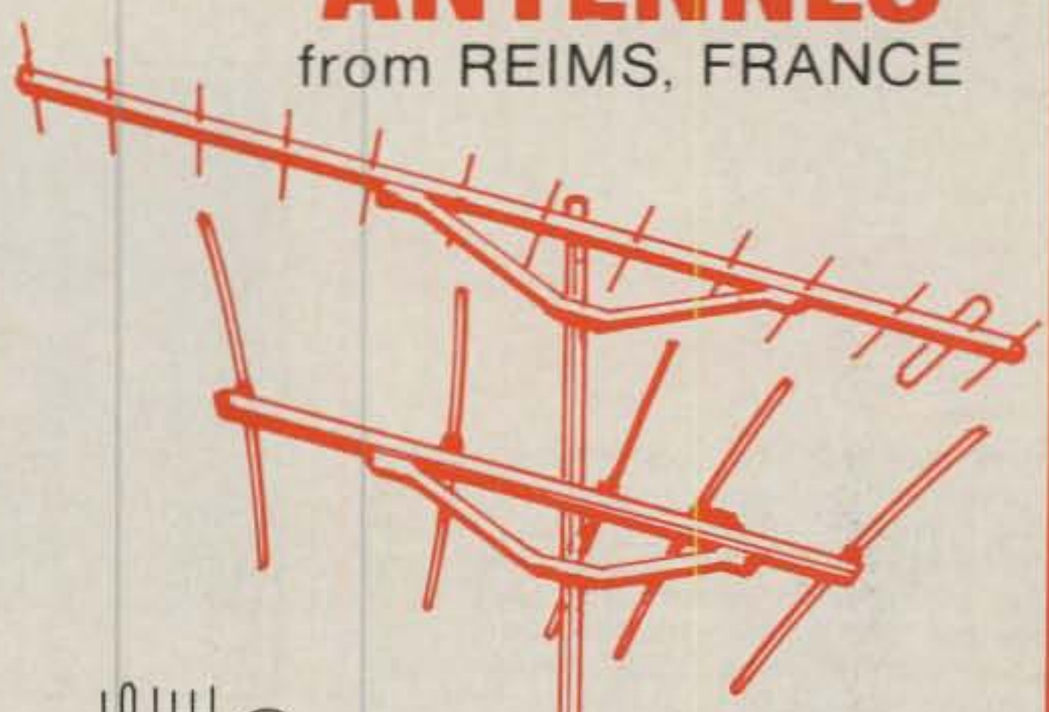

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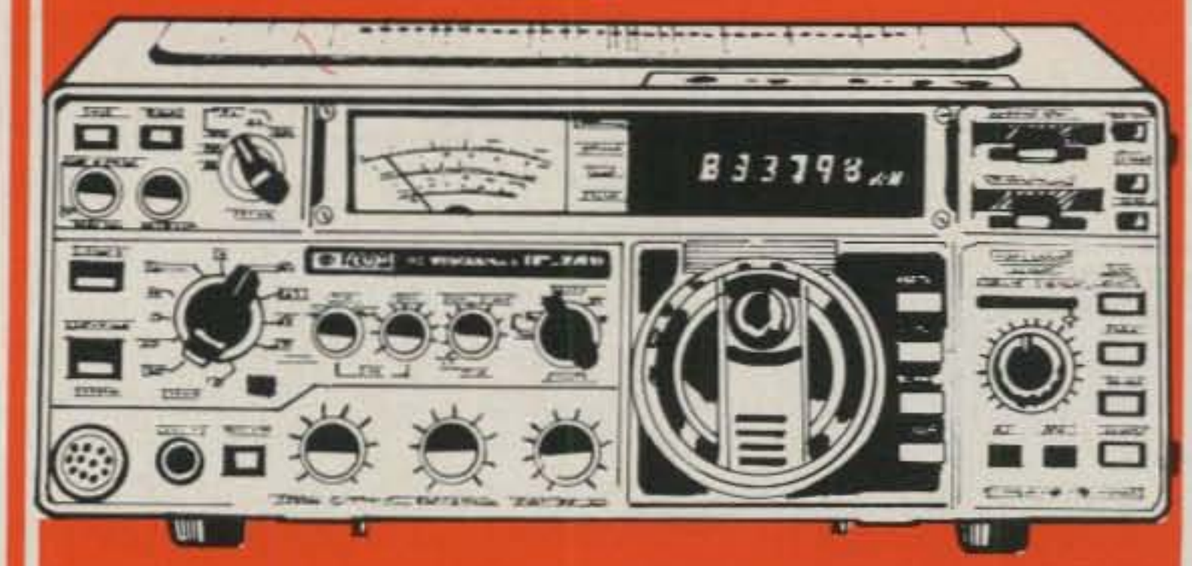

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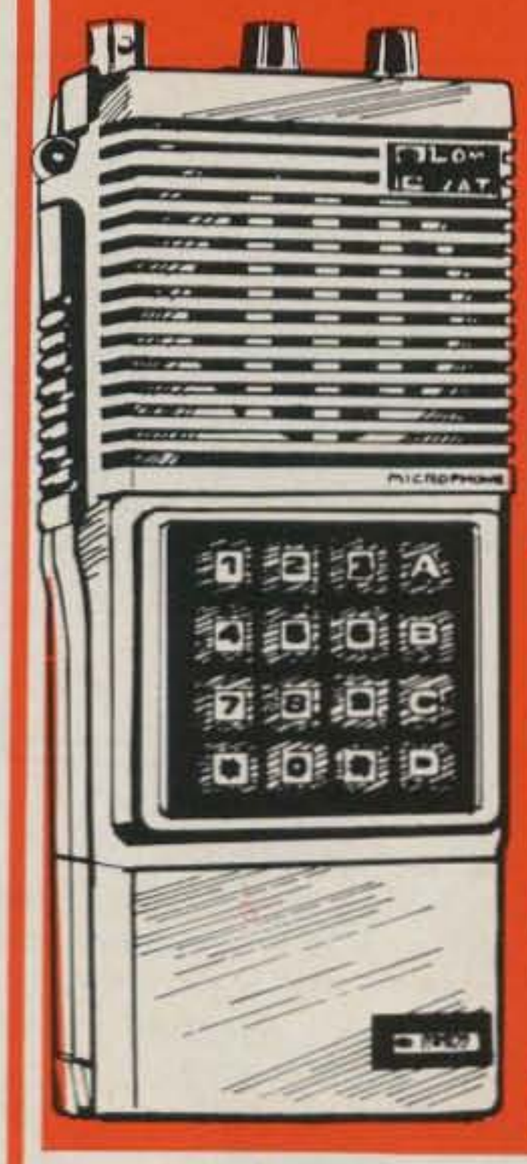

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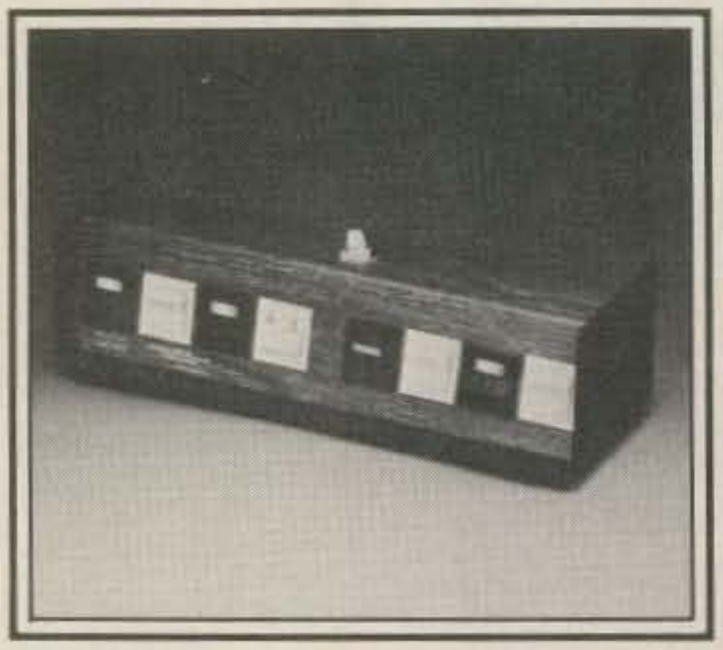
CQ SHOWCASE

Alpha Delta Master AC Control Console

Alpha Delta Communications has introduced its new Master AC Control Console which combines power surge protection and centralized "on/off" control of several components. The MACC unit itself plugs into a single outlet, while providing eight plug-in "U" ground outlets of its own: one "hot" for a continuously powered application such as a clock and seven for individually controllable components.

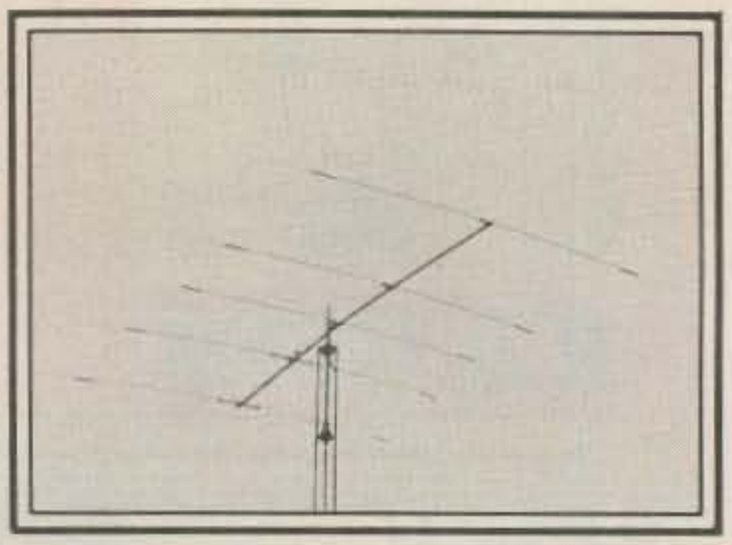


The front panel has rocker switches for the individually controllable components plus a master control "on/off" rocker which allows the entire system to be turned on or off at once. All rockers are lit when "on."

The MACC uses three-stage automatically restorable circuitry to clip off power spikes and surges—plus a manually resettable circuit breaker for further protection. It is rated at 15A, 125 VAC, 60 Hz, 1875 watts continuous-duty total for the console. The MACC is priced at $79.95 (U.S.). For more information, contact Alpha Delta Communications, P.O. Box 571, Centerville, OH 45459, or circle number 105 on the reader service card.

TET Triband Beam

TET Antenna Systems has announced the availability of their top of the line HB35T triband beam. This is a 5-element dual-drive antenna for 20, 15, and 10 meters. With the dual-drive concept both the radiator and the reflector are driven with a phase difference that provides extra gain and improved front-to-back ratio. The beam has only one pair of traps per element for simplicity and reliability. The trap capacitors are coaxial rods mounted

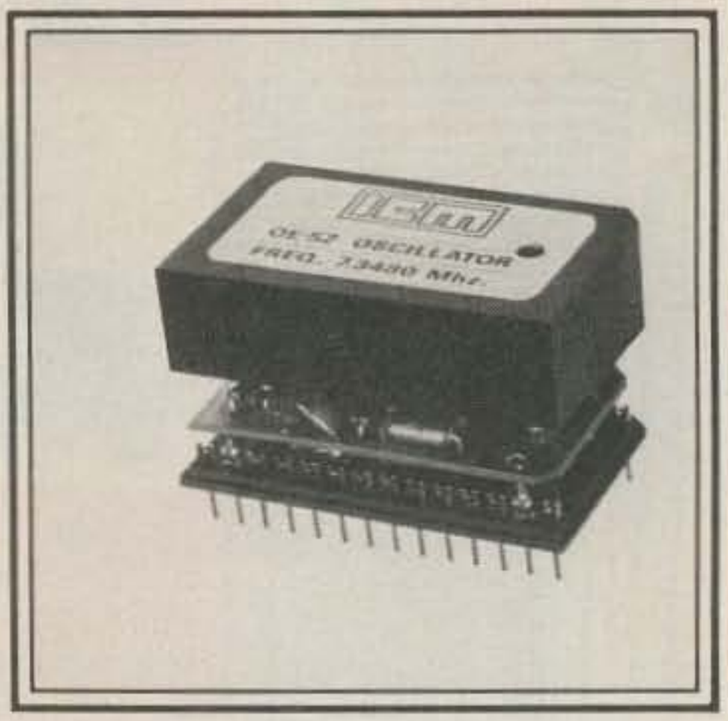


inside the elements to give low losses and weatherproof operation.

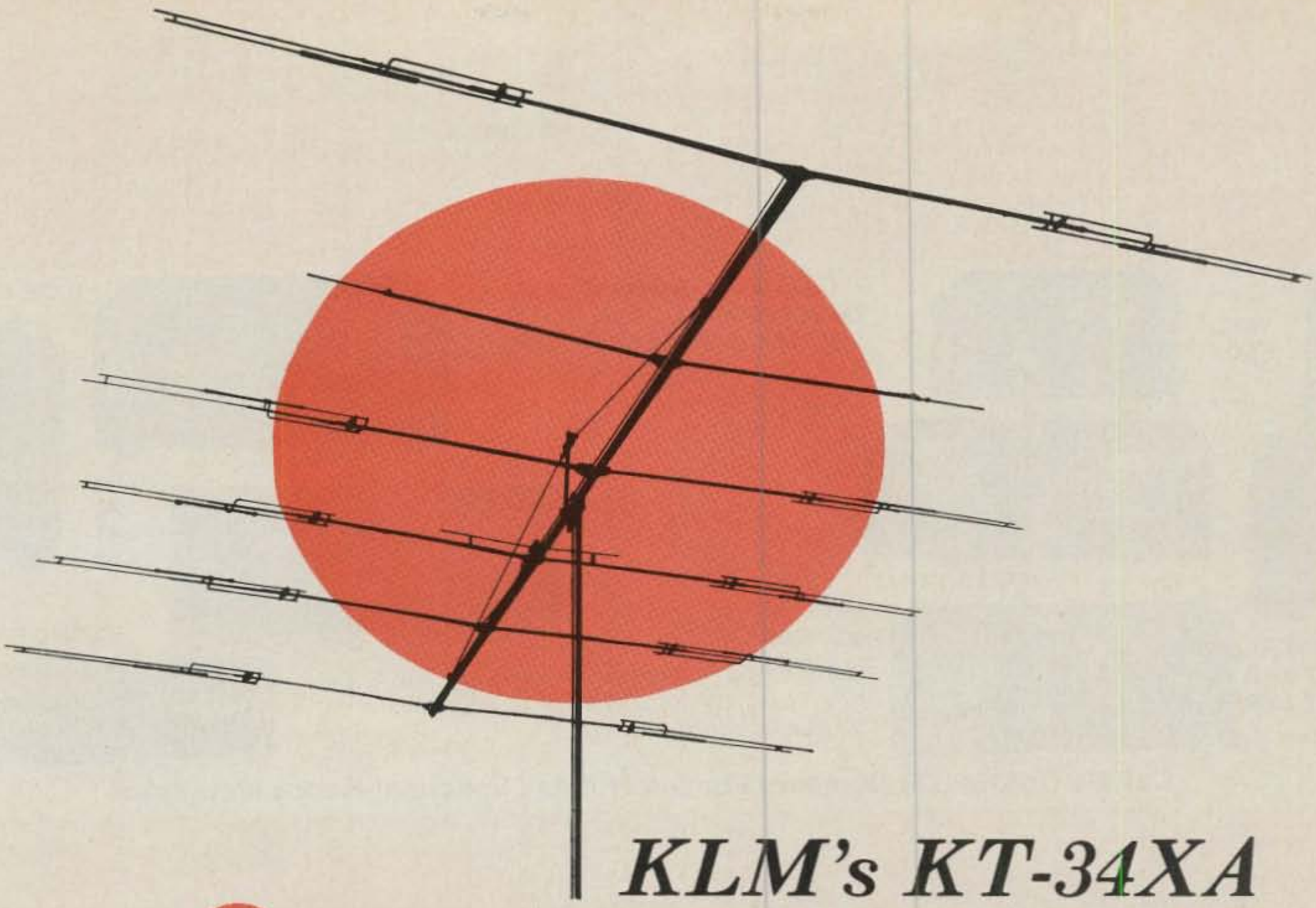
The HB35T has a 25-foot boom, weighs 50 lbs., and provides excellent gain for DX work. The price is $329.95 plus shipping. For further information, contact TET Antenna Systems, 1924E W. Mission Road, Escondido, CA 92025, or circle number 102 on the reader service card.

ICM TTL Output Oscillator

This latest design in International Crystal's "OE" series oscillators features TTL output. The output of the OE-52 and OE-53 is sufficient to drive up to ten TTL loads. The TTL output offers many new general instrumentation design applications in clock circuitry, micro processing, and precise frequency control.



Specifications: input voltage +5 v.d.c. reg.; temperature stability −30° to +60°C; output voltage 5.5v PP, 2.9v RMS; trim range ±10 ppm minimum; size .430″ × 1.45″ × .795″. For more information, contact International Crystal Manufacturing Co., Inc., 10 North Lee, P.O. Box 26330, Oklahoma City, OK 73126, or circle number 101 on the reader service card.



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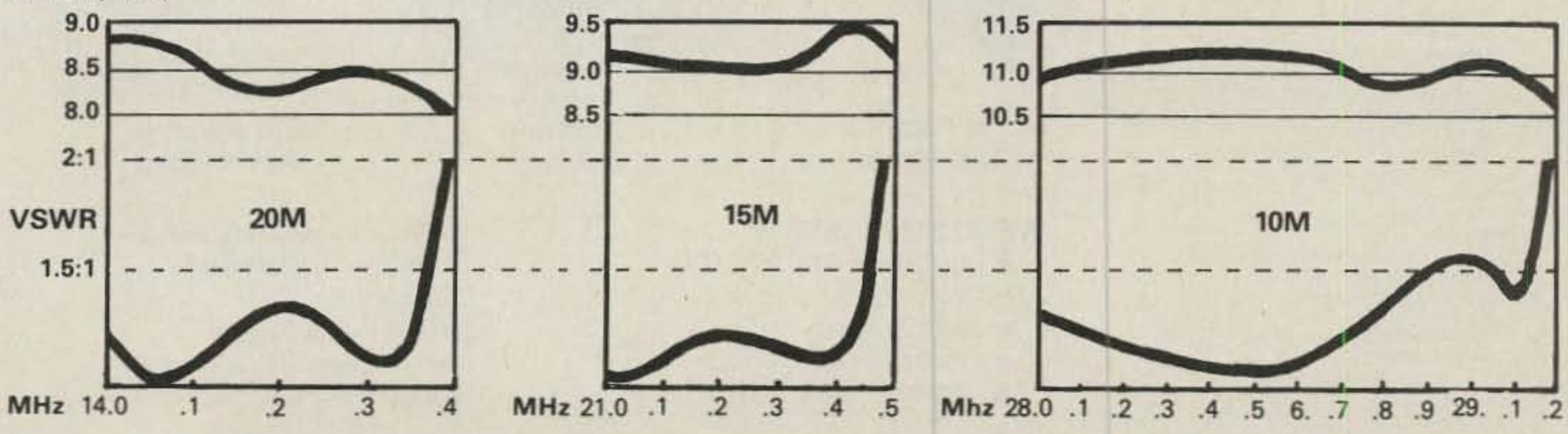
KLM's KT-34XA TRIBANDER is the 2nd generation of a unique new series of antennas designed to provide superior **broadband** coverage on 20, 15, and 10 meters. The combination of lossless linear loading and hi-Q air capacitors enables the KT-34XA to outperform **all** commercial available tribanders and meet or exceed the performance of a conventional stacked monoband system. The lower weight and windload of a single antenna mean reduced tower and rotator requirements. Thus, overall system costs can be kept to a minimum while enjoying the best of monobander-type performance.

KLM's field proven KT-34A is the heart of the "XA" model. The boom length of the "XA", however, has been doubled, and one tri-resonant and one full size 10 meter element have been added. These changes increase the gain to **11-11.3 dBd** on 10M, **9-9.5 dBd** on 15M, and **8.5-9 dBd** on 20M. Two driven elements are used to make the KT-34XA unusually broadbanded (a concept applied to many KLM antennas). Gain is virtually flat across each band except for 10 meters which has been optimized for the DX'er, 28-29 MHz. The chart below shows the remarkable performance qualities of the KT-34XA.

KT-34XA GAIN vs. VSWR



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THE INS AND OUTS OF THE WASHINGTON SCENE

Commission had Full Agenda of Amateur Matters up for Consideration in October–December Time Frame

As we go to press, we have learned from James McKinney, Chief, Private Radio Bureau, and John Johnston, Chief, Personal Radio Branch, PRB, that a number of important matters pertaining to the amateur service should have been addressed by the time this column appears in print. In some cases, readers will find that the Commission has already taken final action.

With respect to the Commission's 21 October 1982 meeting:

- A decision should have been made regarding the issuance of a Notice of Proposed Rulemaking (NPRM) which will propose the elimination of amateur logging requirements. Those wishing to continue the practice, of course, could do so.
- A Report and Order should have been considered to approve the operation of high-frequency (3–30 MHz) amateur beacon stations.
- A Final Order modifying Part 97 should have been considered; the modification, if approved, will provide code credit for amateur licensing purposes to holders of Commercial Telegraphy licenses.
- An NPRM should have been considered to eliminate the mail-back procedures on the Novice class license exam. The NPRM, if issued, will propose that the volunteer examiner develop and administer both the code and theory exams (the latter developed from material approved by the FCC), and that passage of both exams be certified on a Form 610. Submission of this form will then result in the issuance of a Novice class license. This procedure, if adopted, could cut three to four weeks off the time it now takes to license a Novice.

In addition to the above, the Commission was to have addressed amateur access to the 30 meter (10 MHz) band at its meeting on 28 October 1982. It is possible, therefore, that authorization for our use of this band now exists.

Finally, two matters which should have been addressed by the FCC in the October-December 1982 time frame are:

- Issuance of an NPRM seeking public comment on the procedures to be used by volunteer amateur license examiners;
- Issuance of an NPRM seeking public comment on the creation of a no-code amateur license.

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Dr. William Schneider, K2TT, Sworn In as Under Secretary of State

The September issue of the *Chronicle of International Communication* reports that Bill Schneider, K2TT, was sworn in as the Under Secretary of State for Security Assistance, Science and Technology. Schneider formerly served as the Associate Director for National Security and International Affairs in the Office of Management and Budget (OMB). Within the Department of State, he will have the responsibility for directing the activities of all offices which address international communications and information affairs. These include:

- The Bureau of Economic and Business Affairs,
- Office of Transportation and Telecommunications Affairs,
- Office of International Trade,
- Office of International Communications Policy,
- Organization for Economic Cooperation and Development,
- Bureau of International Organization Affairs,
- UN Educational, Scientific and Cultural Organization (UNESCO) matters.

When not pinned behind his desk, Bill can often be found operating in major amateur radio contests as a member of the K2GL team.

Cable TV System Fined $6,000 for Excessive Radiation in Ham Band

The Federal Communications Commission, on 6 October 1982, fined Sonic Cable TV $6,000 for signal leakage in excess of that permitted by the rules ($2,000) and for failing to correct harmful interference to amateur operations ($4,000). Sonic operates cable systems at Grover City, Arroyo Grande, and Pismo Beach, CA.

According to Vern Wilson, Chief, Regional Services Division, Field Operations Bureau, FCC, the Commission had received complaints from local amateur operators for over two years regarding harmful interference they were experiencing from Sonic's cable system. As a result of these complaints, the FCC's Long Beach, CA, field office conducted two on-site inspections of Sonic's cable systems.

During both inspections, Commission engineers found instances of excessive signal leakage. Further, they substantiated the presence of harmful interference at various local amateur installations located in communities served by Sonic.

The Commission, on issuing the fine, said it was apparent that Sonic had failed to take adequate steps to resolve the occurrences of harmful interference and excessive signal leakage on its systems. Both violations were said to threaten the Commission's regulatory goal of compatibility between the shared use of frequencies by cable systems and various co-located over-the-air licensed services.

UoSAT Restored to Useful Life

The UoSAT Salvage Team at SRI International has succeeded in restoring UO-9 to useful service. After an accidental command in April 1982 had commanded both the 2 meter and 70 cm beacons to turn on simultaneously, the command receivers at 2 meters and 70 cm were so desensed that the satellite was unable to respond to ground station commands. The only solution was to find an earth station with sufficient effective radiated power (ERP) to overcome one of the desensed command receivers. The station at SRI International was selected for the chore since the dish exhibits about 42 dBd gain at 70 cm. Given the SRI transmitter's power, this antenna would (and did) permit at least 12 megawatts (!) ERP to be targeted on UO-9.

The UO-9 rescue effort was under the direction of Dr. Robert Leonard, KD6DG, Director of the Radio Physics Laboratory at SRI. Supporting the effort were K1WHS at Lebanon, ME, and the UoSAT Program Office at the University of Surrey, England, the latter under the leadership of Dr. Martin Sweeting, G3YJO.

Successful completion of the SRI effort occurred on 20 September 1982 at 2235 GMT. At that time, the SRI team,

sending a command on 70 cm, heard the 2 meter transmitter on 145.825 MHz fall silent.

The entire staff at *CQ* joins your Washington Editor in congratulating the SRI International team and their supporting groups on this extraordinary achievement by amateur service licensees.

Stephen A. Sharp Approved by Senate for Seat on the Commission

The senate has approved the appointment of Stephen A. Sharp to a seat on the FCC's commission. Sharp had held the position of general counsel to the FCC.

Sharp, a Republican, is only scheduled to serve a nine-month term rather than the usual seven-year term. The reason for this is that Sharp will assume Commissioner Washburn's seat, which expires 30 June 1983, and at that time the commission will be reduced from seven members to five (Commissioner Joseph Fogarty's term also expires on 30 June).

Given the Reagan Administration's strong backing of the Sharp nomination, Washington insiders are betting that if another seat on the commission becomes available before 30 June, Sharp will be appointed to fill the vacancy, thereby permitting him to serve a longer term.

Cordless Telephones Pose Threat to Amateur 2 Meter Operations

As reported in *The WESTLINK Report*, a new type of cordless telephone manufactured for export only could, if operated in the U.S., cause interference in the band 143–147 MHz. The telephone, Noncord DX Model NC-20M, is touted by the manufacturer as having a range of 20 miles, with greater ranges possible using an optional gain antenna.

Another manufacturer is producing a similar system: the Rovo/Pro Cordless Long Range Telephone.

Advertisements for both systems fail to mention that operation in the U.S. is illegal. If you suspect that interference encountered on the 2 meter band is caused by the operation of either the Noncord or Rovo/Pro cordless telephones, notify your local FCC engineer-in-charge or the Field Operations Bureau, FCC, 1919 M Street NW, Washington, D.C. 20515.

First Commercial Shortwave Station in U.S. Starts Operation

The first commercial shortwave station, WRNO of New Orleans, LA, has commenced operation. Of interest to amateurs is Bill Hauser's "World of Radio" program which can be heard on Saturday and Sunday evenings. According to *Hamgram* (published by the Electronic Equipment Bank of Vienna, VA), Hauser's program covers many areas of interest to the shortwave listener.

WRNO would appreciate receiving reports from listeners noting date and time heard, frequency, and signal strength. All reports will be confirmed with a beautiful WRNO QSL card.

Reports of reception and requests for WRNO's broadcast schedule should be sent to WRNO, P.O. Box 100, New Orleans, LA 70181.

Speed-O-Matic Ordered to Show Why its Products Should Not Be Decertified

The Speed-O-Matic Corporation of Harbor City, CA, was recently ordered by the FCC to defend the certification of its electronic speedometer. If the company cannot show why the product's certification should be left intact, the speedometer would have to be taken off the market.

As reported in *The Washington Post*, the company is alleged to have " . . . improperly modified (its product) to help drivers avoid speeding tickets." Specifically, the modified units emit signals which interfere with the proper operation of police radar systems by making it appear that the car is traveling more slowly than it really is.

NASA Publishes New WX Satellite Book

As noted in *AMSAT Satellite Report*, NASA has recently published a book which will be of interest to the amateur satellite community. According to Amateur Satellite Corporation's Dr. Martin Davidoff, K2UBC, the book, *Teacher's Guide for Building Weather Satellite Ground Stations*, was written by R.J. Summers and T. Gotwald of NASA. For information on the book's availability, write to Educational Programs Branch, Office of Public Affairs, NASA, Goddard Space Flight Center, Greenbelt, MD 20771.

AMRAD Announces Successful Packet Radio Test Using OSCAR

According to the *AMRAD Newsletter* for October 1982, Robert Diersing, N5AHD, successfully passed a packet through OSCAR 8 on 1 September 1982 using nbfm modulation and Mode J. Several additional tests were successfully completed on 6 September using s.s.b. All of the packet tests involved transmission from, and reception by, N5AHD. Additional tests are planned, and those who desire to participate in the program should contact AMRAD, 1524 Springvale Avenue, McLean, VA 22101.

Geraldine Sweeney, N4GHI, pauses between QSO's at a recent demonstration of amateur radio, while Steve Schneider, WB4EEA, explains the Mt. Vernon Amateur Radio Club's license preparation program to several interested s.w.l.'s. Also participating in the on-the-air demonstration (not pictured) was Jeff Olson, WD4ARO. (Photo by Melissa L. Cohen)

Mt. Vernon Amateur Radio Club Represents the Best in Amateur Radio

Public service and assistance to newcomers . . . these are the hallmarks of the Mt. Vernon Amateur Radio Club. Interviewed at a recent Club-sponsored demonstration of amateur radio in a suburban Washington, D.C. shopping center, the President, "Pete" Jones, KE4MA, stated that his group is dedicated to providing emergency service to jurisdictions in the D.C. area. To this end, many of the Club's members were commended for their participation in the January 1982 Air Florida crash. Pete also noted that the Club has an active license preparation program, and within the last 10 months it has "graduated" nine Novices, five Technicians, and two Generals. The Mt. Vernon Amateur Radio Club has over 100 members who represent the government, military, and private sectors. For more information on this dynamic organization, call in on the Club's repeater during any Tuesday evening meeting (146.655/055 MHz) or on 10 meters (28.9 MHz) following each meeting.

Your Washington Editor thanks Mr. Richard Smith, Chief, Field Operations Bureau, FCC, for his contributions to this month's column.

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Novice Roundup

The American Radio Relay League (ARRL) sponsors the Novice Roundup (NR) Contest each February. The Novice class of license came into existence in 1951, and the first Novice Roundup was held in 1952. This year's NR is the 32nd.

The name "Novice Roundup" began many years before Technician licensees were granted code operating privileges in the so-called Novice bands. The name remains appropriate because operation remains confined to the frequency segments (bands) available to Novice class licensees on a shared basis with all other classes of American amateur radio licensees.

Dennis Sams, KA7LCX, of Livingston, Montana, has been a Novice since July 1981, and he is about ready to become a General. Dennis operates on 15 and 40 meters and has all but two states confirmed towards earning the WAS (Worked All States) award. He enjoys being the first Montana contact for many amateurs, and he has found it fascinating to get to know other amateurs during on-the-air contacts. His station includes a Yaesu FT-101-ZD transceiver, a 5-band vertical, and an inverted Vee antenna.

Participants

This contest is primarily for American Novice and Technician class licensees, but General, Advanced, Extra, and foreign (DX) operators are also invited to operate in it. Novices and Technicians can work all amateurs (Novice, Technician, General, Advanced, Extra, and DX), but General, Advanced, Extra, and DX amateurs are only allowed to work Novices and Technicians in the contest. This is a good rule, because it guarantees that at least one Novice or Technician is involved in each NR contact.

Benefits

I advise you to operate in the NR even if you have a poor station and/or low code proficiency. It will be nice if you get a certificate (see picture of ARRL Novice Roundup Certificate of Merit) for working at least 200 NR contacts, and you will have just cause to be extremely proud if you are the top scorer in your ARRL section, or one of the top ten scorers in the country.

However, you do not need to achieve these lofty accomplishments to benefit from NR activity. This contest provides a great opportunity to contact amateurs in many counties, states, and countries. You probably can work more different contacts during one day of the NR contest than you normally work in a month. These contacts can help you qualify for hundreds of operating awards.

NR operation will let you judge your operating skills and station performance against those of other operators. NR participation can also help you increase code receiving and sending proficiency. You can benefit in many ways by operating in contests, and there are contests every week, as listed in the Contest Calendar of this magazine.

2814 Empire Ave., Burbank, CA 91504

Competition and Awards

This contest provides a unique opportunity for Novices and Technicians to compete on the air against other Novices and Technicians in their own ARRL sections, plus against those who operate from other ARRL sections. Novices just compete against Novices, and Technicians only compete against Technicians; Novices and Technicians do not compete against each other in this contest.

The ARRL issues a nice certificate to each Novice and Technician who makes at least 200 NR contacts, and an ARRL certificate is awarded to the top-scoring Novice and Technician in each ARRL section. The ARRL also issues appropriate certificates to the top ten scorers in the country.

