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THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur radio

Up Front and Center!

TR-7950/7930

The exceptional front-end selectivity and sensitivity, coupled with Kenwood's excellent audio section, gives you lots to hear! Compact design makes this transceiver at home in the shack or on the go!

- **Large, easy-to-read backlighted LCD readout.**
  Indicates receive/transmit frequency, frequency offset, sub-tone selection, memory status. An LED readout indicates S & RF units, REVERSE, CENTER TUNING, PRIORITY, and ON AIR.
- **Programmable scanning, with center-stop tuning.**
  Microprocessor technology allows you to scan the entire 2 meter band, or just a small portion of it. Scanning stops on the center frequency during band scan—**a Kenwood exclusive!**

- **21 Multi-function memory channels.**
  The TR-7950/7930 "remembers" frequency offset, and optional subtone channels. Memories 1-15 are for simplex and "normal" repeater operation. Memory pairs 16/17 and 18/19 are for "odd-ball" splits. Memories "A" and "B" store upper and lower band scan limits. The radio "beeps" when memory channel 1 is selected.
- **Extended frequency coverage.**
  Covers 142.000-148.995 MHz in 5-kHz steps. Repeater offsets are automatically selected in accordance with the ARRL 2 meter band plan. The front panel "OS" key may be used to allow manual changes in offset.
- **Multi-function keyboard.**
  The 16-key DTMF pad can also be used for direct frequency entry, subtone selection, memory address and scan programming. The keyboard is illuminated for night time use.

TR-7950 optional accessories:

- TU-79 three frequency tone unit
- PS-430 power supply
- KPS-12 fixed-station power supply for the TR-7950
- KPS-7A fixed-station power supply for the TR-7930
- SP-40 mobile speaker
- SP-50 mobile speaker
- MC-55 mobile microphone
- MC-46 16-key autopatch UP/DOWN microphone
- SWT-1 2 m, 100 W antenna tuner
- SW-100A/B power meters
- PG-3A noise filter

Model TR-7950 (45 watts) shown. TR-7930 is identical, but with 25 watts output.
Complete service manuals are available for all Trio-Kenwood transceivers and most accessories.
Specifications and prices are subject to change without notice or obligation.

More TR-7950/7930 information is available from authorized Kenwood dealers.

KENWOOD

TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut Street
Compton, California 90220

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Matching Pair

TS-711A/TS-811A VHF/UHF all-mode base stations.

The TS-711A 2 meter and the TS-811A 70 centimeter all mode transceivers are the perfect rigs for your VHF and UHF operations. Both rigs feature Kenwood's new Digital Code Squelch (DCS) signaling system. Together, they form the perfect "matching pair" for satellite operation.

- **Highly stable dual digital VFOs.**
  The 10 Hz step, dual digital VFOs offer excellent stability through the use of a TCXO (Temperature Compensated Crystal Oscillator).
- **Large fluorescent multi-function display.**
  Shows frequency, RIT shift, VFO A/B, SPLIT, ALERT, repeater offset, digital code, and memory channel.
- **40 multi-function memories.**
  Stores frequency, mode, repeater offset, and CTCSS tone. Memories are backed up with a built-in lithium battery.

- **Versatile scanning functions.**
  Programmable band and memory scan (with channel lock-out). An "alert" function lets you listen for activity on your priority channel while listening on another frequency. **A Kenwood exclusive!**
- **RF power output control.**
  Continuously adjustable from 2 to 25 watts.
- **Automatic mode selection.**
  You may select the mode manually using the front panel mode keys. Manual mode selection is verified in International Morse Code.
- **All-mode squelch.**
- **High performance noise blanker.**
- **Speech processor.**
  For maximum efficiency on SSB and FM.
- **IF shift.**
- **"Quick-Step" tuning.**
  Vary the tuning characteristics from "conventional VFO feel" to a stepping action.
- **Built-in AC power supply.**
  Operation on 12 volts DC is also possible.
- **Semi break-in CW, with side tone.**
- **Optional voice synthesizer.**

More TS-711A/TS-811A information is available from authorized Kenwood dealers.

Optional accessories.

- CD-10 call sign display
- SP-430 external speaker
- VS-1 voice synthesizer
- TU-5 CTCSS tone unit
- MB-430 mobile mount
- PG-2J DC power cable
- MC-60A, MC-80, MC-85 deluxe desk top microphones
- MC-48 16-key DTMF, MC-42S UP/DOWN mobile hand microphones
- SW-200A/B SWR/power meters:
  SW-200A 1.8-150 MHz
  SW-200B 140-450 MHz
- SWT-1 2-m antenna tuner
- SWT-2 70-cm antenna tuner

Complete service manuals are available for all Trio-Kenwood transceivers and most accessories.
Specifications and prices are subject to change without notice or obligation.

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TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut Street
Compton, California 90220

A Letter from the President . . .

TEN-TEC INC

HIGHWAY 411 EAST • SEVIERVILLE, TENNESSEE 37862 • 615-453-7172

Dear Fellow Amateurs:

Here is a picture of our newest Amateur Radio transceiver - the CORSAIR II. It is, without question, a superb piece of gear I am proud to put the TEN-TEC name on. New features include a computer designed, 16 pole crystal ladder filter, 8 pole audio bandpass filter, built-in 40 character memory keyer, dual mode noise blanker and out-of-the-box AMTOR compatability.

Performance improvements start with typical dynamic range in excess of 95 db, better unwanted sideband suppression, and, when using the variable audio filter, up to 10 db improvement in noise floor.

We also think you'll like the stylish new appearance of the CORSAIR II. The gold and green digital readout, the contrasting gray and black cosmetics and the textured, matte finish knobs make an attractive package you will be proud to have on your operating desk. At TEN-TEC, we offer no gimmicks, just technology. Write us for full details.

73,

TEN-TEC, INC.
Jack Burchfield

Jack Burchfield, K4JU
President

Corsair II

SEE YOUR DEALER OR WRITE

TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862

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Offices: 76 North Broadway, Hicksville, NY 11801. Telephone: 516 681-2922. CQ (ISSN 0007-893X) is published monthly by CQ Publishing Inc. Second Class postage paid at Hicksville, NY and additional offices. Subscription prices: Domestic—one year $16.00, two years $29.00, three years $42.00; Canada/Mexico—one year $18.00, two years $33.00, three years $48.00; Foreign—one year $20.00, two years $37.00, three years $54.00; Foreign Air Mail—one year $73.00, two years $143.00, three years $213.00.

Allow six weeks for change of address. Printed in the United States of America.
Postmaster: Please send change of address to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

The Radio Amateur's Journal

ON THE COVER: Here are Greg Sands, N4KJB (left) and Barry Gorodetzer, N4IFE on a mini-DXpedition, sitting on a rock in Biscayne Bay, Miami, Florida. Photo by Larry Mulvehill, WB2ZPI.

JULY 1985 **VOL. 41, NO. 7**

FEATURES

DEPARTMENTS

Zero Bias AN EDITORIAL

The May cover of *CQ* was a nitpicker's delight. There were nine—count 'em, nine—official nits depicted on the cover. Boy, was our face red when the letters started coming in. "Artistic license" wouldn't work, as there were too many nits to deny, so the only thing left to do was make it into a contest: "We planned it all the time."

The criteria for winning were set: speed of discernment coupled with extreme pettiness and compulsive attention to detail. First let me state that no one got all nine, and obviously we didn't get any. The winner was selected from among all the entrants with scores of six. He had a postmark two days earlier than the next received entry—that's speed and agility. Besides admonishing us for the cover, the winner closed with a PS stating that with his luck, the fellow on the cover probably still got a higher score than we did! No so. Our Official Nitpicker Contest Winner is Bob Wanderer, KT2D. Bob, you have indeed won a *CQ* Contest, and for your perspicacity we are awarding you a one-year subscription to your favorite magazine, *CQ*.

Although there is only one clear-cut winner, the following is a list of the first 12 high-claimed scores (in order of receipt):

Call	Nits
KT2D	**6**
KS3F	1
W4RI	6
ND5B	3
KY2O	3
W5QJM	2
W8WVM	1
W9OFQ	2
N0AJU	1
W2BIE	2
WB4YQE	1
W0LTL	1

Travels With CQ

Dayton was the biggest and most active hamfest in a long time. The weather was perfect all three days. You can measure the success of a hamfest by how many days it takes to recuperate from the experience. This was a three- to four-day recuperation by the time we got feeling back in our legs and the pain went away.

This year the fleamarket was opened early on Friday morning, so the exhibitors had a chance to get some of the good stuff before the main exhibit area opened at noon. Once the main area opened, it was really tough to get away from the booth for a while.

Dick, Jack, Arnie, Herb, and I left from New York early on Thursday morning. We arrived in time to meet Larry Mulvehill, WB2ZPI, *CQ*'s ace photographer (and the one who takes cover shots with nine nits) at the Dayton airport. We went to the hotel and met Lew McCoy, W1ICP, and Carl Dane, W1FXK. From there it was off to the arena and booth setup time. It was also a good chance to walk around and see some of the new stuff as it was being set up by the other exhibitors.

Alan, K2EEK, Jack, W2LZX, and Dick, K2MGA, share a toast.

Over the weekend we were joined by Steve Bolia, N8BJQ; Ade Weiss, W0RSP, who had copies of his new book with him; Steve Katz, WB2WIK, and Peter Putnam, KT2B, who had a great slide presentation on our new VHF Contest at the booth; Bernie Welch, W8IMZ; and Bob Cox, K3EST. It really was a busy weekend, and if you weren't a little buzzed-out by Sunday afternoon you weren't paying attention. People always ask, "Why Dayton?" I don't know, and I don't think anyone else knows why this city has become the amateur radio hamfest capital of the world, but it has. It's truly a full sensory experience in amateur radio. If you haven't been there, shame on you. If you haven't been to any hamfest, double shame on you. You are missing out on some of the best fun there is to have in amateur radio.

This weekend we are off to two hamfests. Dick and Arnie are off to Birmingham, and Herb and I are heading for Rochester. There's lots going on out there, and you should be part of it.

Change of Status

Last Friday we had a celebration of sorts here at the *CQ* offices. Jack, W2LZX, our National Advertising Sales Manager, stepped down into semi-retirement. Although he will still be involved in *CQ* projects, he has left the day-to-day chores to Arnie, KA2TYA. It was a celebration of sorts, because he's not really saying good-bye, and we're too young a company to have anyone retire. It was a good excuse to have a party and drink champagne.

What can you say about someone you've known over 30 years who is the world's greatest salesman, the world's most loyal friend, and the world's most active amateur. To paraphrase Hugh Cassidy, "Jack Is." Jack is a man who gives at least 200% to everything he does, worries about you like a father, and still has time to rack up more countries on 30 meters than there are countries.

Next Month

Next month we will be resuming our Ticket Talk column with a new contributing editor. Fred Maia, W5YI, editor of the popular *W5YI Report*, will share with us his expertise on the entire Volunteer Examiner program. Fred was the first person to be appointed by the FCC as a Volunteer Examiner Coordinator (VEC) in all regions. He has been an amateur for a long time, holding an Extra class license. He is a member of QCWA and MENSA. Fred will be sorting out the new amateur radio operator testing program for you and keeping you updated on its progress. You are invited to submit any questions on the program or any input for the column to Fred Maia, W5YI, P.O. Box 10101, Dallas, TX 75207.

73, Alan, K2EEK

TRY DOCTOR DX™

Morse Transceiver Simulator/Trainer

Our Customers Will Tell You Why

There is not enough that I can say about your Doctor DX. . . . I find a half an hour or so, every evening, just as rewarding as all get out. . . . As I said at the outset, I don't think there are words to describe just what Doctor DX will do for any amateur. *73's, Barry Goldwater, K7UGA.*

". . . Any operator capable of copying code will come out of a few sessions with the good Doctor a better operator, or a much better operator . . . This is a serious Trainer for anyone interested in contests or DX. I guarantee it will make you a better operator." . . ." *Bob Locher, W9KNI, CQ Review, October 1984.*

"I haven't had so much fun since I was a teenager. Doctor DX is the closest thing to the fountain of youth I have found." . . . *Jack Gutzeit, W2LZX, CQ Magazine.*

"This is the sort of simulator we've all looked for—a trainer to permit new DX/contesters to sharpen skills off the air, a simulator to permit possible DXpeditioners to get the feel of operating 'on the other end,' a fun club program and a brief peek into the awesome technology of tomorrow, up and running 'today.' Congratulations indeed to Advanced Electronic Applications, Inc." . . . *Ellen White, W1YL/4, How's DX column, QST Magazine, October 1984.*

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2. WC4E	6,174,673
3. W7NI	5,479,760
4. K5ZD	4,300,000
5. K1EA	3,007,185
6. NF6H	2,556,190
7. KK9V	2,051,280

24 HOUR MARATHON

1. WC4E	22,587,552
2. W7NI	17,426,088
3. JE3MAS	9,658,985
4. N6TR	7,116,650
5. NJ2L	2,596,560

A real piece of work! You have a real winner here . . . *J.B., Dallas, TX*

Great fun and resharpening the CW skills . . . *T.R., Cincinnati, OH*

"Doctor DX can be many things to different people. I think that those who use it will find it to be very rewarding and plenty of fun." . . . *Craig Clark, N1ACH, Ham Radio Magazine Review, October 1984.*

Super program for the DX'er. Great fun! . . . *F.S., Milwaukee, WI*

Wonderful product. Thank you for not requiring a disk . . . *R. Mc., Loveland, CO*

" . . . Boy, does it simulate! . . . The highest praise should go to the programmer or programming team that brought us this software . . . If you have worked all of the bugs out of your contest station, you will want to 'work out with Doctor DX' to improve the most important piece of equipment in your shack—the operator." . . . *Jeff Ward, K8KA, QST New Product Review, December 1984.*

"Super" . . . *Ron Spiro, W2AO.*

DDX-64 is the best innovation since the electronic calculator . . . *S.G., Grandview, MO*

So real it's "spooky." How'd you get all little men (gud ops too) packed in there???? . . . *C.D., Battle Creek, MI*

"I could talk myself blue trying to convince you that this product is the most exciting thing I've seen in my eleven years as a ham, but it isn't the same as experiencing it yourself. My final advice? Buy this program now!" . . . *Perry Donham, KK2Y, 73 Magazine Review, October 1984.*

Absolutely incredible!!! Please continue with *more* of the same . . . Love C.W. but have been off the air for years due to T.V.I. . . . Please introduce more programs similar to Dr. DX . . . This is a fantastic source of enjoyment!!!!!! . . . *D.T., Sun City, AZ.*

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AEA Brings you the Breakthrough!

Around the corner. Yaesu's VHF/UHF

Whether it's for working your favorite repeater or working an exotic land, Yaesu's got the choice in VHF and UHF radios that you need.

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For your hand. We're constantly raising the standards in handheld radio technology. And our 5-watt, 2-meter FT-209RH and our 4-watt 440-MHz FT-709R are no exceptions.

In fact, you won't find a more flexible, easy to use HT design anywhere.

Each rig gives you a battery saver that really helps conserve your battery power.

Two microprocessors make for a wider range of scanning functions. And complete storage capability in each of the ten memory channels.

Even an optional plug-in tone encode/decode module is available.

And best yet, these two high-powered HTs fit very comfortably in your hand, thanks to an ultra-slim and lightweight design.

However, if you're looking for a more basic and inexpensive handheld alternative, we've got your bases covered too.

We give you a choice of three bands of operation: the FT-203R for 2 meters, the FT-103R for 220 MHz, and the FT-703R for 440 MHz.

Each of these lightweight rigs features 2.5 watts of power and an optional DTMF keyboard.

Over land. Our two mobiles give you a lot of power in very small packages.

The FT-270RH is a 2-meter, 45-watt rig that conveniently packs its 45-watt punch into just about any small space in your car.

The FT-2700RH is a 25-watt FM dual-bander that lets you operate on 2 meters or 440 MHz. Or combine the two for cross-band, full-duplex, telephone-style operation.

Either way, both rigs are simple to operate. You get ten memory channels. Flexible band-scanning functions. Dual VFO capability.

Around the world.
line gets you there.

With a clean, uncluttered LCD display for easy readout.

You don't even have to take your eyes off the road to determine your operating frequency and memory channel. An optional voice synthesizer announces them both at the push of a button on the microphone.

Also, an optional plug-in tone encode/decode board is available.

Across the world. We've got the world's most popular link to OSCAR 10, the triband FT-726R.

And talk about DX. You'll be making worldwide contacts in true 20-meter style. With excellent signal quality too.

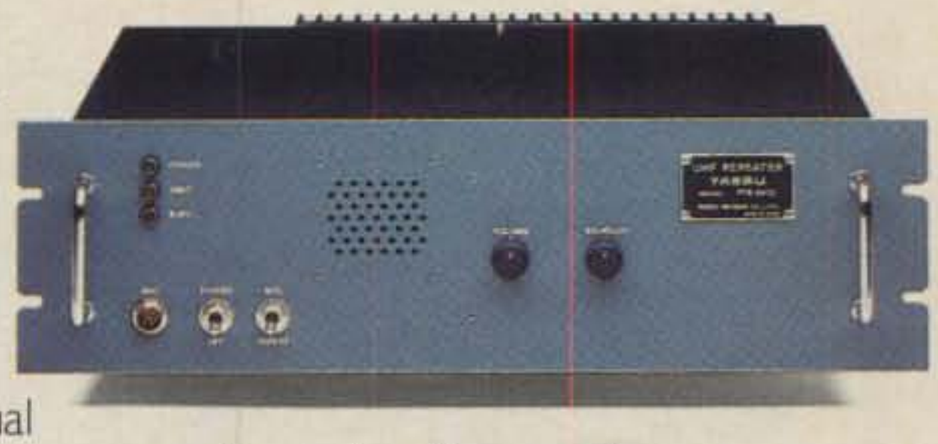
And better, you can work the world from just about anywhere. Including apartments and antenna restricted neighborhoods.

The FT-726R is a 2-meter, 10-watt rig with cross-band capability. To assemble the core of your earth station, simply plug in two optional modules, one for 435-MHz operation, another for cross-band duplex.

You get eleven memories, dual VFO registers, highly versatile scanning functions, and a whole lot more to make the FT-726R a highly worthwhile investment.

Tie it all together. Finally, if you're looking for a repeater system, we've got just the repeater and intelligent controller that you need.

We'll help fine-tune your system to fit your individual requirements. No matter what they



may be. Just write us with your system specifications, and we'll recommend the required hardware.

What's more, you can rest assured that our repeater system is proven and reliable. In fact, it's been used extensively in both amateur and commercial applications.

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Our Readers Say:

Misuse Of The 10 Meter Band

Editor, *CQ:*

I have a subject that I think should be brought up, and that is the misuse and abuse of the 10 meter band. Since I've only been licensed for about six months now, I have noticed a dramatic increase of intruders on this band. The type of intruders that I have noticed popping up into 10 are car services and CBers (the latter doesn't refer to all).

To my knowledge, I thought 10 meters was allocated to just hams, not unlicensed persons (Hi Hi). Even though I'm new, I have only come across a few other amateurs who care enough to monitor and take notes of such activity. It aggravates me more when contests are going on and nobody can copy anything. Has anyone else thought about taking or having any actions against intruders? I guess not, or I would have read or heard something on the matter. Why do I sense everyone is ignoring 10 meters? So what if propagation isn't that great most of the time; it's still a band that was allocated to us amateurs.

My gripe is let's all pay more attention to what goes on when this band isn't active. You will be very surprised at what goes on there that you don't want to hear. If you do hear something, let them beware of what they are doing and who is supposed to be operating there, not the other way around. Let's not all sit around and watch it turn into another CB band. Remember, if that ever happens, we might have to go through what we just did to keep 220 MHz. It's up to us to save this band, not the intruders. I just wanted to let some people know that a few of us still care. I hope some of you give it some thought.

Billy Oggeri, KA2VXY/AG
Queens, NY

A Modified Apple Program

Editor, *CQ:*

Reference: March 85 *CQ*, page 64, Reflected Power Program for Apple II+. I attempted to run the referenced program on my Apple IIe exactly as published, but several bugs were found. The modified program listing is attached. This modification will permit the program to run on an Apple IIe with Extended 80-column card and ImageWriter printer. You may publish this listing if you so desire.

James A. Johanson, K2SCU/5
Greenville, TX

```
10  REM  CBM-64 REFLECTED POWER
20  REM  BY LEW MC COY W1ICP
30  REM  CQ, FEBRUARY 1983
40  REM  CBM-64 BY K. THURBER, W8FX
50  REM  REWRITTEN FROM SEP 1983 CQ BY
60  REM  LOUIS J. JACOBS JR. KN9V
70  REM  MODIFIED BY LOUIS J. JACOBS,JR.
80  REM  REWRITTEN FROM JULY 1984 CQ FOR
90  REM  THE APPLE II+ BY JOHN WEAKLY
100  REM  WA8ZEQ/4, MODIFIED FROM MAR 85
101  REM  CQ FOR APPLE IIE BY J.A. JOHANSON, K2SCU/5
110  HOME : REM  CLEAR THE SCREEN
120  INPUT "OPTIONS: VIDEO OR PRINTER? V/P-) ";A$
130  HOME
140  PRINT
150  PRINT "*** DETERMINING REFLECTED POWER ***"
160  PRINT : PRINT
170  PRINT : INPUT "ENTER FORWARD POWER (WATTS) ";F
180  PRINT
190  INPUT "ENTER MAXIMUM VSWR ";VM
200  PRINT
210  INPUT "ENTER VSWR STEP SIZE ";S
220  IF A$ = "V" THEN  HOME : GOTO 250
225  IF A$ = "P" GOTO 245
230 D$ = " ": REM  CTRL-D
240  PRINT D$;"PR#1": REM  ACTIVATE PRINTER IN SLOT #1
245  PRINT : PR# 1
246  REM  FOR 80 CHR PRINTING
250  PRINT  SPC( 7)"FORWARD POWER IS ";F;" WATTS"
255  IF A$ = "P" THEN SR = 5:ST = 5: GOTO 260
258 SR = 5:ST = 5: REM  NUMBER OF SPACES
260  PRINT
270  PRINT "VSWR"; SPC( SR)"REFLT'D PWR "; SPC( ST)"TRUE RAD PWR"
280  PRINT : GOSUB 500: REM  CALCULATION SUBROUTINE
290  IF A$ = "V" THEN  GOTO 310
305  PR# 0
310  PRINT : INPUT "DO YOU WANT TO DO ANOTHER CALCULATION? Y/N ";C$
320  IF C$ = "Y" THEN  GOTO 110
330  HOME : END
500  REM  CACULATION SUBROUTINE
510  FOR V = 1 TO VM STEP S
520 R = F * (((V - 1) / (V + 1)) * ((V - 1) / (V + 1))):T = F - R
530  IF A$ = "P" THEN  PRINT V,R,T
535  IF A$ = "V" THEN  PRINT  TAB( 1)V; TAB( 10)R; TAB( 27)T
540  NEXT V
550  RETURN
```

SPECTACULAR SIMPLICITY

KDK FM-240

2M - 25 WATT FM TRANSCEIVER

- Superior features, simpler to use for 2 meters, MARS, CAP
- Compact size for better fit in today's automobile
- 16 fully programmable memory channels, plus priority call channel, plus 2 VFOs for today's user
- Subaudible encode and decode standard for today's 2 meter bands
- Subaudible frequency programmed by freq, no chart needed
- Speech synthesis option for voice VFO
- Superior man machine interface—one knob and one button, program all of the features easily—alphanumeric LCD prompts
- 16 button speaker/mic with UP/DN lock-out switch

This radio does every single thing we asked the design staff to make it do, and it does it in an easy to use, simple manner. It is truly spectacular to operate such a radio in the 2 meter band. For example, the FM-240 has two VFO modes—one called VFO, the other QSY. So if you are on your favorite channel and want to QSY, simply push QSY and tune the main knob to the new frequency. To return, simply push QSY again. The entire radio follows this simple but spectacularly effective engineering formula. ONE BUTTON + ONE KNOB, SIMPLY SPECTACULAR SIMPLICITY.

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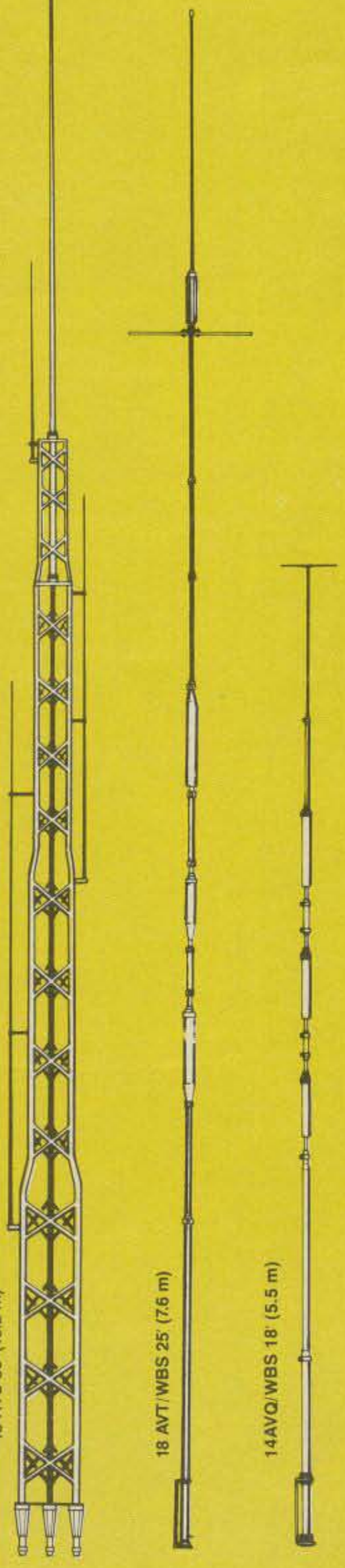
Hy-Gain broadband vertical antennas load the new auto-tune solid state rigs, require minimal space and provide low angle radiation without the expense or the problems of support structures.



18AVT/WBS (80-10 meters) The most successful vertical antenna of all and for good reasons. Broadband performance covers the 40, 20, 15 and 10 meter bands in their entirety. Automatic 5 band switching is accomplished by mechanically superior, highly efficient factory tuned Hy-Q traps with large coils for consistent performance at 2:1 or lower VSWR on 40-10 meter band edges; bandwidth on 80 meters is approximately 40 kHz with VSWR below 2:1. A factory tuned matching network for 50 ohms impedance is dc grounded for lightning protection and reduced precipitation static. The mechanical integrity of this antenna is so stable that performance does not change with the weather. The 18AVT withstands winds to 80 mph (128 km/h) without guying. All stainless steel hardware is included.