General, Advanced, Extra, and foreign (DX) amateurs are invited to take part in the NR contest, but they are not eligible for NR certificates. These operators provide contacts, cards, and code practice for Novices and Technicians.

Multi-operator stations (two or more operators using the same callsign at one location, including loggers) are also ineligible to win NR contest awards. This rule keeps it a one-on-one contest and prevents a group (such as a club) from competing directly against an individual Novice or Technician operator.

No certificates are awarded to DX Novices who operate in the NR. However, American Novices will greatly appreciate opportunities to contact DX amateurs, and I hope many of you will be on the air. Very few (150) Novices and Technicians will earn a contest certificate, but the others are likely to be happy with a few DX contacts.

Dates and Times

The NR contest starts at 0001 UTC on the 29th of January, and it ends at 2359 UTC on the 6th of February. To state it more simply, it starts Friday evening January 28th (local time), and it ends Sunday evening February 6th. The NR starts one minute past 4, 5, 6, and 7 p.m. PST, MST, CST, and EST, respectively. Similarly, the NR ends one minute before 4, 5, 6, and 7 Pacific, Mountain, Central, and Eastern Standard Times, respectively.

The NR contest length is 215 hours and 58 minutes. Novices and Technicians are allowed to work a maximum of 30 hours in the NR. The NR log must show each time one goes on and off the air during the contest, and the minimum allowable time off the air is 15 minutes. Listening time on the air counts as contest operating time, and it must not be shown as time off the air. I advise you to be completely honest in all contest matters; it helps you to accurately gauge your improvement in subsequent contests.

Operating

Bands. All NR contacts must be made in the 80, 40, 15, or 10 meter Novice bands. No crossband contacts are allowed, such as listening on 10 meters and calling or answering on the 15 meter Novice band. It does not help to work the same station more than one time on a

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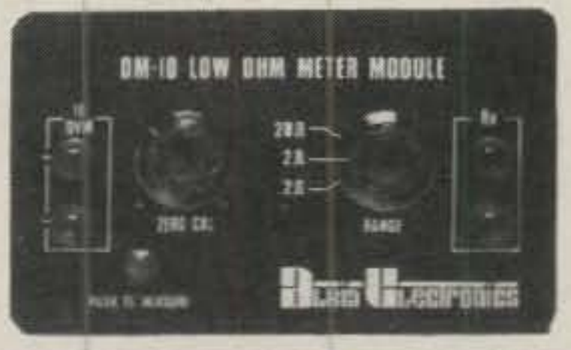
LOW OHM METER MODULE, DM-10

Measure resistance from 10 milliOhms to 20 Ohms. Now you can measure resistance down to 10 milliOhms with this low cost, easy to use DVM module. Check coil resistance, transformers, relays, chokes, printed circuit board copper paths and ground cables. Special zero balance control nulls out input cable resistance to insure accurate readings. Your DVM has to be set to 2V range during operation.



- Resistance range 10 milliOhms to 20 Ohms
- Zero Calibration control
- Battery powered (push to read battery saver circuit). Requires 9 Volt Battery (not included)
- Size 6.25" x 3.75" x 2"
- Incl. Model 336 Test Clips

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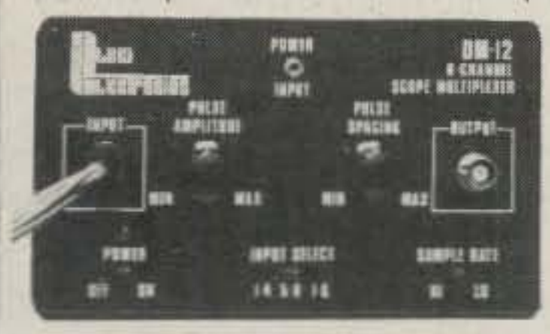

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- Zero Calibration control
- In one easy to use, self-contained package
- Battery powered, with "push to read" battery saver circuit (9V batteries not included)
- Size 6.25" x 3.75" x 2"
- Includes Model 336 Test Clips

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PORTABLE SELF-CONTAINED CIRCUIT DESIGNER, DM-5

Contains 8 LEDs and 8 logic switches.

- Control switches and buffered LED logic indicators
- Plug your ICs into solderless breadboards, tie in power and ground, connect your logic switches and LED indicators
- All interconnections between LEDs, switches and circuits via 22-26 solid wire
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Also available in 4 LEDs and 4 logic switches. MODEL DM-5A

*Batteries not included

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- Convenient benchtop size (7" x 10" x 3") durable attractive case

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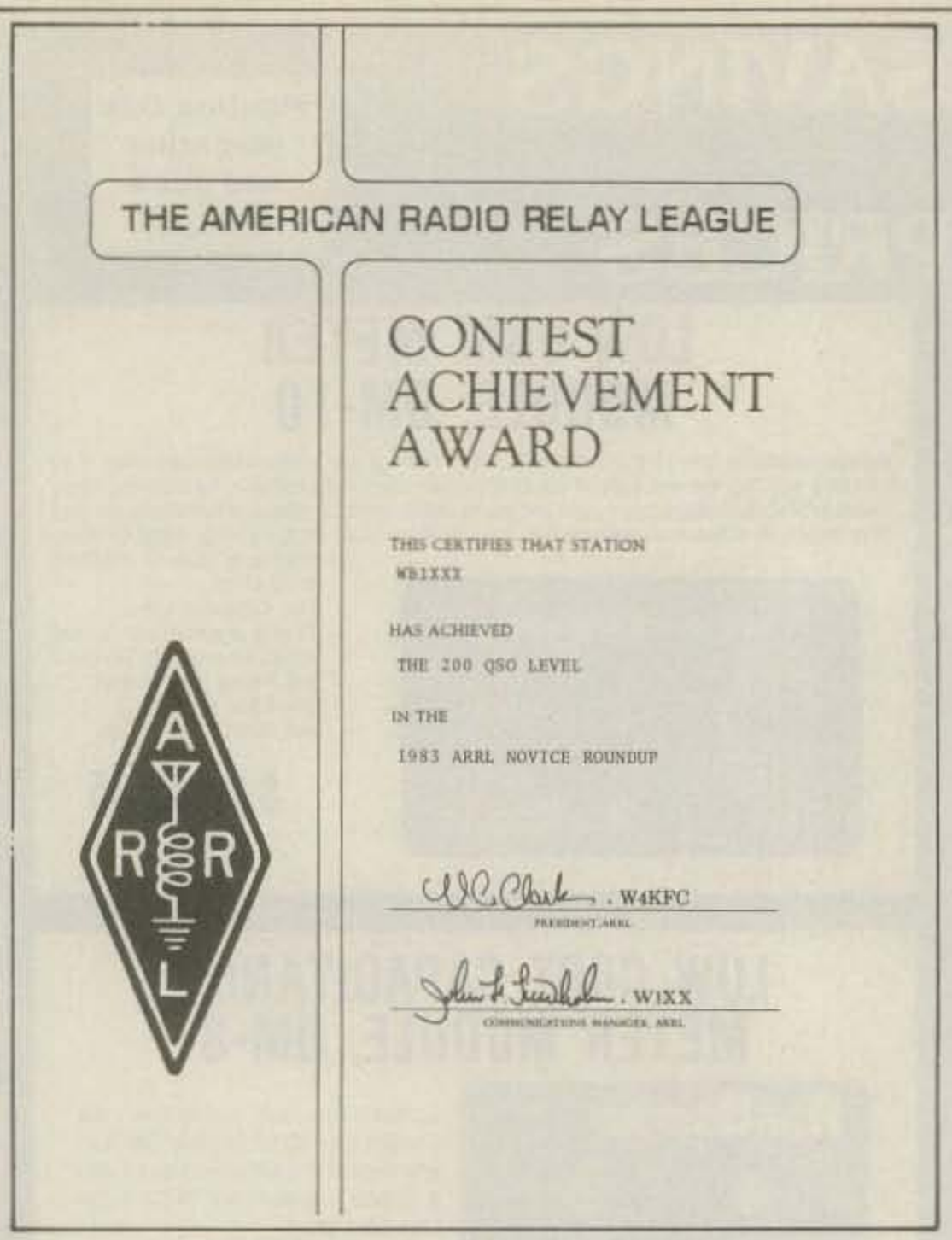

THE AMERICAN RADIO RELAY LEAGUE

CONTEST ACHIEVEMENT AWARD

THIS CERTIFIES THAT STATION
WB1XXX

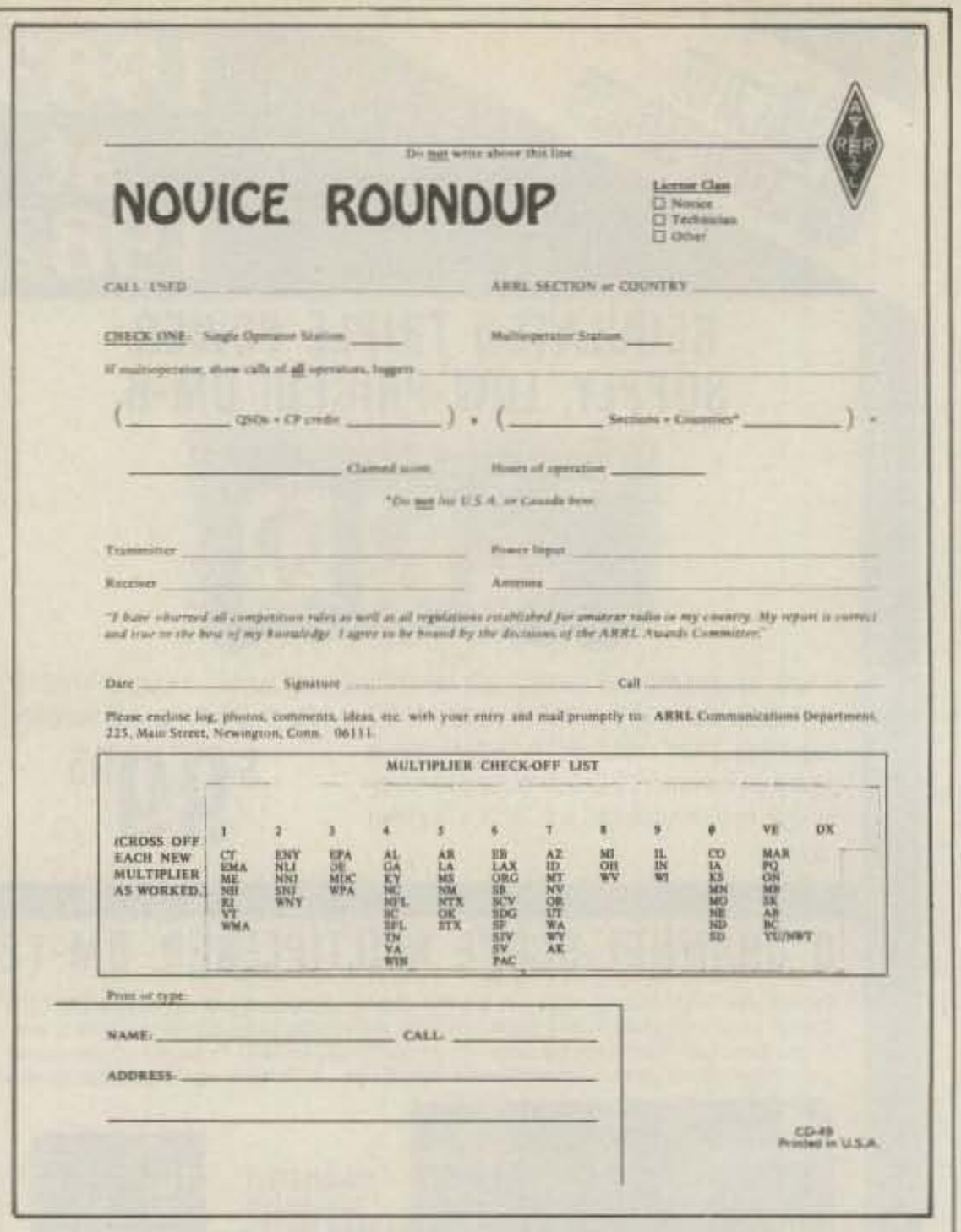
HAS ACHIEVED
THE 200 QSO LEVEL

IN THE
1983 ARRL NOVICE ROUNDUP

W4KFC
PRESIDENT, ARRL

W1XX
COMMUNICATIONS MANAGER, ARRL

The ARRL Novice Roundup Certificate.


Do not write above this line

NOVICE ROUNDUP

License Class
☐ Novice
☐ Technician
☐ Other

CALL USED _____ ARRL SECTION or COUNTRY _____

CHECK ONE: Single Operator Station _____ Multioperator Station _____

If multioperator, show calls of all operators, loggers _____

(_____ QSOs × CP credit _____) + (_____ Sections + Countries* _____) =

_____ Claimed score Hours of operation _____

*Do not list U.S.A. or Canada here.

Transmitter _____ Power Input _____

Receiver _____ Antenna _____

"I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge. I agree to be bound by the decisions of the ARRL Awards Committee."

Date _____ Signature _____ Call _____

Please enclose log, photos, comments, ideas, etc. with your entry and mail promptly to: ARRL Communications Department, 225, Main Street, Newington, Conn. 06111.

MULTIPLIER CHECK-OFF LIST

(CROSS OFF EACH NEW MULTIPLIER AS WORKED.)

1	2	3	4	5	6	7	8	9	0	VE	DX
CT	ENY	EPA	AL	AR	EB	AZ	MI	IL	CO	MAR	
EMA	NLI	OE	GA	LA	LAX	ID	OH	IN	IA	PQ	
ME	NNJ	MDC	KY	MS	ORG	MT	WV	WI	KS	ON	
NH	SNJ	WPA	NC	NM	SB	NV			MN	MB	
RI	WNY		NFL	NTX	SCV	OR			MO	SK	
VT			SC	OK	SDG	UT			NE	AB	
WMA			SFL	ETX	SF	WA			ND	BC	
			TN		SJV	WY			SD	YU/NWT	
			VA		SV	AK					
			WIN		PAC						

Print or type:

NAME: _____ CALL: _____

ADDRESS: _____

CD-49
Printed in U.S.A.

Sample summary sheet.

band, or on more than one band, since credit is just allowed for one contact with each different station worked. It is fairly common to have DX amateurs call American Novices using voice (usually s.s.b.) on the 10 and 15 meter Novice bands; these crossmode (voice-code) contacts do count in the NR, as long as both sides of the contact are within the same Novice band. Keep up-to-the-minute dupe sheets (the dupe sheets are two-sided) of all stations contacted during the NR to help you avoid working the same station more than one time.

Identification. Novices add /N and Technicians add /T to their callsigns during this contest to indicate their eligibility to all amateurs participating in the NR. As examples, a Novice with a callsign such as KA4ABC uses KA4ABC/N, and a Technician with a callsign such as WA6FNM uses WA6FNM/T during the contest. Out-of-area operation is also indicated in callsigns to minimize confusion. As an example, if a Technician with an apparent California callsign, such as WA6FNM, is operating in the NR from Louisiana, he would identify as WA6FNM/5T to indicate that he is operating from the ARRL Louisiana section instead of the Los Angeles section.

General, Advanced, and Extra class licensees are not required to indicate class of license as part of the callsign used in the NR. However, many of us use /G, /A, or /E to make it very clear to other General, Advanced, Extra, and DX amateurs that we are not valid NR contacts for them; we are only valid NR contacts for Novices and Technicians. This additional identification is particularly useful in cases in which callsigns such as KA6CUT and WB6PNY are used. Such callsigns might lead one to believe that these amateurs are Novice or Technician licensees, whereas they are both Extra class amateurs.

Objective. The idea is to work as many amateurs as possible in all the countries and ARRL sections you can contact. It is very helpful to maintain a check sheet to let you see at a glance which countries and ARRL sections you still need to multiply your NR score as you operate in the contest. It is simple to start with a list that shows all ARRL sections grouped by callsign areas and to cross out each section as it is worked to show that it is no longer needed as a contest multiplier. The accompanying list of ARRL sections can be reproduced to serve as an aid.

Each time a new section or country is worked, it must be indicated (in sequence) in the NR log. Simply start with number one and continue up as you earn multipliers, including countries.

More than one section abbreviation is shown in the ARRL sections list, if more than one is known to be commonly used. Very few foreign amateurs are usually contacted during this contest, and it is common practice to simply add the callsign of the first amateur contacted in each country to the check-off list to show it is no longer needed for NR multiplier credit.

Typical Contact. As is true in all contests, NR contacts should be as brief as possible. A typical good NR contact between KA4ABC and W6JEP in the first few days of this contest could be as follows:

CQ NR CQ NR CQ NR CQ NR CQ NR DE KA4ABC/N
CQ NR CQ NR CQ NR DE KA4ABC/N KA4ABC/N
CQ NR CQ NR CQ NR DE KA4ABC/N KA4ABC/N KA4ABC/N NR K

KA4ABC KA4ABC DE W6JEP W6JEP NR K

W6JEP DE KA4ABC BT 579 NC 579 NC BK

BK R 589 LA 589 LA DE W6JEP BK

BK R 73 CQ NR CQ NR CQ NR DE KA4ABC/N KA4ABC/N NR K

Look at the preceding typical exchange and evaluate it very carefully with regard to the comments in the rest of this paragraph. In the initial call, KA4ABC included the /N each time with his callsign to indicate contact eligibility to all other amateurs. Notice also that the number of CQ NR transmissions decreased from five to three and station identification increased from one to three during the calling sequence, and the NR contest activity was again indicated prior to the invitation to transmit (K). When W6JEP answered the call, she just identified both stations twice, left off the /N, and indicated contest participation by sending NR before the invitation to transmit. Once the two-way contact has been established, there

is no need to continue using /N or /T.

The KA4ABC reply to W6JEP is very brief; the callsigns are just sent one time each and only at the beginning of the reply. The RST report and ARRL section are sent twice to minimize possible requests for repeats. Neither the term RST nor the word *section* precedes the report and League section, since it is obvious what both are, and the break sign (BK) is used to eliminate unnecessary identifications. During contest activity, a series of short transmissions is not likely to extend 10 minutes, and the identification shown in the sample exchange suffices. Note that the W6JEP response is short; the R advises that the KA4ABC contest data has been received. W6JEP then sends the report (RST) and her section twice, identifies with just her callsign to give KA4ABC assurance that he is copying the correct signal, and sends the break sign to invite KA4ABC to respond.

When KA4ABC answers, he sends R to indicate the contest data has been received, he may send best regards (73), and he then sends a short contest call in case another station is waiting for a contest contact. When the short call is sent, the /N is again added to indicate contest eligibility to all amateurs. This indicated brief exchange is further abbreviated after the first few days the contest has been in progress, but the sample exchange is suitable at the start of each year's NR.

After the first few days of NR activity, shorten the call to a single 3 by 3 or 2 by 2 (CQ NR CQ NR DE KA4ABC/N KA4ABC/N NR K, as an example) and listen carefully (above and below your transmitting frequency) for answers before repeating this call. The rest of the previous explanation holds true when using this preferred shorter calling procedure.

Brevity. Do not routinely exchange normal contact information during contest contacts. In other words, do not send your name, location (QTH), rig, antenna, weather (WX), or mailing address information as parts of contest contacts. Keep each contact brief. Do not send faster than you can receive accurately; let the other fellow slow down to a speed you can copy. If the other operator sends too fast, tell her/him to send more slowly (QRS).

If you contact a state or country you need to have confirmed, simply request a QSL when you send your card. I send a card to each amateur contacted for the first time, which is not a common practice among most amateurs. However, most amateurs send a QSL in response to each card received. If all amateurs just responded to cards received, none would be exchanged. Nevertheless, if received cards initiate completion of the QSL exchange, that is okay; the person who wants the other amateur's card is simply the one who begins the exchange.

Logging

Required Entries. Your NR log must show the time each contest contact started. It is preferable to use Universal Time Coordinate (UTC) when logging radio contacts, since it eliminates possible time zone confusion. Most experienced amateurs only use UTC. UTC is still called Greenwich Mean Time (GMT). Greenwich Civil Time (GCT), Zebra time, or Zulu (Z) time is by many amateurs, and they are all meant to indicate the same time. However, UTC has been the correct term for several years and it should be used. The other amateur's callsign (/N and /T indicators not required) and ARRL section (or county) must be logged for each contact. Received and sent signal (RST) reports must both appear in the NR log. Your station callsign and dates of contest operation are also required. (See typical Novice Roundup log form.)

Forms. Special NR contest log sheets can be requested from the American Radio Relay League, 225 Main Street, Newington, Connecticut 06111.

The NR logs do not have to be mailed to the ARRL until one month after the contest ends, so you should have time to request logs from the ARRL, fill them in, and mail them. If you transcribe NR contest entries from your original log, be sure to repeat all contact information on the forms to be turned in. ARRL entry forms and summary sheets (see sample) should also be requested to accompany your contest logs. Send a self-addressed and stamped envelope (s.a.s.e.) with your request for these ARRL forms and send your request without delay. The ARRL also has contest check sheets. You should request the ARRL forms immediately so that you will receive them in time for this contest.

Submitted Material. The contest material submitted to the ARRL is not returned, so do not send your only (original) log sheets. It is a simple matter for most of us to duplicate material before mailing it to the ARRL. Take your time and try to submit correct material that is easy to read. Checking contest entries is a tough job, but you can make it easier for League checkers by turning in good material. The League appreciates receiving check logs

ARRL 74 Sections Check-Off List

(1)	CT	CONN	Connecticut
	EMA	E MASS	Eastern Massachusetts
	ME		Maine
	NH		New Hampshire
	RI		Rhode Island
	VT		Vermont
	WMA	W MASS	Western Massachusetts
(2)	ENY		Eastern New York
	NLI		New York City and Long Island
	NNJ		Northern New Jersey
	SNJ		Southern New Jersey
	WNY		Western New York
(3)	DEL	DE	Delaware
	E PA	E PENN	Eastern Pennsylvania
	MDC	MD or DC	Maryland or District of Columbia
	W PA	W PENN	Western Pennsylvania
(4)	AL	ALA	Alabama
	GA		Georgia
	KY		Kentucky
	NC	N CAR	North Carolina
	N FL	N FLA	Northern Florida
	SC	S CAR	South Carolina
	S FL	S FLA	Southern Florida
	TN	TENN	Tennessee
	VA		Virginia
	WIN		West Indies (KG4, KP4, KV4, etc.)
(5)	AR	ARK	Arkansas
	LA		Louisiana
	MS	MISS	Mississippi
	NM		New Mexico
	N TX	N TEX	Northern Texas
	OK	OKLA	Oklahoma
	S TX	S TEX	Southern Texas
(6)	EB	E BAY	East Bay
	LAX	LA	Los Angeles
	ORG		Orange
	PAC		Pacific (KH6, etc.)
	SB	S BAR	Santa Barbara
	SCV		Santa Clara Valley
	SDG		San Diego
	SF		San Francisco
	SJV		San Joaquin Valley
	SV		Sacramento Valley
(7)	AK	ALAS	Alaska
	AZ	ARIZ	Arizona
	ID	IDA	Idaho
	MT	MONT	Montana
	NV	NEV	Nevada
	OR	ORE	Oregon
	UT		Utah
	WA	WASH	Washington
	WY	WYO	Wyoming
(8)	MI	MICH	Michigan
	OH		Ohio
	WV	W VA	West Virginia
(9)	IL	ILL	Illinois
	IN	IND	Indiana
	WI	WIS	Wisconsin
(0)	CO	COLO	Colorado
	IA		Iowa
	KS	KANS	Kansas
	MN	MINN	Minnesota
	MO		Missouri
	NE	NEBR	Nebraska
	ND	N DAK	North Dakota
	SD	S DAK	South Dakota

Canadian Provinces

MAR	VE1	Maritimes or Newfoundland
PQ	VE2	Quebec
ON	VE3	Ontario
MB	VE4	Manitoba
SK	VE5	Saskatchewan
AB	VE6	Alberta
BC	VE7	British Columbia
NWT/ YU	VE8	Northwest Territories or Yukon

CONTEST
DUPE SHEET

CALL _____ BAND _____ MODE _____

	AA—AL complete	KA—KZ college	K	N	W	WA sufficient only	WB	WD	VE	
1										1
2										2
3										3
4										4
5										5

Sample dude sheet. (These forms two-sided.)

Novice Roundup

CALL USED _____ SECTION _____

50 QSOs per side
Number each new multiplier as worked

FREQ.	DATE/TIME GMT	STATION WORKED	EXCHANGE SENT	EXCHANGE RCVD*	POINTS

CD-48(107M) -over- Printed in U.S.A.

Sample log sheet. (These forms are two-sided.)

from General, Advanced, Extra, and DX operators who take part in the NR.

Scoring

Contact Points. One point is earned for each station contacted while on the air in the NR, whether or not contacted amateurs are participating in the contest, as long as the report and ARRL section are obtained.

Code Proficiency Points. If you have an ARRL code proficiency certificate, your stated receiving speed (words per minute) is added to your point total for the stations you contacted. If you do not hold an ARRL code proficiency certificate, or if you want to increase the rate shown on your certificate, you can submit your January or February W1AW or W6OWP qualifying copy with your NR material to claim these extra points.

Multipliers. The total number of points derived from your contest contacts and your ARRL (not FCC) certified code proficiency rate are multiplied by the number of foreign countries and ARRL sections you contacted during your NR contest operation. Remember that Alaska, Canadian Provinces, Hawaii, and the West Indies (Guantanamo Bay, Puerto Rico, and Virgin Islands) are ARRL sections and they do not count as countries.

Summary

I hope to contact you on one of the Novice bands. I was never a Novice because that class of license did not exist when I was getting started in our amateur radio service. Nevertheless, I work about 1,000 Novice band contacts every year, and I have participated in each Novice Roundup. When the NR contests were held in the 1952 through mid-1970 era, the Novice license was just valid one year. It could not be renewed, and it was not available to anyone who had previously held any class of amateur radio operator license. In that time frame, no Novice could compete in more than one NR as a Novice, and newer Novices seldom participated at all. Novice licenses now are valid a maximum of five years and they can be renewed, which means that Novices can be experienced in previous NR contests, and improved scores should result. Similarly, it is a recent change that allows Technicians to use the Novice code bands. Enjoy this contest by putting your station in good condition and reserving adequate good operating time during the NR.

NR contest activity has always been slow at the start, and it is common to have other operators request an explanation of contest rules. I advise you to direct them to NR coverage in this column or in other magazines, which is simpler and better than trying to give all this information to each amateur who requests it. NR activity continues to build as the days pass and more amateurs become aware of it. By the last day of the contest, activity is excellent. If you get this issue before the contest starts, please mention the Novice Roundup to every amateur you contact in the Novice bands to let them prepare for this excellent contest.

73, Bill, W6DDB

DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATIONS AROUND THE WORLD

Now, the New Year reviving old desires,
The thoughtful DXer to DXing retires . . . .

Dxing is a constant itch. Even now in the dark days of early January, when the sun sets later each evening but has not yet started rising earlier, DXers will be found thinking of little else than DX. Last week, on one of those brilliantly clear mornings that come after a frontal passage, one of the locals came up the hill to corner us.

"I've decided to work to be a perfect DXer," he announced proudly. "I will work to be one of the best, working everything, listening always on the morning long path, and constantly planning my future so that when I'm not working DX, I'll be somewhere on a DXpedition: maybe one of the Caribbean islands or even Tahiti. But wherever there is DX or DXing, I'll be there. That's for sure!"

We were astounded. Not that it was totally unexpected, for often one can detect in the very young or the newer DXers a strong nobility of purpose. Just as the prosperous always believe in that which makes them prosperous, the DXer always believes in DXing. Always! But first we had to know more of the question before us. "Tell us about it," we said, though the urging was hardly needed.

"The idea came to me at the last club meeting," the Local advised us. "We had been just standing around before the meeting, talking about important things such as when Bouvet might be heard again or how many times and on how many bands we would work Heard Island, when someone in passing commented that one operator was 'a perfect DXer.' This brought some argument, some skepticism that there was any such specimen, but I believe that there is and that one should work towards that goal. Don't you think so?"

Of course we did. Every DXer seeks perfection, especially in other DXers. We were willing to aid him in his quest, but first we had to know more. "Tell us more," we were quick to say, "and just what is a perfect DXer anyhow?" We were asking the question even though we suspected that somewhere along the way someone would bring up the point that any DXer who works off a list would never be considered perfect, possibly not even a DXer. But we wanted to hear the Local. We repeated our question: "Just what is a perfect DXer anyhow?"

77 Coleman Dr., San Rafael, CA 94901

Last summer a Swedish group was in the Faroe Islands for a bit of DXing, working all bands, including some of the new WARC allocations. The band conditions were not good, but some 2300 QSOs were made. In the photo, from the left are SM5IB/OY, SM7WI/OY, SM5ENX/OY, SM5ACQ/OY, and SM5BTX/OY standing, and SM5FUG/OY clutching the power supply. All are members of the Vasteras Radio Club. (Photo via SM5ENX)

We thought we had him there. For though one may think of perfection as a desired state, often one has second thoughts when the time for decision is at hand. Certainly one is always conscious of the perfection in one's own efforts; the problem is in judging the worth of others. Frequently they tend to lack some of the essentials of perfection, and definitely so when their DXCC counters are less.

However, we did not have him stuck for long. He gave us a quick, bright smile and said, "Heck! I came up here today thinking that you'd be able to tell me what is perfection. You always seem to know most everything." Son of a gun! What could one say in the glow of such adulation? So we held up a hand, to give us time to think. Was this one really serious?

There have been others in other times who thought of what makes the perfect DXer. Once we read about one who was labeled "perfect." This was an instance never forgotten, for this one was praised because he had worked 100 countries, gained a DXCC certificate, and then stopped right there, renouncing any further interest in DXing except perhaps at the contemplative level. "The Perfect DXer" they had labeled him. And even in those distant days there was a strong surge of disbelief when we read those words. No true-blue DXer could stop at 100 countries. He would hardly be within the DX doorway before stepping outside again.

"Did any of you consider someone like Don Wallace?" we ventured. Don has been around since Guglielmo was a kid in downtown Bologna. And he has worked everything that ever came on the bands and is still in there looking for more DX. He never seems to tire at all." We thought that this was a good one to open with and make some points, but the Local was less than enthusiastic.

"Maybe," he said, his voice hardly vibrant, "but some of the fellows mentioned his name and one fellow noted that Don had never worked Dui. Even though he has worked most everything since DXCC rose from the ashes back in 1947, Don never worked Dui. So this fellow argued that Don could never be perfect. Maybe almost but not quite." The Local stopped a bit to think about that and then went on. "Some of those there strongly insisted that the quality of a DXer should not be judged on DXCC totals alone. The point was made that if this were to be the criteria, seniority and longevity would tend to be dominant factors in DXCC status. What do you think about that?"

Hmmf! When one ventures into the arena of ancient DXers, a cautious path should be followed. There are a multitude of the well-worn types, probably more than in any other group. And we weren't ready to back down on Don Wallace, because we had Bob Kelley, W0BW, and a long list of others if needed. But before we could leap in to respond to the words of the Local, he was coming on again.

"One of the fellows at the meeting kept insisting that the really good DXer can only be one who runs low power. To get on the Honor Roll and only run low power was offered as the ultimate in DX accomplishment, this possibly only to be attained by DXers pure in heart and noble in spirit. But then someone asked this fellow what low power was, and he said it was anything under a kilowatt." There was a pause and we were fixed with a questioning eye. "The others seemed to lose some interest when the fellow said this. Do you really think that is low power?"

Really we did not. But before we even got close to rendering an opinion, the Local was off again. "Some thought that the only perfect DXer is one who is out most of the time on a DXpedition, always turning up in some rare place, working DX around the clock, and QSLing immediately. Those were offered as examples of the highest type of DXers, and it seemed that the more some were worked for new country counters, the more enthusiastic was their opinion of them. What do you think?"

We were keeping our mouths shut at this point, figuring that these queries only came when he needed to draw breath. But we thought of another time in years long gone when we needed late informa-

tion on the plans of a far-ranging DX type—not what he was doing then but what he'd do next. Needing the information for a deadline, we tried telephoning one close to the DXer, though not a DXer himself.

"Talked to him on the phone last night from _____," he advised us. "He said he'd be there through the weekend." We were thankful for the advice, though puzzled because the far-ranging DX type had just that morning been working them like mad from a country over a thousand miles away. Definitely a top DXer, but the quality of his perfection was another thing. At times one may suspect something less than perfection. Or it could be we misunderstood. It might be that things and events are themselves; we are the ones who twist the shape of them.

We still had to answer the local who, though filled with purpose, stil had some doubts to quiet. But we were beginning to wonder whether or not we would be able to quiet anything, let alone answer his endless questions. What we were starting to look for was where the turn of a question might become its own answer. Then the Local stepped in to help us.

"You know," he said quickly, "I did mention this to the Old Timer from up the hill when I met him down at the market the other day. I got a quick answer that maybe I don't quite understand. Perhaps you could help."

We were willing to try. Perfection in a DXer is something that may often be thought possible, but seldom have we felt that we were even close to such a presence. "Go ahead," we advised, and we welcomed the chance to be listeners.

The Local smiled, leaning closer so we would not miss his words. "The Old Timer told me that as a DXer you will be a lot closer to perfection when you stop worrying about how other DXers may regard your operating and concentrate on doing the best possible job of DXing that you yourself can do. You never will be quite sure just how close other DXers may be to the perfect state, but you surely will be able to tell how close *you* are."

Son of a gun! What could we say to all of this? But the Local still had a quizzical eye fastened on us. "That sounds right to us," we said, but he was not satisfied.

"It might be," he said, "but if I am a perfect DXer and no one else knows it, what good will that do me?

We thought that we could but decided not to try. First he would have to attain that DX state of Nirvana, and having arrived there, he would be oblivious to anything else. But we knew we could not even think of telling him this, so we patted him on the shoulder.

"Keep up the good work," we said and got a quick smile. And as most DXers eventually learn, a good cliche is always handy when you find that your unanswerable logic has put you in a corner, for no DXer will ever cease to hunt for what he wants or cease to hope for great things. But to try to explain everything in simple terms is often a dialogue of the deaf. Perfection is desirable and most DXers seek it in one form or another. But sometimes it is not understood just why it is sought. One must learn to believe, for one of the first of the major tenets of DXing to be learned is that which says, "Be a Believer!" One must always believe that there is perfection in DXing. Always seek it! True-blue DXers are always seeking it.

The WPX Program

Mixed

1009	K2POF	1012	WØGK
1010	LA8KD	1013	EA9IE
1011	KH6MD		

S.S.B.

1522	DJ1HN	1528	KC4YY
1523	OK3YEB	1529	KH6MD
1524	JR1RBR	1530	WØIJH
1525	WA8ZDL	1531	EA9IE
1526	Y25FG	1532	WA4QQV
1527	N4AKO		

C. W.

2177	PY1DUB	2180	KA2HMJ
2178	JA1NW	2181	JA5PWW
2179	G3MYO		

VPX

228 WDX2QQ

Endorsements

Mixed: 450 WØGK, EA9IE. 500 KO2Q, WØGK, EA9IE. 550 KO2Q, WØUBT, EA9IE. 600 KO2Q, JA4ESR, WØUBT, EA9IE. 650 JA4ESR, WØUBT, OH2KP, EA9IE. 700 JA4ESR, OH2KP, EA9IE. 750 K5PR, EA9IE. 800 EA9IE, WD9IIC. 850 EA9IE. 900 I8RFD, EA9IE. 950 EA9IE. 1000 LA7JO.

S.S.B.: 350 JR1RBR, Y25FG, KH6MD, EA9IE, WA4QQV. 400 Y25FG, KH6MD, EA9IE, WA4QQV. 450 Y25FG, EA9IE, WA4QQV. 500 W4MNZ, Y25FG, KC9DS, EA9IE, WA4QQV. 550 K9BOL, EA9IE, WA4QQV. 600 ON6IT, EA9IE, WA4QQV. 650 EA9IE, NP4CC. 700 EA9IE. 750 W6LQC, EA9IE. 800 W6LQC, AC2J, EA9IE. 850 EA9IE. 900 I8YZP, EA9IE. 950 EA9IE. 1000 I8YZP. 1050 I8YZP. 1100 I8YZP. 1150 I8YZP. 1200 I8YZP.

C.W.: 350 JA1NW, JA5PWW. 400 JA1NW. 550 PY4ZI. 1200 SM5CMP.

10 meters:	KH6MD, KJ7U, EA9IE.
15 meters:	JA4ESR, I1POR, EA9IE.
20 meters:	W4MNZ, EA9IE.
40 meters:	EA9IE.
80 meters:	EA9IE.
Asia:	EA9IE.
Europe:	OK3YEB, JA4ESR, W4MNZ, EA9IE.
No. America:	KH6MD, EA9IE.
Oceania:	EA9IE.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.

Heard Island

Prepare! The hour nears! This late January should find a number of signals out of Heard Island, and if you miss this one, you may have to wait a bit for the next one. Keep in mind that the last station really heard was VKØHM about 12 years back, and should you miss this one, how would you like to look forward to waiting until 1995 for the next one? Heck, it might be even longer!

At least ten operators plan to be active from Heard before the end of this month, this to keep two or three stations on the

air simultaneously during the stay. From time to time last fall the number of operators in the planning varied, but there will be a handful for sure. In addition to VKØHI, you might also listen for VKØCW and VKØMD.

The effort is due to sail from Freemantle in Western Australia early in January with enroute stops at Amsterdam Island (FB8Z), St Paul (FB8Z), and Kerguelen (FB8X), before arriving at Heard Island. Camp will be established in Atlas Cove in the vicinity of the cable station long abandoned, and other components of the expedition will be making landings at other points on Heard Island as well as on some of the adjacent islands, some of which have no record of any previous landings.

A bit back mention was made of the first amateur operation from Heard Island under the call of VK3ACD/Heard. There was another operation by members of the Australian National Antarctic Research Expedition in 1948–50, and Michael Vause was signing VK1HV/Heard. Bill Lippmann, W6SN, was their first W/K QSO on April 25th. At that time VK1HV was running 25 watts from some junkbox gear and using a Hallicrafters receiver.

In 1963 N.T. Lied used the VKØNL callsign, and in 1969 Bill Rohrer signed VKØWR when the *USCG Southwind* stopped to unload some scientific gear.

Hugh Milburn, WA6EAM, signed VKØHM in 1970 when he was on Heard in connection with a group making celestial observations for the National Mapping Expedition. There was a French group on the island about a year later, and F2JD is reported to have been active. This may not have been any big effort, as records of this effort seem to be very scant. In other words, the feeling is that not many of the deserving W/K's worked this one, F2JD being reported as using the VKØHM call then.

Apparently, the National Mapping group has been at Heard off and on in recent years, possibly last being there in 1980, and they reported that some of the buildings at the old cable station are still in good repair and the 80 foot antenna is still standing.

The most recent effort came when the *Cape Pillar* took some of the mapping group to the island. VKØRM was used by the radio officer of the ship, but he lost the final in his rig before any amount of QSL's were made.

Look for VKØCW and VKØHI before too

The WAZ Program

10 Meter Phone

216	I4EAT	217	EA9IE

15 Meter Phone

146	N2KK/6	148	I4EAT
147	EA9IE		

20 Meter Phone

420	JH1KRC	423	I4EAT
421	XF4DMX	424	KI7M
422	7X2LS	425	EA9IE

40 Meter Phone

21	EA9IE

10 Meter C.W.

41	W1WLW

15 Meter C.W.

77	DK5AD	78	G3FXA

20 Meter C.W.

177	PAØGT	179	W7CNL
178	9V1TL		

All Band WAZ

S.S.B.

2516	JH7XRG	2526	WB8LFO
2517	N4BAA	2527	EA3AOE
2518	JJ1KTI	2528	WA4OIB
2519	K5GTL	2529	EA3KW
2520	JA8KSD	2530	DJØUR
2521	JA3GAK	2531	VE7AJ
2522	OZ6EI	2532	ON7SD
2523	WA4CTA	2533	K8CX
2524	XE1MDX	2534	AJ7V
2525	DF6RP	2535	W2NC

C.W. and Phone

5431	I5SMX	5442	K5OTI
5432	WD8MRC	5443	WAØUWS
5433	JA1HRK	5444	G3VMY
5434	JA2ZP	5445	DL5FF
5435	YU3TFC	5446	KK9A
5436	W5ASP	5447	SM4IKL
5437	DF6NW	5448	SM3AZV
5438	OZ1CEX	5449	VK3BFD
5439	HA8DZ	5450	AKØM
5440	DL4MBE	5451	DL9JJ
5441	K8CX	5452	DF6JC

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (37 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

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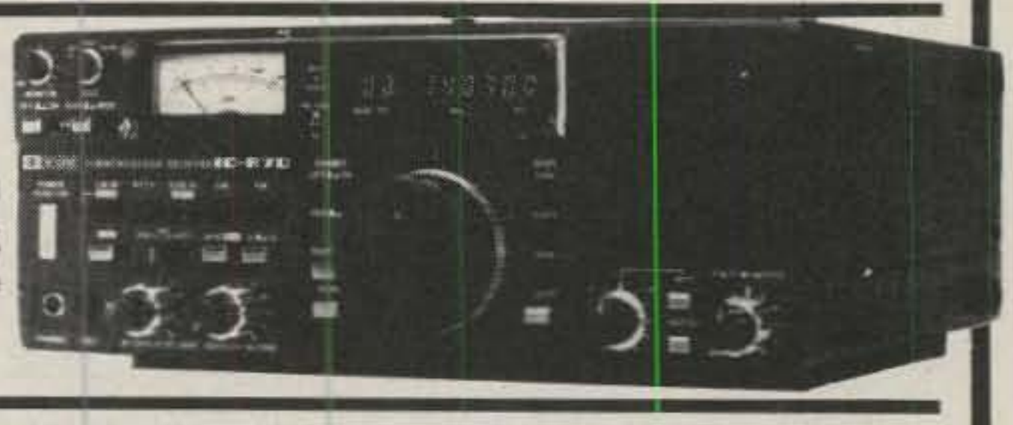

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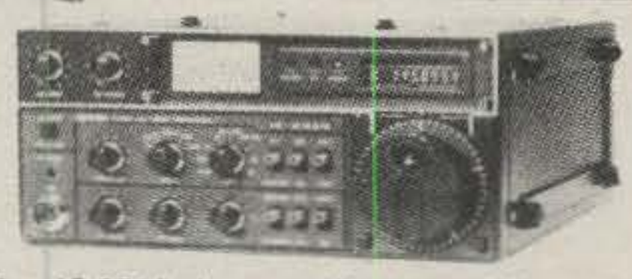

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CIRCLE 21 ON READER SERVICE CARD

many weeks pass. If you are beaten to a pulp in the early pile-ups, have patience. With this being a well-organized effort with qualified operators, by the third or fourth day the difficulty in working any of the Heard stations will be eased.

HZ1AB, Saudi Arabia

One-sixty has been added to action in downtown Dhahran, and you might watch for them in the *CQ* 160 Meter Contest later this month. In the upcoming *CQ* WPX tests in March and May, keep alert for HZ1AB on 160, 80, and 40 meters. Just before the turn of the year, the station was still looking for North America to finish off a WAC! Also, they wanted to round out a 5BWAS and 5BDXCC.

HZ1AB has been on the air since 1946, and some of the blanks may be due to the nature of the transient operators. Though an exotic call is supposed to be worth 20 dB in a pile-up (that's what the DX folklore says), those at the station still thirst for some new countries confirmed by a QSL on the wall. It should help most egos swell just a bit to note from the following list some of the needed ones they were looking for not much more than a month or so back.

D6/Commoros	VP8/So. Georgia
FB8W/Crozet	VP8/So. Orkneys
FS7/St Martin	VR6/Pitcairn
FH/Mayotte	VS5/Brunei
FR7/Glorioso	ZD8/Ascension
FR7/Juan de N.	ZD9/Tristan de
HC8/Galapagos	ZL/Chatham
J5/Guinea Bissau	3B7/St. Brandon
JD/Ogosawara	3D2/Fiji
KP1/Navassa	3X/Guinea
T2/Tuvalu	5V7/Togo
TZ/Mali	9L/Sierra Leone
UA1/Franz Josef	9X/Rwanda
VK9/Willis	1A0/Knights of M.
VP2K/St. Kitts	

This may sound a bit hard to believe, but when they made up the list they were still looking for 8Z4. In March of 1980 when many of the current stalwarts showed on the scene, they had but 150 countries confirmed.

Look for HZ1AB primarily from their sunset until sunrise Thursday. This usually means that they will show around 14110 kHz at about 1900Z. After sunrise they usually move to 14210 kHz listening for the needy W/K/VE's. Often when operating on 160 they also are on 7050 kHz looking for information or schedules or just to advertise their availability if nothing else. Should you be interested, in January their sunrise is around 0245Z and sunset at 1315Z. That early in the month, early in February, it will be 0235Z up and 1325Z down. QSL's go to K8PYD.

Lloyd and Iris Colvin

The Colvins departed the States in October and headed for the Middle East. Expectation is that they are still out, probably through the next couple of months and into the early spring. By now you may have worked them in a number of spots with them running up big totals of QSO's.

Late information on their activities and immediate plans can be found by listening to the W6TI DX bulletins at 14002 kHz at 0200Z on Mondays. W6RGG has been handling this W6TI DX information service since way back in the mid-1960's and the enthusiasm for the unending service is still strong.

CQ DX Awards Program

S.S.B.

1180	KC4YY	1184	EA3KW
1181	WA4CTA	1185	EA5BCX
1182	W6SN	1186	VE2FSU
1183	W4MAN		

C.W.

556	KA2HMJ	557	N5CID

S.S.B. Endorsements

310	W4EEE/316	275	XE1OX/286
310	W9JT/315	275	EA3KW/282
310	VE3GCO/312	250	K4JLD/254
310	DL6KG/311	250	WA4CTA/259
310	W9SS/311	250	WA4OIB/254
310	W2SUA/310	200	EA5BCX/204
300	W8ILC/308	200	KB5EK/200
275	KB8DB/291	150	KF4EO/158
275	W6SN/289	150	VE2FSU/160
275	XE1OW/286	28 MHz	VE2FSU

C.W. Endorsements

275	W6SN/292	200	N5CID/202
200	K4JLD/204		

The number of active countries is now 318. The basic award fee for subscribers to CQ is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an s.a.s.e. is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply.

Geoff Watts

For longer than some DXers can remember, Geoff Watts has been turning out the English "DX News Sheet." The years inevitably work their toll, and some months ago Geoff was forced to relinquish the work on the bulletin. The health of his XYL was not good, and she was hospitalized for some months in the middle of last summer. Then after being released to return home, she had a relapse and was again hospitalized.

Geoff himself has had some problems over the years. Originally he did the whole production at his home in Norwich. A few years back when the task was becoming difficult, the RSGB stepped in to take over the production portion of the publication, Geoff continuing to do the DX compilation and writing.

In other years Geoff has mentioned some of his problems. One was with his eyesight, his telling of a time when he used four pairs of eyeglasses when working on each week's issue, each pair of increasing strength so he could read the copy. In those days he held the bulletin to one sheet printed on one side only, always with carefully plotted use of available space.

Geoff finally had to give up a large portion, if not all, of it after turning out over a thousand issues. Figuring out the number of weeks, allowing for postal strikes and other problems, Geoff was supplying DXers with a valuable service for over 20 years. It is always a surprise to some to learn that Geoff was never a practicing DXer, although his interest in DX was intense. Actually, he was not even a licensed amateur, taking up the work because of his s.w.l.'ing.

The RSGB carries on with the "DX News Sheet," Martin Atherton, G3ZAY, and Don Field, G3XTT, carrying on the work of the bulletin. Their address for information is: DXNX, Box 146, Cambridge.

In some ways it is always a bit poignant to see one of the stalwarts of the DX world having to relinquish some of his work, and especially so when it was a task in which Geoff took extreme care, being unflaggingly conscientious with an evident desire to be of help to DXers. If you are an older DXer, you probably have known of Geoff Watts for a long time. Should you be one of the newer types, remember the name, for Geoff Watts has served DXers long and well.

DX? Where?

There are always those who feel that the great days of DXing are long gone; that DX, the bands, even the DXers themselves are not what they used to be; that these days we all are deep in the valley of despair; and that the lands of DX promised will never be. But is it really that bad?

Actually, there seems to be always a bit of DX available, and some of it a bit better quality. Running through a couple of months in mid-summer, here are but a few of those reported active. Beyond these there was a whole passel of DX available.

July: CR9AT Macao, TYA11 Dahomey, VK9ZA Willis, VS5GA Brunei, YI1BGD Iraq.

August: FB8WG Crozet, FR7CG/T Tromelin, J28DP Djibouti, T3OBY Kirabati, T2AGD Tuvalu, TN8AJ Congo Republic, VE6AWS/1 Sable Island, 5R8AL Malagasy, 7Q7LW Malawi, 9M8NL E. Malaysia.

September: BY1PK China, A51PN Bhutan, FR0GGL/G Glorioso, HZ1AB Saudi, PY0 St Peter & Paul, F6FIC/TZ Mali, ZD9BV Tristan, VK9NYG Cocos-Keeling, 3D2RW Fiji, 3D6AK Swaziland, 5N8ARY Nigeria, ZL4OY/A Campbell.

Never doubt that there is a lot of DX out there. There is, and the few listed above hardly give but a small idea of just what is available. Mostly all you have to do is get them to hear you.

Manihiki

Victor Revera, ZK1CG, operated from Manahiki last summer. Though thought at the time that a trip to a remote DX spot is only an extension of a cruise on the "Love Boat," sometimes the cold dawns

5 Band WAZ

Standings as of October 1, 1982

All 200 zones worked:

1. ON4UN, John Devoldere (Belgium)
2. K4MQG, Gary Dixon (U.S.A.)
3. SM4CAN, Kent Svensson (Sweden)
4. AA6AA, Steve Orland (U.S.A.)
5. W8AH, Albert Hix (U.S.A.)
6. W6KUT, E. A. Andress (U.S.A.)
7. EA8AK, Fernando Fernande (Spain)
8. LA7JO, Stig Lindblom (Norway)
9. EA3SF, Fernando Blenert (Spain)
10. OH1XX, Hannu Nieminen (Finland)
11. EA8OZ, Julio Rosello (Spain)
12. WØSD, Edward Gray (U.S.A.)
13. KØZZ, Gary Knutson (U.S.A.)
14. ON6OS, P. Michiels (Belgium)
15. OK3TCA, E. Melcer (Czech.)
16. K6SSS, Fred Capossela (U.S.A.)
17. ZL3GQ, Peter W. Watson (New Zealand)
18. OK3CGP, Stefan Melcer (Czech.)
19. SMØAJU, Leif Lundin (Sweden)
20. OZ3PZ, Preben Thomsen (Denmark)
21. I3MAU, Reno Mauri (Italy)
22. I2ZGC, Gianni Zillio (Italy)
23. 4Z4DX, Dov Gavish (Israel)
24. N4KE, Ron Blake (U.S.A.)
25. K5UR, Rick Roderick (U.S.A.)
26. K9AJ, Michael McGirr (U.S.A.)
27. SM3EVR, Tord E. Julander (Sweden)
28. LA5YJ, Bjorn Hugo Ark (Norway)
29. DL3RK, Walter Geyrhalter (W. Germany)
30. N4WJ, Frank McCormick (U.S.A.)
31. G3MCS, W.R. Hawthorne (England)
32. SM5AQD, Hakan "Hawk" Eriksson (Sweden)
33. WØMLY, George McKercher (U.S.A.)
34. IØRIZ, Gianni Rizzi (Italy)
35. ON5NT, Ghislain Penny (Belgium)
36. OH6JW, Antti Kiviuoma (Finland)
37. OK1AWZ, Milan Dlabac (Czech.)
38. IV3PRK, Pierluigi "Luis" Mansutti (Italy)
39. DJ6RX, Klaus Heintzenberg (W. Germany)
40. OH3YI, Ossi Lehvas (Finland)
41. I4RYC, Relli Claudio (Italy)
42. ZL1BIL, Mike Edwards (New Zealand)
43. I4EAT, Fausto Minardi (Italy)
44. ZL1BQD, R.J. Runciman (New Zealand)
45. TG9NX, Francisco Capuano (Guatemala)

The top contenders for 5 Band WAZ:

1. JA3EMU, 199
2. F5VU, 199
3. CT1FL, 198
4. W1NG, 198
5. N4RR, 198
6. W8UVZ, 198
7. EA8QL, 197
8. K1MEN, 197
9. K7UR, 196
10. W8GT, 195

175 Stations have attained the 150 zone level

bring something other than a promise of another rosy dawn.

The shelter on the boat taking ZK1CG to Manihiki was not the best, and a bit of wave brought a bit of water over the bows and into the deluxe accommodations. Water swished over the gear and somewhat blunted its sharp edge of capability. At the landing through Tauhunu Passage, Vic fell overboard, afterwards always to be greeted with " . . . aren't you the fellow who fell off the boat the other day?"

Vic operated over a month in the Northern Cook Group, working both c.w.

Victor Revere, ZK1CG, was on from Manihiki in the Northern Cook Islands some months back. A W/K type, Vic has also signed 5W1DJ and KA7HBH/KH8. Here he is with his XYL on their wedding day in Rarotonga. (Photo via WD9CIJ)

and s.s.b. QSL's go to Box 618, Rarotonga, Cook Islands.

Vic was married just before the trip, the accompanying photo showing the wedding party on the great day. Vic has also signed 5W1DJ and KA7HBH/KH8.

BVI Licensing

Arthur Swain, Telecommunications Officer (Radio) for the government of British Virgin Islands, passes along information on how you get a BVI license right from Tortola.

First, in order to obtain an amateur license in the British Virgin Islands, you must possess a current General, Advanced, or Extra class license. There is a $15.00 annual fee (plus 10¢ stamp duty) for the license, and each license (or its renewal) is good until January 31st in the year following the year of issue. However, if the license is issued after August 1st, you will only have to pay half the fee.

Should you wish to handle all the licensing work in advance of your arrival in BVI, send a certified copy of your current license along with a postal money order for $15.10 payable to the Accountant General. They won't take your personal check. Actually, there is no formal application form, so just tell them what you want. Send the package to: Telecommunications Officer, Ministry of Communications, Works and Public Utilities, Government of the British Virgin Islands, Tortola, British Virgin Islands.

1983 World Communication Year

This one is at hand, and the Potomac Valley Radio Club won't want you to forget it. They are sponsoring an operating activity (contest) in mid-January starting at 0001 UTC on Saturday, January 15th, and running to 2400 UTC the same day.

Activity will range from 1.8 MHz to 275 GHz except for the new (but not yet with all of us) 10, 18, and 24 MHz bands. Actually, you need some items of reference such as the ITU Regions and the 75 ITU

Zones to really prosper in this test. Most amateurs, and especially DXers, have these on their walls, but should you need one, drop a quick s.a.s.e. to Potomac Valley Radio Club, Box 337, Crownsville, MD 21032. *(See Contest Calendar this month for the ITU map and list.)* This will give you all the zones as well as full information on this operating activity (contest). It is intended to be a world-wide effort to mark Communications Year. The United Nations General Assembly in November 1981 adopted a resolution so designating this year.

Canadian DX Assn.

Here are the VE DX Assn. officers for this year, this group being the long-time publishers of *Long Skip,* which frequently comes up with some sharp DX input: John Sklepkowycz, VE3IPR, President; Martin Rosenthal, VE3MR, Vice-President; Wilf Antheunis, VE3FEA, Secretary-Treasurer; Doug Joyce, VE3MV, Recording; John Scott, VE3EZU, Membership; Ted Roberts, VE3II, and Garth Hamilton, VE3EUP, Directors. Some of those calls should look familiar. Perhaps some will remember VE3EUP as 5H3LV/A on Zanzibar in February 1970. It was good for DXCC counters then, though an awfully hard one to corner.

Aland Islands

Steve Lowe, G4JVG, was on the Aland Islands in August and has forwarded some of the details of the operation. In addition to being the goal of DXers from time to time, this group of islands is also a well-used vacation spot in northern Europe, and often the OHØ action is a combination of both. Anyhow, here is what Steve writes.

The gear was "All-American," consisting of a Drake T4XC and R4C. There was a National NCL-2000 linear, the pair of RCA 8122 tubes giving the OHØ legal limit of 600 watts.

Along with G4IWA, Steve concentrated on 160 and 80 meter DX on s.s.b. Noise was a problem during both weeks of the operation, and the effort to work into W/VE was not successful. They did work the British prefixes, Spain, and western Europe. They even worked an OJØ Market Reef effort.

Eighty meters was better, working the east coast W1's to W4's and W8. Canada brought the VE1 and VE2 and also a VO1. Below the equator South America was good, this action including a VP8. One night they caught A71AD and A91P. A good many of the Russian Republics came in on 80.

Forty meters was good, the team using an "Ore Dee" V40 quarter-wave vertical GP antenna with 8 quarter-wave radials. This worked well on the long haul, JA's, UAØ's, UH8's, UI8's, and AP2 coming in, but still no North American QSO's. If anyone heard G4JVG/OHØ or G4IWA/OHØ last August on 40 meters, Steve would appreciate a report.

The plans are to again return to the Aland Islands during the winter months when low-frequency propagation is better for North America. Steve wants to work W/VE's on 1.8 MHz s.s.b. and to work the west coast long path on 3.8 MHz s.s.b. In addition to the winter run, they plan an intensive operation from OY Faroes during the coming summer.

If you worked G4JVG/OHØ, you can QSL either via the RSGB Bureau or to Steve Lowe, Styrmansg 9, S-114 54 Stockholm, Sweden. Even the callbook G4JVG address in England is good. And speaking of callsigns, during the Aland operation four different callsigns on Market Reef were worked. These included OJØMA, OHØNC/OJØ, K5KG/OHØ/OJØ, and OH3JR/OJO.

Steve currently signs G4JVG/SMØ from Stockholm. In other days he has signed G8FEO and EP2SL.

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsements involving the issuance of a sticker is $1.00. The basic award fee is now $4 for *CQ* subscribers and $10.00 for non-subscribers. Please attach your latest *CQ* mailing label to qualify for the $4.00 rate.

C.W.

W6PT	318	K9MM	313	DL3RK	303	WA8DXA	294	N5DX	280
DL7AA	317	K4CEB	313	K3FN	301	W6SN	292	W4BV	280
ON4QX	316	K6JG	313	DJ7CX	300	JA1GTF	285	WB4RUA	279
W3GRS	316	W4BQY	310	OK1MP	300	WØSR	285	K4SE	278
W9DWQ	316	N6CW	310	N4MM	300	WØIZ	285	SM6CST	277
K6EC	315	K4XO	306	K1MEM	300	SM3EVR	284	W1WLW	276
N4PN	315	W4OEL	306	AA6AA	298	K8PYD	284	I3OBO	276
W6ID	314	W1NG	305	N6FX	298	JH1VRQ	281	K9IW	275
N6AV	313	W2GT	304	K9QVB	298				

S.S.B.

K2FL	318	K4MQG	314	ZL1BIL	306	AI5I	295	KA8T	282
W6EUF	318	I8YRK	313	N4PN	306	W9RY	294	I5BDE	282
K6WR	318	EA4LH	313	XE1KS	305	WA4DAN	294	EA3KW	282
W3GRS	318	OE2EGL	313	LU1BAR/W3	305	VE3IPR	294	AI8M	281
W3NKM	318	DK2BL	313	WA4WTG	305	WD8MGQ	293	N3RL	281
DL9OH	318	WØSD	313	VK3JF	305	W2FGY	293	N9AMF	281
W9DWQ	317	K9RF	313	AA6AA	305	YU1DZ	293	VE3IUE	280
IØAMU	317	WØSFU	313	W1NG	304	JA5PUL	292	WDØBNC	280
K8DYZ	317	N4MM	313	G4CHP	304	WB1DQC	292	KB8O	280
F9RM	317	I5WT	312	VE3FJE	304	W7FP	291	I8KCI	280
VE3MR	317	VE3GCO	312	WB4NDX	304	I3OBO	291	KP4EQF	280
I8AA	317	K8LJG	312	WA4JTI	303	KØGT	291	N2AQH	280
VE3MJ	317	OE3WWB	312	9H4G	303	KB8DB	291	K1VHS	280
W4UG	317	K5OVC	311	W8JXM	302	AB9E	290	ACØA	280
XE1AE	316	VE7WJ	311	LA7JO	302	WB4UBD	289	WD8MOV	279
I4ZSQ	316	K4XO	311	AI8S	302	W4BQY	289	WA2VEE	279
I8KDB	316	I3LLD	311	N5FG	302	W6SN	289	K8HV	278
W9KRU	316	N6AW	311	VE3MRS	302	YU2RTW	288	IØRIZ	278
ZL3NS	316	W9SS	311	W8PCA	302	K9UAA	288	K3MWN	277
VE3GMT	316	DL6KG	311	W7OM	302	WD9IIX	288	I8INW	277
YV1KZ	316	YV5AIP	310	W6FET	301	K4CXY	287	KB5RF	277
W3AZD	316	K6XP	310	K9SM	301	K8VFV	287	JH4PRU	277
W4EEE	316	WØYDB	310	I8LEL	301	WB3HAZ	286	WA6TOO	276
ZS6LW	315	N2SS	310	W2CC	300	WB6GFJ	286	K1WJ	276
VE2WY	315	VE4SK	310	HP1JC	300	VP9CP	286	WA4TLI	276
K6JG	315	K8PYD	310	DJ7CX	300	XE1OW	286	XE1CI	276
DJ9ZB	315	W2SUA	310	K5DUT	300	XE1OX	286	KB8KW	276
IØZV	315	N4KE	309	JH1VRQ	300	AE5B	285	WØKU	276
K6YRA	315	N6AV	309	W6DN	300	CT1UA	285	K9QVB	276
F2MO	315	VK4VC	309	K8CMO	300	WB3DNA	285	W8ILC/ORPp	276
K9MM	315	YV5DFI	308	IØMBX	300	TG9EP	284	WAØTKJ	276
W3GG	315	W8ILC	308	IBACB	298	K9HQM	284	AI9R	276
ZL1AGO	315	N4PN	308	IV3YRN	298	KB5FU	284	VE4AT	275
W4DPS	315	4Z4DX	308	W1LQQ	297	SM4CTT	284	IØSSW	275
W9JT	315	WØSR	307	XE1NI	297	I2MQP	283	W6MFC	275
N4WF	315	OK1MP	307	K4SE	296	KB3OQ	283	KB9KD	275
K6EC	314	XE1J	306	K9IW	296	W8IMZ	282	I5EFO	275
W4SSU	314	K9BWQ	306	I6PLN	295	KKØC	282	NN4Q	275
K9LKA	314	K1UO	306	WA4LOF	295	KC8JH	282	W4BIM	275
OZ3SK	314								

Brunei

A new prefix is expected for this Borneo spot; maybe it has already arrived. But until it does, VS5MS, Tunku Mahmood Shah, can often be found in the first 50 kHz of the 20 meter phone band after 1000Z, possibly up to 1500Z.

Brunei has been a British protectorate, but, as has happened in so many other places, it will soon be on its own. That's the reason for the new prefix. VS5TX, who has been heard from Brunei, should be back in Hong Kong by now.

The ITU

The International Telecommunications Union met in Nairobi starting in late September, the meeting scheduled to last six weeks. The Radio Society of Kenya was operating a special event station during the meeting using the callsign 5Y4ITU.

The ITU Plenipotentiary Conference was not exactly a quiet affair, the United

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CIRCLE 28 ON READER SERVICE CARD

States walking out of one meeting in mid-October in protest of a Syrian resolution on Mid East political matters. Earlier both Britain and the U.S. had threatened to quit the meeting entirely, possibly even to withdraw from the ITU if an Algerian resolution was passed.

If you worked 5Y4ITU and you seek a good, reliable QSL route, try P.O. Box 45681, Nairobi, Kenya.

International DX Meeting

The great annual migration of DXers to the yearly conference in California takes place this year over the weekend of April 22nd to 24th. It again will be at the Holiday Inn in Visalia, this over the years proving to be the only central spot which can handle the crowd.

Bill Zachman, W6TPH, will be the convention chairman. The programs will be handled by Jay and Jan O'Brien, W6GO and K6HHD, respectively, of the QSL Manager list effort.

The 1983 effort is being handled by the Northern California DX Club. They promise a lot of DX action and lots of foreign DX types. Over the years these International DX Meetings in California have consistently drawn multitudes of true-blue DX types. Plan to join your peers in the April sunshine.

Some DX Notes

H.R. 3239, which was the final version of the legislation affecting the fields of radio frequency interference, monitoring by volunteers, volunteer examination preparation and administration, and the length of license terms, was signed into law a few months back. This was the successful end to years of efforts to effect some needed changes.

Prachuab Kirikhan, HS5AID, says he is back being action after burning himself out watching satellite TV and the multitude of soap operas. Hank notes that some QSL information needs correction. In QSLing to the Western Hemisphere, cards go to AG6D, A.E. Elge, 155 Vista del Monte, Los Gatos, Calif. 95030. This is good only for HS5 operations; from any other HS call area, go direct or via the HS Bureau.

JA4ENL handles only JA QSL's for Hank at HS5AID, and a European manager is needed for Europe, Africa, Middle East, and Russia.

The Western Pennsylvania DX Assn. is still looking for any Deserving DXer in their area who may need aid and comfort and a good DX Club. Wayne Albert, KB3KV, at 1508 Ligonier St., Latrobe, Penn. 15650, is the secretary of the club and will help anyone asking for information. Alan Lefcort, WB3GPR, is the 1983 President; Walt Orzechowski, KG3K, the Vice-President; Don McDaniel, KJ3Q, the Treasurer; and Stan Dicks, W8YA, handles the club's newsletter.