14AVQ/WBS (40-10 meters) Offers very similar construction and the same excellent broadband performance as 18AVT over the entire 40, 20, 15 and 10 meter bands; automatic band switching with mechanically superior large-coil Hy-Q traps and very low angle radiation pattern. The smaller, low visibility size also makes the 14AVQ very suitable for roof mounting. The optional 14RMQ roof mounting kit includes base plate, mast and radial/guy wires. All antenna hardware is stainless steel.

18 HTS (80-10 meters. 160 meters with optional loading coil) The superb reliability of the 18 HTS is manifest in installations now over 20 years old. And, with the improvements we made over the years, the 18HTS is now better than ever. Automatic band selection is achieved through a unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical ¼ wavelength (or odd multiple ¼ wavelength) exists on all bands. For example, outstanding broadband performance on 20, 15 and 10 meters is achieved with an extended ¾ wave collinear. On 80 meters bandwidth is approximately 250 kHz at 2:1 VSWR. With the optional base loading coil exceptional performance is also provided at 160 meters. The galvanized tower requires no guying and withstands winds to 100 mph (160 km/h). A special hinged base allows complete assembly at ground level and permits easy raising and lowering. Includes stainless steel hardware. WARC kits to be available.

Other Hy-Gain vertical multiband antennas are available though not shown here. The 12AVQS (20, 15, 10 meter) is similar to 18AVT above but with VSWR of 1.5:1 or less on all bands. The 18VS (80-10 meter) comes with a base loading coil and may be installed on a short mast driven into the ground. All include stainless steel hardware.

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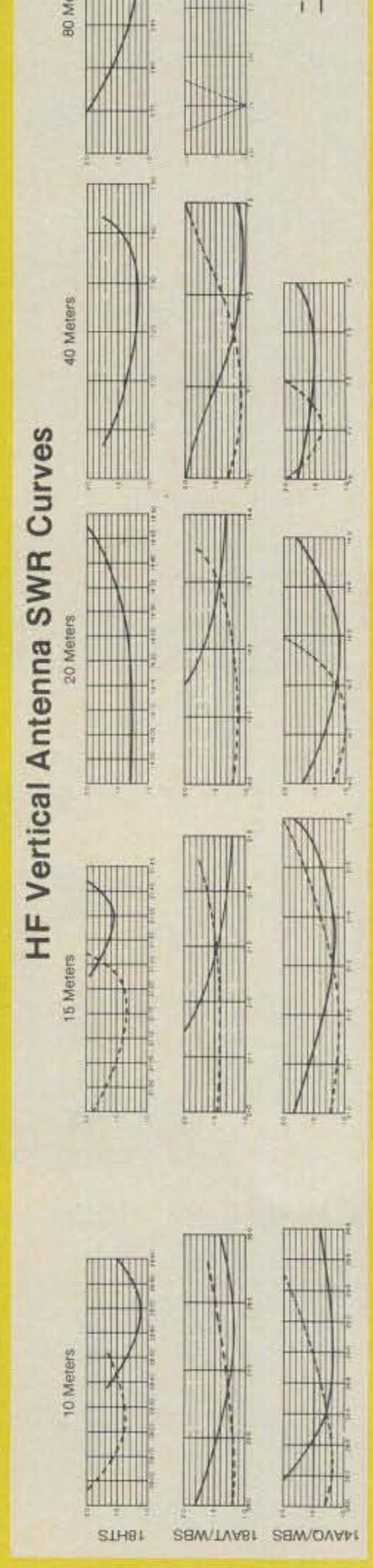
HF Vertical Antenna SWR Curves



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Filter	-6dB Width	Center Freq. MHz
FL45	500 Hz	9.000
FL54	270 Hz	9.000
FL44A	2.1 KHz	0.455
FL52A	500 Hz	0.455
FL53A	250 Hz	0.455

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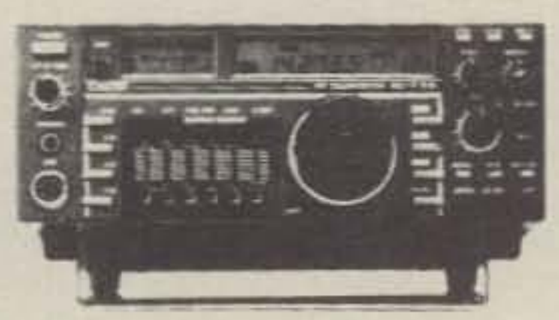

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Willard Hunton's travels in Asia had an impact on the DXCC and the Honor Roll that is virtually unparalleled. Over the years he has held the following calls: W6ODD/CR8, /EZ, /FI8, /FL8, /KG6, /KM6, /KP4, /KV4, /PY, /VP4, /VU2, /YS, EZ3AG, F13AG, KL7AL, MX3AG, SY5MA, VS3AG, XE3AG, XU3AG, W3AG/XU, XW3AG, YN3AG, and YS3AG.

W6ODD/W3AG DXCC's Prime Mover

BY JAN D. PERKINS*, N6AW

The sun set over Saigon as Bill Hunton finished putting up a vertical Zepp antenna. It had been a very productive day. Visiting the chief of police earlier, Bill had received permission to operate. He attached the open-wire feeder to his push-pull 807s and loaded the transmitter to 40 watts input. He tuned across 20 CW and found a European calling CQ. W6ODD/FI8 was on the air.

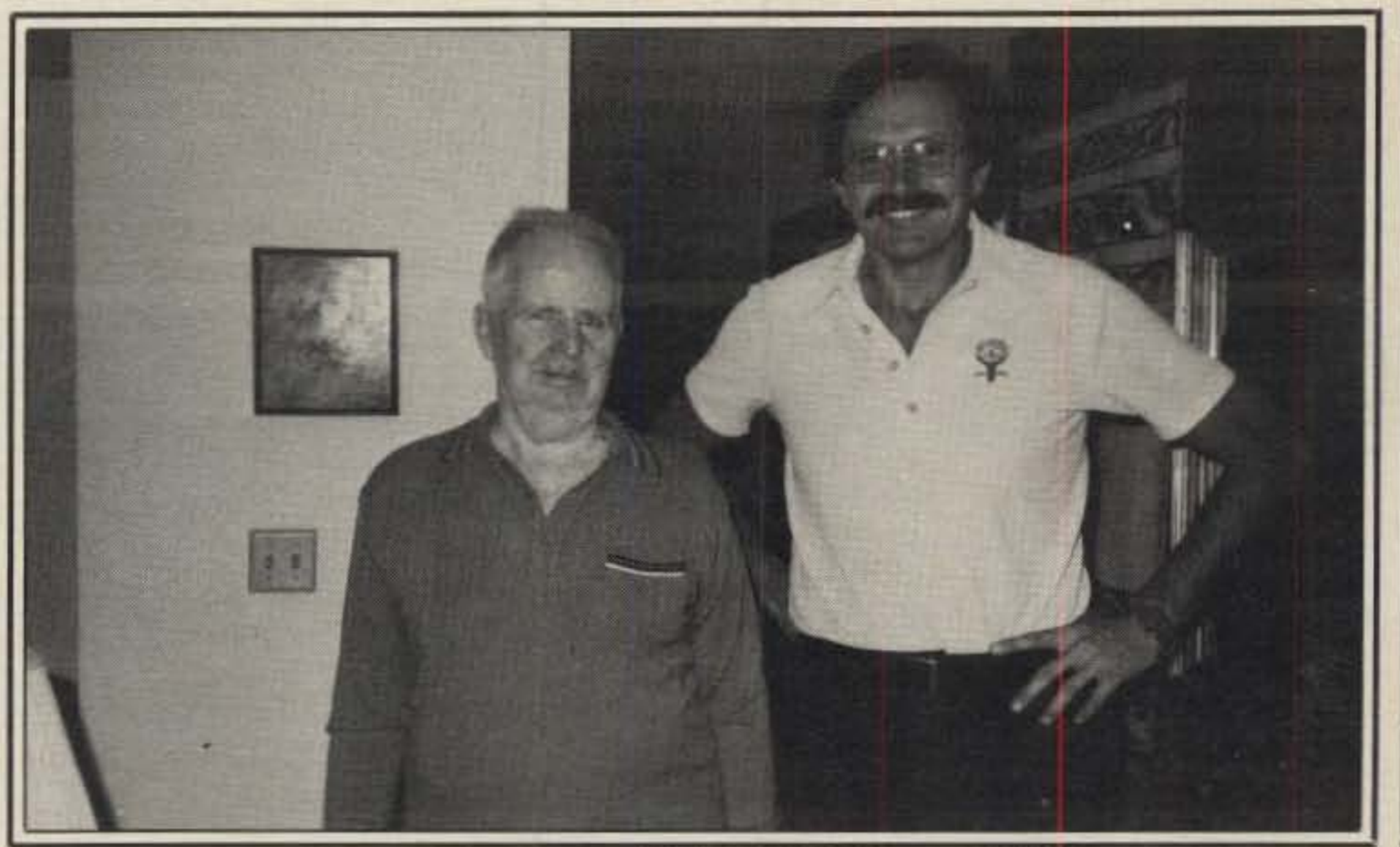
Bill's stay in Saigon was three weeks, and at that time, July 1948, French Indochina consisted of what is now known as Cambodia, Laos, and Viet Nam. That entire area was part of the French Colonial Empire.

In those days the ARRL forwarded QSLs to a safer address for stations operating from politically sensitive regions. Bill requested that cards for him be sent via the ARRL. In that part of the world a direct QSL drew unwelcome attention.

Bill Hunton should know. He goes back a long way in radio.

"I started out an an SWL in the early 1920s," Bill said, "just missing the spark era. My first receiver was a galena crystal detector and a pair of headphones. I later added an audio amplifier, and after getting a license, I built a one tube, self-excited transmitter."

Bill didn't know anyone in amateur radio at the time. The code was just another challenge to meet. That was in 1927. The government assigned the call 3AG. By convention, U.S. stations signed the NU prefix. Two years later the U.S. was allocated the W prefix, and his call became W3AG. He used the same rig for a number of years, and in 1936 he built one using an article in *QST*—push-pull 807s, VFO-controlled.



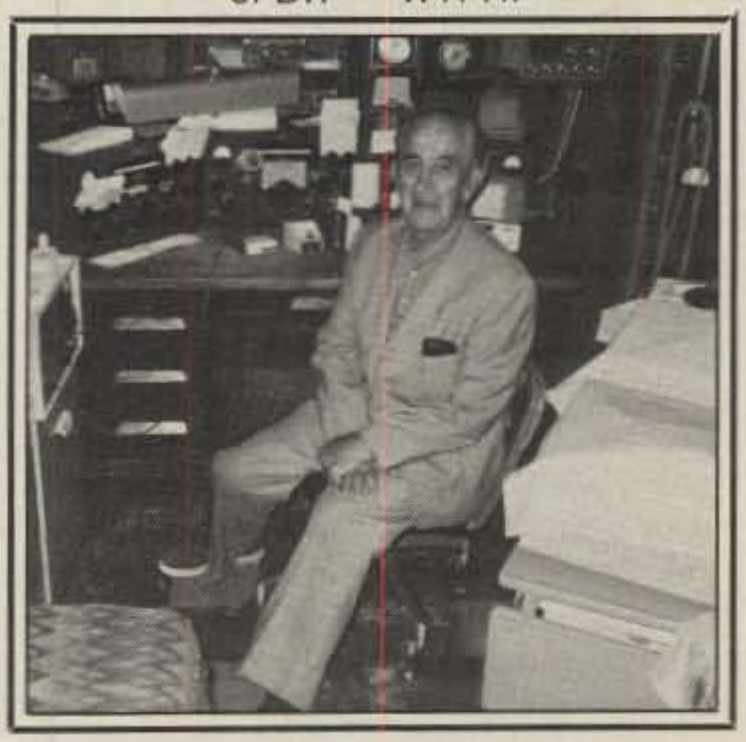
DXers, old and new: W3AG/W6ODD and N6AW.

Bill worked for the Treasury Department, and in 1936 they sent him to California for two years. Bill lived in Stinson Beach, just north of San Francisco, and was licensed as W6ODD. He found that DX was a lot tougher to work from the west coast.

In 1938 Bill returned to Virginia. Still using the push-pull 807s, he achieved DXCC #107 in 1939. He never used an amplifier. Bill found that he could eventually work every station he wanted to with low power.

When World War II started, Bill joined the Merchant Marine. At the end of the war he was in Shanghai, China. V.J. day was August 15, 1945, and three months later U.S. stations were allowed back on

"The postwar period was the golden era of DX"—W1FH.



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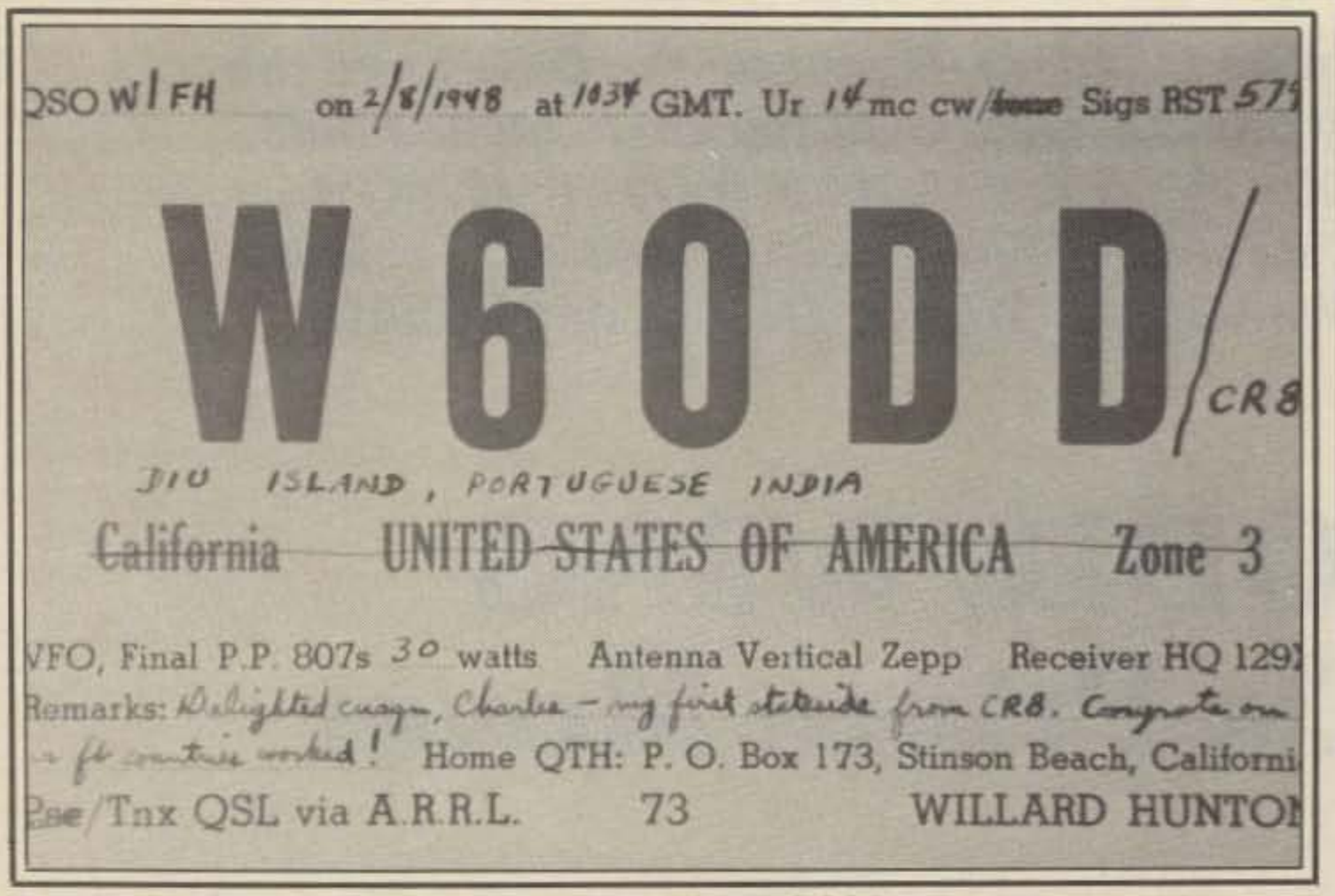
QSO W1FH on 2/8/1948 at 1034 GMT. Ur 14 mc cw/~~fone~~ Sigs RST 579

W6ODD/CR8

DIU ISLAND, PORTUGUESE INDIA

~~California~~ UNITED ~~STATES~~ OF AMERICA Zone 3

VFO, Final P.P. 807s 30 watts Antenna Vertical Zepp Receiver HQ 129X

Remarks: Delighted cuaga, Charles - my first stateside from CR8. Congrats on 76 countries worked! Home QTH: P. O. Box 173, Stinson Beach, California

~~Pse~~/Tnx QSL via A.R.R.L. 73 WILLARD HUNTON

Diu Island—the rarest country in the world. Only 50 QSOs were ever made from Diu.

the air on 10 meters only. The next July (1946) 20 meters was approved by the FCC for amateur radio.

When Japan surrendered, GIs across Asia and the Pacific began modifying military radios and stringing 20 meter dipoles. The long arm of the FCC didn't reach past the continental U.S. Prewar callsigns were activated and used portable, as well as variations thereof.

Bill commenced operation from Shanghai as W3AG/XU in October 1945. Several GIs across China were worked the first day. Most substituted XU in place of their W prefix. XU3AG became Bill's standard call.

Later that month Bill traveled to Penang, Malaya (VS3AG). Enroute Bill used the shipboard station and signed XW3AG. (The XW prefix was as yet unassigned. Laos would not come into existence until 1954.)

In November he returned to the China mainland and took a boat upriver to Hulutao, Manchukuo (Manchuria, also C9). MX3AG began operation on 20 meters.

Bill recalled, "I always enjoyed working DX rather than ragchewing locally. I tuned the bands for something interesting, rather than just calling CQ." Almost 200 stations would come to know that gut-wrenching feeling of being answered by rare DX.

He remained there two weeks but didn't fraternize with local amateurs. "In Manchuria," Bill said, "they were sensitive to foreigners. The war was just over, and their losses had been very heavy." Throughout his travels in Asia, no photographs were ever taken. He later remarked, "I never carried a camera. Many countries didn't have U.S. embassies, and lots of local people packed pistols."

Ready to leave Manchuko, Bill stopped to settle the tab. "I didn't know the exchange rate," he said. "However, they seemed pretty happy, so I suppose it was in their favor."

French Indochina, second on the all-time needed list.


QSO W1FH on 6/7/1948 at 1229 GMT. Ur 14 mc cw/~~fone~~ Sigs RST 569x

W6ODD/FI8

SAIGON-INDOCHINE FRANCAISE Zone 26

VFO, Final P.P. 807s 40 watts Antenna Vertical Zepp Receiver HQ 129X

Remarks: Hail, DX King! Delighted QSL. Sure sure get around, Charles. Fine letter, pix & stamps Home QTH: P. O. Box 173, Stinson Beach, California

~~Pse~~/Tnx QSL via A.R.R.L. 73 WILLARD HUNTON

Thanx for C11AA, Taiwan - I'll go to Tibet for your next time!

In early December 1945 Bill opened up again as XU3AG. One day he worked Reg Fox, AC4YN. Reg was almost a local QSO booming in from Tibet. "His signal drifted quite a bit," Bill noted. "Our QSO started mid-band and ended up at the far end on my HQ129. I later tried using an HQ129X (internal crystal filter), but it had too narrow a bandpass. I stuck with the HQ129."

While in Shanghai he often heard an Aussie operating locally. One day they happened to meet. "I'm sure that he had heard me operating also," Bill said. "We chatted for quite a while, but amateur radio was never mentioned. It was safer to keep a low profile."

While Bill was crisscrossing Asia, he often worked Rod Newkirk, W9BRD, stationed in the Philippines. Rod recalls, "I was KA1KN in the P.I. after peace broke out in late 1945. Gosh, I sure had fun with an 807 homebrew and a Windom for 20 strung between tent poles. One thing I remember is the fantastically short skip on 14 MHz in that area at that time."

XU3AG worked more than 300 stations before leaving China. Bill stopped in El Salvador during January 1946. YS3AG combed 20 meters for a week. Mostly Pacific GIs and Europeans were worked, along with a few South Americans. The U.S.A. was still up on 10 meters. He moved on to Mexico, stopping along the Yucatan Peninsula for a few days (XE3AG), and then headed for Stinson Beach, California.

A year and a half later Bill traveled to South America. On the way he spent two days in the Virgin Islands (W6ODD/KV4). There were no trees close to the hotel, so he draped a wire out the window. The U.S. was now back on 20 meters and could easily be worked.

Bill moved on and spent two days in Brazil (W6ODD/PY). Then he continued on his trip, stopping in Trinidad (W6ODD/VP4, now 9Y4). After two weeks of sun and DX he returned to Stinson Beach.

Back in California he began to prepare for a longer trip. Bill made a vertical Zepp with open-wire feeders cut for 20 meters. That was a half-wave antenna end-fed with a resonant quarter-wave transmission line. The antenna was rolled up and stored in a suitcase. A key, ARRL minilog, HQ129 receiver, and the trusty 807 rig were added, everything barely fitting into one bag.

The next spring he visited the Caribbean. In April 1948 he spent a night in Puerto Rico (W6ODD/KP4). The antenna was easy to string and seemed to work well. In May he visited El Salvador (W6ODD/YS). Bill left in June and stopped briefly in Stinson Beach. This time he headed for Asia.

Midway was his first stop (W6ODD/KM6). After one night of operation Bill

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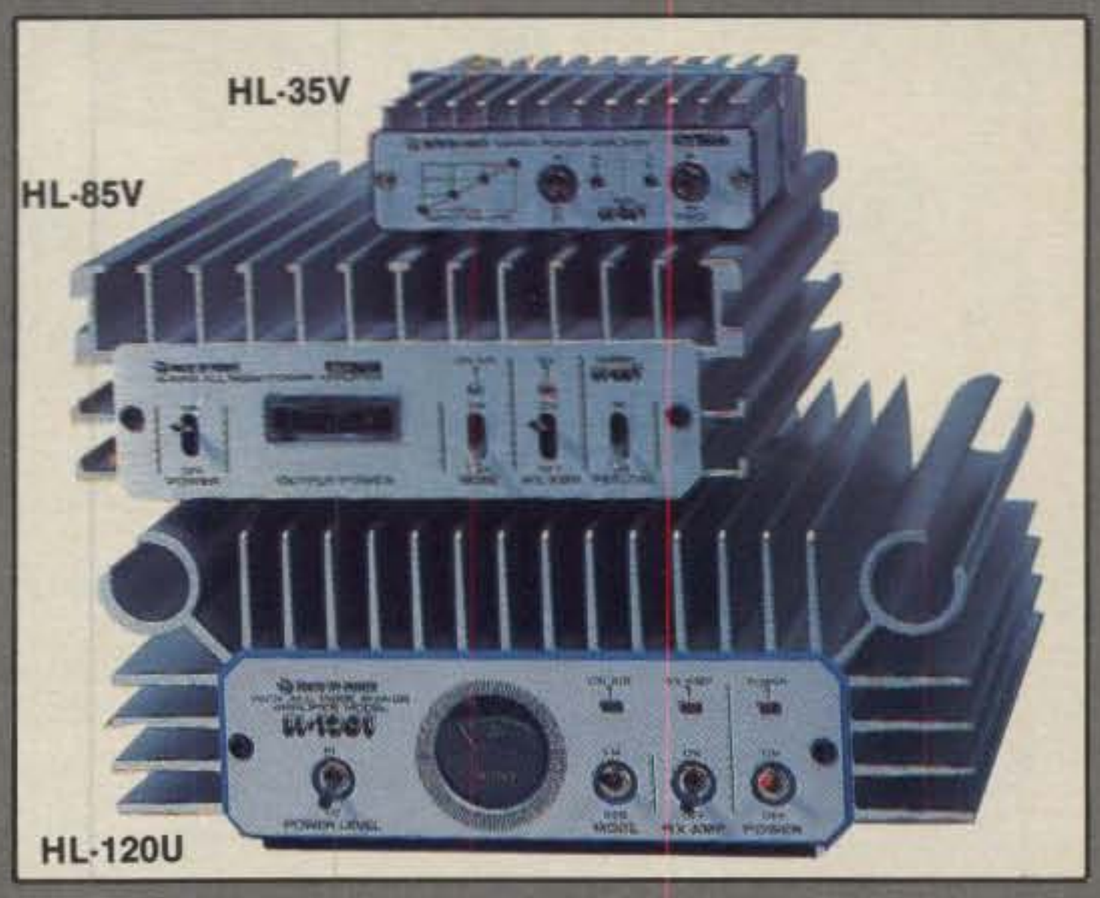

Specifications	2 METERS HL-30V	HL-35V	HL-35VL	HL-85V	HL-110V	HL-160V	HL-160V25	430–450 MHz HL-20U	HL-30U	HL-60U	HL-120U
Pre-Amp Type	N/A	Gaas-FET	Gaas-FET	Gaas-FET	Gaas-FET	MOS-FET	MOS-FET	N/A	Gaas-FET	Gaas-FET	Gaas-FET
Power Metering	N/A	LED	LED	Meter	Meter	Meter	Meter	N/A	LED	Meter	Meter
Input (Watts)	.25-5	.25-5	.25-5	10-14	3-14	3-14	20-30	.1-4	1-4	8-14	8-14
Output (Watts)	2.5-30	2.5-30	2.5-30	70-90	90-110	140-160	140-160	18-22	25-30	45-60	90-110
SSB Mode	NO	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES
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MODEL	SP-122	SP-220	SP-420	SP-230	SP-430
Freq. Range	1.6-60MHZ	1.8 ~ 200MHZ	140 ~ 525MHZ	1.8 ~ 150MHZ	140 ~ 500MHZ
Sensor Mnt.	FIXED	FIXED	FIXED	DETACHABLE	DETACHABLE
Pwr Ranges	20/200/2KW	2/20/200	2/20/200	15W/150W	5W/60W
No. Meters	1	1	1	1	1
Peak Mode?	YES + HOLD	YES	YES	NO	NO
Impedance	50 OHMS	50 OHMS	50 OHMS	50 OHMS	50 OHMS
Functions	PWR/VSWR PEP + HOLD	PWR/VSWR PEP	PWR/VSWR PEP	PWR/VSWR CAR VOLTS	PWR/VSWR CAR VOLTS
Accuracy	10% READING	10% READING	5% READING	5% F.S.	5% F.S.

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Joe's not there? Store a message at his station!
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In Packet Radio, your station is a radio, a computer terminal, and a TNC (Terminal Node Controller, hopefully the AEA PKT-1). You type and the TNC sends short bursts (packets) of two-tone modulation called AFSK. The other station decodes them and displays them on his monitor screen. He then sends to you.

There is a lot of activity—local clubs, voice nets, mailboxes/bulletin boards, links between bands, long range (digi)repeaters and chained digipeaters, voice nets, search/rescue and emergency work, newsletters, satellite communications, technical development of new equipment and software, etc. 220 MHz will be very important to packet radio. Help us populate it and "Save the Band"!! We need your help and participation.

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AEA Packet Radio
RAM length is 2000
cmd: connect to N7ML via KB7G, K6RFK
cmd: ***CONNECTED TO N7ML
Hi Mike - have you seen the great new AEA
   PKT-1?
YES JOHN - LOOKS GOOD K
Bye Mike sk
cmd: ***DISCONNECTED
cmd:
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Packet radio is:

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Multi-frequency—10.147, 14.103, 145.832, Oscar 10, 145.01 (and other local 2M frequencies) are being used now.
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Multimode—conventional radio, meteor scatter, but no EME/moonbounce yet (will you be first?).
Simple—you control the PKT-1 by typing 5-6 simple one- to four-letter command words on the terminal or computer. Several of them are shown in the above monitor screen simulation, which shows a connect via digipeaters, and an interchange between two stations.

It's easy to get going. You probably already have the radio, and the computer or terminal. You'll need to operate your computer in RS232C mode using "communications terminal" software that is free or cheap. We can usually furnish information on what to use for popular computers. The rest of the software is resident in the PKT-1 (you will need to buy a PKT-1). And you need a MIC connector to connect to the (furnished) radio cable you'll plug into your radio MIC jack. And "BRAAP," you're on the air with "Packet Racket."

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moved on to Guam (W6ODD/KG6). He spent four days on the island and then left for Indochina.

On July 3, 1948 W6ODD/FI8 opened up from Saigon. "Word got around, you know," Bill said. "Sometimes I would turn on the receiver and find stations calling me blind. I encountered very few poor operators. Of course, most of the time I avoided pileups and looked for DX."

While in Saigon Bill stopped by the French Embassy and met Paul Ferrand, FI8ZZ. "Paul was a generally nice sort of fellow," Bill reported, "and mentioned that due to his tenuous situation, he usually didn't QSL. His rig was not *apparent* at the embassy." Paul was the section chief of the REF for the French Embassy in Saigon. He made the mistake of routinely asking the Minister of Colonies in France for authorization to operate, disregarding the old adage that it's easier to get forgiveness than permission.

FI8ZZ was active from 1948 to 1951, but never received permission to operate from France. Bob White, W1WPO, later remarked that only four FI8ZZ QSL's were ever submitted for DXCC credit. Don Wallace, W6AM, found a G.E. representative who was going to Saigon and asked him to stop at the French Embassy with a QSL. In a letter to W6AM, enclosed with Don's Indochina confirmation, Paul Ferrand wrote:

"In view of the political situation, in Indochina, we are not authorized to transmit and official permission has not been given.

"FI8ZZ is therefore a clandestine station and he makes all his transmissions at his own risks.

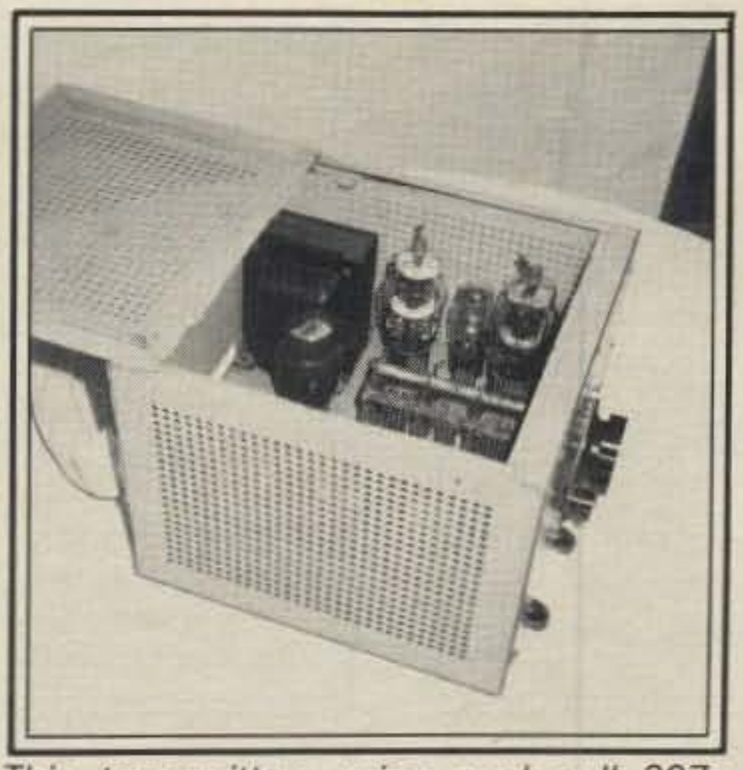
"These requests have been made to the president of the REF, and to the Minister of Defense, of the French Colonies and also by myself to the local authorities, but we have not received favorable word for several months."

While he was in Saigon, Bill Hunton worked more than 200 stations, nearly half of them W6's. He left Indochina at the end of July 1948 and landed at Port Blair in the Andaman Islands.

Permission to operate was easy to get, according to Bill. "The RAF (Royal Air Force) was there, and I just contacted one of the signal officers listed in the callbook." After he strung his vertical Zepp that evening, a tune across 20 yielded nothing. Bill broke from tradition and tried a CQ. Nose, KH6IJ, nabbed him on the grey line opening from Hawaii. They exchanged 459 reports, and both continued looking around the band for more DX. Bill operated as W6ODD/VU2 for just two days, and then his plane continued on to Portugese India.

Due to his frequent operations, some amateurs speculated that he was maritime mobile. Bill replied, "After 1945, I never operated from aboard a ship, although some thought I did, I moved around so much."

August 2, 1948: Dawn was breaking as Charlie Mellen, W1FH, tuned across 20 meters. *Hmmm, a nice weak one working a European . . . W6ODD/CR8!* Chas didn't occupy the top spot of the honor roll by lack of vigilance. He was Bill Hunton's first stateside QSO from Diu Island, Portuguese India. Charlie pointed out, "There were no DX bulletins then, no lists. You tuned the band daily, never knowing what you might hear. It was the golden era of DX."



This transmitter, using push-pull 807s and a 6L6 VFO, is similar to the one Willard carried around the world. (Tnx W6PN)

A French bunker near Saigon. Pictured is the author, WB6PNB/XV5 (now N6AW).

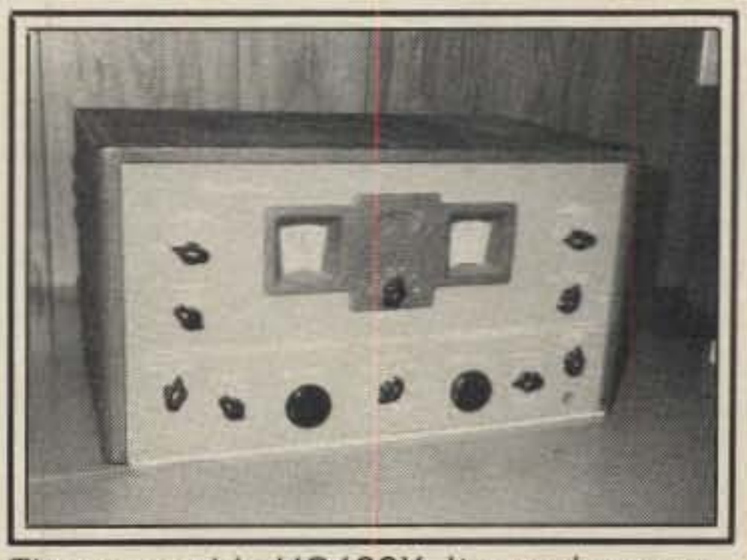
W1FH was Bill's only QSO with New England from Diu. As the sun rose across the U.S., a handful of midwest stations, and more than a dozen W6's, also worked Bill. If only they had known . . . .

Another vigilant DXer in the log was Lew McCoy, W0ICP, now W1ICP. "If you ask Charlie," Lew said, "he'll be the first to tell you we were going nip-and-tuck to see who would be the first DXCC postwar. He, of course, won, but I am sure I beat him out with an all 10 meter DXCC just a few weeks after he got Number 1."

Arriving at Diu Island, Bill stayed four days. He worked almost 50 stations. "It was very primitive," he reported. "No English was spoken at all. I strung my vertical Zepp in the trees about two miles from town. Line voltage was up and down, and the power input varied from 30 to 50 watts. Sometimes the power was out for a couple of hours."

Later that morning W6KPC was having coffee with W6AM. They were preparing to go up one of the poles and work on a rhombic. About 7 a.m. Don got a phone call. "Don, W6ODD/CR8 is on 20 meter CW," a DXer reported. "Thanks," Don replied, "but we are just about to go out and repair an antenna. I'll work him tomorrow."

Bill was on Diu Island for two more days, but due to his operating hours and the unreliable line voltage, no more stateside QSOs were in the log. He snagged a few Europeans and South Americans, plus a couple of VK/ZLs, to bring his QSO total to over 40. "Most of my operating was after dark," Bill said, "until 2 or 3 a.m. It was least conspicuous then, plus a good time for DXing."

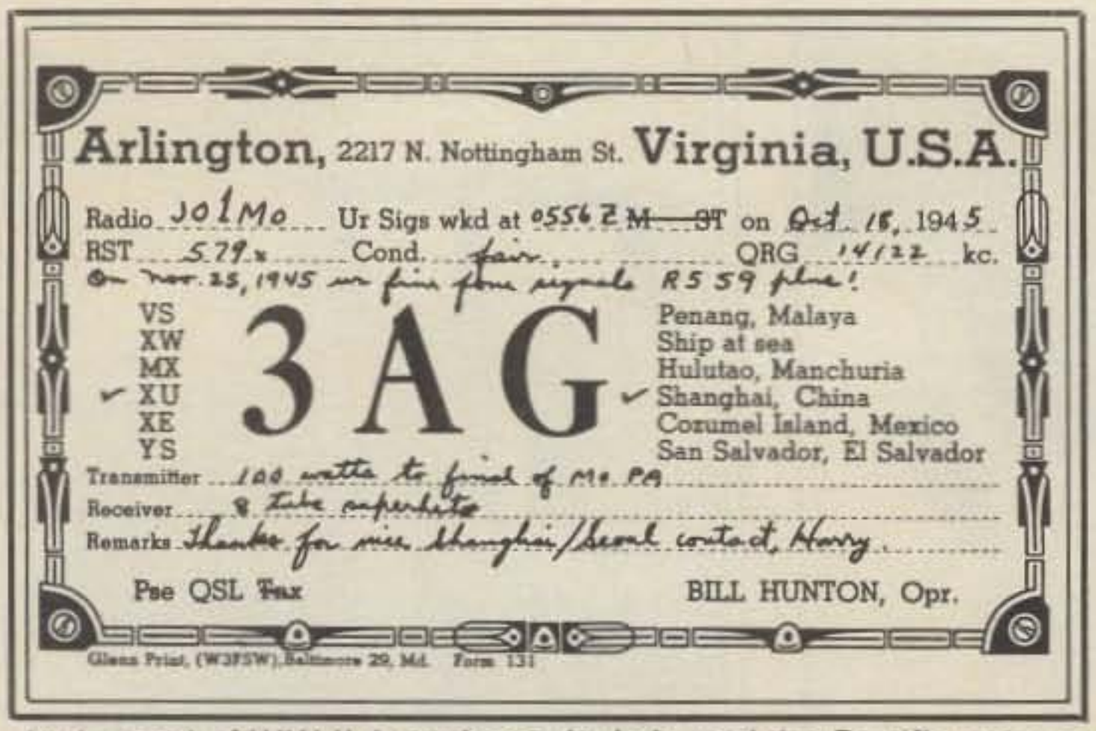


The venerable HQ129X. Its predecessor, the HQ129, had no crystal filter. (Tnx WA6NBS)

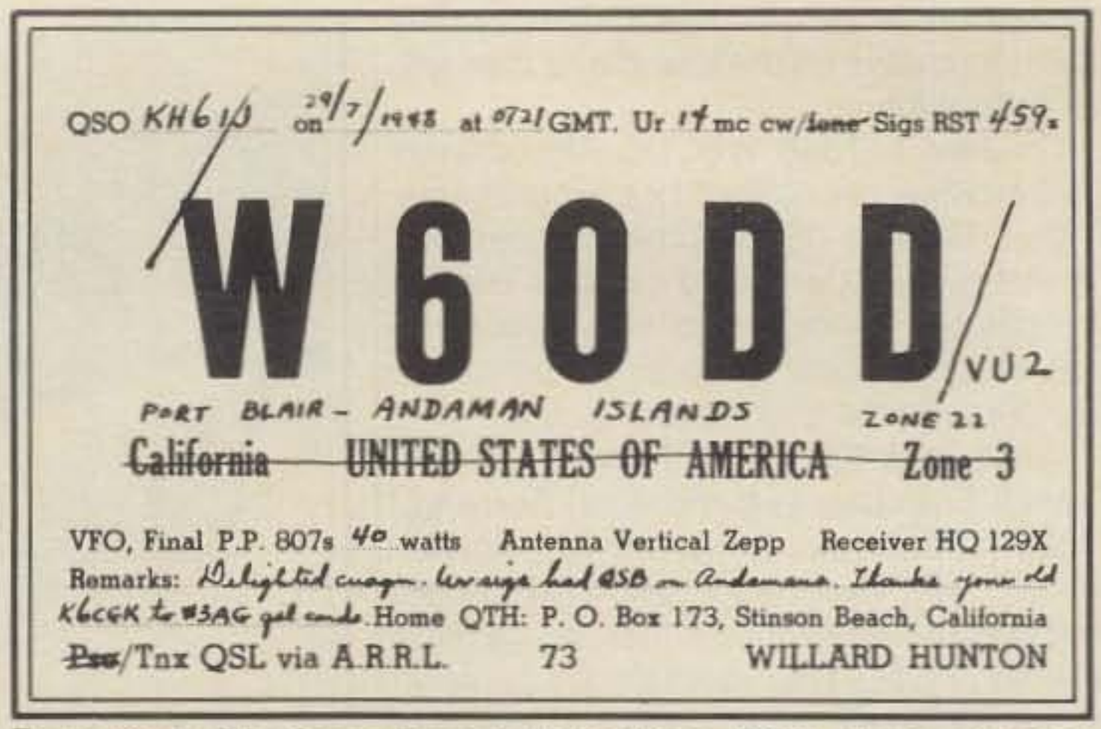
One had to be careful when a radio was used in that part of the world. East and West Pakistan had recently split from the newly independent India. Nearly half a million people had perished during the turmoil. Mahatma Ghandi had been assassinated six months earlier, and tensions were high. Prime Minister Nehru was eyeing the CR8 territories, a Portugese possession for the past 4½ centuries. India viewed Portugal's presence as an illegal occupation and was determined to recover its land.

Bill left Diu Island, and his next stop was along the Red Sea at French Somaliland (W6ODD/FL8, now Djibouti, J2). Due to his operating hours, only a handful of stateside stations were contacted. Permission to operate was not a problem. "No English was spoken there," Bill reported. "I put up the antenna shortly after arriving and took it down when I left." In the few days there 50 stations were worked. "You always kept the rig in a suitcase," he recalled, "until you got to your room and unpacked. It wasn't wise to strike a high profile." Bill only operated CW on his trips. "Phone operation disturbed people," he explained, "and drew attention to you."

Bill returned to Stinson Beach for the next 11 months. There was quite a stack of QSLs awaiting him. They had been forwarded by the ARRL in West Hartford,



At the end of WW II Americans in Asia and the Pacific were on the air almost overnight.



Enroute to Diu from French Indochina, Bill's plane stopped briefly at Port Blair.

Connecticut. In July 1949, he traveled to Europe and spent two weeks in the Saar (W6ODD/EZ). The prefix later assigned to the area was 9S4. This was an autonomous region between France and Germany that was deleted in 1957. Europeans were locals, of course, and hundreds were worked. Only a few stateside stations were contacted.

Back in Stinson Beach again, Bill stayed 18 months until the spring of 1951, when he traveled back to Saigon. French Indochina had recently been banned for U.S. stations to work (FCC Public Notice, December 21, 1950, included Indonesia, Iran, Japan, and Thailand). For the next two months Bill operated undercover from Saigon as FI3AG. Preparing for departure, he traveled to Cap St. Jacques near the mouth of the Mekong River. On his last night in the country he worked Ed Hawkins, W6CUQ (now K6ZO).

Bill's next stop was Nicaragua. Over the next four days YN3AG worked 50 stations. He returned stateside to live for the next 20 years.

Bill said, "I enjoyed operating from exotic locations. However, the world political situation was becoming very unstable. My next trip I might not make it back." (China and Tibet had fallen to the Communists the year before. In less than three years the French would give up Indochina after their defeat at Dien Bien Phu. In 1954 the FI8 territory fragmented into the countries of Laos (XW), Cambodia (XU), and Viet Nam (XV)).

French negotiations with Ho Chi Minh had collapsed, and guerilla warfare in French Indochina was heating up. After December 1950 France explicity forbade amateur radio in Indochina. The U.S. then placed it on its banned country list. FI8AZ, as well as FI8AB and a couple of others, was active from 1951 to 1954.

In July 1952 the ARRL communications manager, F. E. Handy, W1BDI, wrote a concerned DXer:

"Sorry about FI8AB and any other FIs. For U.S. hams to work them is a 'sure way' to invite an FCC citation.

"The REF has refused to handle any cards to be forwarded to French Indochina, since they are not licensed and work in disregard of their government."

After WW II the ARRL's policy was to accept QSLs for DXCC credit, whether or not the operator had permission to operate. Hence the term "QSL via ARRL." The League made no bones about forwarding QSLs from clandestine stations. They were happy to do so.

However, the ARRL broke with tradition at this time. No QSLs were accepted for credit from French Indochina after December 1950. W6ODD/FI8 sent out more than 200 cards, and FI8ZZ is known to have issued 4 (out of his thousand-plus QSOs). These were the only QSLs accepted for DXCC credit. Bill accounted for over 98 percent of the French Indochina confirmations. (W6CUQ's only country needed is FI. He has 366.)

France had ceded its Indian (FN8) territory to India in 1954, shortly after it gave up Indochina. India was determined to recover the remainder of its foreign occupied colonial territory.

Prime Minister Nehru entered negotiations with Portugal, but they were not fruitful. In 1955 he tried Ghandi's approach—peaceful occupation of the CR8 territories. Shots were fired by the Portugese, and India broke diplomatic relations with them.

In the spring of 1961 Ed Hawkins, W6CUQ, was climbing up the DXCC list-

HENRY

REPORT #2

New models reflect our policy by design. Technology moves fast. At Henry Radio we keep up with a steady flow of new models, some for amateur use, some for commercial use, some for industrial use and some for scientific research.

Here are three new models for this month:
*New UHF model 3004 1500 watts output at 440 MHz.
*New VHF model 3002 1500 watts output at 144 MHz.
*New HF 5K Classic, 3.5 to 30 MHz (not for sale to U.S. amateurs)

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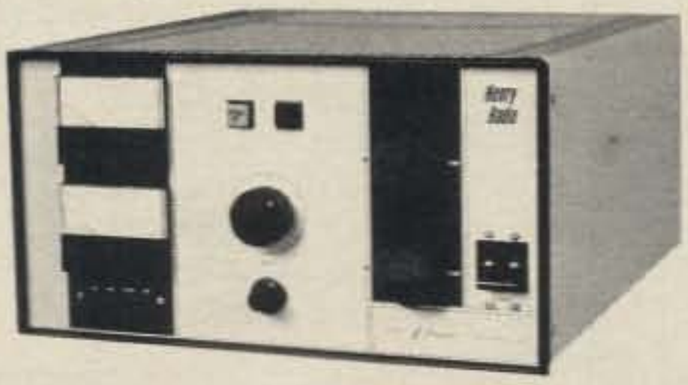
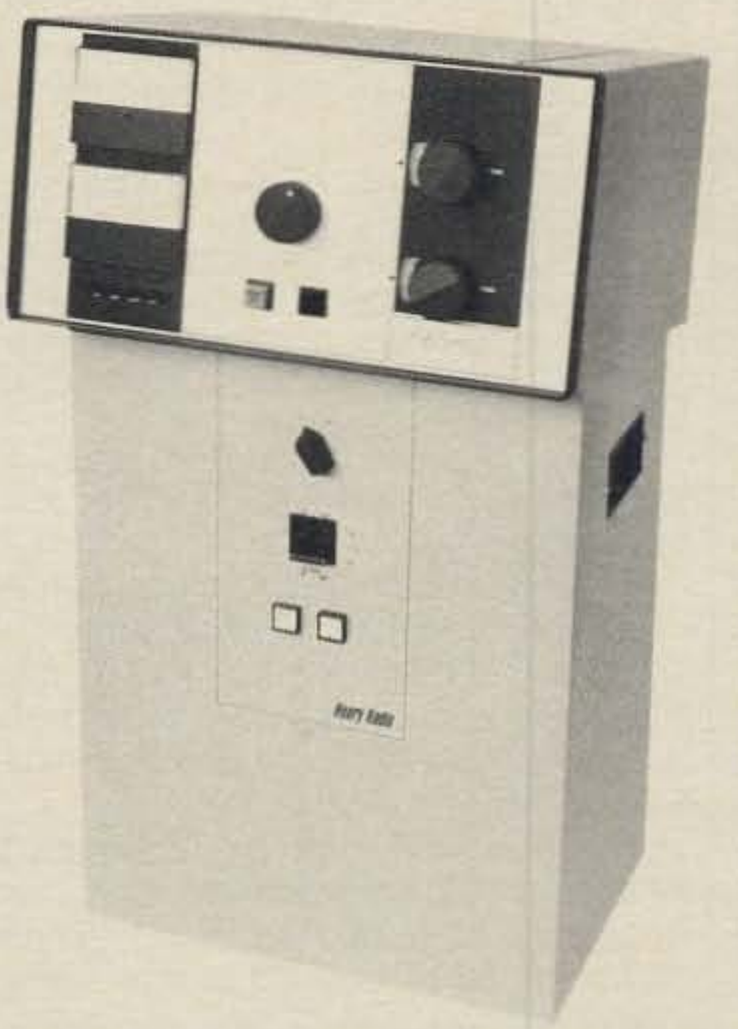
3K Classic...uses the superb Eimac 8877 tube. More than 13db gain. We believe the 3K to be the finest amateur linear available anywhere...the amplifier of every amateur's dreams.



2KD Classic...a desk model designed to operate at 2000 watts effortlessly, using two Eimac 3-500Z glass envelope triodes, a Pi-L plate circuit and a rotary silver plated tank coil. We challenge you to find a better desk model for even a thousand dollars more.



2002-A...a bright new rework of our popular 2002 2 meter amplifier. Uses the new Eimac 3CX800A7. The RF chassis uses a 1/4 wave length strip line design for extreme reliability. It provides 2000 watts input for SSB and 1000 watts input for CW. Because this tube is rated at an unheard of 15dB gain, only about 25 watts drive is required for full output.

2004-A is identical to the 2002A except that it is set up for the 430 to 450 MHz band. This amplifier uses a 1/2 wave strip line and offers all of the same specifications as the 2002A.

1002-A A rack mount 2 meter amplifier with the same design as the 2002A, except using one 8874 tube for 1/2 power specifications. Rated at 600 watts PEP output and 300 watts continuous carrier output. It employs the same strip line design as the 2002A.

1004-A...a rack mount half-power version of the 2004A. Covers the 430 to 450 MHz band using a 1/2 wave strip line design.

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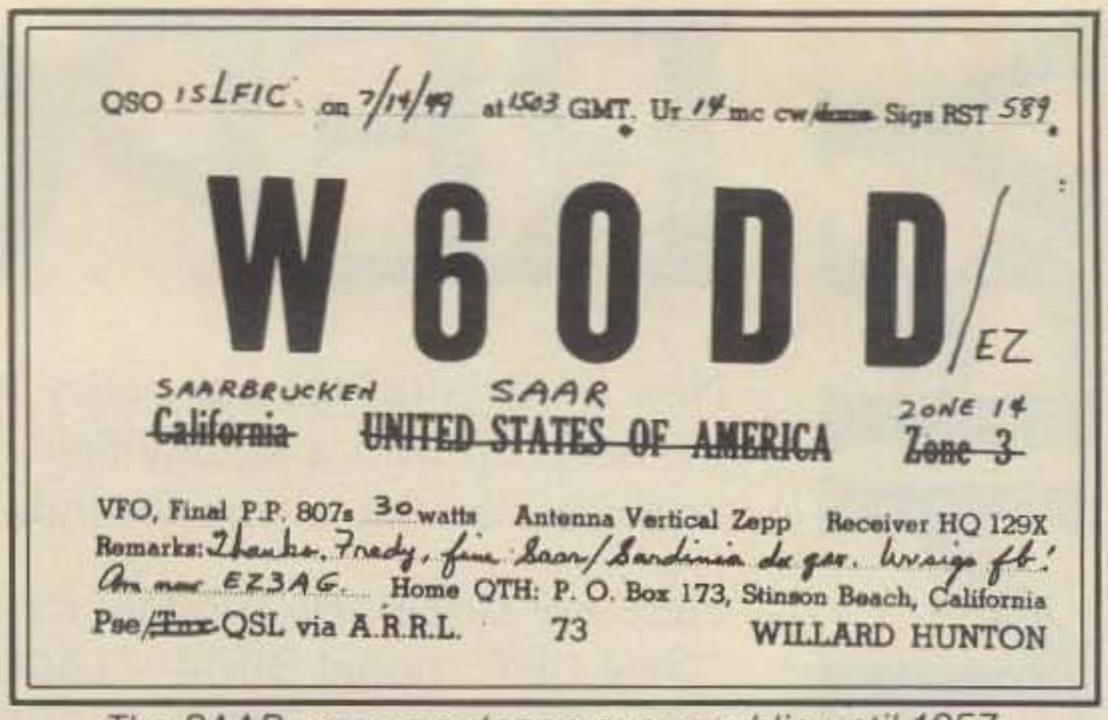
Bill worked almost 100 W6's from Saigon.