India amateurs used VU9 as their prefix up to mid-November. The Australians

This is the IDXF Navassa crew preserving for posterity their appearance at this stop in the Caribbean. From the left, front row, are KP2A, W0DX, W2IJB, K0OO, K8CW, N2OO, and K1MEM. Standing is N6CW. Out of sight behind the camera was WA2MOE. (IDXF photo)

were using AX until early fall.

From the Pearl of the Antilles, Oscar Morales Tur, CO2OM, says that after September 1st of last year only QSL's handled by his own hand will be valid. Anything else might be suspect. In other words, for CO2OM, QSL direct to P.O.B. 4940, Habana 4, Cuba.

Ken Butterfield, KV8I, says that he is ready to defend the good names of TR8JD and 7X4BL to the death. In other words, he thinks they are a couple of friendly and accommodating DXers.

Catching Gerard, TR8JD, on the fly, he asked about possible c.w. action. Gerard immediately shifted from s.s.b. to c.w. On another band a query about 10 meter operations brought a quick shift from 15. When working Boucif, 7X4BL, again there was a query about c.w. work. Boucif did not have a key, but used the p.t.t. microphone for a c.w. contact. On top of everything, the QSL's came quickly.

The Bouvet action heard about occasionally last summer seems to be still alive, though by early fall no definite date had been heard. It will come within the next several weeks, if it comes at all this year, January and February being the best months for conditions.

Albania still gets a lot of attention; and undoubtedly some are still working to figure out how to put downtown Tirana on the air. Something will come one of these days, it always has, and Albania will be heard on the bands.

The VP8 QSL's that were at Port Stanley for various operations at the time of the dispute last summer seem to have been destroyed, this including QSL's for Antarctic bases. If you sent off a VP8 QSL about that time, it might be provident to try again.

Back during the summer months three men at one of the Palmer Peninsula bases were marooned for weeks on an offshore island. They finally decided to try to make their way across the ice, but never arrived and were presumed lost. Among them was Ambrose Morgan, VP8AEI.

Wayne Bollschweiler, WB7QID, asks about the 5BWAS in the August item about OK1AWZ. Wayne figured that the number might be a bit high, he gaining #611 back in 1979. We dug out the original, hand-written copy. It still looks like #33627, but we suspect that it is a bit lower. Being a bit smarter this time, we won't be specific, just to note that Milan, OK1AWZ, holds a 5BWAS, but probably not #33627.

Karl Renz, K4YT, was busy through the last half of 1982 in another swing through the African DX countries. He made over 5000 QSO's from TYA11, signed K4YT/5N0 from Lagos in Nigeria, operated briefly at TJ1BB, and continued on to TL8 Central African Republic. During the fall months he was aiming to make stops at TN8, TR8, 9Q5, 9U5, 5Z4, 5X, ET3, and S79. If you caught up with Karl at all his stops, you caught some good DX. If you want to QSL, send them to his brother, W2TK, but keep in mind that the cards will not be processed until after Karl completes his trip. IDXF is providing the QSL cards.

QSL Information

A4XJO to WB3JRU
C31JX to DK9FE
C3BLM to EA3BKZ
CO2HS to KB7SB
CO2HQ to KB7SB
FM7CF to WB3AKI
HS5AID to AG6D (Western Hemisphere only)
HS5AID to JA4ENL (JAs only)
HS1BV to KO2A
HZ1AB to K8PYD
FP8JA to WB2MSH
IU8ITU to I8MPO
J6LB to KO2A
J6LZA to K4LTA
DK3GI/HK1 to DL2MY
K4LQ/C6A to WB4OSN
KR4C/J6L to KR4C
K5YY/J6 to K5YY
KH8AC to K7ZA
OX3GH to WA2TTI
OZ7GI/5N9 to OZ7GI
SM0GNU/OH0 to SM0GNU
T32AF to WH6AIF
V2AAW to KG6S
V2ANH to KE1A
VE8ML to VE4TZ
N1AFC/VP9 to N1AFC
W6TEX/CT3 to W6TEX
VS5MS to N2OO
Y89BV to W5GZI
ZK1YL to ZL2BAO
ZM7VU to F6DYG
ZP5JAL to KO2A
3B8FE to 3B8CF
3C1AB to EA1QF
4K1A to UA3AEL
4S7AJG to K9AJG
4S7XS to DL7XS
4X6BL to KO2A
5Z4CS to JI1VLV
6Y5PL to G3SXE
KA3BUJ/8R1 to N7YL
9M6VW to KO2A
9Y5BNP to W3HNK
AH2AN to NASA TRACKING STATION, Dan Dan, Guam 96916
AH2AQ to 1559B Bamboo St. APO San Francisco 96334
CO2OM to Box 4940, Havana 4, Cuba
AM82AAI/Z to Box 171, Zaragoza, Spain
CT2CB to Box 44, Santa Marie, Azores
DU7RLC to Box 901, Bacolod City, Philippines
GJ3ZAY to Box 146, Cambridge, England (DX News Sheet)
GJ4LVH to Box 146, Cambridge, England (DX News Sheet)
HT1MAT to Box 1474, Managua, Nicaragua
G4JVG/OH0 to S. Lowe, Styrmansg 9, S-114 54, Stockholm, Sweden
G4IWA/OH0 to RSGB QSL Bureau
HS1AID to Europe/Africa/Middle East/Russia Box 169 Chian Mai, Thailand
OA4DW to N4DW, Box 35, Bristol, Virginia 24203
SV0CJI to Box 349, Rhodes
VP2MDX to N5DXD, Box 7681, Houston, Texas 77270
WH2ADG to 1559B Bamboo St., APO San Francisco 96334
5N0KRT to Box 2772, Kano, Nigeria
5Y4ITU to Box 45681, Nairobi, Kenya
FO0OJ to Box 700, Rio Linda, Calif. 95673
FO0JO to Box 700, Rio Linda, Calif. 95673

The QSL Manager for the following stations is Bob "Kappy" Kaplan, WA4WTG, 445 N.W. 202 Terrace, Miami, FL 33169: J3ABG, FY7AE, LZ2JF, TJ1BF, V2AK, ZF2GE, ZP5KS, 4X4NJ, 4X4VB, 4X2BYB, 4X6BYB, 4Z4DX, 4Z4HF, 4Z4LF, 5Z4RH, 6Y5MC, 6Y5RL, 8P6AH, 8P6BN, 8P6IB, 8P0A. Kappy is an avid stamp collector, and he would appreciate your using attractive or commemorative stamps on your envelopes or simply including these with your QSL requests.

73, Cass, WA6AUD

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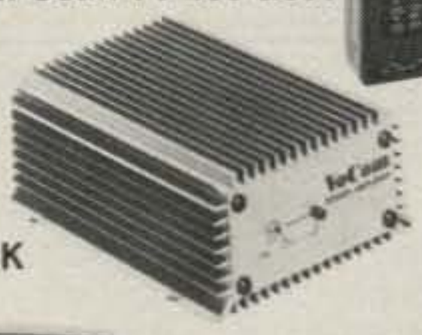

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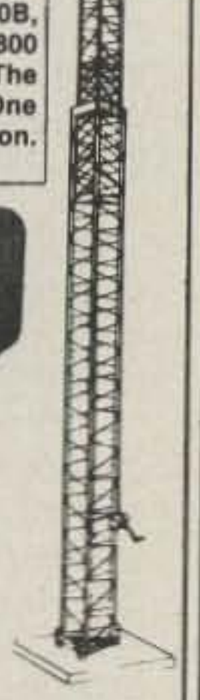

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CQ Reviews:

The Yaesu FT-707 H.F. S.S.B. Transceiver

BY JOHN J. SCHULTZ*, W4FA

The Yaesu FT-707 is advertised as being "hardly larger than a book," and it comes pretty close to achieving that claim since it measures only 93 × 240 × 295 mm overall. Of course, the "book" meant was probably one like the *Home Medical Adviser* rather than a small pocketbook, but nonetheless, the "packaging" is remarkable for a full-featured h.f. s.s.b. transceiver.

Give or take a few ideas and features, the FT-707 is a compact version of the popular Yaesu FT-107 design concept.

The FT-707 is both handsomely and compactly packaged. It is shown with a scanning-type microphone, but the scanning feature requires the FT-707DM Digital VFO.

Circuitry Details

Fig. 1 shows a block diagram of the FT-707. Like the FT-107, it turns out to be a sophisticated version of a 9 MHz i.f., single conversion h.f. transceiver, although some frequency mixing stages are included which might not allow one to clearly see this at first. Looking at the transmit side first, the s.s.b. transmit chain is conventional, with audio and carrier signals being fed into a balanced modulator stage, D3007–D3010 (upper left of fig. 1). The resultant 9 MHz (8.9875) d.s.b. signal is then buffered and reaches the 2.4 kHz s.s.b. filter XF2003 and a following buffer amplifier. The resultant s.s.b. signal proceeds to a double balanced mixer stage, Q1008 (which is also the first mixer stage used in the receive mode).

At this point, the s.s.b. signal is frequency translated to the final output frequency, and the following amplifier stages (Q1002, Q1003, and the PA unit) build up the signal to the 240 watt input level. The linear amplifier stages are all broadbanded so the PA stage is followed by a low-pass filter unit which switches in separate low-pass filters for different band combinations. These filters are all relay switched, the same as in the FT-107, which is quite a trick considering the size difference between the FT-107 and FT-707. The bandswitch in the FT-707 controls only d.c. voltages, by the way, and either relays or diode switches affect the actual r.f. signal paths.

A directional coupler samples the output signal before it reaches the antenna terminal and provides for both an ALC feedback voltage and s.w.r. sensing for protection of the PA unit (although the front panel "meter" indicator does not display s.w.r.). Thermal over-temperature protection is also provided for the PA unit, and if an excessive temperature is reached, an internal fan is turned on. Actually, all three protection systems for the PA unit (ALC or overdrive, excessive s.w.r., and excessive PA heatsink temperature) are interlocked so if any excessive condition occurs, drive to the PA unit will be reduced and/or the cooling fan will be activated.

Finally, in the transmit mode, one should mention the full VOX circuitry (gain and delay controls are on the front panel) and the semi-break-in feature on c.w. A built-in sidetone oscillator has part of its output on c.w. routed to the VOX circuitry to provide the c.w. semi-break-in feature. The microphone/carrier level controls can be adjusted to run any input level from QRP levels to full input on s.s.b. or c.w.

In the receive mode, the input signal is routed through a 1.7 MHz high-pass filter and then to a dual-gate MOSFET r.f. amplifier (Q1001). This stage has diode switched bandpass filters in its drain terminal for each band covered. The signal then goes to the same double balanced mixer stage as used on transmit which uses Schottky-type diodes. The combination of this type of mixer stage, the r.f. amplifier characteristics, and a low-noise oscillator injection signal are the heart of the FT-707's "front-end" performance.

After being translated to the nominal 9 MHz i.f. frequency, the signal goes to a series of noise blanker stages. The principle is the same as in the FT-107: time constants in the noise blanker circuitry (Q2010, 2011, etc.) are chosen to distinguish between very short, high-amplitude pulses and slower, amplitude-varying signals so as to gate (squelch) out the former. Unlike in the FT-107, the blanker threshold level is internally but not front-panel adjustable. The signal then goes through the 2.4 kHz s.s.b. filter (or optional 600 Hz c.w. filter) and on to the variable i.f. bandwidth circuitry. The principle of this type of circuitry has been described many times before, so no great detail will be given, although the basic FT-707 scheme is shown in fig. 2. By scanning/superimposing two s.s.b. filter characteristics on top of each other, an effective continuously variable bandwidth of 300 to 2400 Hz (at −6 dB) is achieved. So, there is absolutely no need for any additional i.f. filters, except if one desires extreme skirt selectivity on c.w. This latter point is not always clear, so it is further clarified in fig. 3.

The rest of the receive chain is fairly conventional with additional i.f. amplification, detection (a separate 1N60 diode being used for a.m.), and audio amplification. The latter includes a 2.7 kHz low-pass filter stage and a 3 watt output stage

*c/o CQ Magazine

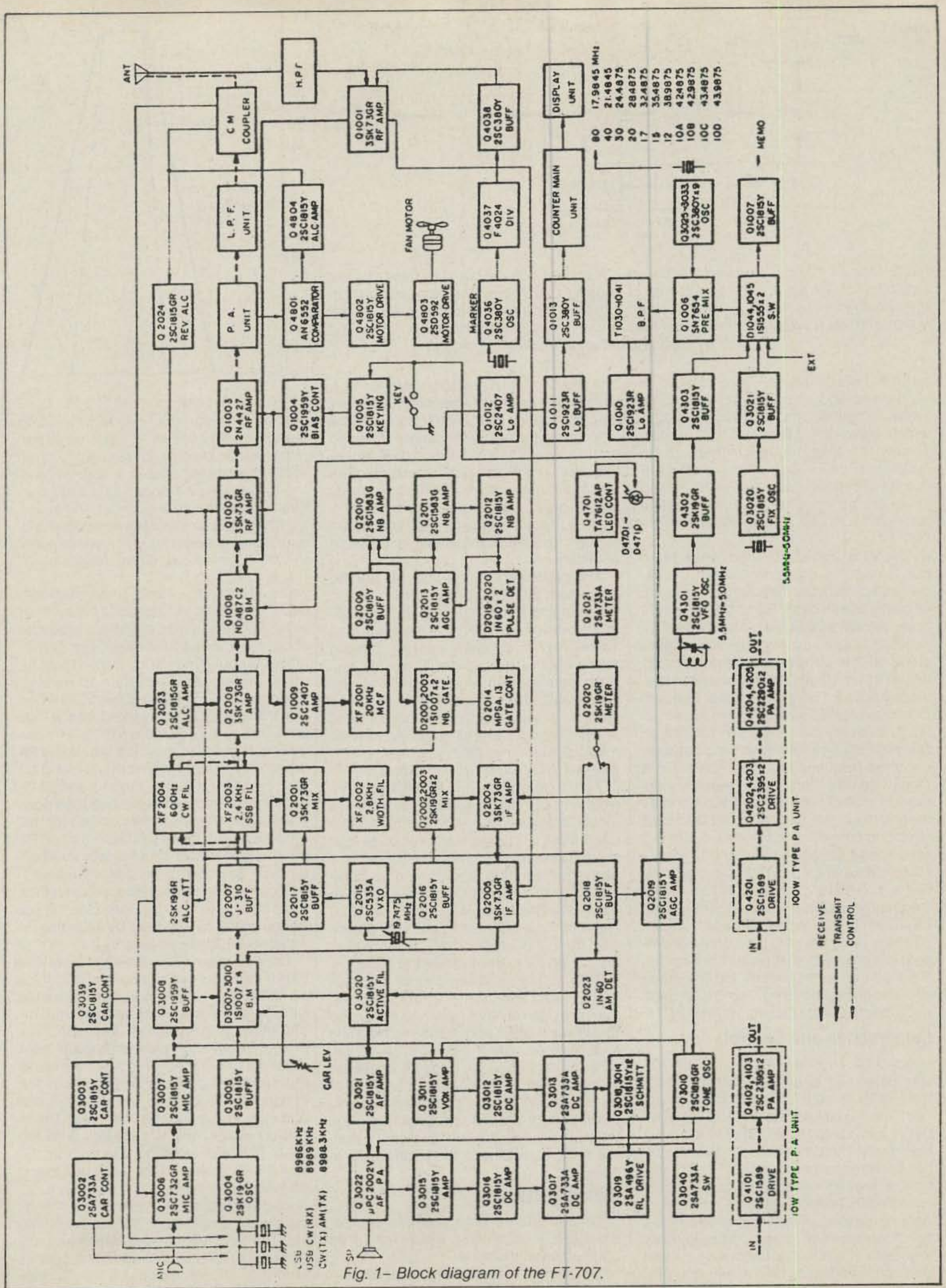

Fig. 1– Block diagram of the FT-707.

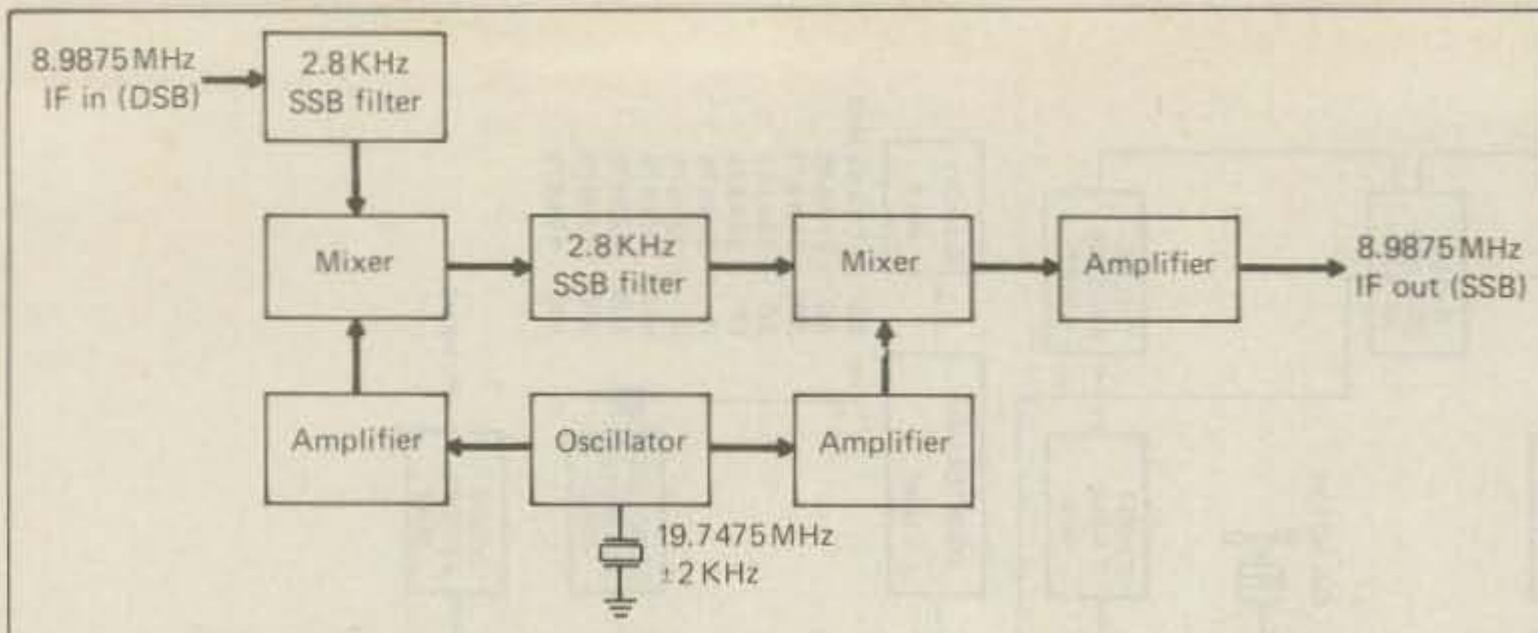

Fig. 2– The FT-707 has true variable bandwidth control in its i.f. chain by imposing the passband of one s.s.b. filter across that of another s.s.b. filter. The block diagram of the circuitry shows the idea involved. The s.s.b. filter in between the two mixer stages is centered on 10.76 MHz. The crystal frequency, in the actual circuitry, is varied ± 2 kHz by means of a tuning diode.

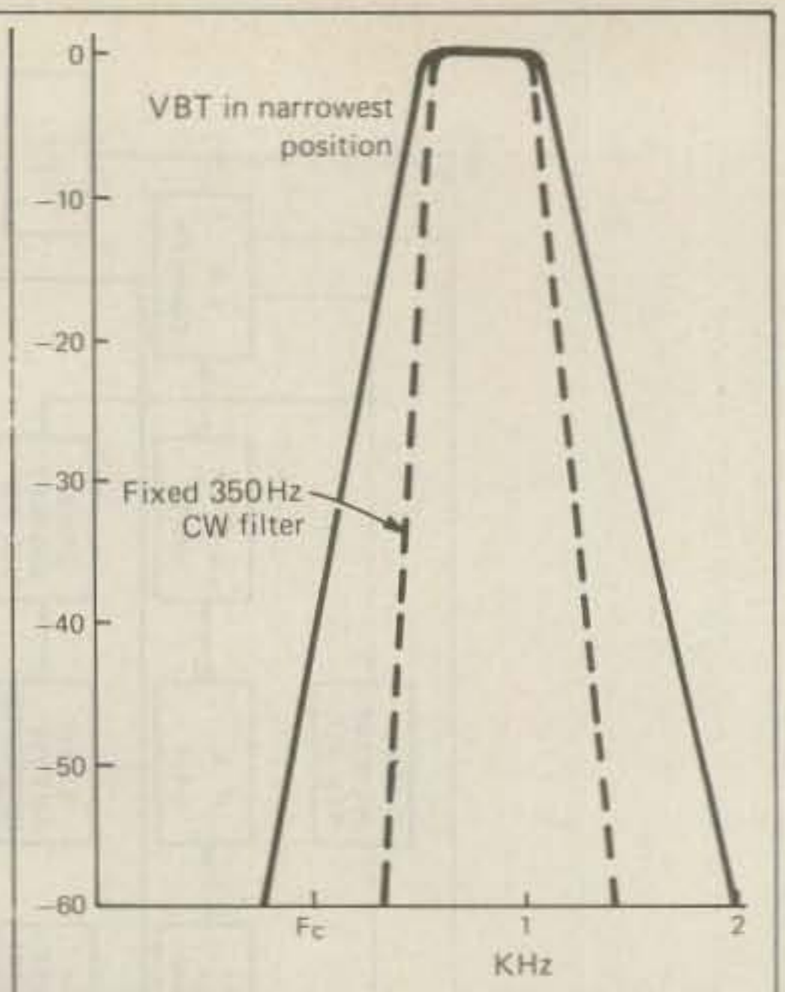

Fig. 3– The variable bandwidth tuning feature in the receive i.f. does an excellent job, but even in its narrowest bandwidth position, as shown, it will not have the same skirt sharpness as a fixed c.w. filter. Most amateurs will not need an extra filter even for c.w., but dedicated c.w. users should consider the advantages of the optional c.w. filters available.

(at 10% THD distortion). Receive a.g.c. is i.f. derived and also includes additional meter amplifier stages (Q2020, 2021) which drive the LED-type "S" meter. Twenty-five kHz frequency markers on receive for calibration of the analog frequency readout (skirt of main tuning knob) are provided by a 3.2 MHz crystal oscillator (Q4036) with divide-down circuitry.

The v.f.o. and digital frequency readout circuitry is common to both the receive and transmit functions. The v.f.o. circuitry uses a basic 5.0 to 5.5 MHz variable oscillator (Q4301), the output of which is frequency translated in a mixer stage so it is correct for the double balanced mixer stage Q1008 which was previously noted. The exact crystal frequencies used for v.f.o. mixing are shown in fig. 1. In every case they are chosen so the main tuning knob always indicates increasing frequency as it is rotated in a clockwise direction. Fixed frequency operation is also possible on each band by means of crystal oscillator Q3020 which uses one optional crystal in the 5.0 to 5.5 MHz range for each band and is simply switched in, when desired, to replace the 5.0 to 5.5 MHz v.f.o. output. The digital frequency counter revolves around an LSI IC which reads the injection frequency to the mixer stage Q1008. Internal presets are provided so the counter displays the true carrier frequency for any mode of operation being used. The 6-digit readout provides resolution to 100 Hz.

Construction and Controls

Although the circuitry of the FT-707 was patterned after that of the FT-107, the FT-707 is quite different in construction. The FT-107 consists of a large number of individually shielded plug-in circuit boards to a "mother board" plus a number of wired-in boards. The FT-707 has only a limited number of large, fixed-mounted PC boards with plug-in interconnecting cabling. The "soldier-like" lineup of transformer "cans," etc., is really impressive. A quick count showed about 55 such enclosures on the two main PC boards. Certainly any alignment or servicing necessary would appear to be very much simplified by this arrangement. The v.f.o. is in its own completely shielded enclosure, as are the PA and PA driver circuitry. The outside of the unit consists of a heavy die-cast front panel and sturdy rolled steel top and bottom covers. Overall, the construction appears rugged enough for almost any mobile or portable application.

The placement of the controls can be seen from the photograph. Obviously, in repackaging the FT-107 into the small dimensions of FT-707, the engineers at Yaesu had to do quite a bit of thinking about control placement. Certainly one thing that was done very well was the placement of the large-size main tuning control. It has an extremely good "feel" in operation and is as large as anyone might desire, although one is dealing with a semi-miniaturized transceiver.

The frequently used **AF/RF Gain** controls and **Clarifier/Bandwidth** controls are nicely bracketed by the less frequently used **Mode** and **Band** switches. One can see the line-up of the various pushbuttons above the controls, and they serve to select VOX or PTT operation, AGC fast or slow, Calibrator on/off, Meter to ALC readout, Fixed Frequency or VFO operation, Noise Blanker on/off, and Clarifier on/off, in that order from left to right.

Two miniature knobs below the main tuning knob, which are a bit difficult to see, provide for VOX gain and delay setting. Four LED's above the main tuning knob indicate when the calibrator is on, when fixed frequency (crystal) operation is being used, and whether the internal or an external VFO controls the transceiver. Considering the space available, one would have to rate the number, placement, type, and size of the controls as excellent.

Bench Tests

On both the transmit and receive side, the FT-707 essentially meets all of its claimed specifications.

On transmit, the carrier suppression was better than –40 dB, unwanted sideband and spurious radiations better than –50 dB, and third-order IMD products about –32 dB at full power. The carrier power output itself varied from 115 watts on 80 meters to 95 watts on 10 meters. The power output fell to about 50% when the transceiver was worked into a 150 ohm load to approximate a 3:1 s.w.r. The built-in, thermally activated fan for the PA never came on during normal testing on c.w. or s.s.b. The a.m. mode was not intensively tested, but at the reduced power input of 80 watts d.c. specified for this mode, all indications would be that no PA overheating would occur under even extended "key-down" periods. "Tune-up," of course, is really non-existent since there are no tuning controls. One simply brings up the carrier level by adjusting an antenna tuner, if necessary.

On the receive side, the sensitivity was better than claimed at less than 0.2 μV for 10 dB S/N on all bands. The dynamic range was a good 85 dB, and the third order intercept point about +10 dBm. The image frequency rejection varied from –65 dB on 80 meters to –45 dB on 10 meters (the latter being more than the claimed –50 dB but hardly significant and still very good for a "no-tune" transceiver). Selectivity is excellent with the s.s.b. filter varying in bandwidth from 2.4 to 4.0 kHz at the –6 to –60 dB points. The variable bandwidth feature functioned very smoothly, varying the –6 dB bandwidth from under 300 to over 2400 Hz. The LED level meter, which actually consists of nine LED elements, functions smoothly enough, but has a tremendous

jump (relative to input signal level) of the LED's which bracket the S9 readout. The one immediately below S9 comes on with about 8 μV input signal and the one above with 40μV input level. One will probably tend to give rather "generous" "S" reports to stations below the S9 level if one goes by the LED indications.

The frequency stability leaves nothing to be desired in any of the operating modes. Drift was less than 100 Hz even far before the 30 minute warmup period specified to achieve that value.

Operational Results

If one accepts the FT-707 as a benchmark attempt to achieve full-performance, 100 watt output level transceiver performance in a semi-miniature package, it must get high marks. It covers the full range from 80–10 meters (including the WARC bands), tuning is very smooth, frequency stability and readout are excellent, selectivity is excellent, c.w. and s.s.b. characteristics are very good, etc. On-the-air reports were consistently good both as to s.s.b. voice characteristics and c.w. keying. Standing it next to some transceivers costing two to three times more left nothing to be desired in the receive mode except for the lack of an r.f. attenuator in those rare cases in which extreme signal input levels are encountered.

If one has to "search" for constructive criticisms about the FT-707, I would present the following points:

1. The LED level meter is colorful, but not as exact as an analog meter and consumes too much current. If an analog meter were used and a disable provided for the LED frequency readout, the receive mode current drain could probably be reduced to 0.5 amp, and the transceiver would become a truly battery-operable portable unit.

2. S.w.r. information is available from the directional coupler circuitry in the transceiver but not presented on the front panel meter. Such a presentation would simplify the use of an accessory antenna tuner.

3. The excellent noise blanker should somehow have an accessible threshold control—either front or back panel. The circuitry used is excellent, but it responds far better to QRM such as the "woodpecker" if the threshold is adjustable.

4. R.f. speech processing, if used with care, can enhance the signal punch of almost any s.s.b. transceiver. The major, expensive components involved in realizing such a processor are already there in the FT-707 (the 2.4 and 2.8 kHz filters), but switching between the receive/transmit chain is necessary, so one gets double-duty use out of these filters for both variable bandwidth tuning on receive and r.f. speech processing on transmit as per the ICOM 720A design.

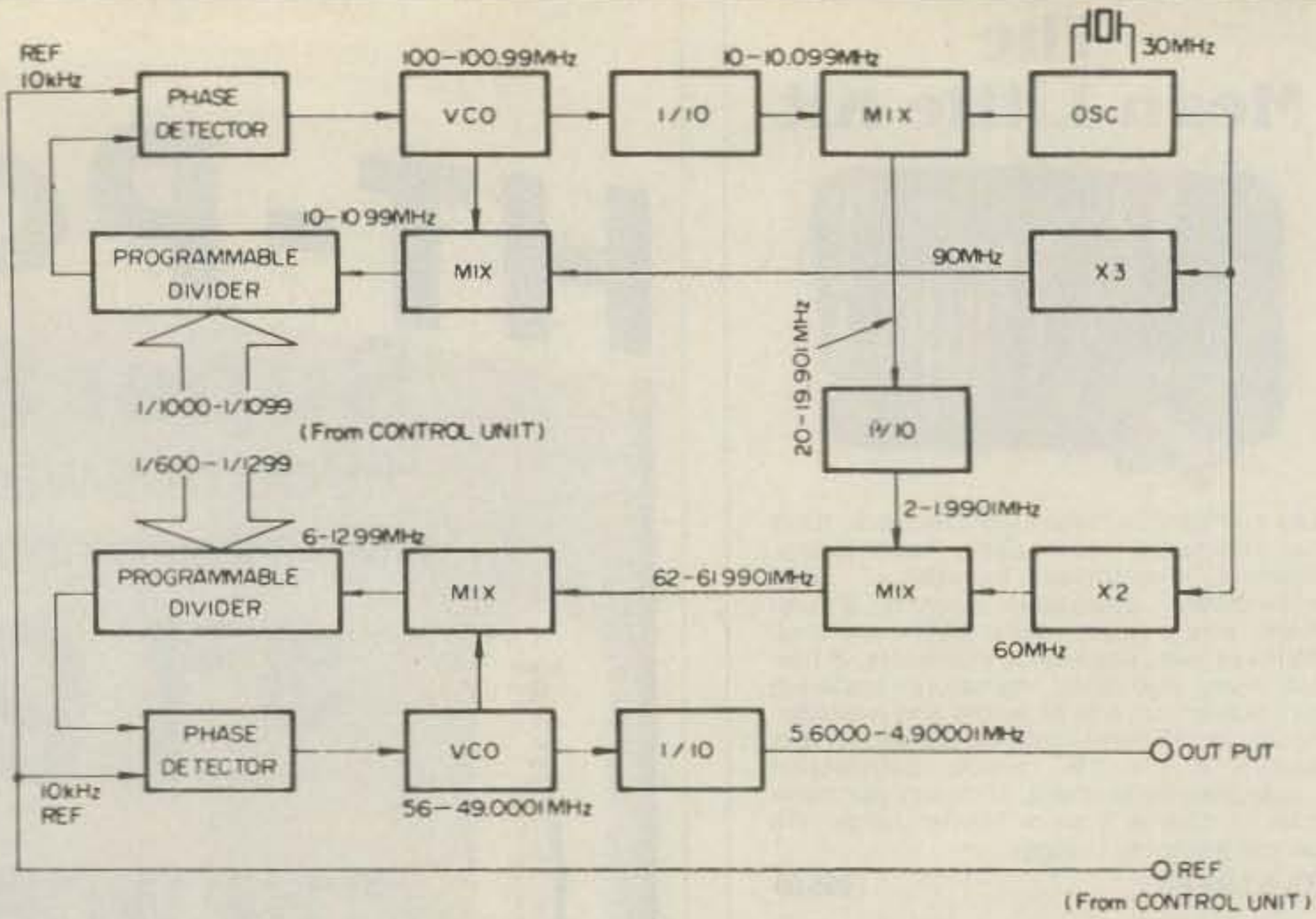

Fig. 4– The heart of the FV-707DM Digital VFO accessory is the PLL section shown in block diagram form. It delivers a synthesized signal in 10 Hz steps from 5.6 to 4.9 MHz to replace the analog 5.5 to 5.0 MHz v.f.o. signal in the FT-707. The other major section of the FT-707DM is a control one based on a microcomputer.