The SAAR was an autonomous republic until 1957.

ings. Looking at a world atlas, he noted quite a bit of real estate between Goa and Diu. The situation called for an expert opinion, he decided. He sent his W6ODD/CR8 card off to Bob White, W1WPO, DXCC administrator, for his assessment.

Bob examined the QSL card and reviewed the DXCC criteria—75 miles separation of foreign territory. Thus, it came to pass that the separate country of Diu/Damao was announced in the fall of 1961.

Forces were in motion, however, that would change the map. In December 1961 India forceably occupied the Portugese territories on its western coast. On January 1, 1962 Diu became a deleted country, virtually before its existence was published. The 40-odd DXers who worked W6ODD/CR8 some 13 years earlier became members of an elite club—the only ones holding a QSL from Diu/Damao. W6CUQ went to the top of the honor roll, and Diu turned out to be the only country W6AM ever missed! (Don currently has 366.) W1FH has all 367.

Bill's operation from Diu was the first CR8 activity from Portuguese India after the war. From 1957 to 1961 Raul Fernandes was active as CR8AC (the Portugese Communications Center in Goa). Twice in 1958 and 1959 HB9QP visited Raul and operated portable from the Goa airport, seven miles southwest of Nova Goa city. When Portugese India was divided into two countries in 1961, HB9QP/CR8 and CR8AC became credited toward Goa, and Bill Hunton's operation was Diu/Damao. These were the only known QSOs from the Portugese territories in India.

It was thought for a time that an Indian amateur could have operated portable CR8. The matter was settled when a letter was received from T. R. Jayaramen. He wrote:

"Goa Daman and Diu were Portugese occupied territories on the west coast of India. On the 19th of December 1961 the three areas were liberated. Prior to this period the relations between India and Portugal were so strained that an Indian amateur could not have operated from Diu.

"The strange coicidence in this case is that I became the Civil Administrator of Goa district in December 1961 when it was liberated."

Bill and his wife moved to Anchorage in 1957 and concentrated on raising a family. Over the next five years KL7AL was a familiar call on 20 CW. During that period they also lived in Nome and Unalakleet. Equipment was difficult to procure so far north. When the Huntons departed from Alaska, the 807 rig was left with a local amateur. On his retirement in 1962, they moved back to his wife's hometown of Williamsport, Pennsylvania.

In 1973 Bill and Lois Hunton went to Greece for a couple of months. DXer that he was, he dropped by Mt. Athos. Bill reported, "The monks had little knowledge of, or interest in, anything in the outside world after about 975 AD. However, by indulging in their favorite drink of *ouzo* (horrible!) I held out for a couple of weeks. My philosophy has always been that it's better to become DX rather than wait for the other ham to show up."

As SY5MA Bill worked 275 stations: 5 on SSB and 270 on CW (including one Novice on 15). "They guys I worked wanted phone QSOs," he said, "but it disturbed the monks. On CW I bothered no one."

That was his last DX operation. "My poor health curtailed my travels," he wrote. "Farewell to W6ODD/CR8 and SY5MA, etc., and hello to W3AG. It was a great life while it lasted."

Many of Bill's logs were misplaced while he was in Greece. However, he still has every QSL he ever received all the way back to 1927. Bill never submitted his cards for a postwar DXCC. The combined total of his east and west coast QSLs exceeds 330 countries. During his travels he operated from all continents except Antartica.

So unfolds the story of how a DXer from the *old school* came to operate from the two rarest countries on the rolls of the DXCC. Willard Hunton—DXer extraordinare!

Special thanks to Bill and Lois Hunton, who were very patient and excellent hosts while I rummaged through logs and nine shoeboxes of QSLs! Also thanks to W1FH, W6FR (W6VFR), W1CW (W1WPO), K6TX (W6AVM), K6ZO (W6CUQ), W6YO (YA1AM), K5UC, W1ICP (WØICP), W6EE (W6IBD), W6RR (W6ITA), W1DX (W1JYH), KH6IJ, W7AO (W6ADP), W1YL (W1YYM), W3AZD, W9BRD (KA1KN), W6QD, W6SN, W1BDI, W2OAA, W1DX, W6UYW, VU2CZ, ISØFIC, VU2JR, and Nancy Stevens for their assistance in researching this article.

HF Equipment	Regular	SALE
IC-735 Xcvr/SW rcvr/mic	849.00	**749.95**
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AT-120 Automatic antenna tuner	TBA	
FL-32 500 Hz CW filter	59.50	
EX-243 Electronic keyer unit	50.00	
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FL-30 SSB filter (passband tuning)	59.50	
FL-44A SSB filter (2nd IF)	159.00	**144.95**
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EX-195 Marker unit	39.00	
EX-202 LDA interface; 730/2KL/AH-1	27.50	
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HM-10 Scanning mobile microphone	39.50	
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IC-745 9-band xcvr w/.1-30 Mhz rcvr	999.00	**779.95**
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EX-241 Marker unit	20.00	
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IC-37A Compact 25w 220 FM, TTP mic	449.00	**299.95**
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BP-4 Alkaline battery case	12.50
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Most DXpeditions last but a short period of time. Here's one that lasted two years and in a sense was paid for by the British government.

ANTARCTIC DXING

BY RICHARD NEWSTEAD*, G3CWI/VP8ANT

"Radio operators wanted by British Antarctic Survey for Antarctic duty." The advertisement was a tempting prospect. My major interests for many years had been contesting (with GB4ANT, among others) and 160 meter DXing. Antarctica seemed to offer enormous potential for both kinds of operating, and where else could I be paid for doing my hobby? Certainly there would never be a better opportunity to visit such an interesting part of the world and put it on the DXCC map, so I soon had an application in the mail.

Six months later, on a warm September morning, I was boarding the Royal Research Ship *John Biscoe* bound for a two-year tour of duty on Adelaide Island off the west coast of the Antarctic Peninsula—Antarctica for DXCC purposes. The voyage south was a leisurely affair. Part of my luggage was an FT-101, antenna wire, and three "Jalbert" parafoil kites, providing the potential for a bit of shipboard DXing. Unfortunately, I was unable to get permission to transmit from the ship. However, I did do some listening with a long wire hung off one of the kites. Not surprisingly, I developed something of a reputation for being eccentric.

The ship called in for a few days at Rio de Janeiro, and passed tantalizingly close to the Peter and Paul Rocks, which were still on many people's "wanted" lists. The captain was reluctant to land because of possible uncharted reefs, and I didn't have a PY0 license anyway, so even a short operation would have been out of the question.

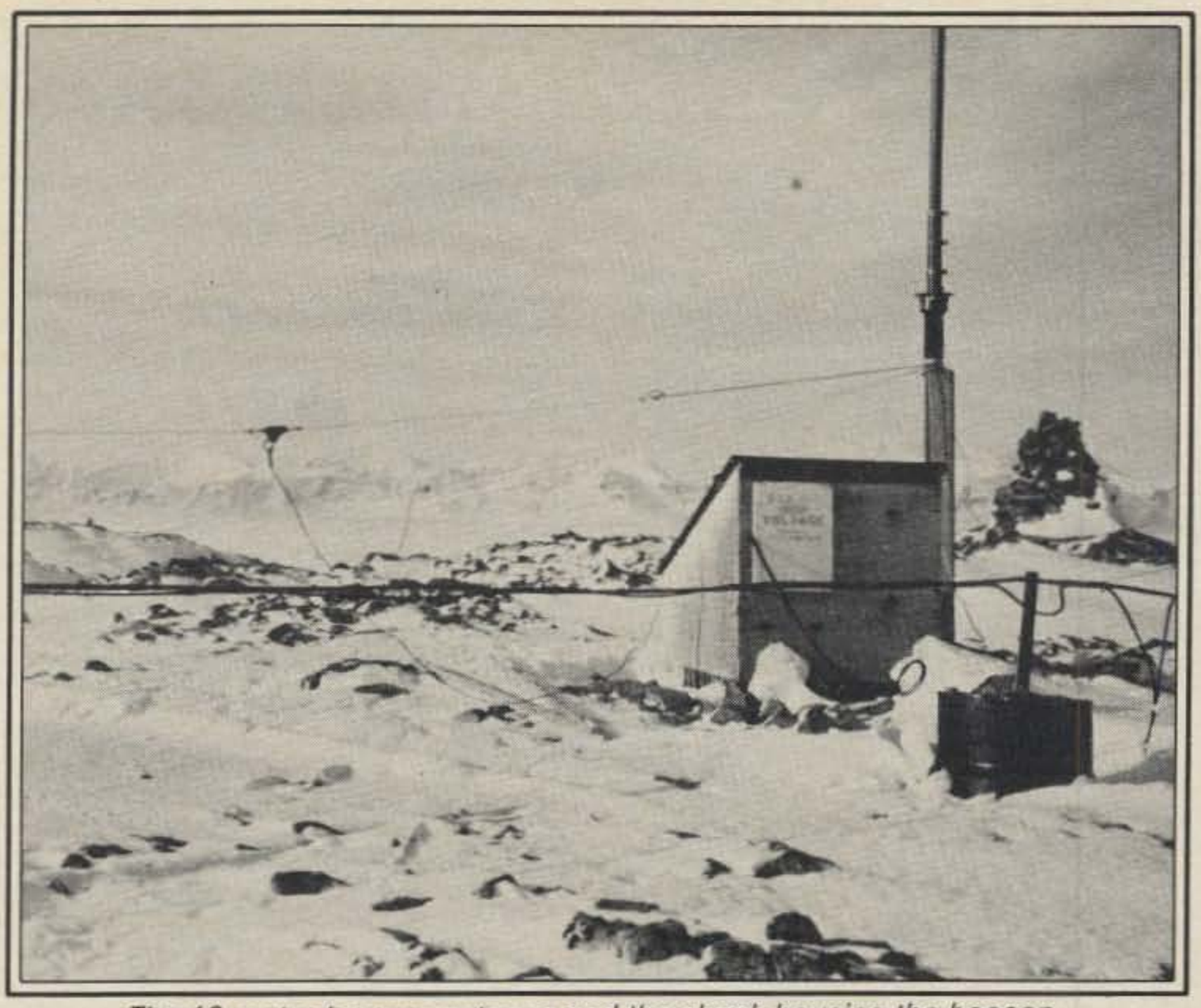
After Rio, the *John Biscoe* headed for South Georgia to spend a week transporting personnel between the two permanent bases at Bird Island and Grytviken (the old whaling station soon to become rather better known), and the summer field camps. As South Georgia is a fairly rare location, I was anxious to get on the air as soon as possible, and one afternoon Brian Stanswood, VP8AEN, the radio operator at Grytviken, gave me the run of his shack.

The author, G3CWI/VP8ANT, at the operating position.

The radio equipment at South Georgia was rather antiquated, and I had to use tube equipment made by RACAL, some of which dated from World War II. The receiver didn't even have an SSB filter. The antennas were dipoles at about 90 feet. Immediately behind the base, mountains to the north rose to several thousand feet. Even so, conditions seemed about average with both the USA and Europe audible. However, 2 hours of frantic CQing on 15 and 20 meters yielded only 12 QSOs, and I began to wonder whether coming south had been such a good idea.

Port Stanley provided a brief interlude of civilization (but no QSOs) before the ship headed south across the Drake Passage and into the ice. After a brief visit to Esperanza, the Argentine base at the northern end of the Antarctic Peninsula near to Dundee Is. (the QTH of LU9ZI in 1982), the final leg of the journey was accomplished by plane from a snow airstrip near Palmer Station to Rothera Base on Adelaide Island. Although there was a

*41 Enniskillen Road, Cambridge, CB4 1SQ England



The 10 meter beacon antenna and the shack housing the beacon.

strict weight limit on the aircraft preventing me from bringing the FT-101, I was able to smuggle in my electronic keyer.

Settling In

Andy Hawkins, VP8QI, the outgoing radio man at Rothera, introduced me to the commercial equipment, most of which worked extremely well on the amateur bands (allaying worries about the FT-101, which, coming by sea, was not due to arrive for several months), and explained that with all the aircraft movements and watch-keeping scheduled I would be far too busy to make any amateur QSOs. Well, God must be a DXer, because within a few days of my arrival a freak storm had totally wrecked both aircraft on the base and I had plenty of time for the more important aspects of radio!

Mercifully, the station (RACAL again) was much more modern than that at South Georgia. The equipment I used on the amateur bands consisted of a fully synthesized transmitter running 1 kw from 1.5–25 MHz (but only about 70 watts on 28 MHz where the PA would not dip correctly), and a separate synthesized receiver. One of my first soldering jobs was to reconnect the CW facility. British bases seldom use CW, and it had been disconnected during installation at Rothera—good I'd brought a keyer.

The station's main antenna, a Vee beam firing at Port Stanley, seemed to work extremely well to Europe and North America on 40–10 meters and was just usable on 80. One-sixty required a separate dipole, and although the only available mast was a mere 15 feet high, its location on a rocky point 120 feet above the sea was some compensation, and within a few days I'd worked into W & G lands.

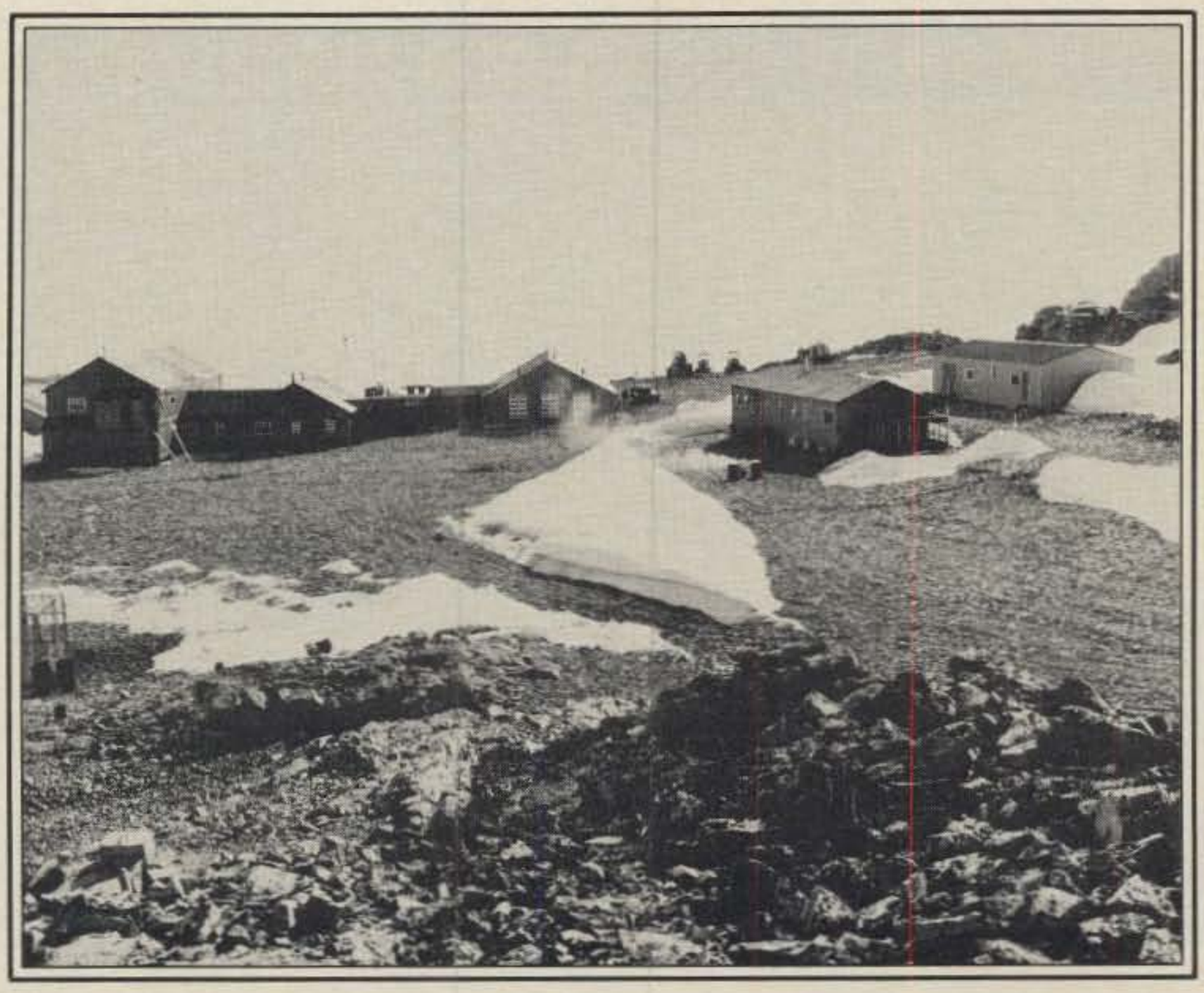
Antarctica is much rarer on CW than on SSB, and the CW pileups on all bands were enormous. The first call on 40 meters produced a wall of callers for 30 kHz, but with QSO rates peaking at 180 per hour, things soon became manageable again. I found the maximum QSO rate was achieved by sending at between 30 and 35 wpm. Faster than that and people had trouble copying; slower and I got bored.

I was soon introduced to one of the chores of life in Antarctica—night firewatch. Because of the enormous threat posed by fire, most bases maintain a patrol throughout the night. When it was my turn, I would set the keyer calling CQ continuously on 160, go once around the base, work the resulting pileup, set the keyer going again, etc. If my return was significantly delayed, there were rarely any callers. They had either given up or fallen asleep waiting for the "K."

The long summer days produced excellent conditions on all the bands with particularly healthy pileups on 15 and 20 around 0000Z. Even 160 continued to produce DX QSOs for an hour or two each night (apart from a two-week gap around the summer solstice), and I was able to enter the *CQ* WW 160 Meter CW Contest at a time of the year when the sun was only below the horizon for a few minutes each day, making over 70 QSOs into the USA and Europe. As the summer passed and the days became shorter, I began to look forward to some interesting LF openings. However, world politics intruded in dramatic fashion.

Towards the end of March my QSL manager, G3ZAY, mentioned in one of our twice-weekly QSL-handling schedules that a diplomatic storm was brewing over an Argentine landing on South Georgia. Within a very few days the Falklands

A view of Rothera base.



had been invaded, VP8's on remote farms were broadcasting status reports, and I had an open radio circuit to VP8AEN at Grytviken, where Argentine troops were expected imminently. The rest of the story is well known. VP8AEN and the other B.A.S. personnel were repatriated by Argentine forces, Brian later joining me at Rothera, and amateur radio activity from South Georgia came to a halt. I too kept a low profile on the amateur bands while the fighting was going on, but a number of G's who continued to show up for my normal schedules were called by VP8's with news from occupied parts of the Falklands. One very weak station, claiming to be in Port Stanley, even reported the extent of bomb damage to the airport after an air raid!

The Second Year

Returning to the bands in August of the following year, the pileups were as big as ever and the QSO total continued to mount until two new aircraft were flown in at the start of October. Fortune did not favor me a second time, and the ensuing summer season was every bit as busy as the previous one had promised to be. I did, however, make a couple of QSOs from the air while flying to a summer field camp at Fossil Bluff.

This period saw the second visit to the Antarctic of Willy de Roos, VK9XR/MM, in his yacht *Williwaw*. Willy put in an appearance at the British base of Faraday, some 200 miles north of Rothera, and was considering a visit to Peter I island, but the presence of pack ice and problems with his radar caused him eventually to abandon the plan. Willy is well known in amateur and yachting circles for his circumnavigation of North and South America in 1977 via the northwest passage and Antarctica. He has described the journey in his book *North-West Passage*.

It was not until mid-March and the departure of the aircraft and transient summer field-workers that serious amateur radio could again be contemplated. While the weather was still reasonably good, I put up a new dipole at 50 feet for 160 meters and also one for 80 meters, a band I had neglected the previous year.

Another urgent task was to install a new VP8ADE 10 meter beacon, as my first act on arrival the previous year had been to switch off the old, tube-based unit. In an advanced state of decay, it had been radiating hash over most of the HF spectrum. Hearing of its demise, a Cambridge firm donated a solid state car telephone transmitter modified to run about 10 watts on 10 meters. B.A.S. had shipped it out, and it now needed to be installed in an insulated enclosure (housing an MF homing beacon for aircraft) on top of Rothera Point. Transferring the memory keyer from the old unit proved to be a simple task and the beacon was soon QRV, although lack of a suitable mast meant that the antenna could only be raised about 5 feet off the ground. Reports from Europe soon indicated that all was well and the signal was getting out.

Conditions during the Antarctic winter were disappointing. HF openings were brief and infrequent for the two months either side of mid-winter (June 22nd), and although numerous stations in the northern hemisphere were weakly audible on 160 and 80, their local summer noise levels prevented them from hearing me most of the time. Forty meters was the best band and was open 24 hours a day, but it did not yield a very high QSO rate because the best openings were to central Asia at around 0300 their time. At one stage the main activity was sending SWL reports to participants in various "county hunter" type nets on 160. Needless to say, they were all astounded that their local QSOs were being monitored in the Antarctic.

A number of opportunities arose to go on field trips in the vicinity of the base, and I usually managed to pack a small 10 watt synthesized transceiver onto the sled. QSOs were very few and far between using CW and a long wire only a few feet above the snow, but several G's were worked. My tent-mates questioned my sanity on a number of occasions when it took 15 minutes to complete an exchange of name, QTH, and report. Despite several requests from G3ZAY to fix a whip antenna behind one of the dog teams, no "dog sled mobile" photograph was taken!

Towards the end of September conditions began to pick up, but so did the work load. The final activity took place on 160 in the *CQ* WW SSB Contest when a number of operators got a surprise multiplier. Bet not many had a VP8 slot on their check-sheets for the band!

The Return Journey

The first leg was again by air to the strip near Palmer Station where the *RRS Biscoe* was waiting. A short courtesy call at Palmer was made, and the radio shack visited. A seven-day period at Deception Island in the South Shetland group enabled me to make 365 QSOs on 20 meter SSB before returning to the UK via Port Stanley, and commercial flights from Punta Arenas (Chile) to London.

During two years in the Antarctic, the VP8ANT QSO total was 40,838. Not bad, considering I was paid to be there, too.

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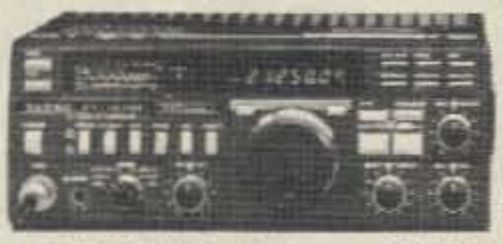

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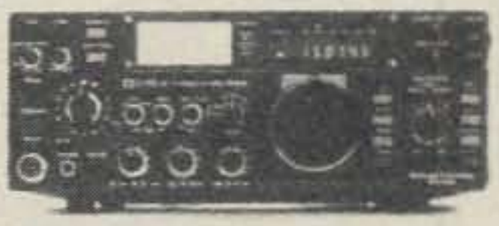

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CQ REVIEWS:

BY DAVE INGRAM*, K4TWJ

The HAL SPT-1 Tuning Indicator For RTTY and SSTV

As home computers continue gaining in popularity in amateur RTTY and SSTV setups, modern-style tuning aids are also becoming attractive accessories for use with those systems. The inclusion of such audio spectrum displays is quite beneficial, as today's "all electronic" setups can prove a mite tricky for some newcomers to master, and nearly everyone has certain nulls, or "holes," within their normal range of hearing. Tone deafness appears to be far more common than color blindness, although it may not be as readily apparent. We often watch a person's lips as they talk, for example, or tune SSB signals until they sound acceptable to *our* ears but slightly off frequency to others. In the case of computerized RTTY setups, variations in speeds or baud rates, signal shifts, and tone polarities are often encountered. The ability to reduce the number of variables by first accurately tuning in a signal and then "stepping" through software selections truly transforms minor confusions into sheer enjoyment.

Prior to the advent of computerized RTTY systems, mechanical teleprinters were interfaced with home-constructed loop supplies and separate terminal units (boxes containing audio tone demodulators and FSK or AFSK modulators). General-purpose oscilloscopes or oscilloscope-type display units were typically used with those setups as a frequency tuning aid (almost every devoted radio amateur had a massive scope during that classic era). Today's setups are rather space conscious, however, and a more convenient tuning indicator is usually desired for use in those situations. Enter HAL Communication's new SPT-1 Spectra-Tune, a visual tuning aid which directly indicates both on-frequency tuning and RTTY shifts on a 40-segment bargraph display (see photo). The tuning indicator is adjustable to cover/display the audio range of 300 to 3000 Hz in 1000 Hz "spreads" across its scale, and it's use-

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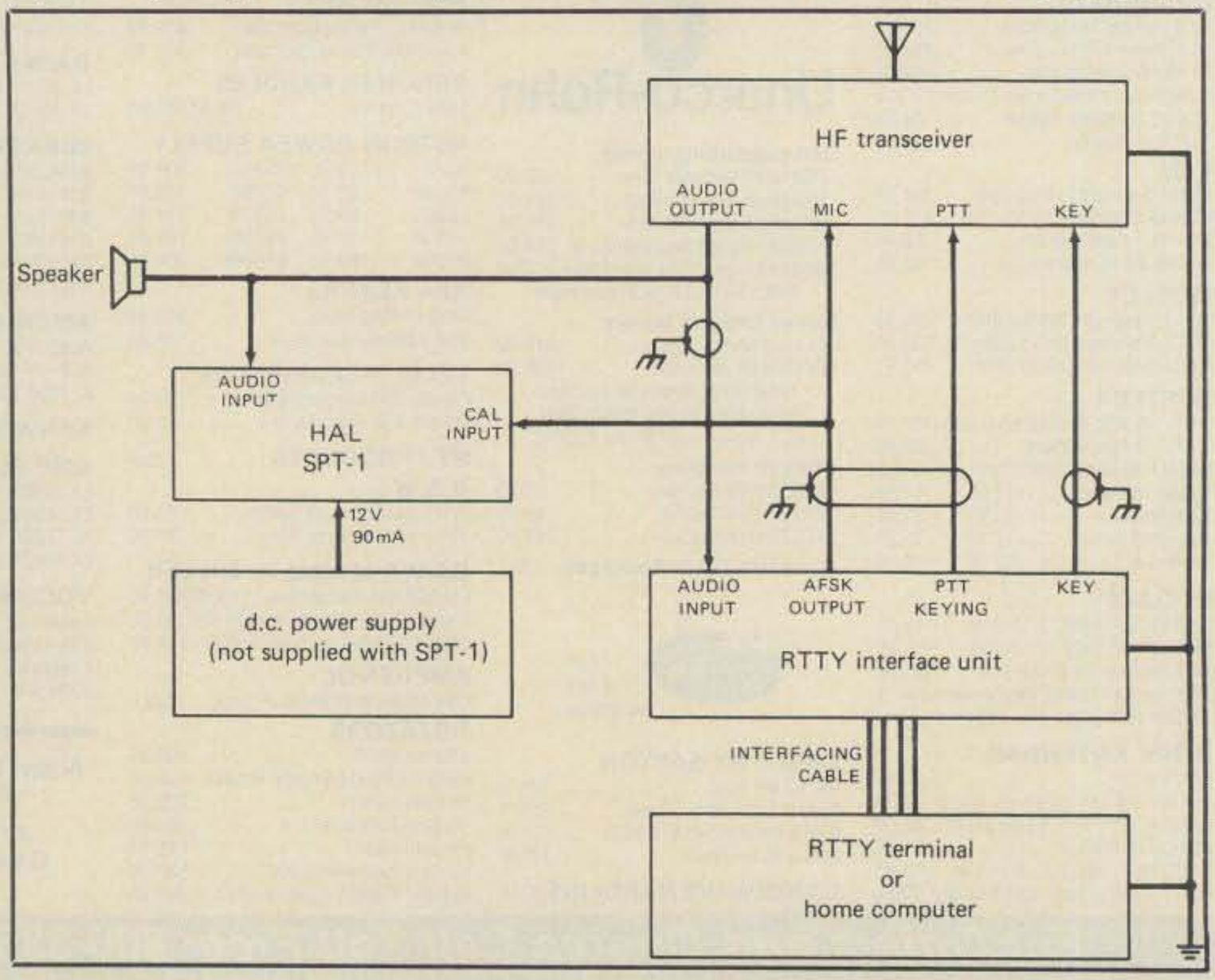
The HAL Communications Spectra-Tune, a compact and effective tuning indicator for RTTY, ASCII, and SSTV.

Fig. 1– Wiring interconnections for adding a HAL Communications SPT-1 to an RTTY (or SSTV) setup. Calibrate input connection to monitor transmit tones is optional.



ful for RTTY, ASCII, AMTOR, CW, or SSTV operations as desired. Installation merely consists of applying 12 volts DC at 90 ma to the SPT-1 and cabling its input to your receiver's audio output—clean, convenient, and very beneficial.

Overview of the Spectra-Tune

The HAL SPT-1 is enclosed in a light-gray plastic case measuring 2½"H × 6"W × 6½"D. The darker gray front panel includes a 4 inch display area, on-off/calibrate/operate switch, and a range adjustment control. Rear-panel extending cables terminate in RCA phono plugs for connection to the station's receiver or interface audio line. The "second cable" can be connected between AFSK generator output and transmitter mike input, if desired, thus providing front-panel selection of transmitted spectrum (calibrate position) or received spectrum (operate position) displays. A third cable terminates in a coaxial plug for DC powering (an external supply is not included with the SPT-1). These connectors, incidentally, were selected for direct plug-in use with HAL's PCI-EXT and PCI-2000 RTTY Interface unit for the IBM Personal Computer. Naturally, you can change plugs and use the SPT-1 with any RTTY or SSTV system.

Since the Spectra-Tune reads out tone shifts or CW center tuning rather than actual audio frequencies, the range control is panel calibrated for RTTY High Tones, RTTY Low Tones, SSTV, and CW operations. This arrangement permits the SPT-1 to be used with various computer interfacing units which might be tuned slightly differently or employ different tones as their CW "center tune." AEA's CP-1 patch unit depends on a 750 Hz tone, for example, while MFJ's 1224 interface detects an approximate 2100 Hz CW note. Either of those ranges can be "centered" and displayed on the SPT-1. Another twist of the range control and SSTV signals are ranged: black (1500 Hz) on the left and white (2300 Hz) on the right.

How It Works

The SPT-1 is essentially an audio frequency measuring device interconnected to a 40-segment LED readout. Tracing internal circuits from the unit's audio input, a high-gain amplifier and limiter first remove amplitude variations and produce a "clean" signal. That signal then drives a frequency-to-voltage converter to produce DC levels proportional to the incoming frequencies. The resultant voltages then drive the 40-segment display. The front-panel range control determines what 1000 Hz range between 300 and 3000 Hz is displayed. The concept may be simple, but the results are commendable!

Serious RTTY or SSTV buffs may notice the series of front-panel marks on the SPT-1's display. Each mark is spaced four LED segments apart and corresponds to 100 Hz tone variations. Likewise, each one of the 40 LED segments corresponds to tone variations of 25 Hz (25 Hz × 40 segments = 1000 Hz range). Assuming the display is calibrated by a known-frequency tone such as 2125 Hz at **M**, 2295 Hz at **170**, 1500 Hz at **BLK**, or 800 Hz at **CW Center** (readjust range control for latter two modes), etc., nearly any audio frequency between 300 and 3000 Hz can be interpolated within 25 Hz accuracy. That capability is convenient when checking AFSK generator frequencies, setting SSTV video swings, comparing 2 meter Touchtone® signals, etc. In fact, the display could also be used with a rig's crystal-calibrator–produced tones for "sweeping" and evaluating one's hearing response.

Since the SPT-1 is "specked" to use a 12 to 15 volt DC power supply, I used an inexpensive wall adapter with good results. You could also tap your solid-state transceiver's 12 volt supply for power if desired. A 9 volt battery was also tried for powering the SPT-1, but it didn't work: the display illuminated, but incoming tones would not display properly. When properly powered, the Spectra-Tune significantly helps to quickly and accurately

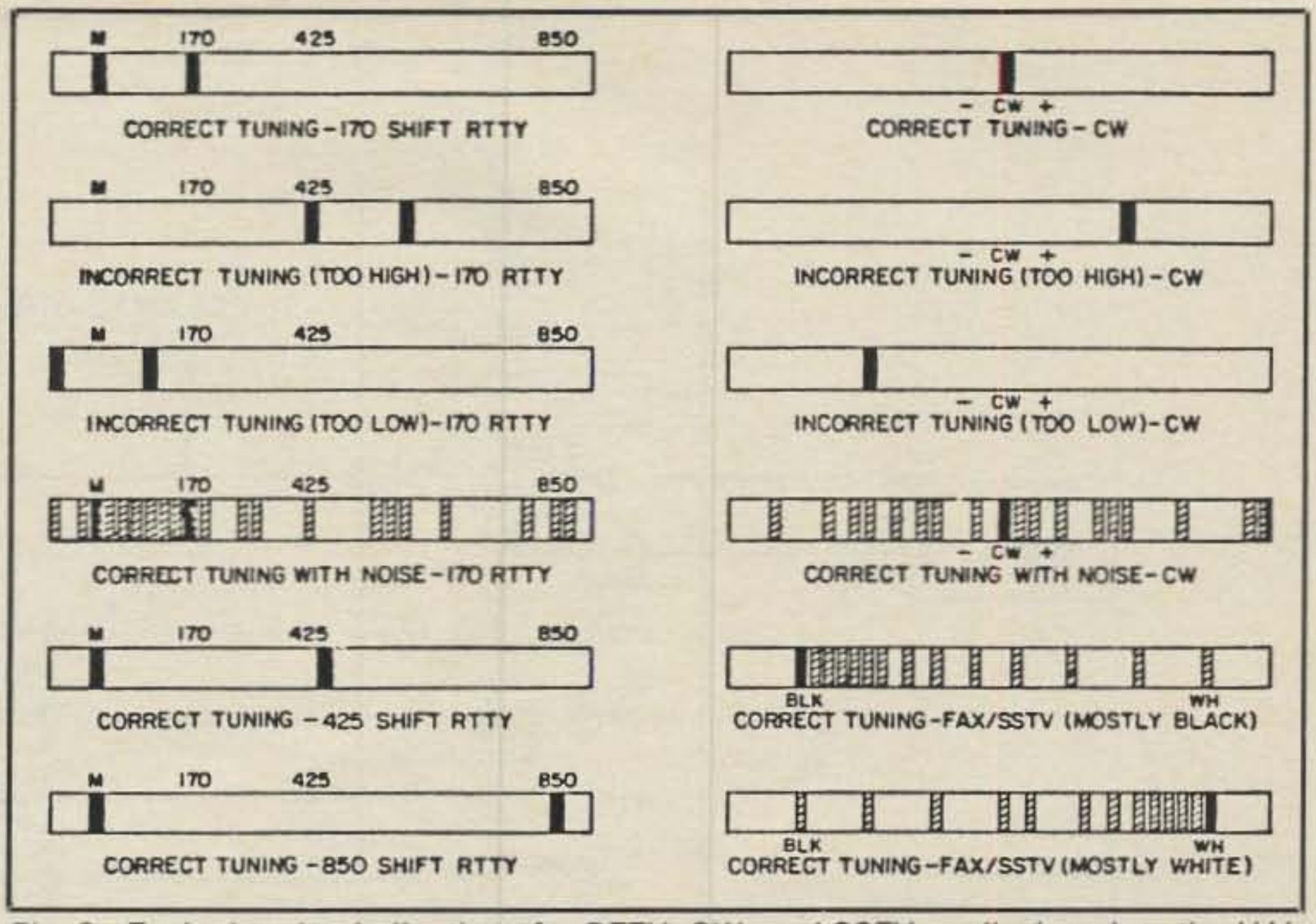


Fig. 2– Typical tuning indications for RTTY, CW, and SSTV as displayed on the HAL SPT-1. The top marks are standard RTTY shifts. The bottom marks are for CW center tuning and SSTV operations. Each LED segment represents 25 Hz shifts.

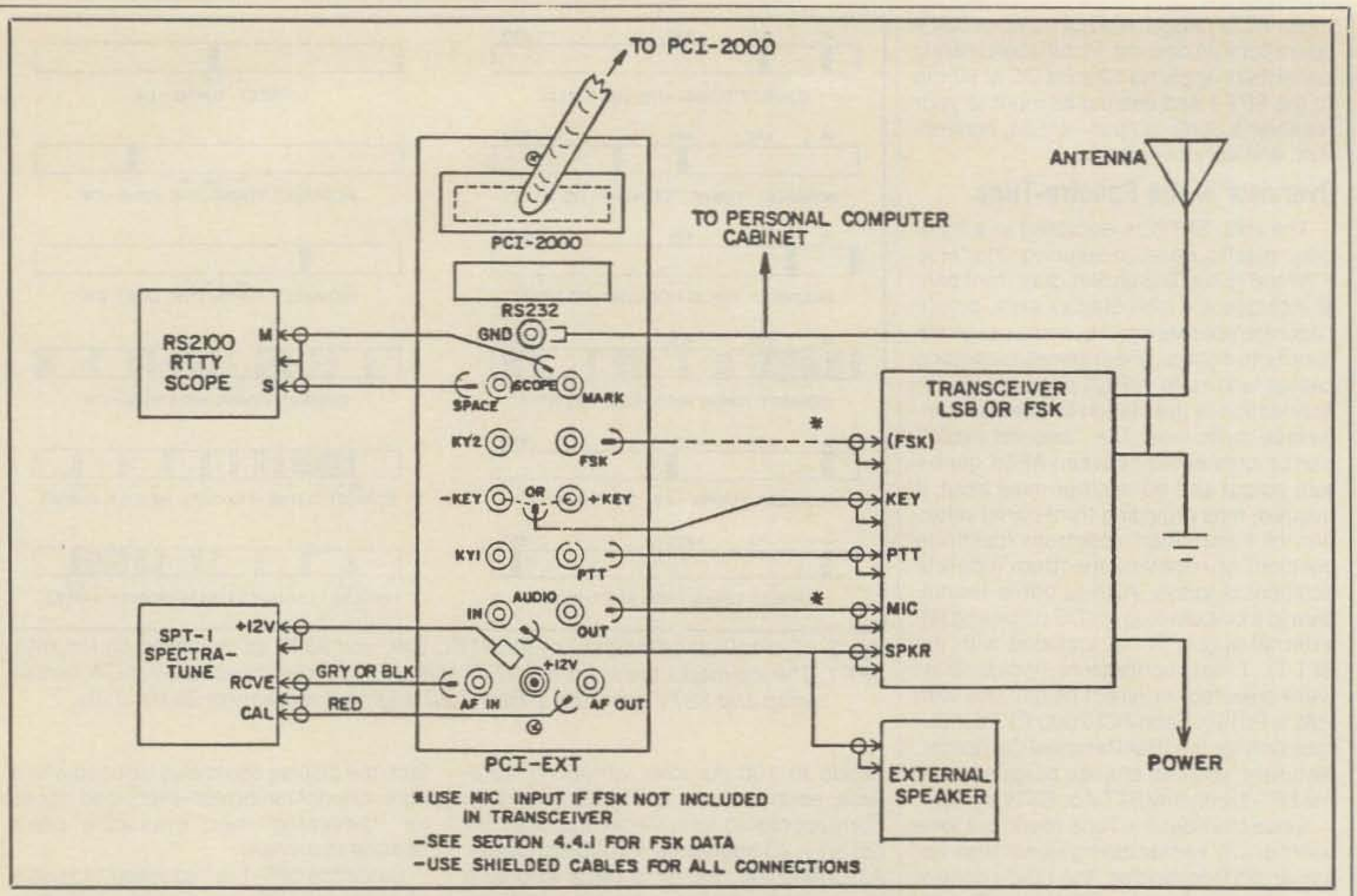


Fig. 3– SPT-1 connections to PCI-EXT computer interface.

tune both amateur and commercial RTTY signals. It's a gem of a unit for old-timers and RTTY/SSTV newcomers alike.

Operating the HAL SPT-1

Since many of you will probably be asking if the Spectra-Tune can be used with this transceiver or that interface unit, etc., I checked its performance with several different rigs and RTTY (and SSTV) setups. I plugged the unit into low impedance "earphone" or "speaker level" lines rather than transceiver demodulator tapoffs in each case (the usual means of rigging RTTY or SSTV setups), and easy receiver tuning was the result in every test (this was previously a "guessing game" with many interface units). See fig. 1.

Getting accustomed to the SPT-1 display took only a couple of minutes, and then on-the-air operations were as smooth as silk (see fig. 2). Watching a received signal slide up or down the display while "mailreading" let me know which way to tune a signal and which RTTY shift to select with unquestioned accuracy. That feature is especially useful when copying commercial RTTY transmissions on non-amateur frequencies—a popular, rising trend that's well worth investigating. The SPT-1 also added a "reassuring air" to my SSTV operations. Many operators do not transmit full black-to-white video swings, leaving others wondering if their own receiving gear is maladjusted. One glance at the SPT-1 answers that question. I also found the SPT-1 ideal for setting up my own camera and scan converter for full video swing, a somewhat tricky adjustment for SSTV newcomers. Lacking some form of frequency tuning guide, it's quite common for video neophytes to adjust their camera and monitor for good in-shack pictures which only swing two or three hundred cycles. When transmitted, those views appear very "washed out" to others. Finally, I've also enjoyed connecting the SPT-1 to my 2 meter FM rig's external speaker jack and checking autopatch tones of other transceivers and talkies. Maybe you could visualize a few more applications for the SPT-1.

Conclusion

Considering today's interest in compact RTTY and SSTV setups, the HAL SPT-1 Spectra-Tune is a very useful station accessory. It will fit into nearly any available space, it is pleasant to view, and it actually has more frequency analyzing capabilities than the classic crosshatch displays of oscilloscopes. The unit is easy to install and use, and it is backed with a one-year warranty. The SPT-1 has a retail price of $169.00. For more information, contact HAL Communications Corporation, Box 365, Urbana, Illinois 61801. CQ

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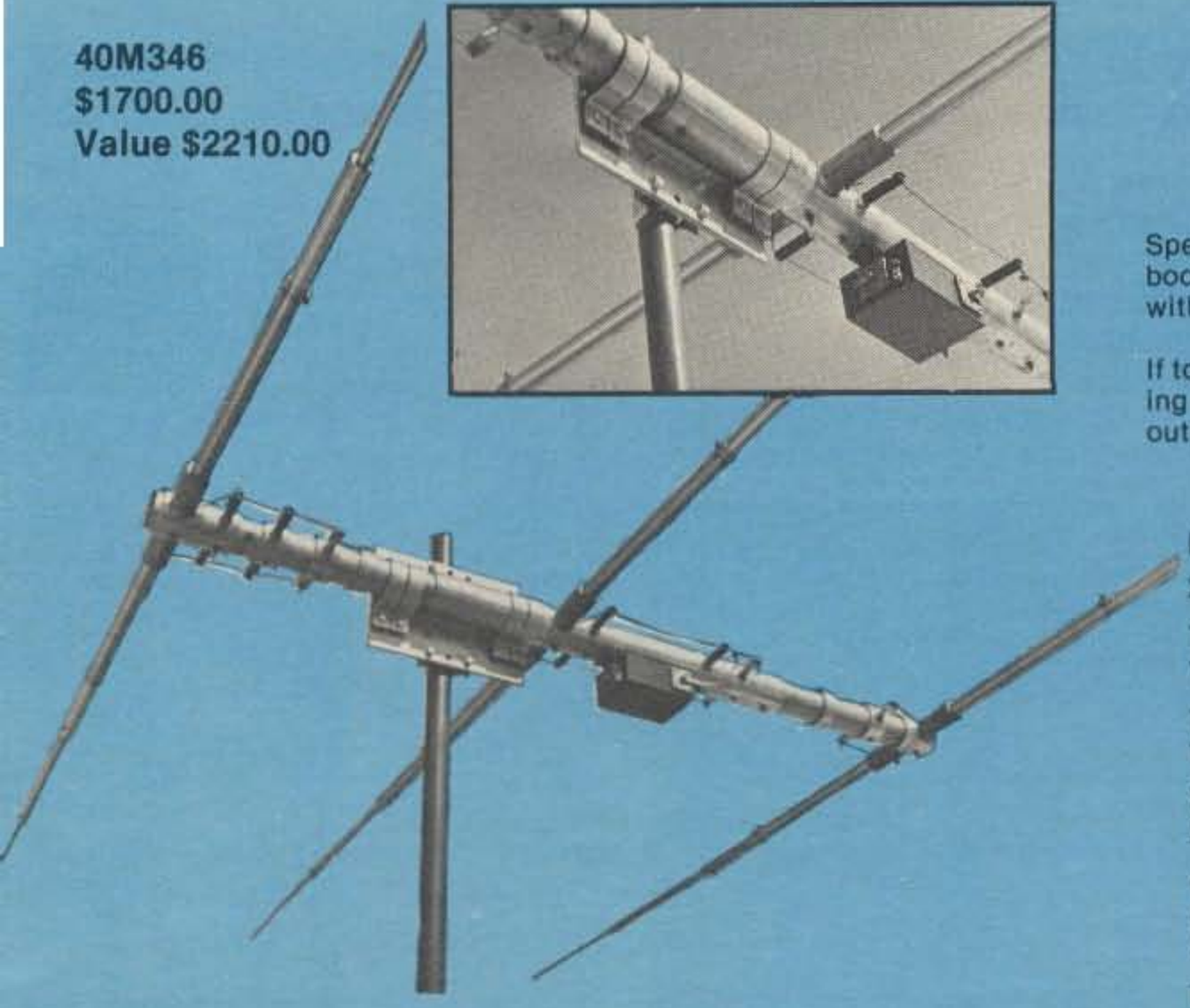

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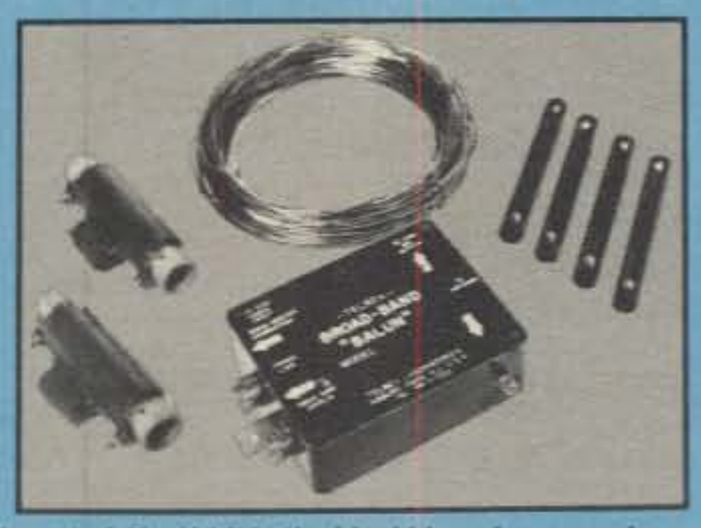

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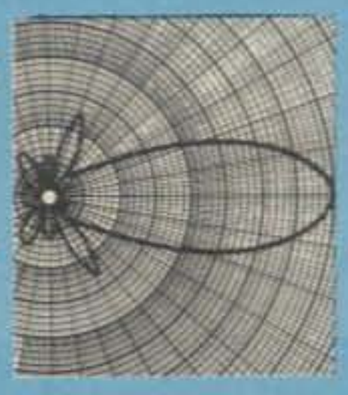

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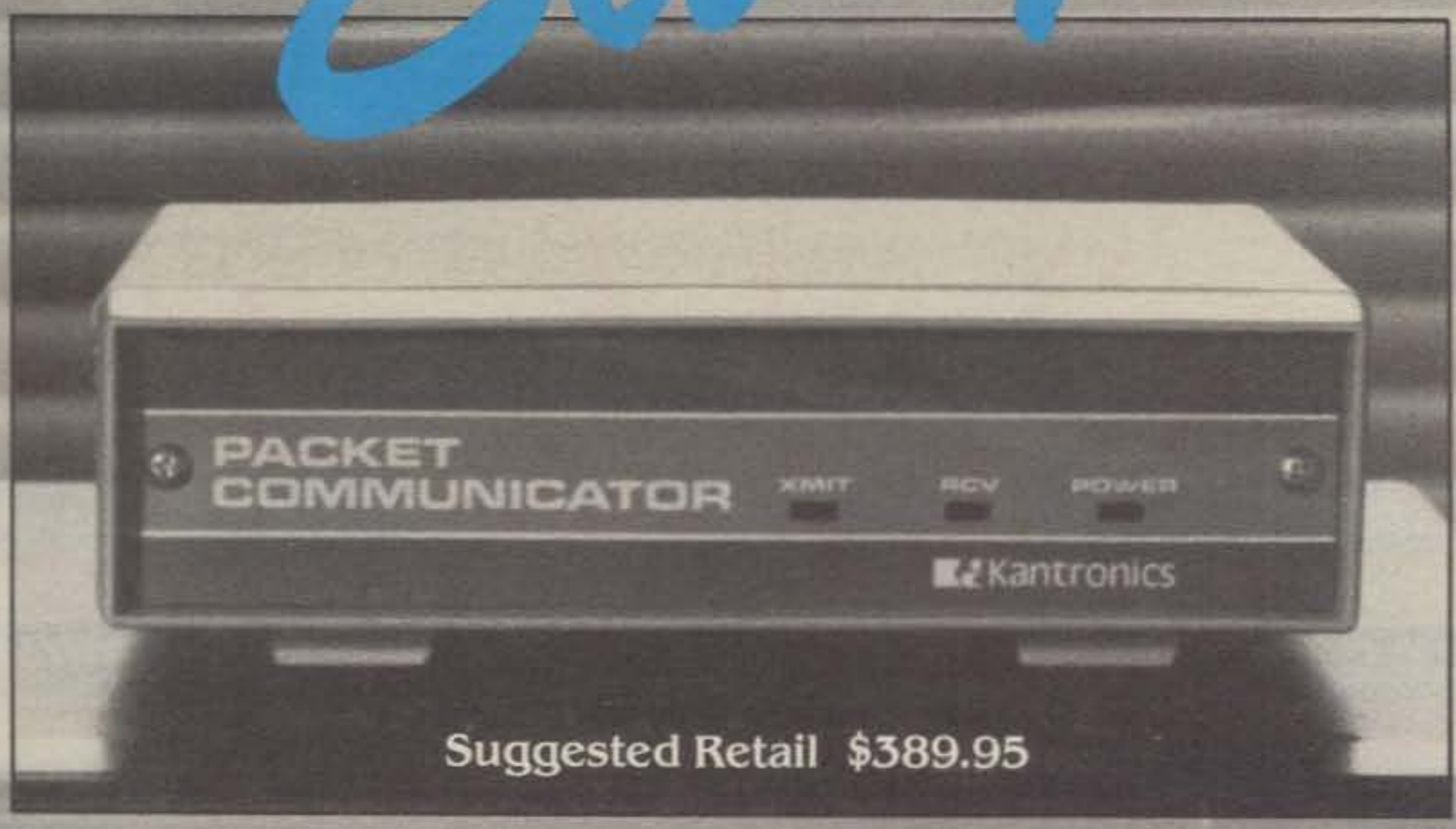

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NASA Space Shuttle Student Involvement Project Award Winner

The March 8, 1985 edition of the Fort Wayne, Indiana *The News-Sentinel* carried the front-page headline "Students Hope Science Projects Blast Off." The story concerned itself with two local high-school students who won two of the 20 regional awards in a national competition sponsored by NASA. The annual competition is used to select student proposals for experiments to be carried out during the space shuttle program. Incidentally, the same two students won the regional award last year.

These bright students and their parents and teachers have every right to beam with pride at the accomplishment. And, in a sense we can take a vicarious sense of pride, too, as one of the students is also an amateur, and her proposed project involves the use of amateur radio. Michelle Allen, the 17-year-old student, is KA9FUL. She received her first amateur license at age 12 and has held an Advanced class license since the age of 13.