Again, one must mention that the above comments are not critical of the FT-707. Some of the features mentioned can easily be achieved by outboard accessories or even internally in the FT-707 by those who are handy at circuit work.

Accessories

The basic accessory one might want to consider for use with the FT-707 is the FP-707 power supply. It's about as compact as the FT-707 itself, which is significant for a full 13.5 volt/20 ampere output supply, and includes an accessory speaker. The a.c. input is adjustable from 100 to 234 volts in various steps. The regulation is 5%, no load to full load, and considering its weight at 7.4 kg (about one kg more than the FT-707 itself), it's quite a good unit.

The major accessory available for the FT-707, however, is the FV-707DM Digital v.f.o. This accessory directly interconnects with the FT-707 and is extremely compact at 27 × 238 × 235 mm. It provides for 12 frequency memories, up/down frequency scanning in slow or fast modes, and split frequency operation using a combination of the FV-707 VFO setting and/or the FT-707 VFO setting. In essence, the FV-707DM is a more advanced version of the DMS unit incorporated in the FT-107M transceiver. Any frequency displayed on the FT-707 readout can be stored in memory in the FV-707DM by depressing the memory channel pushbutton on the FV-707DM. It can be recalled in the same manner, after the FT-707 main v.f.o. is moved to a new frequency, by again depressing the memory channel pushbutton. The 12 available memories can be split up or combined in any manner desired among the various bands.

If one calls up a memory frequency, it can also be used as an up/down scanning reference frequency. Scanning up/down can be initiated by pushbuttons on an optimal scanning microphone. If the Down or Up pushbuttons are depressed momentarily, the frequency changes in 10 Hz steps. If the buttons are held down continuously for 1 to 2 seconds, scanning steps in 20 Hz increments. If in addition to the Down/Up button, a Fast button is depressed, the scanning speed is increased by a factor of 10. One has to manually stop the scanning action of the FV-707DM, but between the combination of memory channels available and scanning speeds, one can cover about any possible DX search or net call-in/frequency shift operation desirable. For those interested in the more technical details, fig. 4 presents a block diagram of the FV-707DM functions.

An optimal accessory for the FT-707 is the FC-707 Antenna Coupler. It sort of recognizes the fact that if you don't have to tune the FT-707, you may have to tune an antenna coupler to achieve maximum power transfer between the FT-707 and a specific antenna. The FC-707 covers, of course, all the same bands as the FT-707 and has calibrated power scales for 15 or 150 watts plus an s.w.r. scale. It will match a resistive load impedance (unbalanced) of 10 to 250 ohms, which is more than enough to handle all the band-edge to band-edge variations found using the usual multiband trap dipole or beam. Insertion loss is less than 0.5 dB.

If one really wishes to tie all parts of the FT-707 and its accessories together, there is the MR-7 Rack Assembly. It's not exactly an interior decorator's style delight, but for an approximate 350 mm height it allows a very functional, practical combination of the FT-707 Transceiver, FP-707 Power Supply, FV-707DM Digital VFO, and FC-707 Antenna Coupler.

The World of Video

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

More Single Frame Color

As you'll recall, last month's column carried an in-depth discussion of Single Frame Color SSTV plus a direct comparison of the W0LMD and Interface Systems units. Since that discussion may prove a useful reference during coming months, we suggest latching onto an issue while they're still available. This month, we have some similarly related SFC news for TRS-80C users. Clay Abrams, K6AEP, has completed design of his Single Frame Color System for the TRS-80C, and interface packages will soon be available. Clay reports that this system will feature dual compatibility for use with either the Interface System or W0LMD formats, and since full software control is utilized, future changes will pose few problems. Bravo!

Many of you read this column out of interest in "modern-age amateur radio." You may be considering joining the "specialized areas" of RTTY operations with a home computer system (split screen displays, canned messages, etc.) and including the capability of SSTV operations. The TRS-80C seems to be a reasonable choice in this particular situation. While most small computers produce compromising results as compared to "dedicated units" such as the HAL RTTY terminal or Robot SSTV scan converter, K6AEP's new software/interface packages come fairly close to spanning that gap. We also understand some super RTTY and full-resolution SSTV packages will soon emerge from the "K6AEP cave," so this may be the ideal time to end delays and begin enjoying a new mode of communications. Expand your horizons. You'll be glad you did. Also remember that general-class SSTV operations are doing quite well on 28,680 kHz and on various frequencies in the upper area of 20 meters.

Another 'investigation area" mentioned briefly in last month's column was the 8 second Single Frame Color system under consideration by W0LMD. Several requests for more information were voiced, so a "line by line" description is shown in fig. 1. This (experimental) arrangement calls for separating the conventional 61 millisecond scanning period for each horizontal line into two parts: one 34 milliseconds and one 22.67 milliseconds. The first part contains only green video information, while lines in the second part alternately convey red and blue video information. White light, you will recall, is comprised of 59 percent green, 30 percent red, and 11 percent blue light. Bearing these facts in mind, the feasibility of reducing red and blue time periods should be understandable. A 4.8 millisecond digital header at 1500 Hz is used for separating the color video signals. Suitably interfaced/programmed SSTV systems remove the red and blue information and place it at the appropriate point in the green video to produce a color SSTV display within a single 8 second time period. Conventional (black-and-white) SSTV compatibility is provided through use of a single 5 millisecond, 1200 Hz sync pulse at the beginning of each horizontal line.

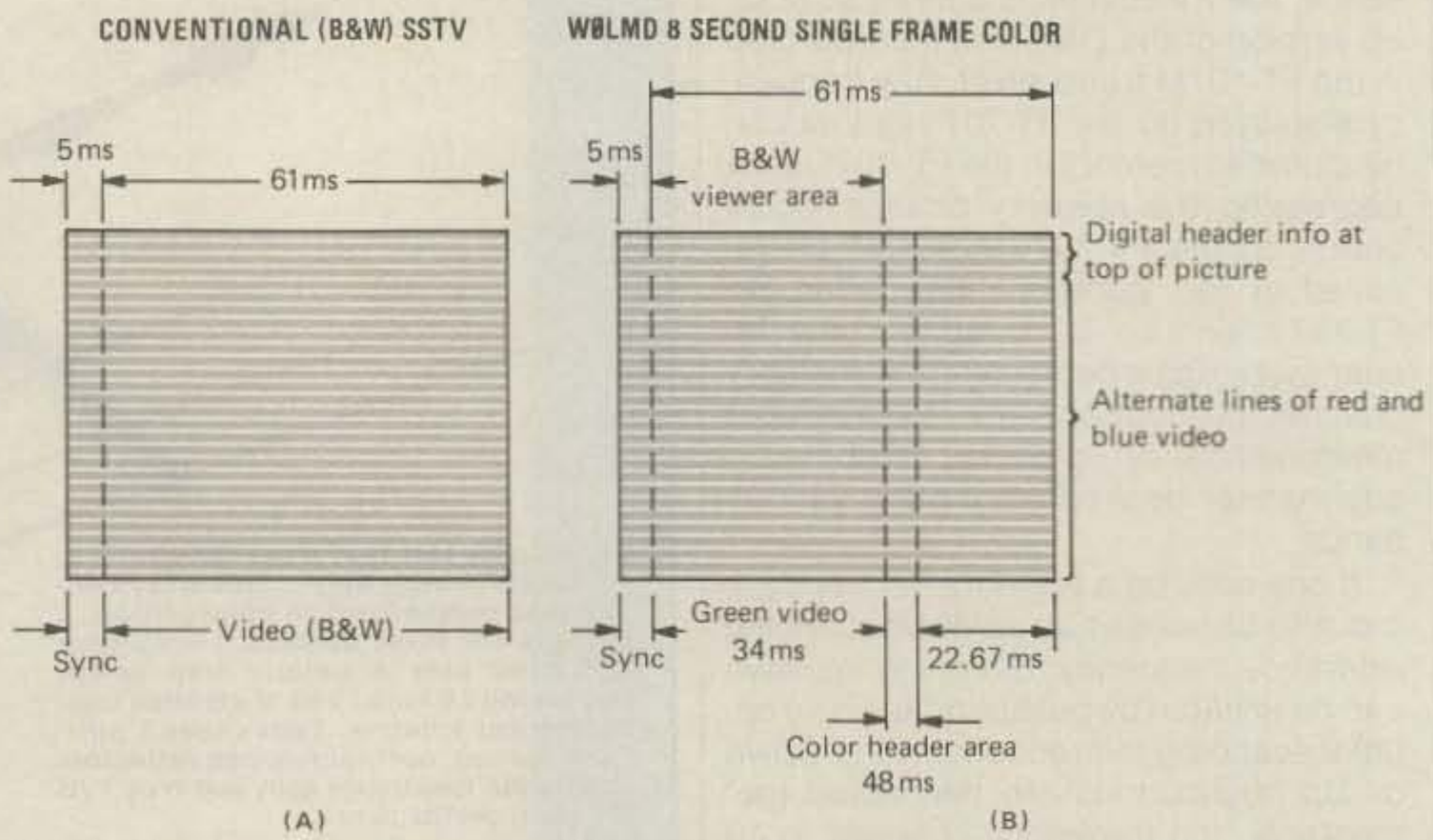

Fig. 1– Line-by-line comparison of (A) conventional SSTV and (B) the W0LMD 8 second Single Frame Color system under investigation. See details in text.

As we've all known, every system has its advantages and disadvantages. This 8 second system provides color SSTV capabilities within the same bandwidth and time period as regular SSTV, but its color resolution is necessarily limited. When viewed on a black-and-white SSTV unit (such as a Robot 400, etc.), these pictures are also quite narrow with a black bar "separating" black-and-white (green video) and color (red-and-blue) information. This is because the (black-and-white) horizontal scan rate is decreased from 61 milliseconds to approximately 34 milliseconds.

Again, I must emphasize that "sideline viewers" and SSTV newcomers avoid becoming alarmed or discouraged with the many video formats presently being investigated. Conventional 128 line, 8 second, black-and-white Slow Scan TV (such as that used by Robot 400's, older P-7 monitors, etc.) is the world accepted format on which compatibility requirements are based. Should new concepts evolve in one year, two years, or five years, your gear will still view a large portion of the Slow Scan action. Remember, too, that Robot has sold over 15,000 units—and the same person didn't buy each one.

Audio Video ID

We occasionally run across some ideas or views on the air that are so doggone clever that they simply must be shared—ideas which can be easily and inexpensively instigated by others, regardless of their technical aptitude or equipment sophistication. One such recent example is the combination audio/video SSTV ID used by Duffy, AB3J (see photo). A "wide" Morse code representation of the station's call is drawn vertically down the ID's side or middle section, each letter coinciding with the precise vertical area (number of lines) of its associated side-of-screen letters. As the transmitted signal rolls down the screen of a viewing SSTV monitor, associated tones emanating from the station's receiver switch between 1500 and 2300 Hz to produce a corresponding audio ID! Might this concept fulfill the FCC's requirements for audio identification during SSTV communications? We doubt it seriously, so play it safe and continue adding voice ID's to your SSTV transmissions.

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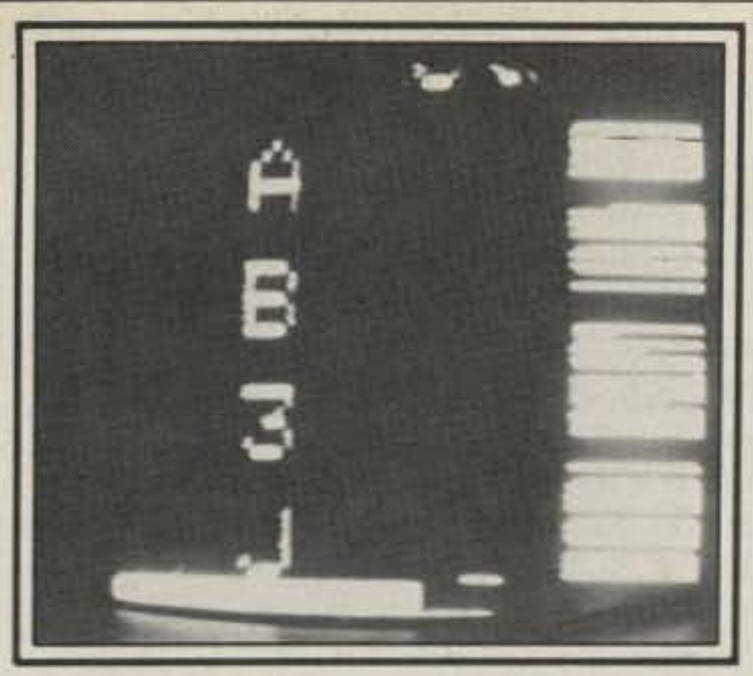

SSTV view of the audio/video ID used by AB3J and described in text. Black-and-white transitions on screen (right) cause 1500 to 2300 frequency shifts of c.w. to coincide with left side's letters. A slight pen "touch up" of photo was required for clarity.

Three-D TV

Several of you have asked if 3D concepts similar to those recently used by commercial television might be employed in SSTV circles. Sure they can, but a slightly different format is advisable.

Conventional TV's 3D setup, quite interestingly, uses an arrangement closely akin to our published suggestions a few years ago. Those ideas involve reducing the output of one color gun and using the other two guns for conveying "left" and "right" eye views. The two 3D cameras are fitted with color filters and separated 4 to 5 inches for creating 3D pictures. The resultant displays are viewed through color-keyed glasses for reproducing 3D effects.

Three-D SSTV, it seems, would best be accomplished using a modified form of the "direct view" technique employed on the Mars probe a few years ago. "Left" and "right" eye pictures were displayed simultaneously on each side of a screen (middle of screen being blank), and the viewer looked through them to "reassemble" 3D scenes.

A single black-and-white SSTV camera and dual mirror setup could scan the 4 inch separated camera views, which would thus appear on each side of an SSTV monitor screen. Viewing Slow Scanners then need only train their eyes for seeing the images in 3D. This training/viewing may be achieved in the following manner. First, stand at a location which will allow viewing some object one-half to two miles away. Then, *without* refocusing your eyes, hold the index finger on each hand vertically at arm's length. Separate the fingers approximately 3 inches, or until a "third finger" appears between the two existing fingers. Once this technique is mastered, try viewing your own SSTV-produced 3D images. Remember: *look past* the monitor (imagine an object a mile away), and the two screen images will produce a 3D view in the screen's middle area. Now who says SSTV experimenting need be expensive or complex?

SSTV for Novices?

We've received some rather interesting suggestions from Tom, KA7NDH, concerning Novice class SSTV operations, and the idea seems to hold merit. Assuming adoption of a specific "gathering frequency," interested amateurs can informally monitor/meet at that point and exchange greetings, telephone numbers, etc., via c.w. The ensuing SSTV exchanges can then be conducted via telephone. Since these activities will probably center around evening and weekends, and since long-distance telephoning will primarily involve SSTV programs, toll charges can be held to a minimum (quite a few QRM-free 8 second pictures can be exchanged in a 19 minute period).

Judging by previous mail at my end, a number of s.w.l.'s and Novices own SSTV gear and frequently "look in" on Slow Scan activities. The "telephoning arrangement" will thus permit joining the action until that General or Advanced class license is acquired. Few problems should be encountered exchanging SSTV views by telephone. An acoustic coupler can be used, or you can pull my old trick of removing the earphone and mike and "hardwiring" SSTV to the line. Pursuing this concept a step further, we might suggest checking with local area clubs or monitoring the popular SSTV frequency of 14,230 kHz for a nearby Slow Scanner who might prove a "helping Elmer." Ultimately, this (and similar arrangements) could expand our SSTV ranks tenfold.

As a "kickoff" for this plan, we'll temporarily suggest a c.w. gathering frequency in the upper end of the 15 meter Novice band (21,280 kHz). Amateurs interested in talking with other SSTV-oriented operators can simply conduct QSO's there and mention their involvements. The resultant action will, in a matter of speaking, "carry the ball from there." Since KA7NDH was not able to serve as project coordinator (compiling and maintaining a list of enthusiastic SSTV Novices, s.w.l.'s, and "Elmers," plus keeping track of SSTV contests), interested amateurs can send notes, ideas, etc., directly to me. We'll put all of you "in touch," either via this column or an ISSS newsletter, and begin setting up activities. Meanwhile, how about a volunteer for heading up this expandable project?

The new Hewlett-Packard TV signal pamphlet contains a substantial amount of video information, and it's yours for the asking.

New H.P. Pamphlet on TV

If you're somewhat new to the video ranks or would like to refresh your technical knowledge of video parameters, Hewlett-Packard has available a free TV/video sync primer book that's quite informative. Look over the 16-page manual a few evenings, and you'll be "in the know" on everything from NTSC standards and horizontal time analysis to chrominance signal and color burst structures. The booklet should be available from your local Hewlett-Packard sales office. Alternately, write to Inquiries Manager, Hewlett-Packard Company, 1820 Embarcadero Road, Palo Alto, California 94303.

Conclusion

As you have probably heard, the FCC recently granted permission to an American company for establishment of the first United States Direct Broadcast TV Satellite (DBS). The setup will resemble a "super station in the sky," programming for the complete nation and transmitting a signal which can be received with relatively inexpensive microwave units. The project is due for completion by 1985 and, with its rumored $600 million investment, should produce some elaborate results. A creditable number of amateurs are presently earning a respectable side income selling and installing TVRO's to public consumers. Visualize the related possibilities once DBS gains popularity and receiving systems start pouring in from Japan. The Japanese satellite TV band is 12 GHz; that's why we haven't seen imported TVRO gear. The U.S. employs the 4 GHz range for commercial TV relays. Since DBS will use 12 GHz, however, "windowsill systems" similar in appearance to many MDS units will become a national craze. Hopefully, the U.S. will have recovered from . . . err . . . poor economics by then. It seems that the video and microwave-oriented amateur involved in securing imported 12 GHz systems and reselling/installing them to consumers could turn a creditable profit. A word to the wise . . . .

What do ya know . . . interest in the ISSS (International Slow Scan Society) is on the rise. All we can say is keep those cards and letters coming (have you sent your "support letter" yet?). This time, we'll make it a reality! Everyone's support is needed. Let's hear from you. Contact or mail to Dave Ingram, K4TWJ, Eastwood Village #1201 South, Rt. 11, Box 499, Birmingham, Alabama 35210.

73, Dave, K4TWJ

It's Hard To Believe . . .

BY STEPHEN D. WILSON*, K0JW

It's hard to believe that after a 20-year lapse in my amateur radio activities I'm getting back on the air! Sure glad I kept my license up. Just thinking back on my operating in the 50's makes my mouth water with anticipation to renew those sensations afresh. DX! Contests! Ragchews! I can hardly wait.

While driving to the local amateur radio equipment store my mind wanders. Why this 20-year lapse in my favorite hobby? Did my interest just dwindle? Not exactly. Several things contributed to it: pressures of raising a family, pursuing a successful career, travel, time required to achieve a higher education. I guess that collectively this was enough to push hamming clear out of the picture. Oh well, here I am with money in hand to swap for that coveted box that needs only power and an antenna to open up the world.

Shelf upon shelf of radio gear is a bit confusing, so I ask the clerk for help. Where are your NC-300's? Where are your Viking II's? "Haven't had one in years" was the reply. "Can I interest you in something 'state of the art'?" Um . . . ah . . . why yes, of course. State of the art, that's what I want! Wow, what a selection! But Kenwood, Yaesu, Ten-Tec, Atlas? No, let me see something in a black and gray Hallicrafters please, or maybe a National or Hammarlund. But show me something that looks like a ham rig, not a stereo tuner. Would you repeat that please? Out of business? No longer available? My hat comes off as I observe a moment of silence. Bill Halligan, do you know about this?

Recovering from the shock and weighing the pros and cons, I settle for a Japanese delight that will occupy only a fraction of the space I had cleared in my trunk. Would you believe that my fingers are trembling as I hook up the antenna and microphone and plug my new toy into the wall?

After carefully scrutinizing the owner's manual, I am finally tuned up on 20 meters. DXCC look out! Boy, here's a good one—a 3C1 and he's just signing! I shoot in my call. "He's using a list, OM" rings out on frequency. That's what I've always loved about ham radio, I think to myself; everyone's so friendly. "Well, it sounds good here; I'm using a Kenwood," I replied to the anonymous breaker. But before my new-found friend could identify, a terrible buzz-saw sound came right on frequency, covering up everybody. Oh well, there will be more 3C1's no doubt.

I tune down about 15 kHz and wow, a TR8 calling CQ! Can I raise him? Yes! Thrilled with the QSO, I tell him, "I'm using a Kenwood, and I just heard a 3C1 using a list. Hope I sound as good as he did." "Yup, you are Q5 on this end, and I used a list before and it was quite efficient. It was excellent with Europe and Asia, but only fair with the U.S. boys." Probably his antenna, I thought as we signed. Wonder why the dealer didn't show me the "list"? Doesn't matter, though. My next contact proves to be an AC4! Can I ask for better DX? A gentleman in Tibet with a southern drawl. Hope I get a card out of that one.

Guess I'll QRT for chow. Don't want to irritate the XYL, and besides, things are quieting down on the band. Seems several stations have QSY'ed to work some real popular fella named Oscar. A warm electronic smell is prevalent as I pull the switch. Just think—after 20 years I'm back on the air. It's hard to believe.

*P.O. Box 173, Bloomfield, CO 80020

The 27th Annual CQ World Wide WPX Contest

SSB: March 26–27 1983
C.W.: May 28–29 1983

Starts: 0000 GMT Saturday
Ends: 2400 GMT Sunday

I. Contest Period: Only 30 hours of the 48 hour contest period permitted for Single Operator stations. The 18 hours of non-operating time may be taken in up to 5 periods anytime during the contest, and must be clearly indicated on the log. Multi-operator stations may operate the full 48 hours.

II. Objective: Object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used.

IV. Type of Competition: 1. Single Operator (a) All Band, (b) Single Band. 2. Multi-operator, All Band *only*. (a) Single Transmitter (only one transmitter and one band permitted during the same time period, defined as 10 minutes, no exception), (b) Multi-Transmitter (one signal per band permitted). **NOTE:** All transmitters must be located within a 500 meter diameter or within the property limits of the station licensee's address, whichever is greater. The antennas must be physically connected by wires to the transmitter.

V. Exchange: RS(T) report plus a progressive three-digit contact number starting with 001 for the first contact. (Continue to four digits if past 1000.) Multi-transmitter stations use separate numbers for each band.

VI. Points: Contacts between stations:

1. **North America Only**

A) Contacts outside of North America count 3 points on 28, 21, 14 MHz, and 6 points on 7, 3.5, 1.8 MHz.

B) Contacts with other North American countries count 2 points on 28, 21, 14 MHz, and 4 points on 7, 3.5, 1.8 MHz.

C) Contacts within own country count **0** points but are permitted for prefix multiplier credit.

2. **Europe, Asia, Africa, Oceania, S. America**

A) Contacts outside of own continent count 3 points on 28, 21, 14 MHz, and 6 points on 7, 3.5, 1.8 MHz.

B) Contacts with other countries on own continent count 1 point on 28, 21, 14 MHz, and 2 points on 7, 3.5, 1.8 MHz.

C) Contacts within own country count **0** points but are permitted for prefix multiplier credit.

VII. Multiplier: The multiplier is determined by the number of different prefixes worked. A **"PREFIX"** is counted once during the entire contest regardless of how many times the same prefix is worked.

A **"PREFIX"** is considered to be the three letter/number combination which forms the first part of an amateur radio call (N1, W2, WB3, K4, AA6, WD8, 4X4, DL7, G3, IT9, KH2, AL7, NP2, WP4, 9M2, CT9, 4J9, PY7, VK4, JE3, VE3, Y32, Y33, Y45, AN8, AB8, H44, KT4, etc.). A station in a call area different than that indicated by its call sign is required to sign portable. The portable prefix would be the multiplier. Example: W8IMZ/4 would count for prefix W4 only and W8IMZ/LX would count for prefix LX**0** only.

Special event, commemorative, and other unique prefix stations are also encouraged to participate.

VIII. Scoring: 1. Single Operator (a) All Band score, total QSO points from all bands multiplied by the number of different Prefixes worked. (b) Single Band score, QSO points on the band multiplied by the number of different Prefixes worked. See VII.

2. Multi-Operated stations. Scoring in both these categories is the same as the All Band scoring for Single Operator.

3. A station may be worked once on each band for QSO point credit. However, prefix credit can be taken only **once** regardless of the number of different bands on which the same station and/or prefix has been worked during the entire contest.

IX. QRPp Section: (Single Operator Only). Power must not exceed 5 watts output to qualify for QRPp section competition. You must denote QRPp on the summary sheet and state the actual maximum power output used for all claimed contacts. Results will be listed in a separate QRPp section and certificates will be awarded to each top scoring QRPp station in the order indicated in Section X. These certificates will be marked QRPp and will show your power output. QRPp stations will be competing only with other QRPp stations for awards. All other information contained in these rules is applicable to this section.

X. Awards: Certificates will be awarded to the highest scoring station in each category listed under Section IV.

1. In every participating country.

2. In each call area of the United States, Canada, Australia, and Asiatic USSR.

All scores will be published. However, to be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must show a minimum of 24 hours.

A single band log is eligible for a single award **only**. If a log contains more than one band, it will be judged as an all band entry, unless specified otherwise. However, a 12 hour minimum is required on the single band.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

XI. Trophies, Plaques and Donors:

S.S.B.

Single Operator, All Band

WORLD - North Florida DX Assn.
U.S.A. - Bob Epstein, K8IA
CANADA - Garth Hamilton, VE2VY
CARIB./C.A. - Ray Alea, KC4OV
EUROPE - Bernie Welch, W8IMZ
JAPAN - Palm Garden Radio Club
SO. AMERICA - Ron Moorefield, W8ILC
WORLD QRPp - Dayton A.R.A.

Single Operator, Single Band

WORLD - John N. Reichert, N4RV
U.S.A. - Richardson Wireless Klub.
(Joe Johnson, W5QBM Memorial)
U.S.A. - 7 MHz - William Diggins, WA8LXJ
U.S.A. - 21 MHz - Ted Pauck, Jr., K8NA
CANADA - Gene Krehbiel, VE7KB
EUROPE - Myron E. Crofoot, WB4VQO
JAPAN - Ken Ruddock, K6HNZ
WORLD - 21 MHz - Lee Wical, KH6BZF
WORLD - 7 MHz - William Diggins, WA8LXJ
WORLD - 1.8 MHz - Arch Doty, Jr., K8CFU/4

Multi-Operator, Single Xmtr.

WORLD - Mike Badolato, W5MYA

Multi-Operator, Multi-Xmtr.

WORLD - Henry Thel, VE7WJ
U.S.A. - Bert Curwen, KL7IRT

Contest Expedition

WORLD - Northern Ohio DX Assn.

• • •

C.W.

Single Operator, All Band

WORLD - Canadian DX Assn.
U.S.A. - Steve Bolia, N8BJQ
CANADA - Canadian A.R.F.
EUROPE - Sig. Jakobsson, TF3CW
JAPAN - Palm Gardens Contest Club
WORLD QRPp - Nevada A.R.A.
(George Hewitt WB7OOQ Memorial)

Single Operator, Single Band

WORLD - Pedro Piza, Jr., NP4A
(Pedro Piza, Sr., KP4ES Memorial)
ASIA - Bruce Frahm, K0BJ
WORLD - 3.5 MHz - Lance Johnson Eng.

Multi-Operator, Single Xmtr.

WORLD - Ron Blake, N4KE
CANADA - Tehrahedral Contest Circle
EUROPE - Jonas Bjarnason, TF3JB

Multi-Operator, Multi-Xmtr.

WORLD - North Florida DX Assn.
NORTH AMERICA - Dick Weber, K5IU

Contest Expedition

WORLD - Northern Ohio DX Assn.

Club (S.S.B. & C.W.)

WORLD - Canadian DX Assn.
(Bud Abraham, VE1VR Memorial)
U.S.A. - Northern Ohio A.R.S.

Trophy and Plaque winners may win the same award *only once* within a **TWO** year period. This does not apply to any QRPp, Club, Expedition or *CQ* Special Awards. A station winning a World Trophy will not be considered for a sub-area award. That Trophy will be awarded to the runner-up for that area.

XII. Club Competition: A trophy will be awarded each year to the club or group that has the highest aggregate score from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area. **(Exception: DXpeditions especially organized for operation in the contest and manned by members.)** Indicate your club affiliation. To be listed, a minimum of three logs must be received from a club.

XIII. Log Instructions: 1. All times must be in GMT. The 18 hour non-operating periods must be clearly shown.

2. Prefix multipliers should be entered only the FIRST TIME they are contacted.

3. Logs must be checked for duplicate contacts and prefix multipliers. Recopied logs must be in their original form, with corrections clearly indicated.

4. An alphabetical/numerical check list of claimed PREFIX multipliers must be sent along with your contest log. (A prefix is counted one time only.)

5. Each entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the contestant's name and mailing address in BLOCK LETTERS.

Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

6. Official log and sample summary sheets are available from *CQ*. A large self-addressed envelope with sufficient postage or IRCs must accompany your request.

If official forms are not available, you can make your own with 40 contacts to the page.

XIV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSO's or multipliers will be deemed sufficient cause for disqualification. Actions and decisions of the **CQ WPX Contest Committee** are official and final.

XV. Deadline: All entries must be postmarked no later than May 10, 1983 for the S.S.B. section and July 10, 1983 for the C.W. section. Indicate S.S.B. or C.W. on the envelope. From rare isolated areas the deadlines will be made more flexible. Your support is appreciated.

Logs go to: CQ Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 or to the **new** WPX Contest Director:

Steve Bolia, N8BJQ,
7659 Stonesboro Dr.,
Huber Heights, OH 45424 U.S.A.

• • •

Please remember to send in early for the WPX Contest Logs and Summary Sheets.

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CIRCLE 85 ON READER SERVICE CARD

Antennas

a monthly feature by
KARL T. THURBER, JR., W8FX

DESIGN, CONSTRUCTION, FACT, AND EVEN SOME FICTION

Antenna Accessories For The Hamshack: Part IV

In last month's CQ, columnist Thurber continued his discussion of antenna and r.f. accessories with a review of the r.f. transformer and the balun. This month he goes on to discuss two other important devices.

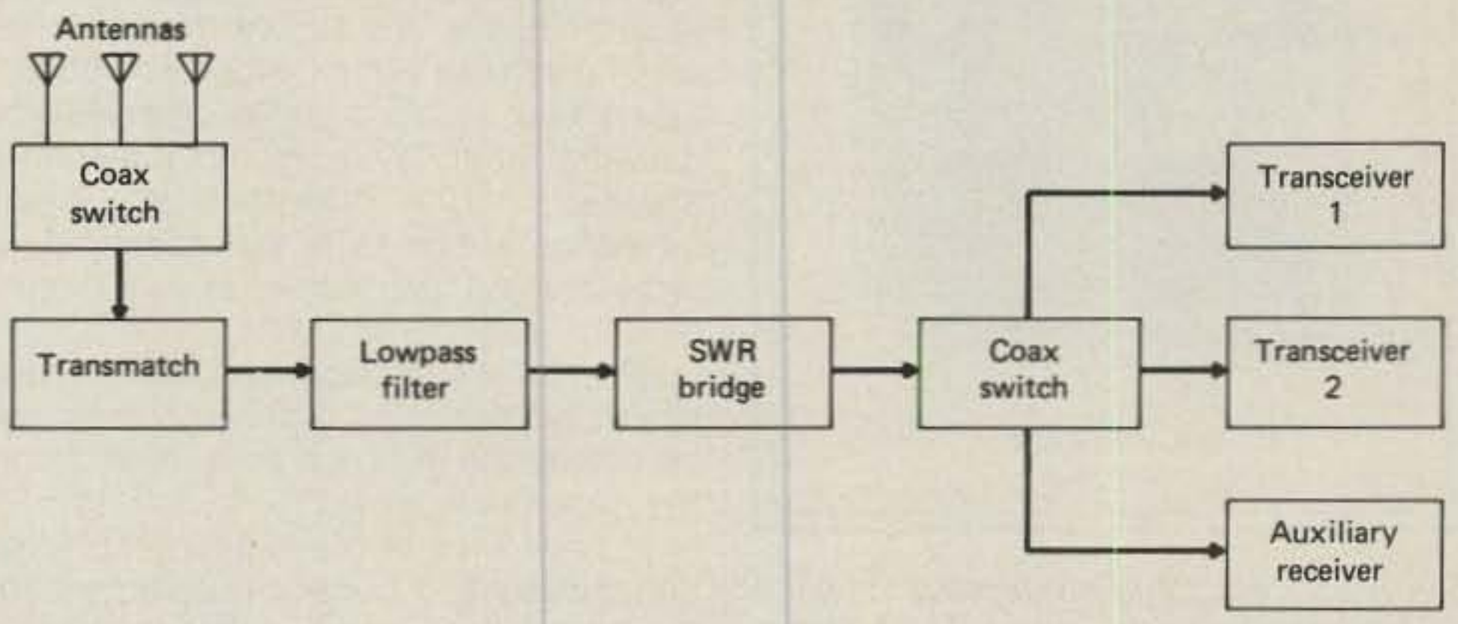
We have examined several useful r.f./antenna accessories in this series. These accessories included the dummy load, r.f. wattmeter, s.w.r. bridge, r.f. transformer, and balun. All of these devices are basic ones, useful or necessary for proper transmitter tuneup as well as antenna adjustment. In this issue we continue with a discussion of two additional in-line accessores: r.f. switches and lightning protective devices. Let's begin this discussion with the r.f. switch.