Michelle's proposal involves the use of HF communications on the shuttle instead of UHF/VHF. Research that she had conducted showed that reliability of communications would increase, and the incidence of blackout would decrease. Michelle is completing her senior year at Northrop High School, and she plans to attend DePauw University in September. She's already received permission to use the university's amateur radio station, so you can look for her on the air from there in the fall.

Our thanks to Michelle's very proud dad, James, KA9L, for sending the information to us. CQ

Michelle Allen, KA9FUL.

As WA6AUD always says, "DX is." The rhyme or reason exists for the partaker, and the means keep changing. If by DX you mean distance, then read K4TWJ's article below and see just how far your signal can go.

OSCAR 10 Simplified

A How-To Guide for Satellite Newcomers

BY DAVE INGRAM*, K4TWJ

The following scenario is only one of many occurrences happening each day on our OSCAR 10 satellite. It exemplifies the exciting new era being enjoyed by radio amateurs world-wide at this very time. These folks are often operators such as yourself—individuals interested in "trying new waters" and re-experiencing the original romance of amateur radio's unlimited opportunities. The times and areas of DX may vary, but the genuine fascination of this superb frontier remains the same.

It's slightly past midnight in the central United States. The HF bands of 10, 15, 20, and 30 meters have been closed for several hours, and operating capabilities on 40 or 80 meters are noticeably confined at this low point in our present sunspot cycle. We're sitting in front of a 2 meter multimode transceiver tuned to 145.910 MHz and a 70 cm multimode transceiver tuned to 435.090 MHz, and we've just passed along 73's after a friendly chat with 7P8CM in Lesotho. We slowly tune up the band, just like we would on 20 meters, and DX is almost everywhere. There are two of our previous contacts, HZ1AB in Saudi Arabia and 4X4AS in Tel Aviv calling CQ; ZR3AU in Nambia working DG6SAK; LX1SI in Luxembourg whom we contacted a couple of days ago; and our old friend OX3BF in Greenland. Actually, there are only a couple of U.S. stations "on the band": a W5 in Texas working another W5 in Louisiana. Apparently, other statesiders turned in earlier and left us to be the DX.

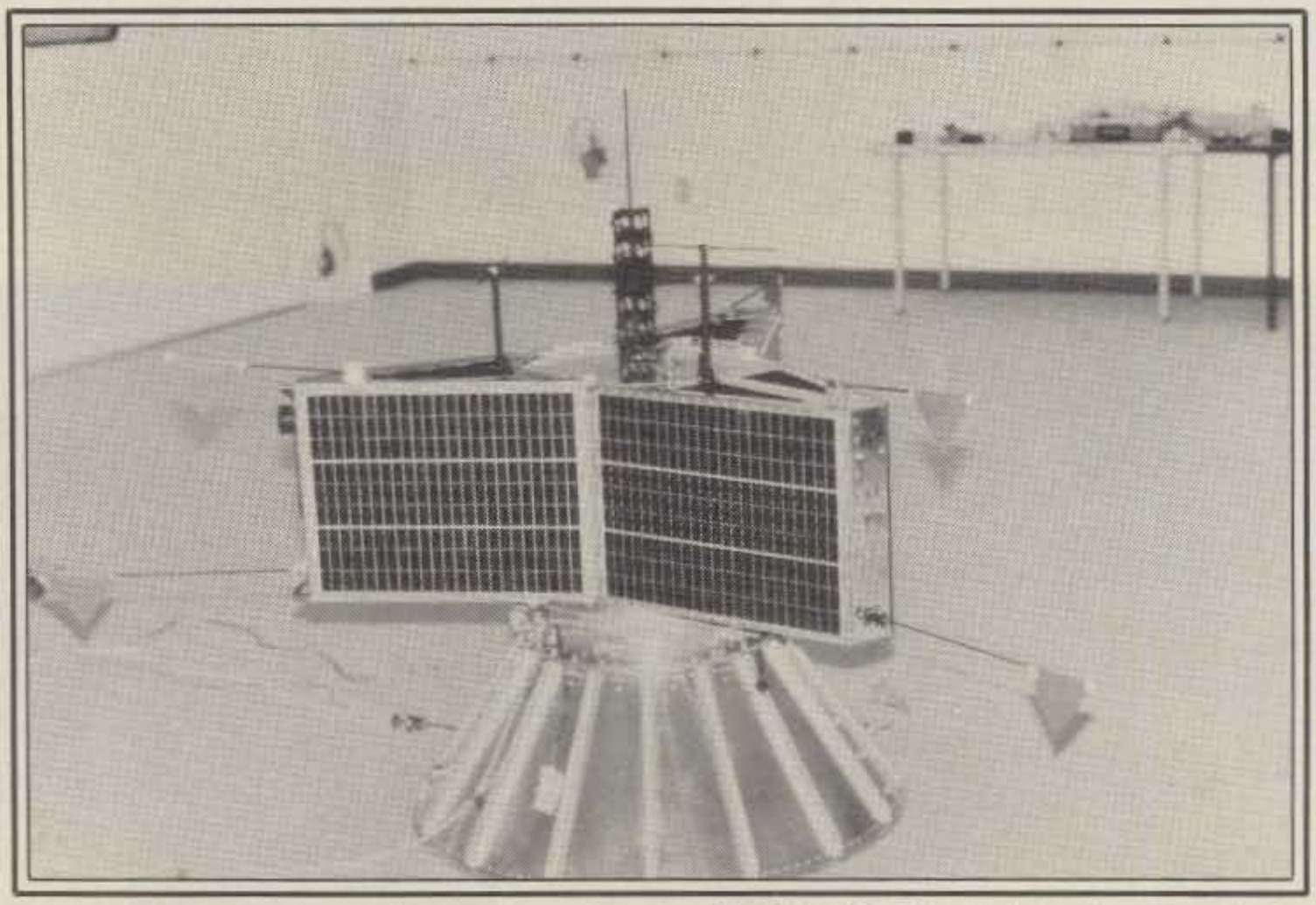


Fig. 1– Prelaunch view of our star-performing OSCAR 10 "decked out" and ready for action. Antennas on spacecraft's sides comprise 2 meter beam. "Topside" antennas operate as phased array for 70 cm and 23 cm. Larger center antenna serves as a backup for all bands of operation. (Photo courtesy AMSAT)

Surely this is an amateur's midsummer's night dream. Maybe an "electronic pinch" will help. We key the 70 cm rig's mike and briefly call CQ while simultaneously tuning the 2 meter rig to check our own satellite-relayed signal. There we are, clear as a bell and sounding exactly like we're received by others over nearly one third of the world's area. A couple of "wheeoos" are heard as others "zero" our satellite relayed frequency. A quick "over," and we're greeted with calls from several Europeans (gosh, this resembles being a visitor in a distant land!). We chat with a number of the gang, then explain that we'll look for them again in three or four days when the operating time will be a comfortable 9 p.m. for us, and an early 4 or 5 a.m. for them. We're both quite confident about those schedules, as *old sol's* antics seldom affect satellite communications. This is today's

*Eastwood Village #1201 So., Rt. 11 Box 499, Birmingham, AL 35210

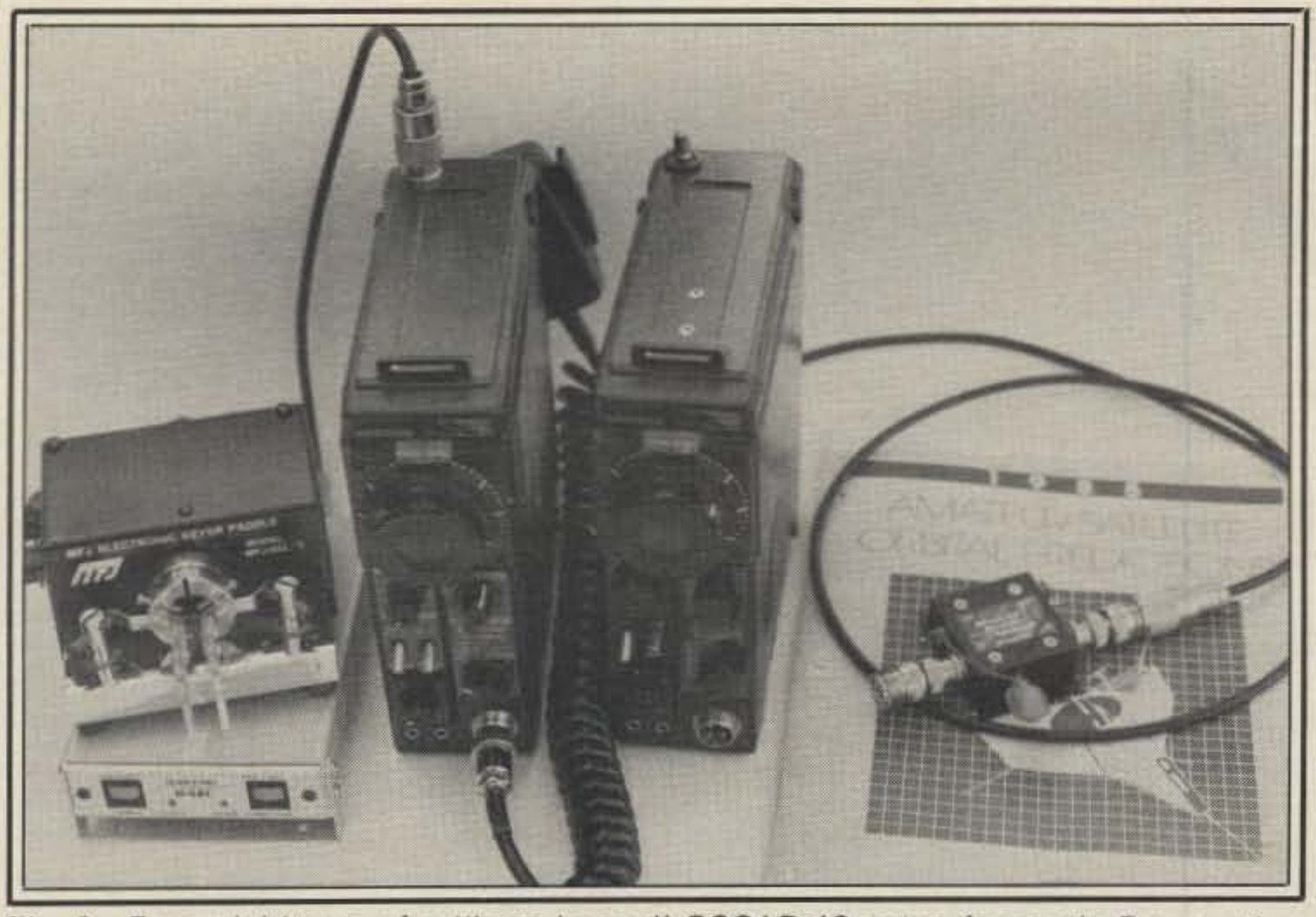


Fig. 2– Essential items of a "bare bones" OSCAR 10 setup for mode B operation. ICOM 202 portable 2 meter SSB/CW transceiver is mated with GaAsFET preamp, while ICOM 402 portable 70 cm SSB/CW transceiver drives Encomm/Tokyo HL32U 20 watt amplifier. Add "twist" antennas for each band and the setup is capable of worldwide communications. (Setup is K4TWJ's backup/portable rig.)

Golden Age of Radio! It's an area booming with excitement, and you can also join the action in a relatively easy manner.

During recent months we've received numerous requests for basic information concerning station setups and on-the-air operations via our outstanding OSCAR 10 satellite. Your inquiries ranged from equipment and antenna selections to ways of interconnecting those units, choices of coax cable, preferred tracking methods, and operating ideas. We'll attempt a nutshell overview with this brief article. However, a medium-size book is obviously necessary to fully answer all the previous questions. That request has also been honored with my latest book, *OSCAR 10 and Phase III Satellites*, which is being published by Universal Electronics, 4555 Groves Road, Suite 3, Columbus, Ohio 43232. The book's cost is $5.95 plus shipping, and it's available from many outlets, including our own *CQ* Book Shop. While awaiting that book's arrival, there are three additional OSCAR 10 articles of special interest: my August and September 1984 *CQ* columns, plus a review of Ten-Tec's 2510 unit in the February 1985 issue of *CQ*. Who says there's a deficiency of OSCAR information?!

OSCAR 10 truly offers a unique new experience in amateur radio communications that must be enjoyed first-hand to be fully appreciated. It provides the DX capabilities of 20 meters, the in-country efficiencies of 40 or 80 meters, the reliability of 2 meter FM, the special attraction of full duplex operation, and an independence from today's "propagation fallouts." Two or more stations operating within a few yards of each other can simultaneously communicate over 150 miles or 15,000 miles without intermod, and the equipment's usual power output for these activities ranges between 30 and 80 watts. OSCAR 10 is quite different from any previous amateur satellite in its bands of operation, its orbit, and its periods of daily operation. Gone are the ionosphere-choked 10 meter downlinks, range-confining low orbits, and 20-minute operating times (that was Phase II, gang; we're now "into" Phase III). Replacing those parameters are 145, 435, and 1269 MHz operations, a globe-spanning eliptical orbit far "above" (or beyond, depending on your point of view) the equator, and operating periods of several hours each day. The usual modes are SSB and CW, with innovations such as Packet Radio and Gateways also rising in popularity. A typical OSCAR 10 setup for our popular mode B operation consists of a 2 meter and a 70 cm rig, a 2 meter GaAsFET preamp, a 70 cm power amplifier, 16-element "twist" antennas for both bands, a project OSCAR orbital prediction calendar, and a world globe or home computer program for tracking. Let's take a closer look at those items.

Equipment Selections And Station Assembly

There's a grand variety of recently manufactured VHF and UHF SSB/CW gear advertised throughout the pages of *CQ* each month, and almost without exception, all of it performs beautifully. Feel free to choose items as your desires and finances permit, but also remember to visualize your setup's overall operation rather than merely to consider individual units. The ability to hear one's own satellite-relayed signals while transmitting, for example, is vital for "tweaking" antenna positions and zero beating other stations. This means your 70 cm transmitter and 2 meter receiver will be operating simultaneously, and separate power supplies are usually desired to diversify their loads. Any transceiver or receiver lacking a good GaAsFET preamp can only provide weak copy (S0 to S1 signals), even when using a high-gain antenna (10 to 16 total elements or "twist" beams). An external GaAsFET preamp usually boosts those levels to S4 or S7 while increasing background noises to only S1. Other types of preamps increase noises to S3 or S4, no real advantage when their signals are S4 to S6. A good satellite receiving system, incidentally, is more desirable than a strong transmitted signal. Everyone necessarily shares the satellite's available energy. Features such as IF shift, selectable AGC, and good noise blankers are important receiver considerations. A variable output control, CW sidetone, and VOX are beneficial transmitter features. The GaAsFET preamp should be RF protected, as many transceivers cycle through transmit at turn on.

Try to position either your OSCAR setup or its associated antenna system so that no more than 20 feet of cable is necessary for interconnection. Even 20 feet is many wavelengths at 435 MHz; attenuation comparable to connecting a half mile of coax to your triband beam. If you're a satellite newcomer, I don't recommend getting bogged down with hardline-type coax and its oddball fittings. Likewise, I also suggest installing your GaAsFET preamp in the shack rather than outdoors to avoid problems of interconnections and weather damage. Keep things simple, right? Consider also that OSCAR antennas only need a clear sky view in the satellite's directions, and they can usually be mounted only 3 or 4 feet above ground.

As a means of clarifying the previous points and visualizing hookups of OSCAR stations, three different yet similar performing setups were randomly picked for inclusion in figs. 3, 4, and 5. We'll describe them "fashion show" style after reminding you these are different examples of how an OSCAR 10 station can be assembled using readily available items. You can obviously mix and match accessories such as preamps, RF amplifiers, etc., according to desires or available items. Additional information on any of these units is available directly from their manufacturers or dealers.

The example in fig. 3 is what I call "Sophisticated Simplicity." ICOM's 75 watt output 70 cm transceiver (471H) is fitted with its optional PS35 internal AC supply for single-unit compactness. Its 2 meter mate, the 271A, is also fitted with its op-

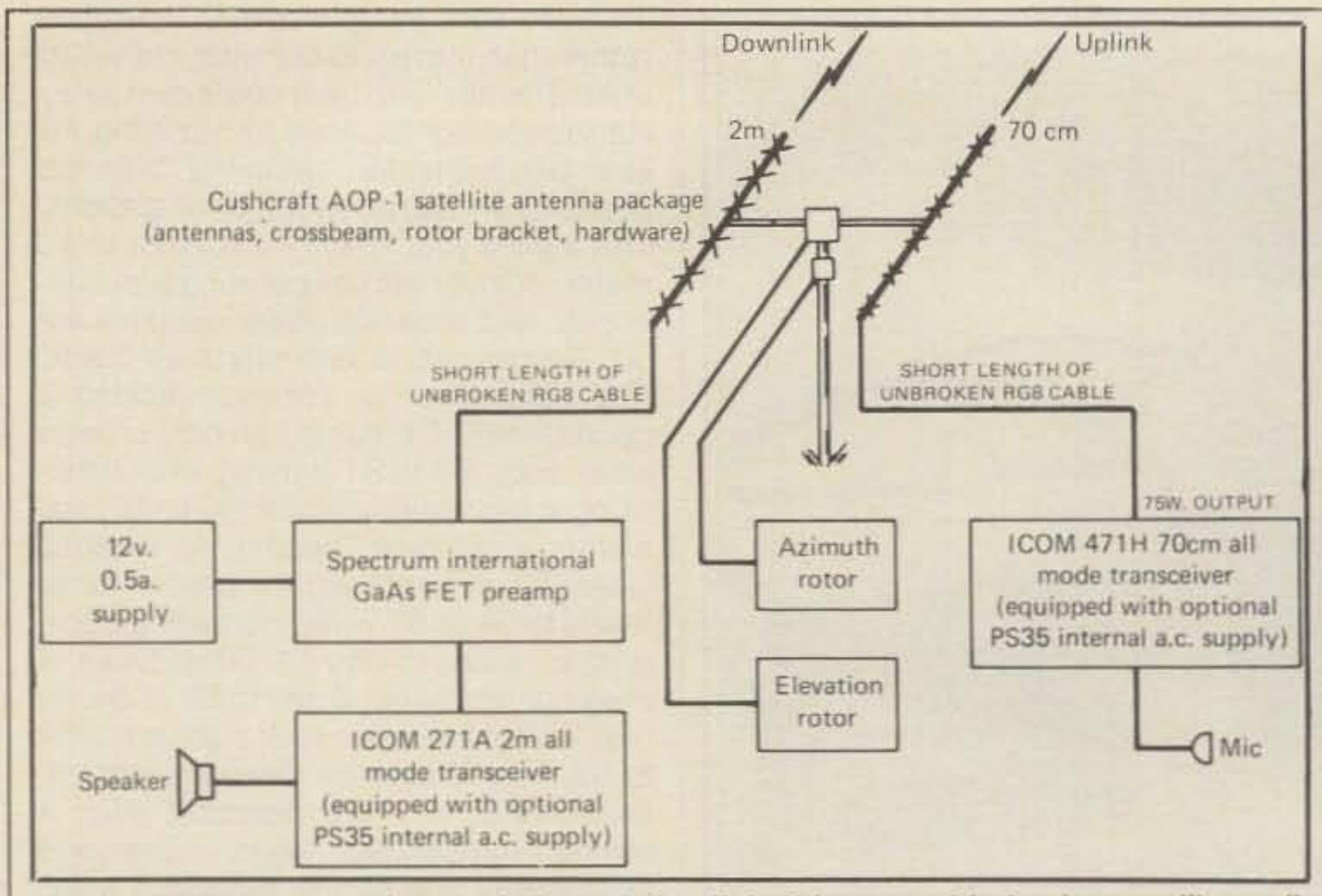


Fig. 3– OSCAR setup of "sophisticated simplicity" is assembled using readily available multimode transceivers, antennas, GaAsFET preamp, and rotors. Illustrated system is quite popular among satellite operators. Equipment variations are discussed in the text.

tional GaAsFET internal preamp and another PS35 supply. I suggest also adding an external transmit-protected GaAsFET preamp such as Spectrum International's new unit to really glamorize 2 meter reception, and then connecting the complete setup to Cushcraft's ready-to-install AOP-1 satellite antenna package via short lengths of top-quality RG-8 foam coax. Dual rotors (a pair of Alliance U100's) plus a Project OSCAR calendar and home-computer tracking program then complete this top-of-the-line OSCAR 10 system. Some of the other multimode transceivers that could be substituted in fig. 3 include Yaesu's FT-480R and 780R twins, ICOM's 290A and 490H units, or Kenwood's TR-9130 and 9500 rigs.

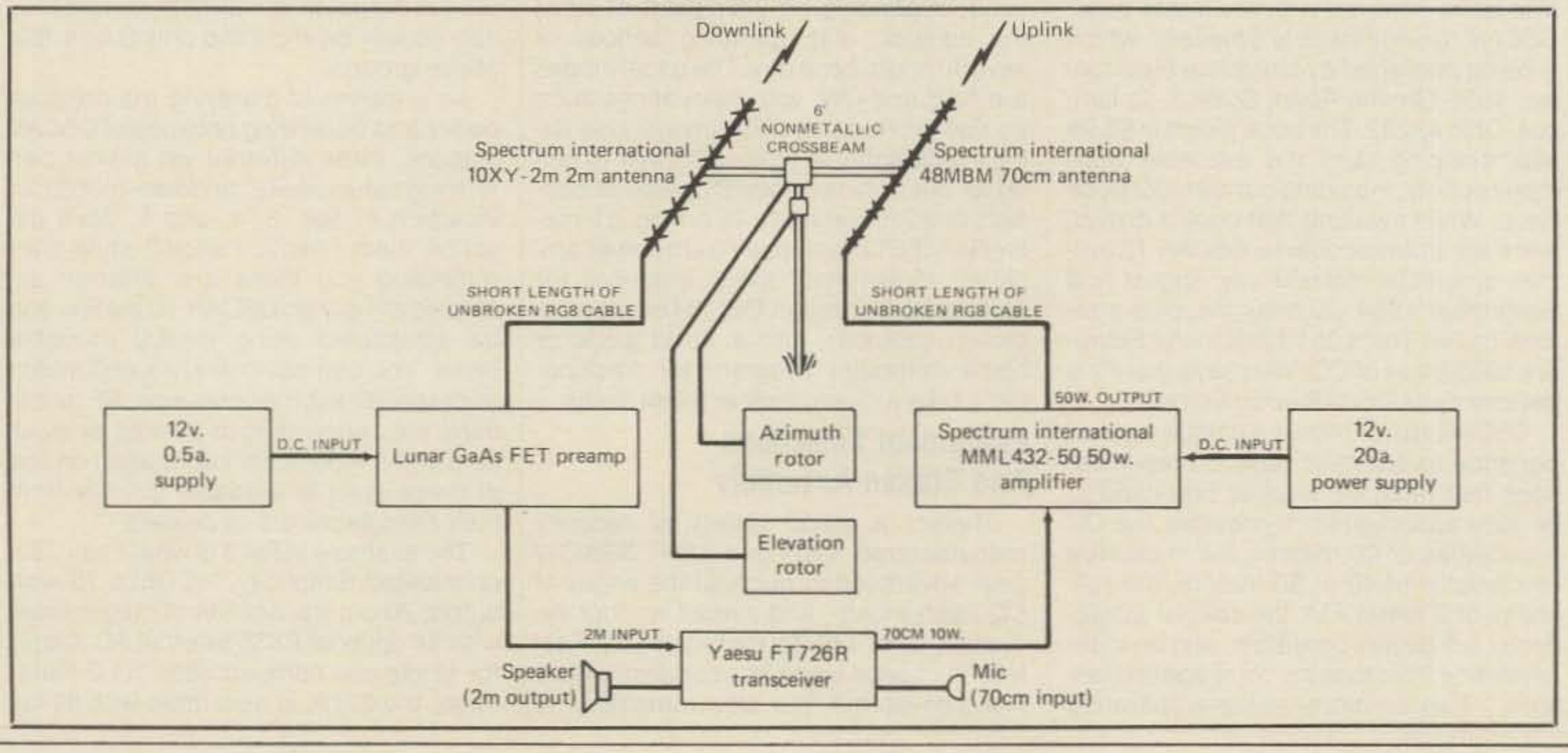
The medium-priced setup exemplified in fig. 4 centers around Yaesu's popular FT-726R full-duplex VHF/UHF transceiver. Its 10 watt output is a mite weak, so I suggest an independently powered 70 cm 50 watt amplifier such as Spectrum International's MML432-50 for punch. Receiver performance is enhanced with the addition of a Lunar Electronic's GaAsFET preamp. The 70 cm antenna shown is a multi-element Spectrum International MBM48 linearly polarized array, and the 2 meter antenna is Spectrum's 10XY-2m "twist" phased/wired for right-hand circular polarization. The antennas are spaced 6 feet apart on a nonmetallic crossboom, and dual rotors are used for positioning. A home-computer program initialized with information acquired via AMSAT Nets (Sundays, 1900 GMT, 14,282 kHz or Wednesdays, 0200 GMT, 3,855 kHz) is used for tracking in this example.

The economical setup shown in fig. 5 uses Ten-Tec's 2510 "Satellite Station" (reviewed in February '85 *CQ*), an ICOM 730, a 90 watt 70 cm amplifier such as Encomm's HL 90U, and an Advanced Receiver Research P144 VDG 2 meter GaAsFT preamp. The 70 cm antenna is KLM's 435-16C, and a Spectrum 10XY-2m is used for 2 meters. A wooden crossboom minimizes crosstalk, and dual rotors complete the setup. Tracking is accomplished using a Project OSCAR calendar and "tweaking" antenna positions by ear. This example is one of my own OSCAR 10 setups, incidentally, and I'm working the world with it on a daily basis. The Ten-Tec includes a 10 watt 70 cm transmitter and a 2 to 10 meter receiving converter in one cabinet. Separate transverters or converters, plus homebrewed beams and a 70 cm amplifier, might be substituted if a "lowest possible cost" system is desired. If a homebrew preamp is contemplated for minimizing the cost of such setups, GaAsFET transistors should be priced first. They are expensive but vital items.

OSCAR Antennas

Since an amateur satellite slowly tumbles end over end during its in-space

Fig. 4– This medium-priced setup centers around Yaesu's popular full-duplex and multimode transceiver, externally powered RF amplifier, GaAsFET preamp, and Spectrum International "twist" antennas. Note that optional 70 cm and second IF modules must be installed in the FT-726R.



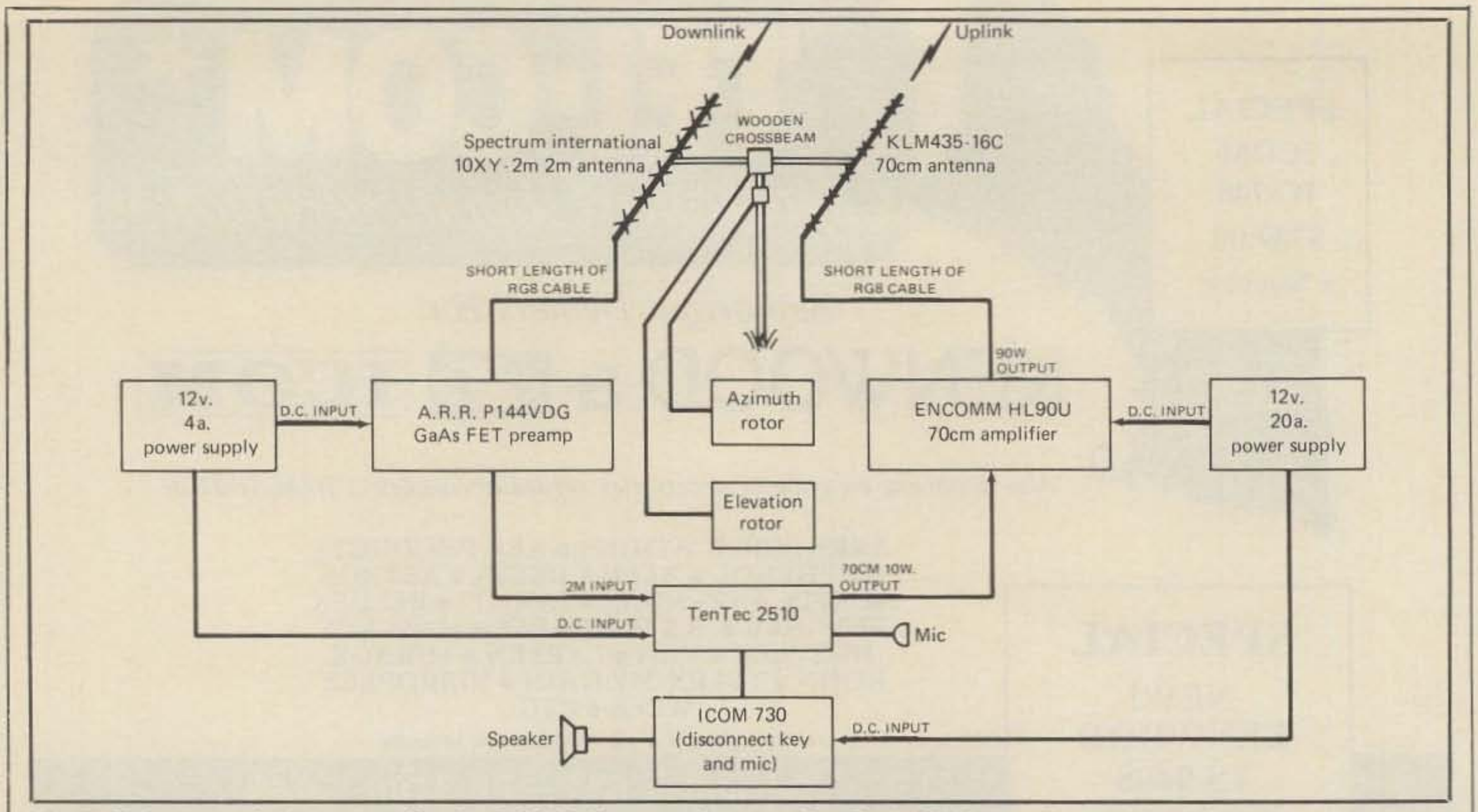


Fig. 5– This economical yet very effective OSCAR 10 system features Ten-Tec's 2510 "satellite station," 90 watt 70 cm amplifier, GaAsFET preamp, and effective mix of "twist" antennas. The 2510 contains 10 watt 70 cm transmitter and 2 to 10 meter receive converter in one box. The ICOM 730 is tuned to 10 meters to complete the setup.

travels, circularly polarized antennas are used to follow that roll. Helicals or crossed Yagis are assembled or phased to radiate a signal which spirals like a bullet from a rifle, with a *right-hand* "twist" (hence their nickname). Preassembled phasing harnesses are usually included in commercially manufactured "twist" antennas. Vertically polarized beams such as those used for FM and repeater activities are occasionally pressed into OSCAR use, but the uneven "whump, whump, whump" caused by their spin modulation on signals is usually quite distracting. A receiver with fast AGC helps somewhat here, but it has limitations.

Twist antennas with gain figures between 10 and 15 dB are prime choices for satellite operations. Lower gain figures either yield very weak signals or necessitate using rather expensive amplifiers. Higher gain figures equate to longer boom arrays and difficulty in keeping the beams aimed at the satellite. Translated into Effective Radiated Power for mode B (70 cm rig's output + antenna gain – transmission-line losses), you usually need between 200 and 700 watts ERP for reliable SSB communications and 100 to 500 watts for CW operations. The previous information should be kept in mind if you would like to build your own satellite antennas. Feedline losses are villains of VHF and UHF communications. That's why I emphasize mounting antennas and rigs in close proximity. I also strongly emphasize using only brand-new, top-quality, low-loss RG8-type cable without any breaks or splices. An otherwise good signal (70 cm transmit or 2 meter receive) can be obliterated by poor cables or connectors that are not weatherized.

Finally, I suggest mounting the satellite antennas on a 6 or 7 foot nonconductive crossboom to minimize 2 meter preamp and/or receiver desensing during 70 cm transmissions. That crossboom can be wood, thickwall PVC, heavy rubber hose over aluminum tubing, or anything else you have handy. Use your ingenuity!

Tracking OSCAR 10

This seems to be an area that unnecessarily sidetracks many OSCAR 10 newcomers. Possibly ideas of fast-paced OSCAR 6 type orbits or visions of complicated tracking aids were intimidating factors. Relax. I've been successfully operating and tracking OSCAR 10 for nearly two years using little more than a Project OSCAR orbital calendar and a latitude/longitude-calibrated world globe. I point my antennas toward the satellite's general direction for a particular day, "tweak" their position while listening to my own downlinked signal, and seldom reposition them during a day's activity. The overall procedure reminds me of tactics used with beams on 20 meters. That's fine, you say, but how does one learn the initial direction to point antennas before "tweaking." That's why you need a Project OSCAR orbital calendar (a year's worth of satellite predictions, obtained for a $10 donation to Project OSCAR, P.O. Box 1136, Los Altos, CA 94023), or a home-computer tracking program (contact AMSAT Software Exchange, P.O. Box 27, Washington, D.C. 20044 with an SASE). If you're a satellite newcomer, try using both of those aids until you "catch the knack" of OSCAR 10's 19-day orbital cycle. OSCAR 10's popular mode B transponder isn't operational during the full time of each day's orbit, however, so I again emphasize monitoring AMSAT Net announcements on present operating schedules.

OSCAR 10 travels in a highly eliptical orbit which carries it approximately 36,000 kilometers from earth twice a day (an 11.6 hour orbit). As the satellite moves away from earth and toward apogee, its line-of-sight range becomes extensive (see fig. 6). Each day's orbit proceeds easterly by roughly 10° longitude, and each day's apogee occurs roughly 40 minutes earlier. Assuming the satellite's apogee is 36 km above earth's 5° latitude south and 165° longitude west (over Jarvis Island) on a particular day (beams pointing "west and slightly up" from southern U.S.), the next day's apogee will be above 5° latitude south and 155° longitude west (same general beam headings, with slightly more elevation). This concept is also illustrated in fig. 7. Approximately nine days later OSCAR 10's apogee will occur over South America. Nine days afterward, apogee will occur over the middle part of Africa. That orbit will then fall from view, and the satellite's "other orbit" (which was previously "opposite" the U.S.-accessed orbit) moves into view for the next 19-day cycle. If this "orbit jazz" seems complex, check

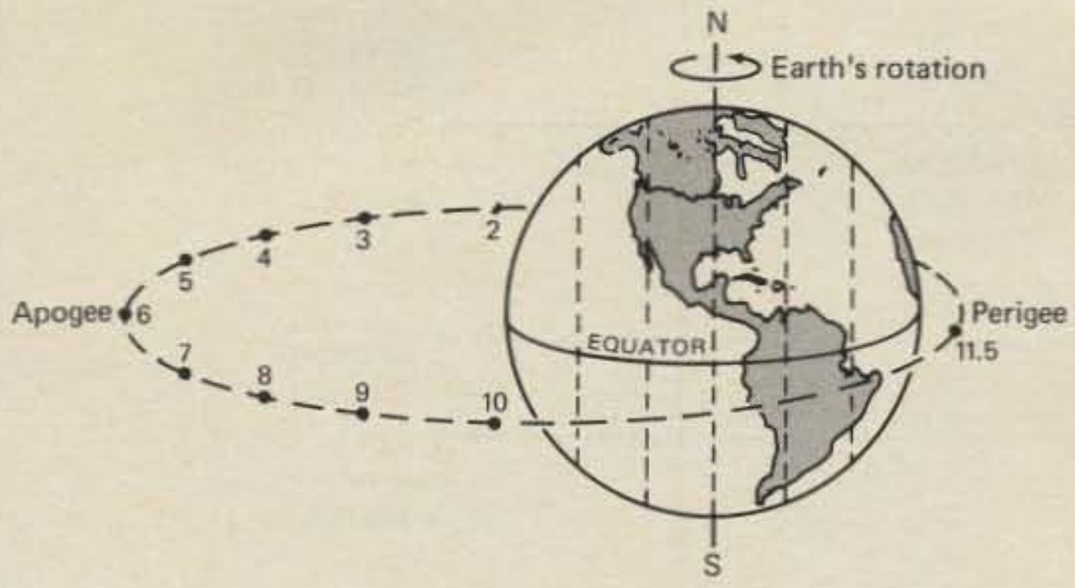


Fig. 6– General concept of OSCAR 10's highly elliptical orbit as viewed from a hypothetical location in space. Note hourly time marks on orbit while visualizing earth's rotation, and you've taken the first step in "mental tracking." Inclination of orbit shown is 5 degrees south latitude. This corresponds to spring/summer season of 1985. The inclination swings ± 26 degrees of the equator over an approximate 2½-year period.

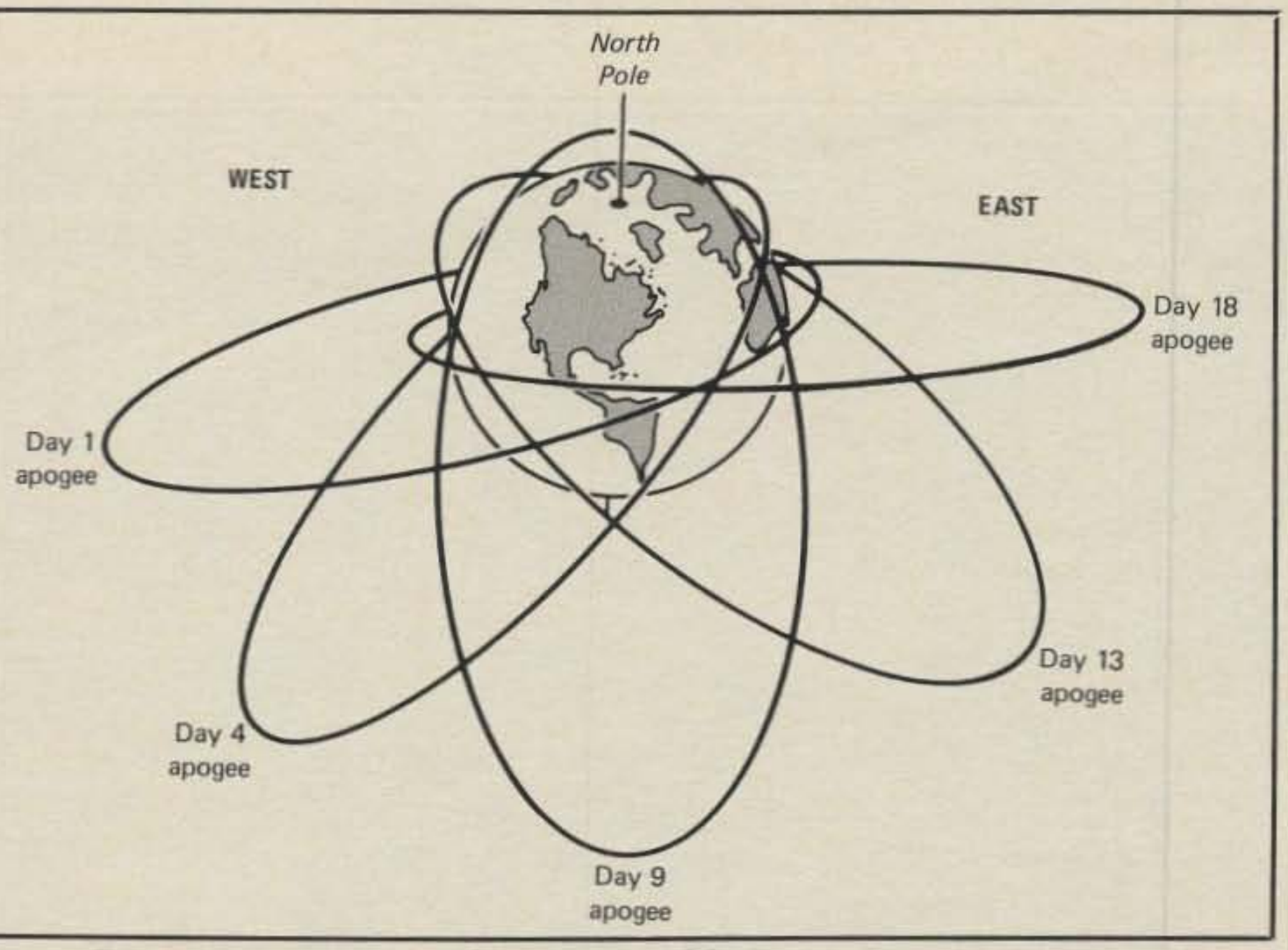


Fig. 7– This hypothetical view of earth and OSCAR 10 orbits illustrates west to east satellite progressions over a 19-day cycle and related line-of-sight ranges. Plot these orbits on a world globe for full three-dimensional clarity.

Fig. 8– A brief sampling of the many QSLs acquired by OSCAR 10 newcomer Sandy, WB4OEE, during her first six months on the new satellite. Country tally within that period: over 40! WAC was achieved during her first 19 days of activity.

my new *OSCAR 10 and Phase III Satellites* book mentioned earlier. Actual tracking procedures are quite simple.

Operating Notes

Since OSCAR 10's mode B transponder relays many SSB and CW QSOs simultaneously, operating procedures generally resemble those of HF bands. The obvious differences are lack of QRM and avoidance of high-power signals. The previously emphasized capability of hearing one's own satellite relayed signals while transmitting (full duplex operation) serves two purposes: avoiding QRM with others (there's no "skip"; everyone hears equally; leaving "elbow room" is both courteous and necessary), and strength-referencing to the transponder's beacon (145.800 kHz). Everyone shares the satellite's energy. Thus, *no one's downlinked signal should ever be stronger than the beacon.* Both overly strong signals and FM transmissions are absolutely taboo on OSCAR 10. Keep your transmitter power low and your receiver performance high.

DX operations on OSCAR 10 are both plentiful and enjoyable, but energy-usurping pileup activities are discouraged. Everyone has an equal opportunity to pleasantly talk with other world areas and propagation doesn't fade. In other words, relax and enjoy genuine international friendships. Many (if not all) DX operators appreciate OSCAR 10's "change of pace," and many QRT if necessary to avoid pileup-loading the satellite.

AMSAT's Role

The worldwide organization directly responsible for initiation, design, construction, and launch of our amateur satellites is the AMateur SATellite Corporation at P.O. Box 27, Washington, D.C. 20044. While AMSAT membership isn't mandatory for using OSCAR satellites, its heartily encouraged as healthy assurance of a continuing amateur satellite program and as operator support. AMSAT's operating funds are acquired from donations, membership dues, promotions, and grants from other organizations such as the ARRL. Although several thousands of dollars in the red, AMSAT continues pursuing additional Phase III and Phase

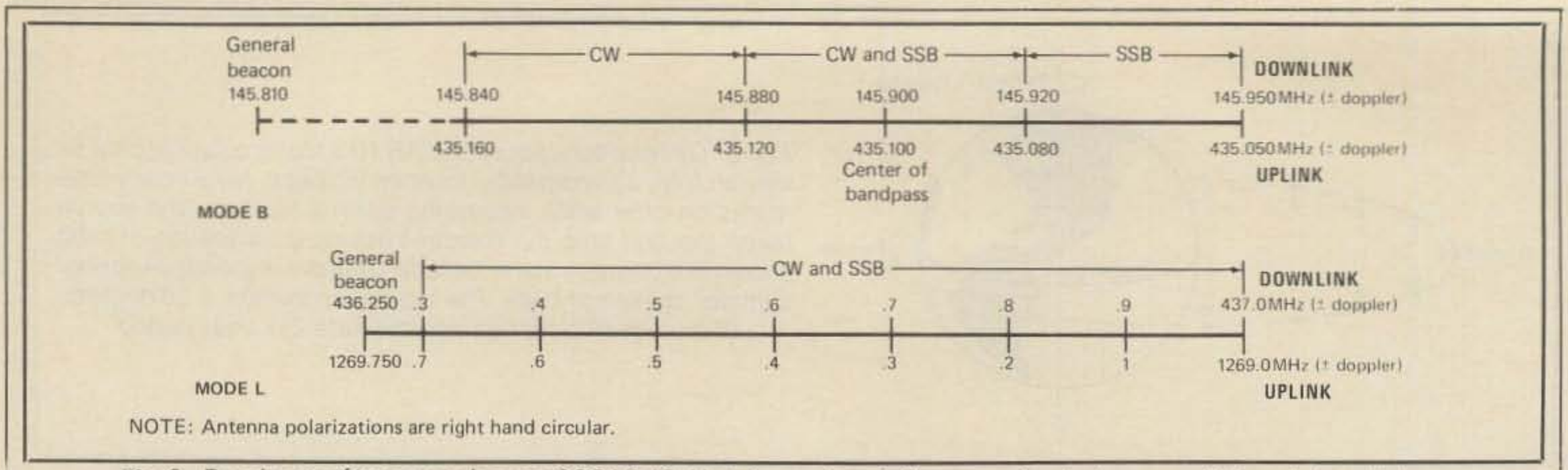


Fig. 9– Bandpass of transponders on OSCAR 10. Note inversions of frequencies between uplink and downlink.

IV satellites at the present time. Every radio amateur is encouraged to join AMSAT, enjoy their bimonthly magazine, *Satellite Journal*, and help ensure our exciting dreams of future satellites become reality.

Conclusion

Due to its easy access using readily available items, this article's discussions centered around OSCAR 10's popular mode B operation. There's another side to OSCAR 10, however, and it's a fascinating area for today's gusto pioneers.

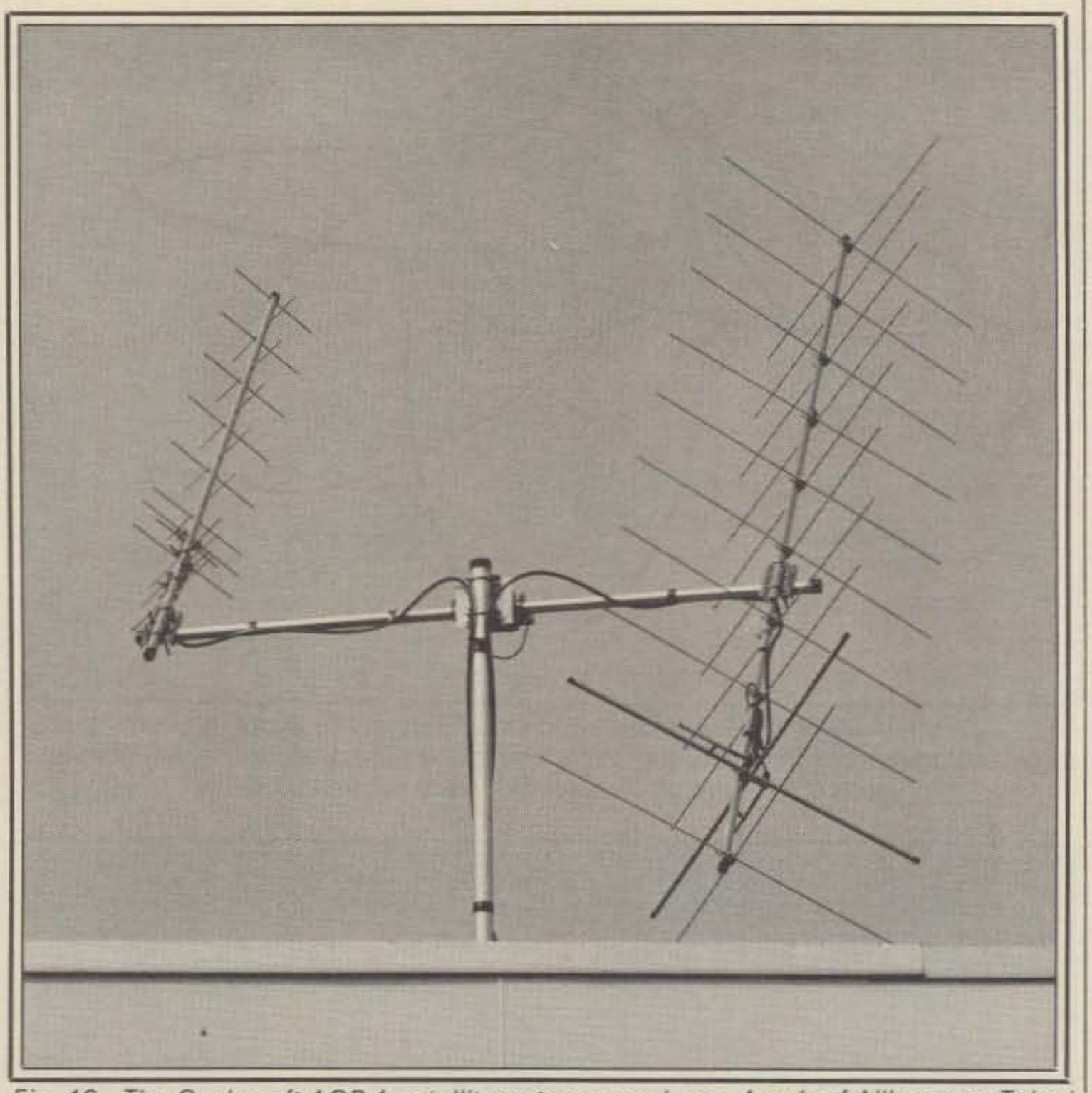


Fig. 10– The Cushcraft AOP-1 satellite antenna package. A pair of Alliance or Telex/Hy-Gain rotators completes the package. If you want to go the single rotator approach, look into the Dynetic Systems DR10, which has a single rotator for azimuth and elevation and features a dual reading indicator.

Mode L receives or uplinks SSB or CW signals in the 1269 MHz range, and retransmits or downlinks them in the 435 MHz range. An antenna/relay problem in OSCAR 10, however, significantly attenuates received signals (and consequently, downlinked signals). An expensively obtained high-power signal is required for operating this mode, and the mating downlink receiving setup should approach "moonbounce quality." This is not a frequency/band problem, but rather a satellite damage consequence. The adverse odds are not difficult to overcome, however, and Spectrum International (P.O. Box 1084, Concord, MA 01742) has everything you need for mode L operations: transverters, antennas, stacking kits, etc.

Amateur satellites are truly the communications medium of the future, and the present time is your ideal starting point in this exciting direction. We obviously can't include every aspect of OSCAR 10 in this article, and we surely don't intend to shortchange mode L or recognition. Good luck, and we'll listen for you on OSCAR 10! CQ

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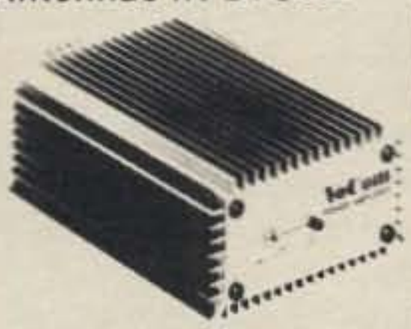

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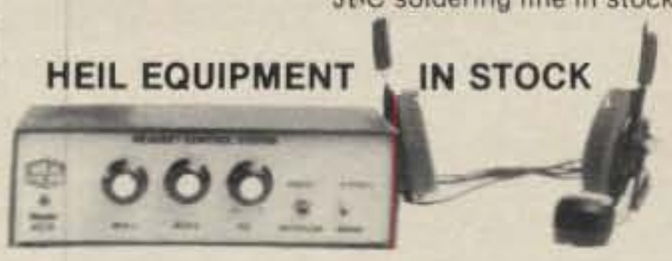

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No glitches, friendly and cooperative officials, and perfect weather make this an unusual DXpedition. It made WA2HZR and a lot of prefix hunters happy, too.

THE HOMELANDS STORY

BY DAVID CHURCH*, WA2HZR

The burning question: Why would anyone go to all the trouble to put on a DXpedition to places that don't even count for DXCC? The answer, of course, is prefixes! The *CQ* WPX program does recognize the Homeland prefixes, and being involved in the WPX game for years, it was evident that these unique prefixes were in high demand, particularly on CW. Being a CW operator and having more than just a casual interest in DX, this seemed to be an ideal operation.

License inquiries were started in late 1982 to Bophuthatswana H5, Venda V9, Ciskei S4, and Transkei S8. By early 1983 it was becoming apparent that getting licensed was not as easy as was assumed. Getting a guest South African license was, of course, the easiest. It was given as WA2HZR/ZS, which counts for WPX as ZSØ. No answer was received from Bophuthatswana or Venda after three attempts. A vague answer came back from Transkei, alluding to the fact that generally only licenses were issued to residents or South Africans. The Ciskei at least provided some hope of a license. After many letters and a crazy international currency transaction, the license arrived two weeks before my departure date of November 30, 1983. The call was S42HZR and was license number 003!