The R.F. Switch

There have been many ways devised to solve the problem of ham shack r.f. power distribution. These range from the physical changing of cable connections (indoors and out), to multi-position coaxial cable switches, to remotely operated switching relay boxes and associated control units.

In practice, if coaxial cable is used for one's r.f. plumbing, there is usually no big problem in using more than one antenna with one or more transceivers, transmitters, or receivers. When using other types of feedline, some mechanical problems may ensue. While switches for, say, single-wire and open-wire feedline are fairly straightforward in single-pole, single-throw (s.p.s.t.), and double-pole, double-throw (d.p.d.t.) configurations, the problems of switching and routing r.f. wiring to various pieces of equipment can lead to the creation of a veritable "rat's nest." Most stations will grow to the point where a number of antennas and transceivers/receivers will be used, so it generally makes sense to primarily do coaxial-cable switching, even if other types of antenna feeders are used; the transmatch can be used to convert all feeders to the "coax domain."

With coax, it is a simple matter to switch r.f. from one antenna to another, to a dummy load, from one transceiver to another, or to an auxiliary receiver. Multiple-position coax switches can be connected back-to-back in order to enable various antennas to be used in connection with any item of station equipment, as shown in fig. 1. As can be seen, the feedline between the two coaxial switches is an excellent point at which to install an s.w.r. bridge or wattmeter. A lowpass filter is connected in the line on the output side of the s.w.r. bridge (rather than on the input side, since some bridges are known to generate TVI-producing harmonics from an otherwise "clean" transmitter).



The diagram above shows how multiple antennas and a dummy load may be connected to a variety of station equipment, including the transmatch and lowpass filter. The feedline between the antenna transmatch and the equipment-selecting coax switch provides a good location for the installation of a lowpass filter and an s.w.r. bridge/wattmeter. For purposes of safety and lightning protection, the antenna switching should be done using the type of coax switch that automatically grounds unused positions. Lightning surge protectors may be installed outdoors, in each transmission line, and/or on each piece of station equipment (transceiver, transmitter, receiver, etc.). A common ground point should be established for all station equipment.

Fig. 1– Typical station r.f. switching arrangement.

Although relatively expensive, heavy-duty transmitting-type coaxial switches are well worth the price, as they may be inserted without unduly disturbing impedance relationships on the cable, usually to 250 MHz or so. Look for the type of switch that features automatic grounding of all antennas except the one actually in use; this is an especially important consideration in the interest of safety and lightning protection. Going on the premise that "a grounded conductor is a safe conductor," most of these switches also have a direct-ground position to ground all antennas when the station is not in service.

Many "all-in-one" antenna transmatches include a built-in r.f. switch as a standard feature. Generally, these allow selection of several coax-fed antennas (often with a tuner-bypass feature), dummy load, or single- and two-wire feedlines. Normally, the switching is on the output or antenna side of the transmatch, so one would still have to install an r.f. switch on the input side of the transmatch, if operation were to be with several transceivers, transmitters, or receivers. Also, an extra switch may be required if the linear amplifier does not have internal bypassing capabilities.

One who actively gets involved in the "antenna farming" business will soon discover the very high cost of coaxial cable, which can account for a major part of the antenna system's total cost. With a large number of antennas, it may prove worthwhile to use a remote switching scheme, in which short cable runs are made from the various antennas to a central (usually tower-mounted) remote switching box, and a single feedline is used for the long run to the ham shack. These allow for the use of practically any number of antennas, while retaining the simplicity of a single feedline, and with no clutter at the operating position.

Typical units, such as those offered by Drake, Heathkit, Antenna Mart, and several others, accommodate five or six antennas and have provisions for disconnecting all antennas and grounding the station feedline at the remote switch location (for safety purposes). Most units require a separate run of TV rotator con-

*317 Popular Drive, Millbrook, AL 36054

Electronic antenna changeover switch has no moving parts. In this B&W model, the transmitter is continuously connected to the antenna, while the antenna circuit to the receiver is blocked during transmit. Switching is virtually instantaneous for fast break-in operation. Unit handles 2 kw PEP and has a built-in receiver preamplifier. (Photo courtesy Barker and Williamson)

trol cable from control box to remote switching box to carry operating voltage and switching commands. To avoid "impedance bump" and weatherproofing problems, N-type connectors are generally advisable for use if operation above 30 MHz is desired.

Generally, the decision to go to a remote switching scheme depends mainly on economics. Considerations include the number of antennas to be used, their location, cable cost and lengths required, and the cost of the switching device itself. In some cases, it's almost mandatory to use the remote switch, since an undesirable shack location might otherwise be dictated when long, multiple feedlines are required. A drawback to remote switching schemes is the possibility of relay-box malfunctions due to moisture or electrical failure.

Most amateurs today use transceivers or easily interfaced receiver transmitter combinations in which both r.f. and control transmit/receive (T/R) switching is fully provided for in the equipment. Interconnection and control problems often surface, however, when separate, noninterfacing transmitters and receivers are used, and when linear amplifiers, preamps, and auxiliary receivers are wired in.

In such cases, and depending on the equipment configuration, two other devices may be used to good effect. One is the old-fashioned *antenna relay*, especially useful if you use a separate transmitter and receiver. Barker and Williamson (B&W), for example, sells a two-position, 2 kw PEP, a.c. operated coaxial relay, the Model 377, that can be operated from the transmitter's VOX or PTT circuits for completely automatic operation; the receiver's input is grounded when the relay is in the transmit position.

Another device is the **transmit/receive (T/R) switch.** This unit is an electronically operated antenna changeover switch. In B&W's Model 381-C, the transmitter is continuously connected to the antenna, while the antenna circuit to the receiver is blocked during transmission. Switching is instantaneous (for break-in operation), there are no mechanical switch contacts to arc or burn, and an internal r.f. preamp provides a modest amount of receiver gain.

While we are mainly concerned with r.f. switching in this column, it's important to realize that *control* switching goes hand-in-hand with *r.f.* switching. Although most modern, compatible equipment reduces or eliminates these problems, it's well to bear in mind that many r.f.-associated accessories generate control problems of their own that must be solved for convenience of operation. When confronted with T/R and control wiring problems, it's a good idea to lay out the control and r.f. switching arrangements for each piece of equipment on paper, trying to plan the setup as an integrated system, rather than working at piecemeal interconnections. Keep in mind an old rule-of-thumb: Whatever you come up with, only *one* switch should have to be manually thrown when switching from transmit to receive!

Lightning Protective Devices

The problem of lightning protection in the ham shack has been described in considerable detail in various articles in *CQ* and in other amateur publications, including several articles by the author, so we won't beat a dead horse here. However, it's instructive to briefly review some of the *general* techniques for lightning protection. Let's list them:

1. Ground all towers, including structures mounted on roofs or atop buildings. Don't rely on existing "cold water pipe" grounds, or the shield on coaxial cable, for proper grounding.

2. Whenever possible, make use of rotary beams using matching devices that place the elements at ground potential, and grounded shunt-fed verticals.

3. Run coaxial cables and control lines from the antenna down the inside of the tower, then underground to the station, if possible.

4. Use a common ground bus, or wire, for the station ground, and connect it to the house's electrical ground system and/or external ground rods. Use caution when relying on the house's internal piping for station grounding.

5. Connect all station equipment and

accessories to the common ground bus—including metal cabinets, microphones, keys, control boxes, etc.

6. Use three-wire power cords on equipment whenever possible.

7. Remove equipment from the a.c. lines when not in use, or use 115 v.a.c. service line arrestors and transient suppressors to guard against equipment-destroying power-line lightning surges.

8. Bypass and ground outdoor rotator and other control cables.

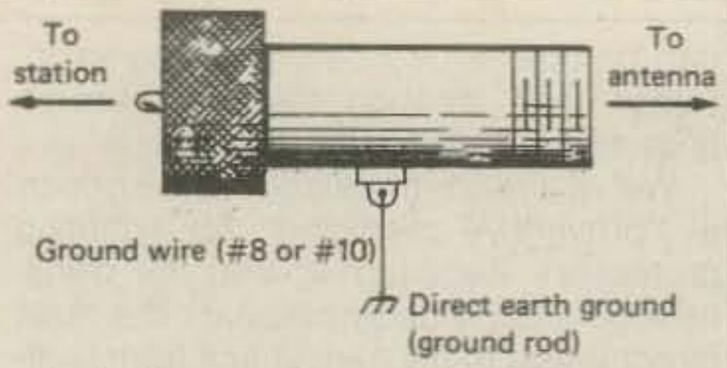
9. Realize that a "good ground" for the r.f. may not exactly be synonymous with a "good ground" for electrical and lightning protection purposes, and plan accordingly.

10. Recognize that the transmission line is probably the station's most vulnerable point for lightning damage; protect it well.

No device can guarantee protection from a direct lightning strike, not to mention *prevention* of strikes. But, if there is any secret to protecting antennas, towers, station, and dwelling, it lies in providing a direct path from antenna to ground so that atmospheric electrical charges can be discharged harmlessly to earth, rather than through the transmission lines and station equipment.

We've already mentioned some general "preventive medicine" for lightning protection. Recognizing that the transmission line probably presents the most direct threat to the ham shack from lightning discharges, it's worthwhile to give the transmission line extra scrutiny, assuming that general preventive measures have been taken.

For starters, it helps to have the antenna itself at d.c. ground potential, as would



This diagram shows a typical commercial lightning arrestor as manufactured by Radio Shack, Cushcraft, Hy-Gain, Amphenol, and others. This type of air-gap device, when installed outdoors and solidly grounded, will provide some degree of equipment protection from lightning surges through the antenna and transmission line; several combinations of male and female connectors are available. However, these devices should not be relied upon to prevent damage or fire caused by a direct hit on the antenna, supporting structure, or transmission line.

Fig. 2– Representative commercial coax lightning arrestor.

be the case with a gamma-matched beam or a shunt-fed vertical antenna, although while the latter antenna may bleed off static build-ups, a direct strike would likely result in failure of the shunt coil, resulting in "ungrounding" of the antenna with ensuing damage.

Needless to say, the coax shield should be grounded at the tower and where it enters the station; a simple transmission line ground consists of a shorted coaxial jack with a #8 or #10 wire run from the jack to a ground rod. This ground should be effected outdoors, or where the transmission line enters the ham shack—*not* indoors.

If one doesn't want to physically disconnect the transmission line for grounding, the coax can be protected at the point where it enters the building. A type UG-363/U or 83-IF coax bulkhead adapter can be mounted to a sheet-metal bracket on the outside of the building where the cable enters; the bracket should be grounded using a length of #8 or #10 wire to a ground rod. Alternately, it's possible to fabricate your own feedthrough using a more readily available 83-1J (PL-258) connector of the type used to join coax sections. A heavy ground wire can be soldered or clamped to the connector, and the assembly can be mounted outdoors.

These devices only provide a measure of "catastrophic" lightning protection with little or no bleed-off of atmospheric electricity from nearby lightning discharges that might induce high voltages and currents on the transmission line. These can, in turn, damage receiver front ends, transmitter tank circuits, antenna coupler circuitry, and other in-line accessories. A more effective approach is to use a commercially made static discharge unit or lightning arrestor in the feedline outdoors at the point where the transmission line enters the building. These units contain a small spark gap that will not arc or short out at normal amateur power levels, but which will allow high-voltage discharges to bridge the gap and be diverted to ground. When installed outdoors and solidly grounded, the devices will offer considerable equipment protection from lightning damage through the antenna and transmission line (see fig. 2). Several manufacturers offer these protectors in various combinations of male and female connectors: Cushcraft, Radio Shack, Hy-Gain, Amphenol, and others. Some amateurs use two devices in long transmission line runs for added protection, one arrestor being mounted near the antenna or on the tower, and another near the station's cabling entrance point.

The air-gap "crowbar" devices described above suffer from two major drawbacks: (1) they generally are destroyed after only one lightning-induced surge or stroke; and (2) they do not react fast enough to spare sensitive, solid-state equipment from damage. A more sophisticated approach is to use the newer, hermetically-sealed, gas-filled impulse suppressor devices that can survive repeated pulses without failure, and that react to protect equipment in a time on the order of 1 microsecond or less.

Several approaches are taken by various manufacturers in the design of these interesting devices. PolyPhaser Corporation's "Zap Trapper"™, for example, is designed to be installed outdoors, on the premise that the best method of preventing damage to ham shack equipment is to ensure that the strike energy never reaches the shack. The device is designed to suppress voltage build-up in less than 1 microsecond, and it can handle several thousand amperes of current. The device is rated at 50 ohms impedance with a 1.15:1 s.w.r. to 1000 MHz, with a 0.1 dB maximum insertion loss. Its turn-on voltage is 280 v.d.c. with a typical surge rating of 10,000 amperes; power-handling capability is about 750 watts. Because the unit is mounted outdoors at the base of the tower or in the antenna feedline, it would offer protection to all in-line station equipment and accessories, such as lowpass filters, baluns, T/R relays, preamps, s.w.r. bridges, antenna tuners, etc.

A somewhat different approach is taken in the "Transi-Trap"™ surge protectors offered by Alpha Delta Communications. These are gas surge arrestors designed to protect specific pieces of equipment from damage due to excessive voltages or currents generated by electrical transients. In operation, application of a sufficient voltage across the element causes an arc to form between the sealed metal electrodes, changing the impedance from greater than 10,000 megohms to a few milliohms in a time of

Simple and straightforward Daiwa coaxial switch is designed for operation to 500 MHz and particularly suitable for switching between two antennas or two transceivers. The s.p.d.t. switch is of the type that automatically grounds the unused terminal. (Photo courtesy J.W. Miller div. of Bell Industries)

less than 100 nanoseconds. Equipment protection is considerable, in that the voltage across the surge arrestor is less than 30 volts. The Alpha Delta units are designed for indoor installation on the rear apron of the equipment to be protected, although outdoor use is also possible. Two models are offered, one a "low level protector" (Model R-T) for use with low-power solid-state receivers, transceivers, or transmitters; and the other a "high voltage protector" (Model HV) for use with high-power linear amplifiers. The units can be used together to form a system. The Alpha Delta units feature a removable "Arc Plug Cartridge" so that the protection capsule may easily be replaced should it deteriorate in performance or fail. Typical voltage breakdown characteristics of the Alpha Delta units are shown in fig. 3.

These sophisticated protectors should see increasing application in the ham shack, especially as more amateurs realize that many equipment failures (especially in solid-state gear) occur as a result of atmospheric electrical surges from distant storm fronts and near misses, not just as a result of "direct hits." In fact, a combination of grounds, indoor and outdoor protectors, and grounding-type coaxial switches may actually be superior to merely disconnecting the transmission line in a lightning storm. This is because if lightning were to strike the antenna system, a portion of the discharge would still follow the coaxial line indoors and jump-arc to anything nearby, opening up the possibility of serious damage to the ham shack. At the bottom line, however, one should realize that the protective devices described are designed to reduce the hazards of lightning-induced surges. However, these devices won't *necessarily* prevent damage or fire caused by a direct lightning hit on the antenna or other

Typical Voltage Breakdown Characteristics for Arc-Plug Cartridge Elements

Ramp Speeds from 100V/s to 30 kV/μs

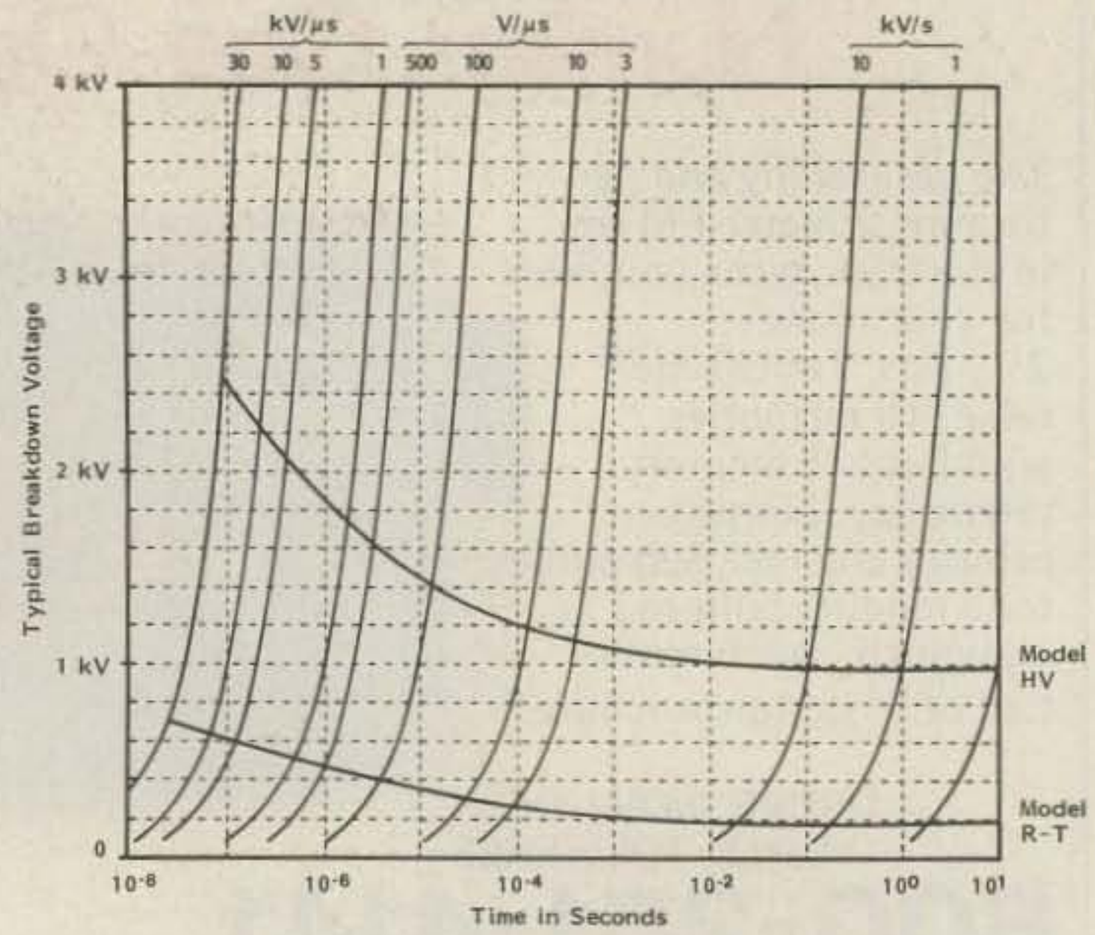
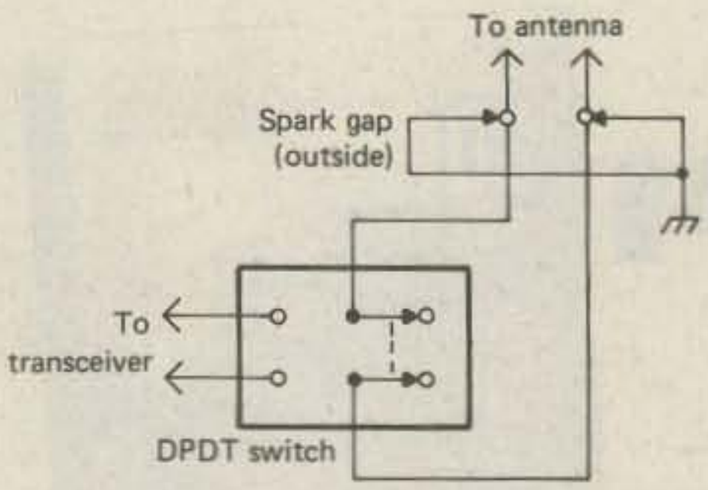


Chart shows typical voltage breakdown characteristics for the Transi-Trap™ Arc-Plug Cartridge Elements. The protectors are constructed of two metal electrodes hermetically sealed in a gas-filled, ceramic cylinder. The design affords lightning-induced surge protection to sensitive electronic devices, especially those using PIN diodes, MOSFETs, and bipolar transistors. (*Source:* Alpha Delta Communications product literature.)

Fig. 3– Typical voltage breakdown characteristics for Alpha Delta Transi-Traps™.

structure. That's up to *Divine Providence!*

Since most amateurs use coax as their transmission line, we have concentrated on its protection. However, it is equally desirable to protect single-wire and open-wire feeders. This may be accomplished by procedures such as physically disconnecting and grounding the feedline outside the ham shack when not in use; installing a grounding knife-switch in the feeders at the point where they enter the station; or installing a spark gap protector in the feedline at the station's cable entrance point to have lightning discharges "shoot the gap" and pass harmlessly to ground. Simple designs for such lightning arrestors are found in the references in the bibliography, while a typical open-wire feeder protection arrangement is shown in fig. 4. (To the author's knowledge, no open-wire transmitting-type lightning arrestor is commercially available.)



Sketch above shows a simple feeder protection circuit for open-wire feedlines, using a double-pole, double-throw (d.p.d.t.) knife-switch and a spark-gap lightning arrestor. The construction details of the lightning arrestor can be found in the *ARRL Antenna Book.* The device can be made of three feedthrough or stand-off insulators and three sections of brass or copper strapping. It should be installed at a point close to where the feedline enters the station. The knife-switch should be installed outdoors if possible, but it may be mounted indoors near the feedline entry point if necessary. (*Note:* Sketch from article by T.E. White, K3WBH, "A Primer of Lightning Protection," *CQ*, July 1981.)

Fig. 4– Protection for open-wire feeders.

Summing Up

This month in *CQ* we have continued our review of various r.f. and antenna accessories. To date, we have examined the r.f. wattmeter, s.w.r. bridge, r.f. transformer, balun, lightning protective devices, and the r.f. switch. Next month, and in subsequent issues, we will continue this series of columns with a look at other important r.f. accessories. These will include the lowpass filter, field strength meter, antenna noise bridge, grid-dip oscillator, as well as other useful devices and instruments. See you then.

73, Karl, W8FX

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Antenna of the Month: Transi-Trap™ Surge Protectors

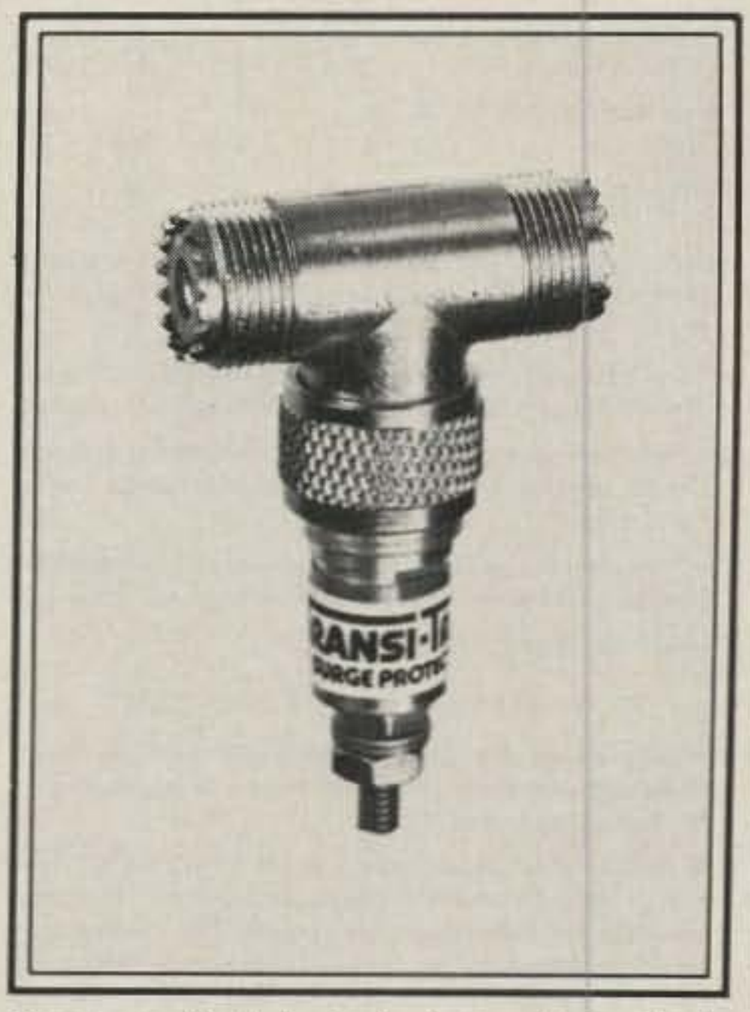
Shown here is the Alpha Delta Communications Model R-T Transi-Trap™ protector with a plug-in HV cartridge at the right.

The conventional air-gap lightning protector design affords practically no protection to solid-state components, since its breakdown voltage and response time is unpredictable due to the arc-forming characteristics of molecules that exist between electrodes in an air gap.

When a sufficient lightning transient, or surge voltage, first occurs across the electrodes in an air gap, the molecules of air are ionized along the surface of the "hot" electrode and are set in scattered, non-straight-line motion. Cascading, the process of increasing the ionization rate, sets more ionized particles in motion at such an accelerated rate that severe air turbulence sets in between the electrodes, causing further scattering of the ionized particles.

Eventually, the ionized particles reach the "ground" electrode, an arc is formed, and at that time the lightning pulse voltage is shorted to ground. Since the actual path length (which determines the breakdown voltage) is variable in nature due to the turbulence and scattered motion of the ionized particles, a precise breakdown voltage, set at a low enough level to protect solid-state components, cannot be assured. Also, since the finite time required to traverse this path (which determines the response time of the gap) is unpredictable, proper firing speed cannot be assured, which would eliminate enough of the transient waveform to prevent damage. Also, when the gap does fire, a fairly high voltage still exists across the arc.

By comparison, the Alpha Delta Transi-Trap gas tube protector design solves these problems by enclosing the gap in an hermetically-sealed ceramic tube which is filled with an isotope of known breakdown characteristics and response time. The path between electrodes is restricted and controlled by the tube design. As a result, the variable and unpredictable nature of the ionized particles is minimized. This concept yields a protector design with a known response time of 100 nanoseconds and a predictable breakdown voltage with a tolerance of ±15% as compared to the approximate breakdown tolerance of 100% for the air gap. Also, due to the nature of the gas in the ceramic tube, breakdown voltage



Illustrated in this photo is the Alpha Delta Communications Model L-T Transi-Trap™ protector on a u.h.f.-type "T" connector.

and response time is not affected by humidity, altitude, temperature, and pressure changes. When the gas fires, the voltage drop across the arc is at a low, harmless level.

The Transi-Trap design allows devices to be set to fire at the lowest possible lightning pulse level for maximum protection of solid-state transceivers and receivers, suitable devices being the Models LT, LT/N, and R-T protectors. A higher lightning pulse level for protection of both solid-state and tube-type amplifiers is provided in the Models HV, HT, and HT/N protectors. Two representative protectors in the firm's product line are shown in the accompanying photos.

The Models R-T and HV are rated for use through 500 MHz, since they make use of special in-line brass tubing. Loss is typically 0.1 dB at 500 MHz, according to the manufacturer.

Thanks to Don Tyrrell, W8AD, of Alpha Delta Communications, for providing your column editor with this interesting description of his firm's protective devices. See Don's article in *CQ*, April 1982 for more details on these "new era" protection aids.

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Although solar activity is expected to continue to decline steadily through the New Year, 1983 looks like it will be another year of relatively high solar activity and associated good ionospheric propagation conditions.

Table I shows the various phases of solar cycle intensity corresponding to specific ranges of smoothed sunspot numbers. This data is based on the behavior of the previous twenty solar cycles for which records are available.

Solar Phase	Smoothed Sunspot Number Range
Intense	Above 120
Very High	90–120
High	60–90
Moderate	30–60
Low	0–30

Table I–Major phases of a solar cycle.

Solar activity during January 1983 is expected to be at the 106 level, or within the Very High range. By the end of the New Year the sunspot count is expected to drop to approximately the 77 level, which would still be within the High region of solar activity.

The *Royal Observatory of Belgium*, the world's official keeper of sunspot data, reports a monthly mean sunspot number of 119 for September 1982. This results in a 12-month smoothed sunspot number of 129 centered on March 1982. This is a drop of 4 from the February level as the present cycle continues its steady decline. Table II shows the progress of the present sunspot cycle, Cycle 21, on a month-to-month basis since its beginning during June 1976, as well as a prediction for the level expected during 1983.

Propagation 1983

Compared to the past four years of Intense and Very High solar activity, expect the following conditions during 1983 for each of the amateur bands between *6* and *160* meters.

6 meters: Considerably fewer DX openings, but some good ones should still be possible during the equinox months on generally north-south paths. Some east-west openings may be possible during the winter months, but they will be few and spotty. This is a daytime DX band.

10 meters: A noticeable decrease in the number and duration of DX openings, but expect a great DX band during the daylight hours of the equinox and winter months, with north-south openings possible during the summer months as well.

15 meters: Not much difference should be noted on this band. Should be great for world-wide DX during the daylight hours of the equinox and winter months. Not many east-west DX openings expected during the summer months, but north-south openings should hold up well during this season.

20 meters: Not much change from previous years during the hours of daylight, when DX openings should be possible on this band throughout the year. Somewhat fewer nighttime DX openings expected, but generally good DX should be possible during much of the period of darkness during the equinox and summer months. Nighttime DX openings during the winter months are expected to be somewhat more spotty than previously.

40, 80, and 160 meters: Basically nighttime DX bands, and no significant change expected this year. World-wide DX should be possible on both *40* and *80* meters during all seasons, and some DX openings are expected on *160* meters during the equinox and winter months.

January Conditions

Fifteen meters should be the best DX band during the daytime hours, with *10* and *20* meters not too far behind.

Ten meters is expected to provide good DX openings from daybreak through the early evening hours on most days during the month. Expect the strongest signals from Europe, Africa, and points east before noon; signals from the southern hemisphere should peak after noon, and from the Pacific and points west in the late afternoon and early evening. Excellent short-skip openings between distances of approximately 1200 and 2300 miles should be possible during most of the daylight period.

The *15* meter band should open shortly after sunrise, with signals peaking towards Europe, Africa, and points east before noon. During the afternoon hours peak conditions should swing towards the south and southwest. Openings towards the northwest and into the Pacific areas should be optimum during the late afternoon and early evening hours. When conditions are High or Above Normal, the band may remain open well into the hours of darkness for paths towards Central

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for January 1983

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 9, 14, 17	A	A	B	C
High Normal: 5, 10, 15-16, 18, 26-27	A	B	C	C-D
Low Normal: 1, 6-8, 11, 13, 19, 23-25, 28-29	A-B	B-C	C-D	D-E
Below Normal: 2, 4, 12, 20, 22, 30-31	B-C	C-D	D-E	E
Disturbed: 3, 21	C-E	D-E	E	E

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9 + 30 dB.**

B—Good opening, moderately strong signals varying between S9 and S9 + 30 dB, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. **Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.**
2. **With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good-to-fair (B-C) on Jan. 1st, fair-to-poor (C-D) on the 2nd, poor-to-impossible (D-E) on the 3rd, fair-to-poor again (C-D) on the 4th, good (B) on the 5th, etc.**

For updated information, subscribe to bi-weekly MAIL-A-PROP, David D. Meisel, Editor, 54 Westview Crescent, Geneseo, NY 14454.

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1976						12	13	14	14	13	14	15
1977	17	18	20	22	24	26	29	33	39	46	52	57
1978	61	65	70	77	83	89	97	104	108	111	113	118
1979	124	131	137	141	147	153	155	155	156	158	162	165
1980	164	163	161	159	156	155	153	150	150	150	148	143
1981	140	142	143	143	143	142	140*	141*	143*	142*	139*	138*
1982	137*	133*	129*	*127*	*123*	*121*	*119*	*117*	*115*	*113*	*110*	*108*
1983	*106*	*103*	*100*	*97*	*93*	*90*	*88*	*86*	*84*	*82*	*79*	*77*

** Provisional, subject to slight change.*
(ital) Predicted for remainder of 1982 and 1983.

Table II– Progress of sunspot Cycle 21.

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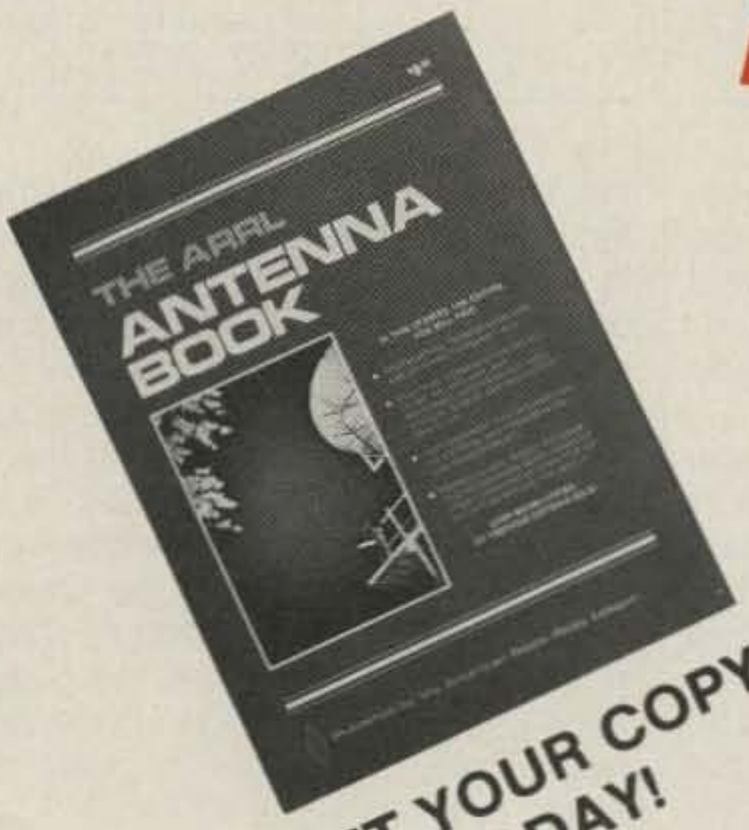

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CIRCLE 54 ON READER SERVICE CARD

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular Meter band (10 through 160 Meters) as shown in the left hand column of the Chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate Meter band column (10 through 80 Meters) for a particular geographical region of the continental USA as shown in the left hand column of the Charts. An * indicates the best time to listen for 80 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

(4) Opening should occur on more than 22 days
(3) " " " between 14 and 22 days
(2) " " " between 7 and 13 days
(1) " " " on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3). Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. On the Short-Skip Chart appropriate *standard* time is used at the *path midpoint*. For example on a circuit between Maine and Florida, the time shown would be EST, on a circuit between N.Y. and Texas, the time at the midpoint would be CST, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones *add* 2 hours in the PST zone; 4 hours in the MST zone; 3 hours in the CST zone, and 5 hours in the EST zone. *Add* 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 P.M. in Los Angeles; 17 or 5 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *standard* time in other areas of the USA *subtract* 8 hours in the PST zone; 7 hours in the MST zone; 6 hours in the CST zone and 5 hours in the EST zone. For example, at 20 GMT it is 15 or 3 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 db gain above these reference levels, the *propagation index* will increase by one level for each 10dB loss, it will lower by one level.

5. Propagation data cohtained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado, 80302.

CQ Short-Skip Propagation Chart
January & February 1983
Local Standard Time at Path Mid-Point
(24-Hour Time System)

Band (Meters)	Distance From Transmitter (Miles)			
	50-250	250-750	750-1300	1300-2300
10	*Nil*	*Nil*	07-08 (0-1) 08-09 (0-2) 09-10 (0-3) 10-12 (0-4) 12-15 (0-3) 15-17 (0-2) 17-18 (0-1)	07-08 (1) 08-09 (2-3) 09-10 (3-4) 10-12 (4) 12-15 (3-4) 15-16 (2-4) 16-17 (2-4) 17-18 (1-2) 18-19 (0-2) 19-20 (0-1)
15	*Nil*	07-08 (0-1) 08-10 (0-2) 10-15 (0-3) 15-17 (0-2) 17-18 (0-1)	06-07 (0-1) 07-08 (1-3) 08-10 (2-4) 10-15 (3-4) 15-17 (2-4) 17-18 (1-3) 18-19 (0-2) 19-21 (0-1)	06-07 (1) 07-08 (3-2) 08-18 (4) 18-19 (2-3) 19-20 (1-3) 20-21 (1-2) 21-22 (0-1)
20	09-11 (1-2) 11-14 (1-3) 14-15 (1-2) 15-17 (0-1)	06-07 (0-2) 07-09 (0-3) 09-11 (2-4) 11-14 (3-4) 14-15 (2-4) 15-17 (1-4) 17-19 (0-3) 19-20 (0-2) 20-06 (0-1)	06-07 (2-3) 07-08 (3) 08-09 (3-4) 09-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (1-4) 21-23 (1-3) 23-01 (1-2) 01-06 (1)	06-07 (3-2) 07-08 (3) 08-12 (4) 12-14 (4-3) 14-21 (4) 21-23 (3-4) 23-01 (2) 01-04 (1-2) 04-06 (1)
40	07-08 (0-2) 08-09 (1-3) 09-10 (2-4) 10-19 (4) 19-21 (2-3) 21-00 (1-2) 00-07 (0-1)	07-08 (2-3) 08-09 (3) 09-11 (4-3) 11-15 (4-2) 15-19 (4) 19-21 (3-4) 21-00 (2-4) 00-02 (1-3) 02-06 (1-2) 06-07 (1-3)	07-08 (3) 08-09 (3-2) 09-11 (3-1) 11-15 (2-1) 15-17 (4-2) 17-18 (4-3) 18-00 (4) 00-02 (3-4) 02-06 (2-3) 06-07 (3-4)	07-08 (3-1) 08-15 (1-0) 15-17 (2-1) 17-19 (3) 19-02 (4) 02-06 (3-4) 06-07 (4-3)
80	07-08 (2-4) 08-10 (4) 10-15 (4-3) 15-00 (4) 00-04 (3-4) 04-07 (2-3)	07-08 (4-3) 08-09 (4-2) 09-10 (4-1) 10-15 (3-1) 15-16 (4-1) 16-18 (4-2) 18-04 (4) 04-07 (3-4)	07-08 (3-1) 08-09 (2-0) 09-16 (1-0) 16-18 (2-1) 18-20 (4-3) 20-06 (4) 06-07 (4-3)	07-08 (1-0) 08-16 (0) 16-18 (1-0) 18-20 (3-2) 20-04 (4) 04-06 (4-3) 06-07 (3-1)
160	09-17 (1-0) 17-19 (3-2) 19-06 (4) 06-08 (3) 08-09 (2-1)	17-18 (2-1) 18-19 (2) 19-21 (4-3) 21-05 (4) 05-06 (3) 06-07 (3-2) 07-08 (3-1) 08-09 (1-0)	17-18 (1-0) 18-19 (2-1) 19-21 (3-2) 21-03 (4-3) 03-05 (4) 05-06 (3-2) 06-07 (2-1) 07-08 (1-0)	18-19 (1-0) 19-21 (2-1) 21-03 (3) 03-05 (4-2) 05-06 (2-1) 06-07 (1-0)

and South America and the Pacific areas. Excellent short-skip openings between distances of approximately 1000 and 2300 miles should be possible from shortly after sunrise through the early evening hours.

During January *20* meters should remain open to some area of the world or another almost around the clock. Signals are expected to peak for about an hour or two after sunrise, and again for about an hour or two before sunset, when openings to many areas of the world should be possible. On many days the band should remain open during the evening hours for paths towards South America and the Pacific areas. Excellent short-skip openings between distances of approximately 800 and 2300 miles should be possible from just after sunrise to as late as midnight. Openings over much shorter distances are likely from mid-morning to mid-afternoon.

Forty meters is expected to be the best band for DX openings during the hours of darkness. Openings to most areas of the world should be possible at sometime between sundown and the post-sunrise period. Exceptionally strong signals may often be possible due to a seasonal decline in atmospheric noise or static. Look for openings to Europe, Africa, and points east in the late afternoon, early evening, and until about midnight. After midnight the band should shift towards the west, northwest, and Pacific areas, with DX conditions peaking just before sunrise. Good openings towards the Caribbean and Central and South America should be possible at just about any time between sundown and sunrise. During the daylight hours, look for short-skip openings between approximately 100 and 600 miles. The skip should lengthen during the late afternoon, and by nightfall conditions should be optimum for openings between 800 and 2300 miles.

Eighty meters is also a nighttime DX band. Openings towards Europe, Africa, and points east should be possible from sundown to midnight, with openings also possible towards the Caribbean and Central America. After midnight, signals should peak towards the southern hemisphere. Openings towards the west, northwest, and the Pacific areas should also

HAWAII
January & February, 1983
Openings Given In Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	07-08 (1) 08-09 (2) 09-13 (4) 13-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-17 (3) 17-18 (2) 18-19 (1)	12-14 (2) 14-17 (4) 17-21 (3) 21-00 (2) 00-06 (1) 06-08 (3) 08-09 (2) 09-12 (1)	17-18 (1) 18-20 (2) 20-02 (3) 02-03 (2) 03-04 (1) 19-20 (1)* 20-01 (2)* 01-03 (1)*
Central USA	07-08 (1) 08-09 (2) 09-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (4) 09-13 (3) 13-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	08-13 (2) 13-14 (3) 14-20 (4) 20-00 (3) 00-02 (2) 02-05 (1) 05-06 (2) 06-08 (3)	17-18 (1) 18-20 (2) 20-21 (3) 21-01 (4) 01-03 (3) 03-04 (2) 04-06 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-03 (2)* 03-05 (1)*
Western USA	07-08 (1) 08-09 (2) 09-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-12 (3) 12-18 (4) 18-20 (3) 20-21 (2) 21-22 (1)	08-10 (4) 10-15 (3) 15-22 (4) 22-01 (3) 01-04 (2) 04-06 (1) 06-08 (3)	17-18 (1) 18-19 (2) 19-20 (3) 20-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-21 (2)* 21-04 (3)* 04-05 (2)* 05-06 (1)*

ALASKA
January & February, 1983
Openings Given In GMT#

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	17-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-01 (1)	15-16 (1) 16-17 (2) 17-21 (3) 21-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	12-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-02 (3) 02-03 (2) 03-05 (1)	06-12 (1) 07-11 (1)*
Central USA	17-18 (1) 18-20 (2) 20-00 (3) 00-01 (2) 01-02 (1)	15-16 (1) 16-17 (2) 17-20 (3) 20-23 (4) 23-01 (3) 01-02 (2) 02-03 (1)	12-16 (1) 16-18 (2) 18-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-03 (3) 03-04 (2) 04-06 (1)	06-08 (1) 08-13 (2) 13-14 (1) 07-12 (1)*
Western USA	18-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	16-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-02 (3) 02-03 (2) 03-04 (1)	12-16 (1) 16-18 (2) 18-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1)	04-05 (1) 05-06 (2) 06-14 (3) 14-15 (2) 15-16 (1) 05-10 (1)* 10-14 (2)* 14-15 (1)*

#See explanation in "How To Use Short-Skip Charts" in the box at the beginning of this column.

*Indicates best time to listen for 80 Meter openings. Openings on 160 Meters are also likely to occur during those times when 80 Meter openings are shown with a forecast rating of (2), or higher.

Note: The Alaska and Hawaii Propagation Charts are intended for distance *greater* than 1300 miles. For openings over shorter distances, use the preceding Short-Skip Propagation Chart.

Check for 6 Meter openings at times when the 10 Meter forecast rating is shown as (4).

be possible after midnight, with these signals peaking around daybreak. Short-skip openings between approximately 50 and 250 miles should be possible during the daylight hours. Openings should extend out to between 250 and 1500 miles during the late afternoon and early evening, and by nightfall openings up to and beyond 2300 miles should be possible.

Expect some relatively good DX openings on *160* meters during the hours of darkness. Openings towards Europe and the east should peak around midnight. The band should shift towards the west and the Pacific areas after midnight, with peak signals likely at daybreak. Openings towards the Caribbean area and into Central America should be possible during most of the darkness period. During the daylight hours intense solar absorption severely limits openings, but some may be possible up to approximately 150 miles. Short-skip openings up to approximately 1300 miles should be possible on a regular basis during the hours of darkness, and frequently the skip may lengthen to the maximum short-skip range of 2300 miles.

V.H.F. Ionospheric Openings

Some *6* meter *F-2* layer DX openings may still be possible this January during the daylight hours. Openings to Europe and Africa are most likely to occur an hour or two before noon. Look for openings towards the Caribbean area and Central and South America from an hour or two before, to about an hour or two after, noon. Openings towards the Pacific and points west should be possible during the late afternoon. Openings towards Europe favor east coast locations, while those towards the west and the Pacific areas favor west coast locations. Check for *6* meter DX openings when conditions are expected to be High or Above Normal. Trans-continental and shorter skip openings are likely to occur during the afternoon hours.

January is a poor month for trans-equatorial scatter propagation, but it may be worth checking *6* meters for such openings between 7 and 10 p.m. local time. Some meteor-scatter openings on the v.h.f. bands should be possible during the first several days of the New Year when the *Quadrantids* meteor shower is expected to take place. Some v.h.f. auroral-scatter propagation may be possible during the month, particularly when conditions are expected to be Below Normal or Disturbed on the h.f. bands. Check the Last Minute Forecast appearing in this column for appropriate dates.

Short-Skip Charts

This month's column contains a Short-Skip Chart for use in the continental United States for distances between 50 and 250 miles. Special propagation charts centered on Hawaii and Alaska are also included. The charts are valid through February 1983. See last month's column for detailed DX Propagation Charts for use during January.

73, George, W3ASK

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"ELECTRONIC BONANZA": Bearcat 100 $288.49, BC-350 $384.95, BC-250 $269.49. Regency D-810 $269.95, M-400 $239.95. Frequency Directories. Shortwave Receivers. Sony-2001 $298.99, ICF-6500 $189.95. Kenwood R-600 $344.95, R-1000 $419.95. Also Panasonic and Yaesu Receivers. True Discount Prices & Free UPS Shipping to 48 States. Stamp Brings Catalog. Write: Galaxy Electronics, Box-1202, 67 Eber Ave., Akron, Ohio 44309. Phone 216-376-2402.

QSL Cards! New designs, high quality, and low prices. Send for FREE samples: WA8NWG, 826 E. Bennett, Mt. Pleasant, MI 48858.

FOUND! A new easy way to learn MORSE CODE in just two hours! Send $10.00 to A. Panther, 630 Marion Street N.E., Suite 120, Salem, Oregon 97301.

6HF5 TUBES: Factory fresh matched sets $22.00 per pair. $12.50 each additional tube in matched set up to ten. SPENCER TUBES, Spencer Hill Box 24, Corning, NY 14830.

FOR SALE: Hallicrafters S22R $75. Boyson, 23 Cove Rd., Brookfield, CT 06804. Phone 203-775-0176.

DIGITAL FREQUENCY DISPLAYS. Converted new Yaesu units for FT-101 series, FT-301, and TS-520S. Plug into EXT. VFO jack and work (no installation). 3/8" red LED's. $110.00 postpaid. 30-day money back. See *73* and *Ham Radio* magazine ads. Models for almost all YAESU, KENWOOD, HEATH, COLLINS, and DRAKE. Write for more information. GRAND SYSTEMS, P.O. Box 2171, Blaine, Washington 98230, or VE7LB Callbook. Phone (604) 530-4551.

SELL: Shure 444D Mic, $30. Preamp Ameco PT-2, $30. Yaesu QTR Clock, $20. All equip. ex. cond. with manuals. Art, K1VKO, 203-853-0587.

WANTED: Senior Citizen Center is in desperate need of a P/A amplifier. I will pay shipping charges. Joseph Schwartz, K2VGV, 43-34 Union St., Flushing, NY 11355, (212) 461-5933.

FREE INFORMATION on the best of used ham radio buys. Send to WA7UBD, Bud Randall, 1512-10th St., Clarkston, WA 99403.

SALE: New FRG-7 in factory-sealed carton for $250 including shipping and original invoice dated Feb. 1982. Roy Merkel, W3HPP, 959 Georges Lane, Warminster, PA 18974. Phone (215) 675-5864.

WANTED: FV101 ext. vfo and info abt mods for FT101B, ANY ant rotator. K. Karmasin, OK2BLG, Pancava 7, 69501 Hodonin, Czechoslovakia.

WANTED: Collins KWM-2 transceiver. K8HCZ, Griebe, R#1, Parkside, KY 40464.

CASH for Ten-Tec Delta Transceiver & power supply. All replies answered. WD0BVF, RR#1, Box 212C, Willard, MO 65781.

FOR SALE: AKB-1 Microlog CW RTTY Keyboard, $200 plus $5.40 for shipping. Bill Bierbaum, 3401 E. Ridge 2, Springfield, IL 62202. Phone 1-217-544-5301.

CONTESTERS: Compu-Log is the most powerful computerized contest logging system available. SASE for details to W1RM, P.O. Box 1188, Burlington, CT 06013.

QST FOR SALE from 30's, also CQ, 73, and HRH. Want 2 or 6 all mode and HF tube XCVR. WB4CVH, 805 Pinebrook Rd., Eatontown, NJ 07724.

FOR SALE: Home Print Shop, 6" × 9" Sigwalt hand press, 19" paper cutter, 42 fonts type, many extras, $2,100. W8EYU 615-484-2647.

I'M LOOKING FOR A QSL MANAGER to handle my outgoing DX QSL cards. KA8OBP, 3032 Golfhill Dr., Pontiac, MI 48055.

WANTED: HA-18A CPO de Skip, WB8OWM.

COMPLETE SERIES of Radio Boys books by Breckenridge and Chapman for sale. SASE for info. Richard W. Randall, 1263 Lakehurst Rd., Livermore, CA 94550.

BALLANTINE 310B Video VTVM $50, RCA Volt-Ohmyst $25, Gen Radio 1612 R.F. Cap meter $30, Beckman 301A Audio Osc. $30. K6KZT, 2255 Alexander, Los Osos, CA 93402.

SB220 $495; Triple Sect small 365MMF capacitor variable for PI output $2; ICOM 22S w/freq exp $150; PR 6JS6C JAP $15. Ship any FOB. Art Ford, 552 Hillside Ct., Melbourne, FL 32935.

WW II A.D.F. (90% +) complete, full manuals. Insides look almost factory new. $300 or best offer (without shipping). K. Spies, WB9YBM, 8502 N. Oketo Ave., Niles, IL 60648.

WANTED: Johnson 1kw matchbox w/directional coupler. Preferably original condition. Send phone number and description, will contact. WB7AVO, 7438 Kester Ave., #8, Van Nuys, CA 91405.

WANTED: Basket-Case Heath I0-10 Scope. Rudy, WB1CXC, P.O. Box 321, Indian Orchard, MA 01151.

FOR SALE: Two Teletype Model 35 Printers, one K.S.R. and one R.O. 100 w.p.m. 10 C.P.S. 20 M.A. Loop can be converted to R.S. 232, $400 and $200. Phone 1-614-537-2039, or write Bill Smedley, WD8BDY, 498 Lee Rd., Follansbee, WV 26037.

WANTED: Copy of parts and inst. sheet for Mosley TA33 Jr. WD5CKF, 116 South Pierce St., New Orleans, LA 70119.

WANTED: Radio Receiver AN/SRR-19. State condition & price. Max Fuchs, WA1NJG, 11 Plymouth Lane, Swampscott, MA 01907-2996.

FOR SALE: Complete station, Yaesu FLDX400 XMTR, FRDX400SD RCVR W/ 6 & 2 M, CW Filter. Extras. $300. WA6IYK (213) 397-2984.

FOR SALE: Tempo I (black face) 10–80, Midland 500 2 meter crystals, IC-230 with PS and TTP, BC-25 Scanner. SASE. ARS, P.O. Box 518, Whitehouse, FL 32220.

FOR SALE: Almost new (mint) FT-101ZD MK3. Extra set of finals (6146B), blower fan, and remote speaker. All for only $699. Won't last long! KC7AV, Tucson, AZ 602-790-1154.

NEED: Collins 51J-4 mech. filters and tech manual. Copeland, W1ODA, 72 Groveside Rd., Portland, ME 04102.

YAESU FT-101 w/cw and fan, excellent condition, $400. KA2FEW, 3427 Stony Point Rd., Grand Island, NY 14072, (716) 773-5290 Tony.

KENWOOD TS-520SE, CW filter, mint, original owner, $450. Trade for TS-120S, IC-730. WD0BVF, RR#1, Box 212C, Willard, MO 65781.

HEATH: Complete station ready to operate. DX-60B Xmtr, current Novice xtals 80–10 mtrs; HR-10B rcvr, xtal calibrator; antenna relay, RG-58U extensions and matching speaker, $210 delivered, CC/MO. Tom Hagerman, 1812 Neihardt, Branson, MO 65616.

WANTED: AN/URA-17 comparator-convertor (CV-843) and C-806/GR control indicator. C.T. Huth, 146 Schonhardt St., Tiffin, OH 44883.

TRADE: Drake Receiver mint for Machinist Tools. Sell 2000 new receiving-type tubes only $1.00 each. W5QJT, 4215 Darwood Drive, El Paso, TX 79902.

WANTED: McElroy "bug" and Vibroplex Zephyr. John White, Box 147, Mabel, MN 55954.

MAKE OFFER: Operating Heathkit Apache TX1 and SB10 Adapter with cables. W2HAC, Deltona, FL 32725.

ALPHA 76. Excellent condition with spare 8874, $850. W9TM, 521 Rumple Lane, Addison, IL 60101. Phone (312) 627-1557.

WANTED: 70-foot steel crank/tilt groundpost tower; Vibrokeyer and electronic keyer for this 3-connector Vibroplex paddle; 12v/10A supply; Thermiodyne TF-6 antique radio. W4EOB, 1412 Winkler Ave., Fort Myers, FL 33901.

WANTED: Manual on Heathkit Linear Amplifier SB200. G.M. Mondrush, W7LOM, 1212 N. Westwood, Mesa, AZ 85201.

WANTED: Multiband Loading Coil, Master Mobile Type 333. KB4ACO, P.O. Box 1556, Florence, AL 35631.

COLLINS 51S-1, 55G-1 LF Tuner. Manuals. Absolutely mint. Always covered. $1800 US postpaid. H. Marhoff, 980 7th St. NW., Largo, FL 33540. Phone 813-584-2988.

COLLECTORS: National NC-173, RME VHF 152A, Hallicrafters SX-117. All in operating condition. Best offer. W9VA, 1345 Linden, Deerfield, IL 60015.

YAESU 720R/U, YM-22 Touchtone Mic and PL, $425. Radio Shack DX-300, $250. Hammarlund HQ-170, $150. Bill, KZ5E, 405-624-2768.

FOR SALE: TEN TEC KR 20 Keyer, ICOM IC-230 2m FM, EV 635A Mic. Al, KX5U, 214-725-5172.

FREE INFORMATION on the HAROAA Awards and Certificates Program. Please enclose an SASE. Cert. Mgr. WB8RTR, P.O. Box 341, Hinckley, OH 44233.

FOR SALE: T4XB, R4B, AC4, MS4, WWV and 160 meter Crystals, $600. A.J. Masi, KM2V, 155 Connecticut Ave., Massapequa, NY 11758, phone 516-PY8-6967.

APPLE COMPUTER NOVICE TUTOR. CW, FCC Sim. Tests, HI-RES, more. Complete, professional, inexpensive. S.A.S.E. for full info. Brown, P.O. Box 111, Mahomet, IL 61853.

WANTED: Any Cowan Publ. "Surplus" books, Lancaster's "Cheap Video Cookbook" and other titles. Quote. DT RTTY, Box 9064cq, Newark, NJ 07104.

"HAMS Do It With Frequency" bumper sticker, $1.00. Send to D. Mollan, WB7FDE, 7805 NE 147 Ave., Vancouver, WA 98662.

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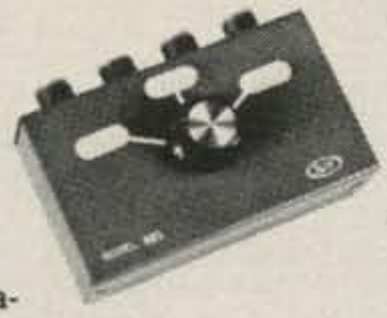
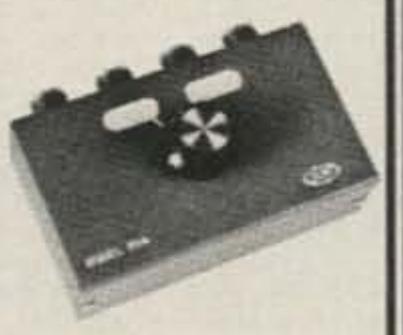


Model 593

- ***Single Pole*** 3 Position with grounding of all unused positions
- ***Crosstalk*** (measured at 30 MHz) is -45db between adjacent outlets and 60 db between alternate outlets

$19.95



Model 594

- ***2 Pole 2 Position***
- ***Crosstalk*** 45db (measured at 30 MHz)

$22.00

Specifications for both switches

- ***Power*** 1 KW-2 KW PEP
- ***Impedance*** 50-75 ohms
- ***VSWR*** 1.2:1 up to 150 MHz
- ***Dimensions*** 1¾" high, 5" wide, 3" deep
- ***Weight*** 1 lb.
- ***Mount*** Wall or desk

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SOPHISTICATED I.C.'S

DATA SHEETS AND APPROPRIATE APPLICATION NOTES ARE PROVIDED FREE WITH ALL INTEGRATED CIRCUITS LISTED BELOW

PART # & MANUF.	DESCRIPTION	PRICE(ea.)
RDD104 (LSI COMP. SYS.)	CMOS DIVIDER I.C. HAS TRUTH-TABLE SELECTABLE INPUT TO YIELD DIVIDE BY 10, 100, 1000, or 10000 OUTPUTS.	$ 3.50
LS7031 (LSI COMP. SYS.)	D.C. TO 5MHZ SIX DECADE MOS UP COUNTER WITH 8 DECADE LATCH AND MULTIPLEXED BCD OUTPUTS AND DIGIT STROBES. ACCESS TO LSD LATCHES ALLOWS ATTACHMENT OF PRESCALERS FOR COUNTING TO 500MHZ.	$13.75
LS7220 (LSI COMP. SYS.)	14 PIN DIP AUTOMOTIVE/MARINE ANTI—THEFT DIGITAL LOCK CIRCUIT HAS 5,040 4-DIGIT COMBINATIONS WITH 25 MICROAMP STANDBY. "SAVE" MODE FOR VALET PARKING.	$ 3.50
ZN450E (FERRANTI)	3½ DIGIT, DIGITAL MULTIMETER I.C., WITH LCD DRIVE, ON CHIP CLOCK AND REFERENCE. A COMPLETE DMM CIRCUIT CAN BE MADE WITH 8 PASSIVE EXTERNAL COMPONENTS.	$14.25
FEO201D (AND CORP.)	3½ DIGIT LCD DISPLAY.	$12.00
TSC7126 (TELEDYNE)	3½ DIGIT A/D CONVERTER, LCD DRIVER DESIGNED FOR LOW POWER APPLICATIONS (mW) WITH A 9V BATTERY (EQUIVALENT TO INTERSIL 7126).	$16.95

CAPACITORS

DIPPED TANTALUMS	1-99(ea.)	100-(ea.)	COMPUTER GRADE mfd	WVDC	Price (each)
.1 mfd/35 V	$.30	$.20	2,200	100	$3.95
.33mfd/35 V	.30	.20	4,000	50	3.95
1 mfd/35 V	.30	.20	12,000	50	5.00
1.5 mfd/20V	.30	.20	21,000	40	3.95
2.2 mfd/15 V	.30	.20	27,000	30	4.95
6.8 mfd/25 V	.50	.35	53,000	25	5.95
68 mfd/10 V	.60	.40	180,000	20	8.95

AXIAL ELECTROLYTICS	1-99(ea.)	100-(ea.)	RADIAL ELECTROLYTICS	1-99(ea.)	100-(ea.)
1 mfd/40V	$.15	$.12	2.2mfd/25V	$.15	$.12
1.5mfd/25V	.15	.12	4.7mfd/35V	.15	.12
4.7mfd/15V	.15	.12	33 mfd/25V	.15	.12
10 mfd/63V	.17	.14	47 mfd/16V	.15	.12
47 mfd/25V	.17	.14	220 mfd/25V	.15	.12
150 mfd/10V	.17	.14	330 mfd/35V	.20	.15
220 mfd/10V	.27	.20	470 mfd/25V	.35	.27
470 mfd/25V	.50	.40	680 mfd/25V	.35	.27
1000 mfd/25V	.70	.50	1000 mfd/25V	.70	.50
2200 mfd/10V	.70	.50	2200 mfd/10V	.70	.50
2200 mfd/40V	.85	.63	3300 mfd/10V	.70	.50

MISCELLANEOUS

DESCRIPTION	PRICE (ea.)
28 PIN S.T. LOW PROFILE I.C. SOCKETS (TIN PLATED)	$ .40
40 PIN S.T. LOW PROFILE I.C. SOCKETS (TIN PLATED)	$ .55
1K or 25K SLIDE POTENTIOMETERS	$ .75
250 OHM HORIZONTAL TRIM POT	$ .50
1 MEG OHM HORIZONTAL TRIM POT	$ .50
220 KILOOHM HORIZONTAL TRIM POT	$ .50
POWER-LINE FILTER (SURPLUS) 5 AMP, 250 VAC, 50 / 60Hz	$5.00
POWER-LINE FILTER (SURPLUS) 10 AMP, 115/250V, 50-400Hz	$8.50

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****HARDLINE CONNECTORS****
(1/2" Phelps-Dodge 50 Ohm Aluminum)

PL-259 (UHF) Male or Female	$18.00 ea.
Type "N" Male	$27.00 ea.
Type "N" Female	$18.00 ea.
Coupling	$32.00 ea.

Same Day Shipment!

POLYETHYLENE DIELECTRIC

RG59/U 100% foil shield TV type	$7/100 ft or 10¢/ft.
RG8U 96% shield mil spec	$27.95/per 100 ft or 31¢/ft.
RG11U 96% shield 75 ohm mil spec	25¢/ft.
RG58AU Stranded Mil Spec 96% Shield	12¢/ft.
RG58U mil spec 96% shield	11¢/ft.
RG62AU 96% shield 93 ohm mil spec	12¢/ft.
RG142/U Double silver shield ... Teflon	95¢/ft.
RG174/U-mil spec 96% shield	$8./per 100 ft or 10¢/ft.
RG213 noncontaminating 96% shield mil spec	36¢/ft.
RG217/U Double shield 50 ohm	85¢/ft.

LOW LOSS FOAM DIELECTRIC

RG6A/U double shield 75 ohm	25¢/ft.
RG8X 95% shield	$14.95/100 ft or 17¢/ft.
RG8U 80% shield	16.95/100 ft. or 19¢/ft.
RG58U 80% shield	07¢/ft.
RG58U 95% shield	10¢/ft.
RG59/6/U 100% foil shield 18 Ga. 75 ohm	12¢/ft.

Cable—shipping $3.00 1st 100 ft., $2.50 each add'l 100 ft.

100 ft. RG8U with PL-259 on each end $19.95
RG8U 97% shield 11 Ga (Equiv. Belden 8214) ... $29.95/100ft.
RG214/U (Double Silver Shield-50 ohms) ..... $1.35/ft.
3/8" tinned copper ground strap ..... 30¢/ft.

****COMPLETE AMPHENOL PRODUCT LINE AVAILABLE****

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HEAVY DUTY ROTOR Cable (2-16GA/6-18GA) ... 36¢/ft.

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Amphenol PL-259	79¢
Amphenol B.N.C. UG88 C/U Male	$1.25
PL-259 push-on adapter shell	10/$3.89
PL-259 and/or SO-239	10/$5.89
Double Male Connector	$1.79
PL-258 Double Female Connector	98¢
1 ft. patch cord w/RCA type plugs each end	3/$1.00
Reducer UG-175 or 176	10/$1.99
UG-255 (PL-259 to BNC)	$3.50
Elbow (M359)	$1.79
F59A (TV type) built on crimp ring	10/$1.99
UG 21D/U Amphenol Type N Male for RG8	$3.00
UG-273 (BNC to PL)	$3.00
3/16 inch Mike Plug for Collins etc. (cutoff)	$1.25

Connectors—shipping 10% add'l. $3.00 minimum

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5kHz 1st-IF FILTER. Reduces hi-pitched QRM. CF-5K/8: $80.00

16-POLE R-4C SSB! Plug-in filter. Best skirt selectivity. 1800 Hz, -6 dB; 2400 Hz, -60 dB. CF-2K/16 (Also 1.6K/16): $135.00.

250, 500 and 1000 Hz 8-POLE 2nd-IF PLUG-IN FILTERS. CF-250/8, CF-500/8 and CF-1.0K/8: $80.00.

PC Board mod. and switching kits. Special AM filters/detector.

Filters also for R-4 (B), R-7, TR-7, TR-4, Signal/One, Atlas.

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CIRCLE 153 ON READER SERVICE CARD

DAVCO DR-30 Receiver Wanted. Geo. Churpek, N6FL, 839 Cambon Circle, Ojai, CA 93023. Tel 805-646-5296.

SELL: Heath SB101 transceiver, HP 23, HM15 Bridge, SB220 Linear. Make offer. K9MNT, 607 Ann Street, Joliet, IL 60435.

WANTED: Reprints of Satellite Tracking Articles that have appeared in *CQ, QST, 73,* and *Ham Radio Magazine.* Dave Riippa, Box-E 161351, Jackson, MI 49204.

NATIONAL NCXMK2, DC & AC Power, VFO Console. Calibrator and manuals. $350.00. Earl Briggs, 4560 NW 16 Way, Tamarac, FL 33309. Phone 305-771-3042.

SALE: Hallicrafters SX-117 and HA-10 LF/MF tuner with service manual. $125. Thompson, 503 Drake Blvd., Longview, TX 75601, phone (214) 757-5780.

RTTY Model 28 ASR with 60 and 100 wpm gears and IRL FSK 500. Both mint condition. Receiver, 0–30 MHz, VGC. All $425. Charles Gehring, KB2RK, RD1, Hannibal, NY 13074. Phone (315) 564-6577.

DRAKE SPR-4 solid-state gen. coverage receiver, loaded, $295. Heath HX-1681 CW XMTR with supply, perfect QSK with SPR-4, $195. Ken Stuber, Box 6772, Tahoe City, CA 95730.

COLLINS 51S-1 and 55G-1 L.F. Tuner. Mint, clean, .2–30 MHz w/manuals. Prepaid in US via UPS. $2000. H. Marhoff, 980 7 St. NW, Largo, FL 33540.

FOR SALE: Santec HT-1200 2m. FM Handheld transceiver, plus ST-5BC 5 hour Base Charger, 3 battery packs, ST-LC Leather Case, ST-EC external charge adapter. All in excellent condition! $225.00. Call 513-376-2700, or write Dan Sullivan, WD8IDZ, 15 Sexton Drive, Xenia, OH 45385.

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FOR SALE: Homebrew transmatch based on "ultimate transmatch" plans. $45 PP. KB4BKO, 7414 Colshire Dr. #8, McLean, VA 22102.

NEW Circuit Data Corp telegraphic distortion analyzer Model CDA770 w/man., 37 to 4800 baud B/O. W7KSG, 1876 E. 2990 So., Salt Lake City, UT 84106.

SELL: Hammarlund Sp-600JX. In one piece but needs work. Manual included. $75. Pick-up only. Bob Hughes, 2302 Briargrove Ct., Richmond, VA 23233.

WANTED: 40 Meter Beam, Connectors for Andrew LDF5-50 7/8 Heliax-L45N/W/or U. Russ, N7SM, 1727 E. 3015 So., Salt Lake City, UT 84106. Phone 801-467-6785.

TRADE: Hardly used Chrome Bencher for good "lightning-bug." Dick Downey, 253 Guy Park Avenue, Amsterdam, NY 12010.

WANTED: Lakeshore Bandhopper VFO and Tapetone converters models TC-144-6, TC-220-6, TC-432-6. Aaron, K5ECN, Box 17395, San Diego, CA 92117.

CRYSTAL BLANKS wanted: AT or BT cuts 5×5 or 5×7. 3.3-4.5-5.0-6.0-6.2-8.3 MHz for FT-243 holder mounting. E. Taylor, W7BYF, 2921 Loyola Dr., Davis, CA 95616.

FOR SALE: Tempo One transceiver w/ext. power supply, immaculate, $350. Kenwood TR-7850 2 meter FM, 3 months old, $360. Benny, N1BZD, Phone (203) 794-0071, Danbury, CT.

FOR SALE: DX-300 General Coverage Receiver, $200. Bearcat 300, $295. FT-227RA, $175. NØWB, 7429 Frederick St., Omaha, NE 68124. Phone (402) 397-2461.

FOR SALE: Icom 22S w/mount, manual. Heath 40W 2M amp kit. Both $150 ppd. H. Binkley, K4DNB, Rt. 1 Box 281A, Butler, GA 31006.

KENWOOD TS-520S, used vy little, mint cond., $530 cashier ck/MO, will pack, you pay shpg. KBØZE, 4063 Lido Dr., Lee's Summit, MO 64063.

STOLEN KWM-380 serial #1394, all mods, from K8LO, 180 Woodmere, Detroit, MI 48209. 1-313-842-1019.

WANTED: Any donated SSB/CW 80–10M (no WARC) Ham Trcvr or TX-RX (QRP or other) which still works. Pse write or send via mail to: Valery (Wally) Stefanoff, LZ2CJ, City Students' Radio Club—LZ1KDP, P.O. Box 812, Sofia-1000 Bulgaria, Europe.

ELECTRONIC AVOCATIONS/WEEKEND WIRELESS? SASE. Timm, 2308 Garfield, Minneapolis, MN 55405.

NEED PARTS or old Junker Central Electronics 200 V Xmitter. Ted L. Wilson, KA7LVT, 12439 So. Giles St., Las Vegas, Nev. 89124.

MANUALS FOR NATIONAL Radio Equipment. SASE gets you a list of 87 receivers & transceiver manuals. Maximilian J. Fuchs, 11 Plymouth Lane, Swampscott, MA 01907.

AMERICAN RADIO CORP. Model 324 & Kenwood MC30S Mike. Cost $229.90. Sell for $175. W3CJI, 2705 Andrea Dr., Allentown, PA 18103. Phone 215-433-4485.

FOR SALE OR TRADE: Clegg 22'er FM Two Meter Transceiver, receive tunable from 146–148 MHz, transmit (10) xtal 30 Watts out, "Mint," $95 or Model 15 RTTY. KA8IJR.

BEAMS: Hy-Gain DB-1015-A duobander for 10 & 15 meters in factory-sealed carton $120. Hy-Gain 204-BA $165. Hy-Gain 153-BA $50. Hy-Gain 103-BA $45. Wilson DB-33 duobander for 10 & 15 meters $75. William Fulcher, N4WF, 217 Bluegrass Drive, Hendersonville, TN 37075.

WANTED: Inexpensive Novice rig and accessories—key, apt. antenna, dummy load, VFO, etc. Doug Kiessling, 7414 Colshire Dr. #8, McLean, VA 22102.

SELL: Kenwood MC-30S noise cancelling microphone, $15. Joe Bronson, WA7HOP, RFD 1, Mission Rd., Globe, AZ 85501.

SALE: 2KW Linear, 4-400A Finals, PS 3000V 1 AMP, B&W 5100B Xmtr, Nat'l NC-303B, Model 19 RTTY. High quality, good price. W1GSM, 419-354-1908.

HEATH SB-401 and mic. $180. SB-303 $200. B&W 4-band trap antenna $35. Hallicrafters S-106 $20. NC-173 $50. KØCAB 319-377-9126.

CHURCH OF CHRIST HAMS: Send QSL & SASE (2 stamps) for 1982 church callbook to NW4L, 1461 E. Chester, Jackson, TN 38301.

WANTED: Hammarlund Receivers, Transmitters, Amplifiers, Parts, Accessories, Manuals or any related items. John Bess, WA5VVT, 29 Southmont Drive, Little Rock, AR 72209.

WANTED: Reasonable, National XCU-50-2 Crystal Calibrator Unit for HRO 60. Cam Burrows, VE3BX, 519-966-3222.

HAMMARLUND HQ-100AC general coverage receiver with clock, A-1, $155, FOB. W9VZR, 4627 North Bartlett Ave., Milwaukee, WI 53211.

WANTED: Manuals, Schematics for Military Equipment. T22/ARC-5 and AN-ART 13A Transmitters and BC 348 Receiver. Bill Dittenber, WD8KPR, 4040 S. Geneva Road, St. Louis, MI 48880.

FM SIGNAL GENERATOR BOONTON 202H (made by HP), 54 to 216 MHz, Calibrated output 0.1uv to 0.2 volts, .5% RF accuracy, w/manual, MINT CONDITION, shipped prepaid to first certified check or postal money order. $325. Dave Smith, 114 H Avenue, Valdese, NC 28690, phone 704/874-3144.

QPRers: Get details of the G-QRP-Club and free sample magazine from Rev. G.C. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham, B37, U.K.

FOR SALE: SB-220 $495; Invader 200/2000 $325; Kenwood TS-511 HF Transceiver $325; ICOM 22S Freq Expanded $140; Yaesu 200R 2M $140. Will ship FOB. Art Ford, 552 Hillside Ct., Melbourne, FL 32935.

WANTED: Yaesu FC-107 Antenna Tuner. Must be excellent condx. WAØBNX, 1323 Carlson Lake Lane, Eagan, MN 55123. Phone (612) 454-8394.

FOR SALE: Yaesu FL-101 transmitter, like new, $275; Yaesu FRG-7700 General Coverage Receiver, excellent condition, $350. Bob, N5EPA, 2280 Calle Cuesta, Santa Fe, NM 87501.

DISABLED, UNEMPLOYED VIETNAM VET needs work in home electronics shop! Experienced in all older ham equipment and latest models. 20 years experience. 12 year military veteran, Collins certified. Amateur Extra/Commercial Licenses. W4NTI, P.O. Box 215, Munford, AL 36268, phone (205) 358-2935.

FOR SALE: Kenwood TS-700A 2-meter all mode, with 12V es 110V cords. Siltronix 1011C in good condition. Ken Wolfe, KA9EWB, Box 134, Buffalo, IN 47925 USA.

WANTED: "CLEGG" AB-144, shortwave to 2 metres, CONVERTER or circuit diagram (photocopy). D. Lister, VK5ZRL, 6 Douglas St., Millswood, South Australia 5034; Phone: Australia (08) 271 0900.

WANTED: Schematic for RME-45 General Coverage Receiver. Will gladly pay costs. B. Drewett, 20026 N. 17 Dr., Phoenix, AZ 85027.

SELL: Heath IM-1202 Digital Multimeter, like new with manual. Best offer. K4HHR (813) 595-6903.

SELL: ICOM IC-551 6 meter transceiver still in box with Cushcraft 3-element beam $325. Dennis Roossien, 4549 Rhodes Ave., SW, Wyoming, MI 49508.

SELL: Collins 32V-2 transmitter with new spare final tube. In good condition. Webb, W8HXE, 4228 Middle Ridge, Perry, OH 44081. Tel. 216-259-3243.

FOR SALE: 30S1 $1800. 75S3B, 32S3, 312B4, 516F2 (all "round") $1450. KWM2, 516F2 $575. 75S1, 32S1, 312B4, 516F2 $795. J. Craig, 32 Birchwood Dr., Rye, NH 03870.

FOR SALE: Heath HW-8, factory aligned, Heath Power Supply, Manuals & Mods., 40 meter Dipole. $145 Shipped Prepaid. Tom Henchy, 14 W. Lester Ave., Murray, UT 84107. Phone 801-268-1268.

SELL: Yaesu FC-902 Antenna Tuner, brand new in box. $110 and I ship. KD5LR, Rt. 4, Box 1834, Lake Charles, LA 70601; phone 318-855-2671.

WANTED: CQ for November 1979. W7MKW, 205 S.W. 102nd Street, Seattle, WA 98146.

WANTED: Yaesu Linear Amp. FL-2000B, also manual for Heath SB-200 Linear, clean. W7LOM, 1212 N. Westwood, Mesa, AZ 85201.

SELL: New Collins Mechanical Filter F455FA21 and F500Y500A-6W2 Crystal Filter Type No. X 250 K-F440. W4OYJ, 405 Winston Ave., Bennettsville, SC 29512.

WANTED: Atlas 110H High Power Transmit Module for Atlas RX110 in operating condition. R. Schappert, KA2BCD, RD1 Box 505, Patterson, NY 12563. Phone 914-279-5833.

HEATH Solid State Ignition Analyzer for use on regular and GM High Energy Ignitions. Operates on 120VAC or 12VDC. Exc. condition, $215. Gavin Maverick II 6 mtr. Tunable filter with output power meter, exc. $30. T.K. Brown, Route 1, Box 102, Forksville, PA 18616.

COMPUTER NETWORKS: I want to get in touch with anyone involved in Computer Networks for exchange of software and ideas. LA7FY, Stoebakken 5, N-4630 Soegne, Norway.

WANTED: Modulator, power supply for Clegg, Zeus transmitter. Aaron, K5ECN, P.O. Box 17395, San Diego, CA 92117.

FOR SALE: Yaesu SP101PB Speaker-Patch, great shape, $35.00. Ed Doran, KA9KOB, RR2, Barry, IL 62312. Phone (217) 335-2687.

ARE YOU Interested in an AD&D net? Or are you just interested in D&D? Contact Brian Fisher, KA3EOA, RD2, Box 618, Portage, PA 15946.

SELL: VFO-520 Mint condition with cable and book, $95. W2JGR (516) 593-8050 eves.

GLA-1000A or B Top Cover or TORIN Fan New $15.00 ea. 1979 DX Callbook $7.50. Sencore Ringer, Yoke & Flyback Tester Model YF33, $100. All Mint, includes shipping. Bob Bradley, W9WGD, 1002 Forest Road, La Grange Park, IL 60525.

KWM-380: In warranty. Noise blanker, speech processor, control interface, 3 filters, service manual, original carton, $2,800. Jim (312) 627-1557.

WANTED: 8"-10"-12"-16" U.S. Navy Ranger Band #501 Disc Transcriptions. Also Artie Shaw 1940–41 String Band 16" ET. Also AFRS-ONs and Coca Cola Spotlight Band 16" ETS. Tom, W4ML, 5041 Jakeman St., Virginia Beach, VA 23455.

WANTED: Crystal blanks. Finished 4.5, 5.0, 6.0, 6.2, 8.3 MHz for FT-243 type holders. Overtones in CR-18, CR-23, CR-19 holders. List to: E. Taylor, 2921 Loyola Dr., Davis, CA 95616.

FOR SALE: The Ultimate SWL's Receiver. Drake DSR-2 in excellent condition. Asking $1950, but will bargain. Al Kaiser, N1API, 194 Glen Hills Rd., Meriden, CT 06450. Phone 203-634-0430.

ADHESIVE MARKERS 3/8" or ½" dia. @ 50¢ card of 72, 3/$1. SASE. Use on components, etc. DT RTTY, Box 9064cq, Newark, NJ 07104.

QUIETUS CASSETTE NET! State delegates. SASE. TIMM, 2308 Garfield #304, Minneapolis, MN 55405.

NEEDED: Kenwood MARS 7600 adapter and VFO-700S. C.T. Huth, 146 Schonhardt St., Tiffin, OH 44883.

COMMAND SETS WANTED: Looking for AN/ARC-5, T-28, etc. in good condition. Send price and description to: N5CEM, 2240 Lockwood Dr., Carrolton, TX 75007.

NOVICE ALL-AMERICAN CERTIFICATE: Work a Novice in all 10 Call Areas. Send list and $1. K6ASI, 25 Rudnick Ave., Novato, CA 94947.

BUGS BUGS BUGS: Collector looking for old bugs. Need Vibroplex, Martin, Johnson, Logan, McElroy, Bunnell, etc. Neal McEwen, K5RW, 1128 Midway Rd., Richardson, TX 75081. Phone 1-214-235-8636.

WANTED: National Velvet Vernier dial for SW3 receiver; Don Chesser's DX Bulletins No. 1 thru 22. Jock, ZL2GX, 152 Lytton, Gisborne, New Zealand.

VINYL BUMPER STICKER reads: dahdidahdit dahdahdidah, $1.00 D. Mollan, WB7FDE, 7805 NE 147 Ave., Vancouver, WA 98662.

CUSHMAN MCM-5 Service Monitor $350, HP-200B Audio Osc $40, HP-400C Voltmeter $45, RCA CX-35 Mobile Test Set $20. K6KZT, 2255 Alexander, Los Osos, CA 93402.

TELEGRAPH KEYS WANTED: Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

WANTED: Johnson Viking "Thunderbolt" working or not. Preferably unmodified and mechanically sound. Send phone number and description, will contact. WB7AVO, 7438 Kester Ave., Apt. #8, Van Nuys, CA 91405.

WANTED OR TRADE: Keys, Bugs, and Sounders. Bob, KI@G, 701 19th, Glenwood Spgs., CO 81601.

ICOM IC-701, IC-PS, mike, mint, $850. Hank Goldman, WA2OVG, 212-796-8617 eves. or 490-2160 days.

FOR SALE: Tempo I (black-face) 10–80, Midland 500, KDK 202S, IC-230 with P.S. and T.T.P., BC-250, VHF Pocket Scanner 150–170. S.A.S.E. P.O. Box 518, Whitehouse, FL 32220.

FOR SALE: 30S1 #10751 $2000. 75S1, 300 Hz $295. 75S1, 32S1, 516F2, 312B4 $750. TR7500 $150. F455FA-31 (new) $45. Astron RS12A 13.8V/12A (new) $50. W1FBG, 32 Birchwood Drive, Rye, NH 03870.

SELL: Kenwood A.T. 200 only $100, Drake 1A receiver $125. Sell 1500 new tubes, receiving types, @ 1.00 each new. List your needs. W5QJT, 4215 Darwood Dr., El Paso, TX 79902.

FOR SALE: Heathkit-Reflected Power Meter, Model AM-2; RF Power Meter, Model HM-102; Q Multiplier, Model QF-1; VFO, Model VF-1; Cheyenne Transmitter, Model MT-1; Transistor Power Supply, Model MP-1. All with manuals and good condition. Make offer. W4KMS, 1112 Littlepage St., Fredericksburg, VA 22401.

WANTED: Heath SB 200 Linear. Must be in Exc. Condx. State firm price in 1st letter. E. Nadolny, W2FXA, 21 Hidden Valley Dr., Elma, NY 14059. Phone 716-655-4162.

WILL PURCHASE: Atlas or similar x cvr in any condition for Boy Scout Camp Oschner, c/o K2ZLU, 38 Yantecaw Ave., Bloomfield, NJ 07003.

SELL: Teletype Model 15 KSR in excellent condition $95.00 FOB. Hal, Box 751, Framingham, MA 01701.

ICOM 701 w/PS, mic, manuals, and cartons, $675. Dick, W7CXW, phone (213) 475-3014.

WANTED: McIntosh, Marantz tube amplifiers. Western Electric tubes, amps, mixers, microphones, tweeters, drivers, speakers, horns, others. Tel: 213/576-2642, David Yo, P.O. Box 832, M.P., CA 91754.

HAPPY NEW EARS!

KENWOOD TS-930S

CW/AM/SSB/FSK
Transmit-all amateur bands 10-160, incl. WARC
Receive 150kHz-30mHz general coverage
Automatic antenna tuner-optional
8 memory channels
"Woodpecker" filter
IF slope/CW VBT/IF NOTCH
Speech processor
One yr. ltd. warranty parts & labor
List $1799 w/tuner - Call!

DRAKE TR-5

10-160 coverage incl. WARC/MARS*
Full break-in CW
No tune-up — solid state
150 watts pep input
List $799 Madison $699
*w/optional crystal

ICOM IC-740

Versatility plus! ICOM's newest addition to HF offers features most asked for by ham operators. 160-10 meters, variable noise blanker and AGC with off position. IF shift and passband tuning, automatic SSB mode selection, notch filter, switchable CW filter, 8 memories, SWR meter, XIT, speech compressor, 100 watts and 12 volt operation. Options are FM, automatic keyer, internal AC power supply and 5 IF filters. *ICOM system compatible.*

List $1099 Madison $969

YAESU FT-102

Unique cascaded filter system, all new receiver front end, IF notch and audio peak filter, variable IF Bandwidth with IF Shift, wide/narrow filter selection, variable pulse width noise blanker, low distortion audio/IF stage design, heavy duty three-tube final amplifier, dual metering system, microphone amplifier tone control, RF speech processor, VOX with front panel controls, IF monitor circuit, WARC bands factory installed.

List $1149 Madison $999

BUTTERNUT HF6V VERTICAL
$125.00
w/30 meter coil

MADISON
Electronics Supply
1508 McKinney
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713-658-0268

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GEAR FOR THE EARS

TS-930S

Filters	
YK-88A-1	$59.95
YK-88C-1	69.95
YG-455C-1	89.95
YG-455CN-1	107.95
SP-930	79.95
HC-10	92.95
MC-60	69.95

TR-5

PS-75	$143.00

IC-740

EX 241 (Marker)	$20.00
EX 242 (FM unit)	39.00
EX 243 (Elec. keyer)	50.00
FL44	159.00
FL45	59.50
FL52 (455 kHz, 500 HzCW filter)	TBA
FL53 (455 kHz, 250 HzCW filter)	
FL54 (9mHz, 270 Hz, CW filter)	
SP4	24.95
SP3	49.50
PS15	149.00

FT-102

FV102DM	$295.95
XF8.9KC 600 Hz 8-pole CW CW filter	50.00
XF8.9 KCN 300 Hz 8-pole CW filter	50.00
XF8.9KA 6 KHz 8-pole AM filter	50.00
XF10.7KC 800 Hz 6-pole 3rd IF CW filter	45.00
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KY-ONE Curtis 8044 keyer unit	45.00
DC cable for FT-ONE	15.00
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YM-35 Scan noise canx mobile mic	20.00
YM-36 Noise canx mobile mic	20.00
YM-37 Mobile microphone	10.00
YM-38 Scan desk microphone	39.00
MD-1B8 Desk microphone	69.00
MH-1B8 Mobile microphone	20.00
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All prices fob Houston except where indicated. Prices subject to change without notice, all items guaranteed. Some items subject prior sale. Texas residents add tax. Please add sufficient postage, balance collect.

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CIRCLE 148 ON READER SERVICE CARD

New Yaesu FT-102 Series

Transceiver of Champions!

The long-awaited new generation of Yaesu HF technology has arrived! New research in improved receiver filtering and spectral purity is brought to bear in the competition-bred FT-102, the HF transceiver designed for active Amateurs on today's intensely active bands!

Unique Cascaded Filter System

The FT-102 utilizes an advanced 8.2 MHz and 455 kHz IF system, capable of accepting as many as three filters in cascade. Optional filters of 2.9 kHz,1.8 kHz, 600 Hz, and 300 Hz may be combined with the two stock 2.9 kHz filters for operating flexibility you've never seen in an HF transceiver before now!

All New Receiver Front End

Utilizing husky junction field-effect transistors in a 24 volt, high-current design, the FT-102 front end features a low-distortion RF preamplifier that may be by-passed via a front panel switch when not needed.

IF Notch and Audio Peak Filter

A highly effective 455 kHz IF Notch Filter provides superb rejection of heterodynes, carriers, and other annoying interference appearing within the IF passband. On CW, the Audio Peak Filter may be switched in during extremely tight pile-up conditions for post-detection signal enhancement.

Variable IF Bandwidth with IF Shift

The FT-102's double conversion receiver features Yaesu's time-proven Variable Bandwidth System, which utilizes the cascaded IF filters to provide intermediate bandwidths such as 2.1 kHz, 1.5 kHz, or 800 Hz simply by twisting a dial. The Variable Bandwidth System is used in conjunction with the IF Shift control, which allows the operator to center the IF passband frequency response without varying the incoming signal pitch.

Wide/Narrow Filter Selection

Depending on the exact combination of optional filters you choose, a variety of wide/narrow operating modes may be selected. For example, you may set up 2.9 kHz in SSB/WIDE, 1.8 kHz in SSB/NARROW, then select 1.8 kHz for CW/WIDE, and 600 Hz or 300 Hz for CW/NARROW. Or use the Variable Bandwidth to set your SSB bandwidth, and use 600 Hz for CW/WIDE and 300 Hz for CW/NARROW! No other manufacturer gives you so much flexibility in selecting filter responses!

Variable Pulse Width Noise Blanker

Ignition noise, the "Woodpecker," and power line noise are modern-day enemies of effective Amateur operation. The FT-102 Noise Blanker offers improved blanking action on today's man-made noise sources (though no blanker can eliminate all forms of band noise) for more solid copy under adverse conditions.

Low Distortion Audio/IF Stage Design

Now that dynamic range, stability, and AGC problems have been largely eliminated thanks to improved technology, Yaesu's engineers have put particular attention on maximizing intelligence recovery in the receiver. While elementary filter cascading schemes often degrade performance, the FT-102's unique blend of crystal and ceramic IF filters plus audio tone control provides very low phase delay, reduced passband ripple, and hence increased recovery of information.

Heavy Duty Three-Tube Final Amplifier

The FT-102 final amplifier uses three 6146B tubes for more consistent power output and improved reliability. Using up to 10 dB of RF negative feedback, the FT-102 transmitter third-order distortion products are typically 40 dB down, giving you a studio quality output signal.

Dual Metering System

Adopted from the new FT-ONE transceiver, the Dual Metering System provides simultaneous display of ALC voltage on one meter along with metering of plate voltage, cathode current, relative power output, or clipping level on the other. This system greatly simplifies proper adjustment of the transmitter.

Microphone Amplifier Tone Control

Recognizing the differences in voice characteristics of Amateur operators, Yaesu's engineers have incorporated an ingenious microphone amplifier tone control circuit, which allows you to tailor the treble and bass response of the FT-102 transmitter for best fidelity on *your* speech pattern.

RF Speech Processor

The built-in RF Speech Processor uses true RF clipping, for improved talk power under difficult conditions. The clipping type speech processor provides cleaner, more effective "punch" for your signal than simpler circuits used in other transmitters.

VOX with Front Panel Controls

The FT-102 standard package includes VOX for hands-free operation. Both the VOX Gain and VOX Delay controls are located on the front panel, for maximum operator convenience.

IF Monitor Circuit

For easy adjustment of the RF Speech Processor or for recording both sides of a conversation, an IF monitor circuit is provided in the transmiter section. When the optional AM/FM unit is installed, the IF monitor may be used for proper setting of the FM deviation and AM mic gain.

WARC Bands Factory Installed

The FT-102 is factory equipped for operation on all present and proposed Amateur bands, so you won't have to worry about retrofitting capability on your transceiver. An extra AUX band position is available on the bandswitch for special applications.

Full Line Of Accessories

For maximum operating flexibility, see your Authorized Dealer for details of the complete line of FT-102 accessories. Coming soon are the FV-102DM Synthesized VFO, SP-102 Speaker/Audio Filter, a full line of optional filters and microphones, and the AM/FM Unit.

CIRCLE 169 ON READER SERVICE CARD

Price And Specifications Subject To Change Without Notice Or Obligation

YAESU

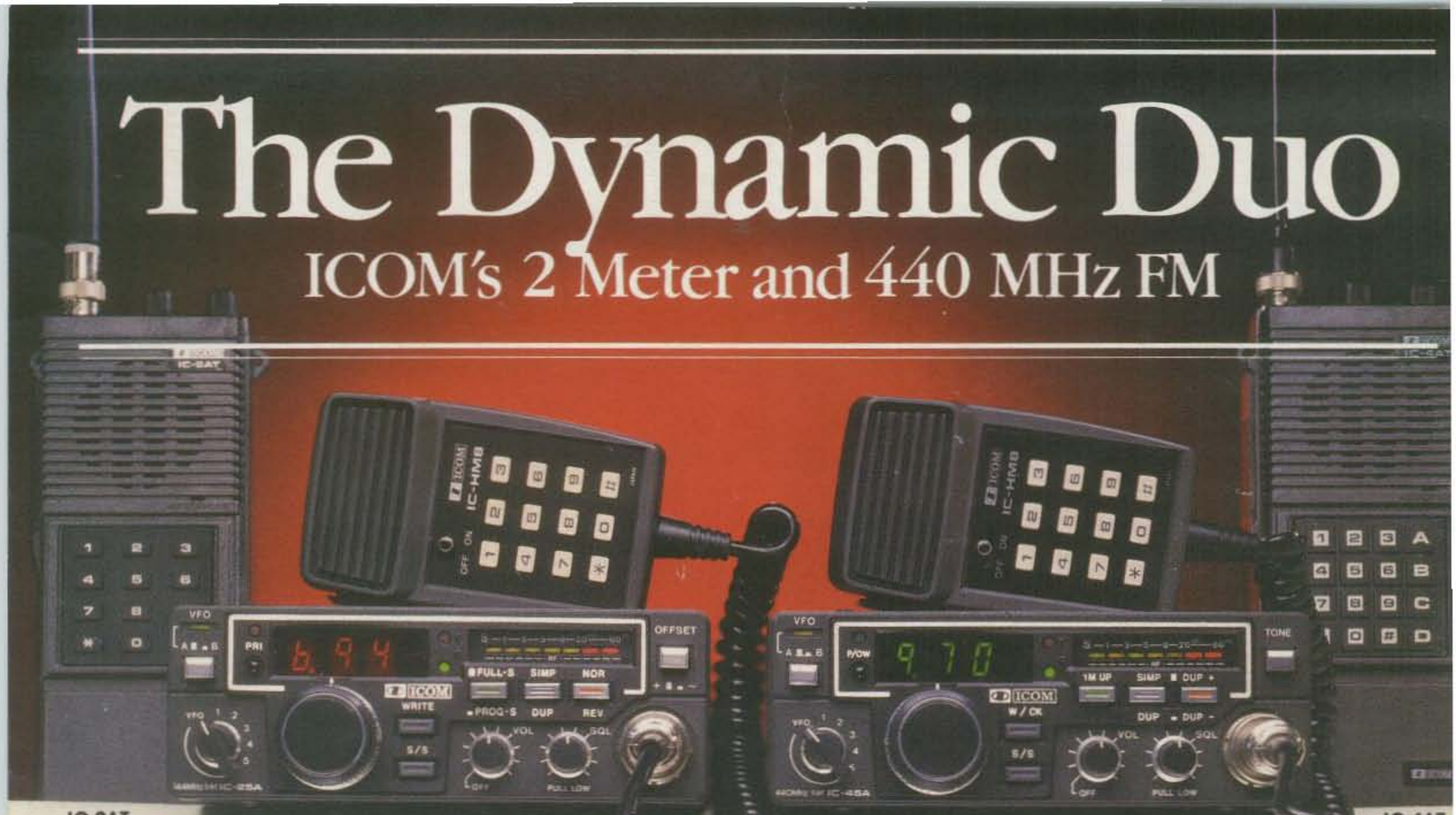
The radio.

YAESU ELECTRONICS CORP., 6851 Walthall Way, Paramount, CA 90723 ● (213) 633-4007
YAESU Eastern Service Ctr., 9812 Princeton-Glendale Rd., Cincinnati, OH 45246 ● (513) 874-3100

582

The Dynamic Duo

ICOM's 2 Meter and 440 MHz FM



25 watt/5 memories/2 scanning systems in a 2"H x 5½W x 7"D package is what has made the easy-to-use IC-25A the most popular 2 meter FM mobile transceiver ever. Now ICOM presents the second half of its mobile duo...IC-45A. The IC-45A covers 440-449.995 MHz. Both transceivers are supplied with touchtone® microphones standard.

Dual VFO's. Dual VFO's give an extra stored frequency for scanning (memory scan scans 5 memories plus 2 VFO's) and each VFO has a different tuning rate for easy QSY.

	VFO A	VFO B
IC-25A	5 KHz	15 KHz
IC-45A	5 KHz	25 KHz

5 Memories. Instant access to most used frequencies. VFO A information is transferred to the selected memory by pushing the write (IC-25A) or W/CK (IC-45A) button.

Priority Channel. Any memory channel may be monitored for activity on a sample basis, every 5 seconds, without disruption of a QSO conducted on a VFO frequency.

LED Bar Meter. Shows strength of received signal as well as relative transmitter output from the fully protected final RF amplifier. APC (automatic power control) is used to detect SWR and adjust the power output to a safe level.

Simplex/Duplex Operation. Standard 600 KHz offset initializes into radio at turn on. Offset may be changed by pressing the priority button while in VFO operation. Rotating the main tuning knob will now change the offset up or down and the offset will be displayed on the frequency readout.

Adjustable Power Levels.

	Hi Pwr	Lo Pwr
IC-25A	25 W	1 W
IC-45A	10 W	1 W

Pulling the squelch knob out places the unit into low power. Both the high and low power may be independently set to accomodate your simplex/repeater requirements or amplifier input characteristics.

Nor/Rev Capability. Use of this button on the IC-25A or the W/CK button on the IC-45A, in the duplex mode, allows one touch monitoring of the repeater input frequency. If simplex operation is possible you will know instantly.

Scanning. Pushing the S/S button initiates the scan circuitry. With the mode switch in a memory position the unit will scan all 5 memories plus the 2 VFO frequencies.

With the mode switch in a VFO position, the unit will scan the entire band or the portion of the band defined by memories 1 and 2. Full band scan or program band scan is selected from the front panel in the IC-25A, internally on the IC-45A.

Both units have internally switched scanning choices of adjustable delay period after a carrier is received then resume scan, or resume on carrier drop.

The Most Compact FM Mobiles on the Market. Fits in the smallest of places. Stacking, matching Mobile Mounts for complete mobile communications for your car.

Memory Backup. When the optional IC-BU1 backup power unit is installed on the back of the IC-25A or IC-45A, memory will be maintained while transferring the unit from power source to power source. If the unit is not removed from power, it will maintain memory even when turned off with or without the IC-BU1.

CIRCLE 3 ON READER SERVICE CARD

ICOM

The World System

ICOM America, Inc., 2112-116th Ave NE, Bellevue, WA 98004 **(206)454-8155**/3331 Towerwood Drive, Suite 307, Dallas, TX 75234 **(214)620-2780.**