As all the correspondence was going on for the licenses, weekly skeds were run with Eric, ZS6ME, and Al, ZS2U, who both would figure in the DXpeditions heavily. Al had operated portable in the Ciskei back in December 1981 after independence. He was willing to get me up and back from his QTH in Port Elizabeth, a 187 mile trip by car. Eric was to meet me at the airport in Johannesburg and put me up for my first night in South Africa. None of us had ever met before in person, but we all had the common bond of CW DX! That's all that's needed.

*Box 592, Mexico, NY 13114-0592

A plane ticket and this is all it takes to be a world-traveling Dxpeditioner. The hand-held bag contains all the clothes that you will need.

A 6 foot long by 6 inch square wooden box was made to house a Hy-Gain TH3 tribander along with tools and 100 feet of RG8 mini-coax. My Ten-Tec Omni and outboard VFO, headset, keyer, etc., went in a pullman suitcase. My carry-on bag had callbooks, logs, gifts, and a few clothes! Who worries about clothes when your going DX'in!

Everything went according to plan. In fact, things were so smooth and the hospitality from my ZS friends was so warm that actual complacency was setting in. Even my luggage came through the various routes and customs with no problems —truly a miracle come true.

Although I had a confirmation for a room at the Amatola Sun Hotel in the capital of Bisho, an acknowledgement of operating an amateur radio station was never mentioned. After initially checking in, a meeting with the hotel manager revealed why no answer was received about amateur radio operation. It seems that about a month sooner a couple of American entrepreneurs had erected a satellite dish on the hotel roof with no permission from the Ciskei PTT. When the PTT arrived to find out who was responsible, the two guys split the scene and left everything a shambles. The dish blew off the roof, tore tiles loose, hit lawn chairs and flower gardens, and ended up in the swimming pool! Needless to say, anything having to do with antennas made the manager very upset. What to do? After long negotiations and explaining the merits of amateur radio and the favorable publicity his hotel might enjoy, reluctant permission was given to operate, but only if no physical attachments were made to the hotel buildings. Therefore, a 20 foot mast was located, the TH3 was erected with an inverted-Vee 40 meter dipole attached to the top, and the QSOs started. From the time we arrived until the first QSO was made was not more than three hours. A lot of ground was covered in a short time!

The QTH proved ideal, with low noise levels and excellent location on a hilltop at 800 feet above sea level. From my operating position I could look out and see three countries at once in the distance: ZS, S8, and S4. Band conditions were variable but generally good. An added bonus was the ARRL 10 Meter Contest, which found that band wide open to the States and beyond. Not all time went to operating, since usually from 10 a.m. to 2 p.m. each day found the bands lackluster. A rental car allowed me freedom for picturetaking during these times. After seven days, on December 13, 1983 with 2100 CW QSOs made, I packed it in and said goodbye to the Ciskei. A return to Port Elizabeth, then to Joburg, and finally to New York via London found me home to a typical central New York blizzard. Nothing like going from summer to winter instantly!

Immediately after getting home, more

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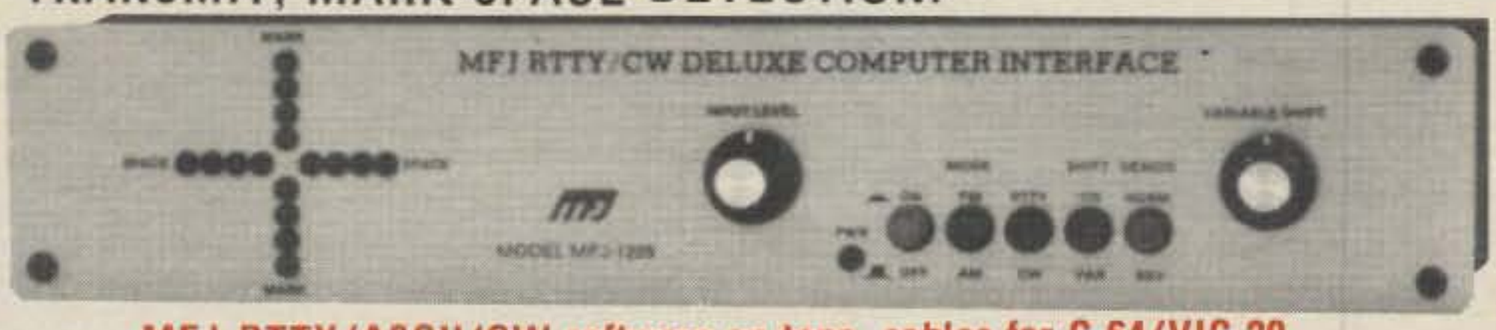

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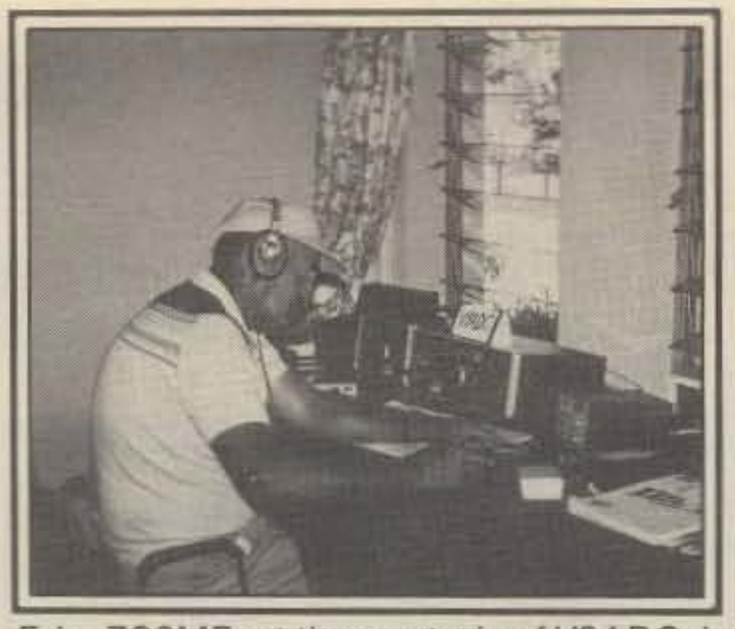
Dave, S8HZR, at Umtata, Transkei. The straight key and the QTH belong to Al, S83U.



Eric, ZS6ME, at the controls of V9ADC, in Venda. This was for the 1984 CQ WW DX CW Contest.

Dave shows how they transport a TH3 in Ciskei.

letters were sent to Venda and Transkei, now with more accurate addresses and directly to those who actually issue the licenses. By mid 1984 an interim call of /V9 came from Venda and the promise of the call S8HZR from Transkei, but it had to be applied for in person at the Postmaster General in the capital of Umtata. So with weekly skeds still with Eric, ZS6ME, plans were made to do the *CQ* WW DX Contest from Venda as a multi-single with Eric and me. Also, Al, ZS2U, was trying to line up the trip to the Transkei.

Leaving on November 17, 1984 was another problem-free trip with all arriving unscathed like the year before. So I wonder what the glitch will be this year! Eric and I loaded up his car and made the 342 mile, 5½ hour trip to Venda on November 22. This hotel manager at the Venda Sun Hotel in the capital, Sibasa, was more hospitable, but he still called the main office back in Joburg to be sure that all was okay to erect radio antennas at his hotel. We started up with the TH3 under a broiling noon sun of 105° and it just got hotter. We found out the antenna balun was no good after putting up the beam and taking it down three times, each time checking through to find out why the SWR on all bands was so high. Somehow water had gotten into the balun. A borrowed Hy-Gain 14AVQ vertical was mounted in the center of the roof, which was all aluminum sheeting. With the roof as a ground plane, it performed beautifully, especially on 40 meters. So again, in little over three hours we were on the air. The hotel was located on a hillside with the north view partially blocked, but not that big a problem for the TH3. The only other near miss was that I almost fell off the roof because the extension ladder hooks let go as I started down on one of many trips. Eric grabbed me by the shirt and I hung on.

It became painfully clear that using WA2HZR/V9 during the contest was not going to make it for a call. First thing next morning, Friday, we went up the road to the Venda Postmaster to see about a V9 call. We found our man in due course, and he was more than willing to comply. Thus, I picked V9ADC, as the last two letters are my initials. The Venda callsign allocation is from V9AAA to AZZ. We took this opportunity to do some picturetaking, for Venda is very mountainous and lush. Hugh eucalyptus forests and orchards of oranges, bananas, guava, etc., were everywhere. Rainfall is plentiful, which makes it a very tropical climate year round.

The contest went well with all bands hot on Saturday, but down on Sunday, especially 10 meters. A thunderstorm on Sunday shut us down right at the 15–1700Z peak into the States. We would easily have topped 2000 QSOs if not for the stoppage. All in all we made over 2500 CW QSOs in less than three days.

On November 27 I flew to Port Elizabeth where Al, ZS2U, lives. We left for Transkei on November 29 after receiving an invitation to operate from the QTH of Julian, S83M. The trip up was 373 miles and took 6½ hours. Once past the border post with our passports stamped for entry, it became clear that Transkeian roads are not for the faint-hearted—winding hairpin turns up and down the mountains with no guard rails and sheer drops to the valleys far below. Livestock roam freely, and cattle and goats use the roads more than vehicles.

Julian had said that his beam needed fixing before we arrived. He had what was left of a TA33 tribander on top of a 36 foot light pole. We got a big extension ladder and tried to put it back in shape. However, there seemed to be no front-to-back at all, and although the SWR wasn't so bad, it just was not radiating to my satisfaction. So up went my TH3 along with a two-element wire beam for 40 meters that Al, ZS2U, had designed. Again, in three hours we fired up making QSOs. The only problem with this antenna mix around was a steady Transkeian veld "breeze" that had me hanging onto the pole with one hand and man-handling the beams with the other—not the safest situation for sure.

This was definitely a laid-back operation, for we had plenty of visitors drop by and propagation was not all the best. We visited the PTT office, and although the official callsign allocation is S83A–ZZZ, S8HZR was issued, and Al picked out S83U. Al used a straight-hand key, which he can pound away on for hours somehow. He is now learning to use his home-brew electronic keyer/paddle.

Julian graciously showed us around the area of Umtata and the countryside. Umtata is on a high plain with mountains in the distance. It is a busy city with manufacturing, farm produce marketing, and more vehicles than people, so it seemed. The University of Transkei is the focal point of higher education in the country.

By Monday morning we were packed to leave with the TH3 remaining behind on the pole. Julian should have a much improved signal now. In a little over three days 600 QSOs were made. Not all that great, but we had a good time and helped out some people.

My return was hurried to Port Elizabeth, then to Joburg to catch my New York flight. All went well, for even the weather in New York was sunny and mild for a change.

There were so many helpful ZS amateurs that they are too numerous to mention. But most assuredly, without Al, ZS2U, Eric, ZS6ME, and Julian, S83M, none of the operations would have come off as smoothly—or perhaps not at all. I finally have to mention that without a shadow of a doubt, all four Homelands should enjoy country status for DXCC. Only politics intervene. Separation by governing body is the criteria. There is no doubt that they are self-governing in their own way, which is very evident when you see for yourself. How some building can be called a country while a self-governing, independent people cannot get country status makes a sham of the DXCC process. But until recognition prevails, the prefixes are unique, the countryside beautiful, and the people warm and friendly. That's good DX any day. CQ

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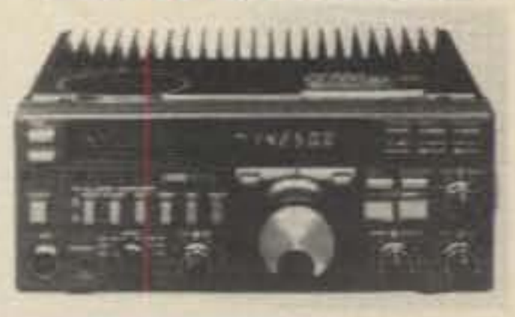

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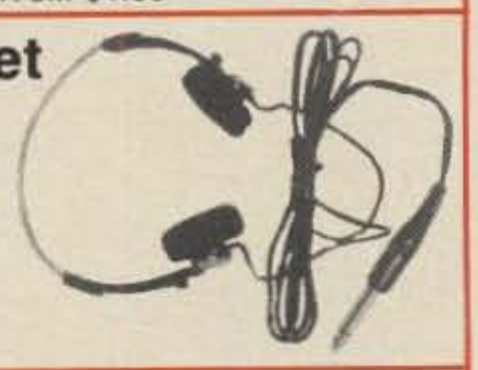

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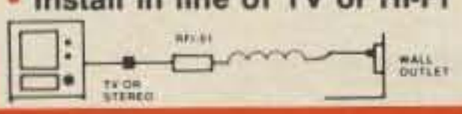

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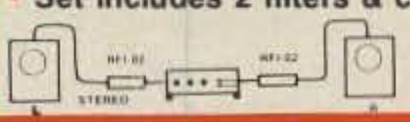

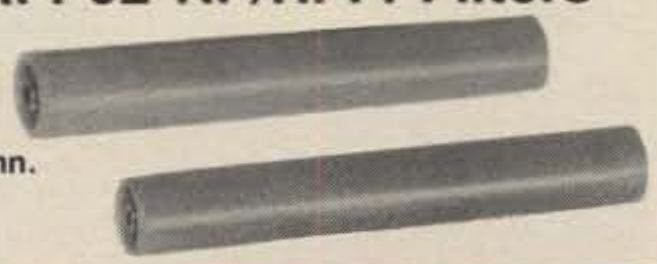

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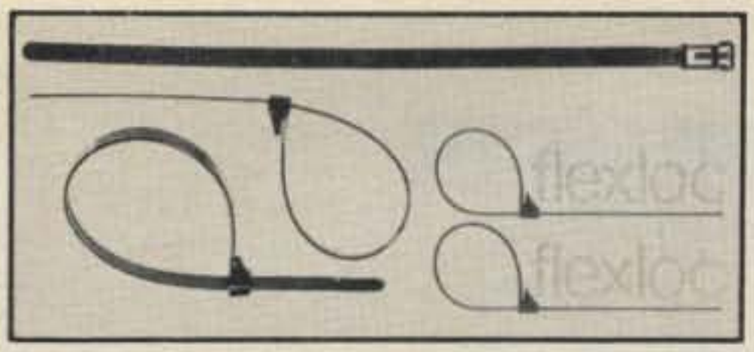
Kenwood TS-940S Transceiver

The new Trio-Kenwood TS-940S sports a unique LCD sub-display that graphically displays CW VBT and SSB slope tuning, and indicates VFO frequency and time in 24-hour format. When the optional AT-940 all-band (1.8–30 MHz) automatic antenna tuner is installed, the sub-display indicates antenna tuner status. Features included are built-in FM, 40 memory channels, 100% duty-cycle (continuous key-down for one hour) transmitter (250 watts input on SSB/CW/FSK/FM; 140 watts input on AM), pan display capability (station monitor SM-220 with BS-8 pan display), and direct frequency entry from the keyboard.

For more information on the TS-940S and the many accessories available, contact Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220, or circle number 104 on the reader service card.

Visual Departures' FLEXLOC Cable Ties

FLEXLOC reusable cable ties are for bunching cables attached to computers



and peripherals, home entertainment systems, a/v, and electronic and electrical hardware. Their quick-release ("pinch of the fingers") lock enables you to reuse the cable ties. Made from tough, flexible nylon (Type 66), FLEXLOC has a tensile strength of 50 pounds. Each 10 inch fastening strap is self-locking with a ribbed backing that permits diameter adjustments up to 2¾ inches and secures the bundle until release.

FLEXLOC Cable Ties are available in packages of 20 direct from Visual Departures, Ltd. for $7.00 (includes first-class postage and handling). For more information, contact Visual Departures, Ltd., 1641 Third Avenue, Suite 202, New York, NY 10128, or circle number 101 on the reader service card.

ICOM IC-3200A Dual Bander

ICOM has announced the IC-3200A 25 watt, compact, full-featured dual bander. The unit has only 14 front-panel controls. It features: frequency coverage—2 meter (140.000–150.000 MHz) and 70 cm (440.000–450.000 MHz); 5 kHz fully programmable offsets for MARS and CAP repeater operation; size 5½"W×2"H×8½"D; 25 watts output on both bands; memory lockout; scanning (memory, band, programmable and priority); ten tunable memories with lithium battery to maintain memories when disconnected from the power source; enlarged LCD display; tone encoder (all PL and subaudible tones built-in); one antenna connector (duplexer is already installed); and variable tuning increments—5 and 15 kHz (2 meters), and 5 and 25 kHz (70 cm).

The IC-3200A comes standard with an IC-HM14 touchtone mic with up/down scan, DC power cord, and a mobile mounting bracket. Price is $549. For more information, contact ICOM America, Inc., 2380 116th Avenue NE, Bellevue, WA 98004, or circle number 105 on the reader service card.

Announcing

•**K7YPT From Fort Laramie**–High Plains ARC will operate K7YPT at Historic Fort Laramie from 0000Z July 4 until 0000Z July 5. Frequencies: phone—3.850, 7.250, 14.300, 21.360, 28.550; CW—50 kHz up from lower band edge. QSL for business size s.a.s.e. to: K7YPT, P.O. Box T, Torrington, WY 82240.

•**New London, Connecticut**–The world's first nuclear submarine *USS Nautilus (SSN-571)* is returning to the Submarine Base, New London, CT, where it will be put on permanent display. The submarine base station, K1SSN, will be on July 4, 5, and 6 to honor the Nautilus's return on July 5. Members from the K1SSN Club Station, Tri-City ARC, RASON, and SCRAMS will operate the K1SSN from 1400Z to 0100Z each day in the lower 20 kHz of the General class phone and CW, 80–10 meters, and the center of the Novice bands. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

•**Tom Sawyer Days Celebration**–The Hannibal ARC will issue a fifth annual special certificate from the National Tom Sawyer Days celebration in Hannibal, Missouri, on July 6 and July 7 from 1500–2100 UTC both days. Frequencies: phone 7.245, 14.290, 21.400, 28.770; and CW 7.125 and 21.125 MHz. To receive the certificate send 8″ × 10″ SASE and your personal QSL card confirming the contact to Hannibal ARC, WØKEM, 2108 Orchard Ave., Hannibal, MO 63401.

•**KA8QVH From Traverse City, MI**–The Cherrland ARC will operate Special Events station KA8QVH to commemorate the National Cherry Festival, Traverse City, MI. Daily operation, scheduled from 1100Z July 7 through 0200Z July 13, in the center portion of the 10–80 meter General phone and CW bands and Novice bands. A large SASE with your QSL addressed to Ed Irwin, 346 Peninsula Trail, Traverse City, MI 49684, for certificate.

•**K4IHU From Hampton, Virginia**–The Southern Peninsula ARC will operate K4IHU from 1800Z July 8 to 1800Z July 9 during the 375th anniversary of the oldest continuous English-speaking settlement in America and the arrival of the replica ship *Godspeed* from England. Frequencies phone 3.930, 7.285, 14.305, 21.385, 28.685; CW 3.705, 7.085, 14.085, 21.085, 28.185. Certificate for QSL with SASE to SPARK, Inc., P.O. Box 4128, Hampton, VA 23664.

•**KI4BR From Summer Extravaganza**–The Parks and Recreation Dept. of Waynesboro, VA and the Valley ARA will operate Special Event station KI4BR in Ridgeview Park in celebration of "Summer Extravaganza." Hours of operation will be from 1700 UTC on July 13 and 14. A "First Edition Certificate" will acknowledge QSO and receipt of QSL. SASE to KI4BR, P.O. Box 565, Waynesboro, VA 22980.

•**Special Event From Ripon, WI**–The Green Fox ARC will operate a Special Events station during the annual "Riponfest" on July 13th and 14th. Operation will be from 1400 to 0200 UTC on July 13th and from 1400 to 2300 UTC on July 14th in the lower 20 kHz of the General class portion of the 15 and 20 meter bands. QSL via the Green Fox ARC, Box 314, Ripon, WI 54971.

•**Battle Creek, Michigan**–Southern Michigan ARS will operate W8DF/8 during the Seventh World Hot-Air Balloon Championship, July 13–21, Battle Creek, Michigan, W. K. Kellogg Regional Airport. Operation on phone in the center portions of General class 80–10 meters and CW in the Novice bands. For special QSL, send SASE to P.O. Box 934, Battle Creek, MI 49016.

•**WAØIUQ From Hot-Air Balloon Races**–The Indian Hills Community College ARC will conduct a Special Event station during the 1985 Ottumwa Hot-Air Balloon Races on July 19–20. WAØIUQ will be on SSB only on 3960, 7260, and 14260 kHz (QRM permitting). Operation will be from 2200–0400 GMT each day. A commemorative QSL card will be issued for SASE and QSL card. QSL via the Callbook address for WAØIUQ.

•**Special Event Station K8EPV**–The Eastern Michigan ARC (K8EPV) will commemorate the annual Port Huron to Mackinac Island Yacht Race, July 20–21. Operation will be from 1400–0200Z both days on

•**WØBXR From Jazz Festival**–The Davenport Radio Amateur Club will operate WØBXR during the Bix Biederbeck Memorial Jazz Festival from 1500–2300Z July 27 and from 1600–2200Z July 28. Additional operation probable from 1700–2200Z July 26. Operation on phone 80–10 about 10 kHz up from lower end of General class band edges. Certificate for your QSL and SASE via Davenport RAC, 2131 Myrtle, Davenport, IA 52804.

•**Space Day 1985**–The Cascades ARS third annual Space Day Special Event Station will be on the air from 0000 GMT July 27 through 1900 GMT July 28. For certificate send QSL and $1.00 for postage and materials. All bands 10 kHz into the General portion. CARS, P.O. Box 512, Jackson, MI 49204.

•**Moscow Blowout Special Event**–The Wichita ARC will operate WØSOE from Moscow, Kansas on July 27–28, 5 to 10 kHz from the bottom edge of the General phone bands. QSL via WØSOE.

•**AMSAT Call For Papers**–AMSAT has issued a call for professional papers reporting original work and/or significant findings in the field of low-cost satellite engineering, space communications, space sciences, and related social value issues. Accepted papers will be published in the premiere edition of *The AMSAT Technical Journal*, publication date December 1, 1985. Papers are due before August 1, and should be mailed to *AMSAT Technical Journal*, P.O. Box 27, Washington, DC 20044.

•**ARRL/VEC Exam, Brewster, NY**–An ARRL/VEC exam will be given on August 17 in Brewster, NY. Send completed Form 610, SASE, and $4.00 check payable to "ARRL/VEC" to Richard Brummer, RFD 6, Box 183, Mahopac, NY 10541, by July 17.

•**The following hamfests, etc., are slated for July:**

July 4, **Harrisburg Annual Hamfest**, Bressler, PA. Contact KC3MG, 131 Livingston St., Swatara, PA 17113 (1-717-939-4957).

July 5–7, **1985 ARRL Dakota Div. Convention**, Rapid City, SD. Contact Black Hills ARC, c/o Gene Bauer, KXØU, 713 Blaine Ave., Rapid City, SD 57701 (605-787-5243).

July 6–7, **Atlanta Hamfestival/ARRL Convention**, Atlanta, GA. Contact Bill Schmidt, KF4CQ, 219 Devonwood Dr., Atlanta, GA 30328.

July 7, **Wilkes-Barre Hamfest**, Kingston, PA. Contact Hamfest Committee, P.O. Box 1094, Wilkes-Barre, PA 18703 (717-388-6863).

July 12–14, **Wyoming Hamfest**, Douglas, WY. Contact Doug DesEnfants, WA7WXQ, North Star Route, Torrington, WY 82240 (SASE).

July 13, **Sheboygan County ARC Lakeshore Swapfest & Brat Fry**, Wilson Town Hall, south of Sheboygan, WI. Contact KR9S, 6400 Hawthorn Rd., Sheboygan, WI 53081 (414-457-3366 after 5 p.m. CDT).

July 13, **Mt. Beacon Hamfest**, Poughkeepsie/LaGrange, NY. Contact W2IHY, RR1, Vanessa Lane, Staatsburg, NY 12580 (914-889-4933).

July 13, **Eau Claire ARC Hamfest**, Eau Claire, WI. Contact Gene Lieberg, KA9DWH, 2840 Saturn Ave., Eau Claire, WI 54703 (SASE).

July 13–14, **Maple Ridge Hamfest**, Maple Ridge, BC, Canada. Contact Maple Ridge ARC, Box 292, Maple Ridge, BC, Canada V2X 7G2.

July 14, **Hall of Fame Hamfest**, Louisville, OH. Contact WA8SHP, 10877 Hazelview Ave., Alliance, OH 44601 (216-821-8794).

July 14, **Wood County ARC Ham-A-Rama**, Bowling Green, OH. Contact Wood County ARC, c/o N8DJB, 7368 Scotch Ridge Rd., Pemberville, OH 43450 (SASE).

July 14, **Lancaster & Fairfield County ARC Hamfest**, Lancaster, OH. Contact Lancaster ARC, Box 3, Lancaster, OH 43130.

July 14, **DuPage ARC Hamfest/Computerfest**, Downers 3.910, 7.235, and 14.235 phone; and 3.710, 7.110, and 21.110 CW. For certificate send QSL and legal-size SASE to K8EPV (C.B.A.) or 654 Georgia, Marysville, MI 48040.

Grove, IL. Contact W9DUP, P.O. Box 71, Clarendon Hills, IL 60514 (SASE), or call 312-971-3294 (8 am to 9 pm).

July 20, **Midsummer Swapfest,** Cary, NC. Contact Cary ARC, P.O. Box 53, Cary, NC 27511.

July 20, **SCARC 85,** Sussex County Fairgrounds, NJ. Contact Donald Stickle, K2OX, Welden Rd., RD#4, Lake Hopatcong, NJ 07849 (201-663-0677).

July 20, **NOARSFEST,** Wellington, OH. Contact NOARSFEST, P.O. Box 354, Lorain, OH 44052 (216-282-4256).

July 20, **Straits Area ARC Swap 'n Shop,** Petoskey, MI. Contact WD8MJB, P.O. Box 444, Conway, MI (SASE), or call 616-347-8693.

July 20–21, **Heavy Hitters Hamfest,** Topsfield, MA. Contact Russ Corkum, WA1TTV, 21 Thorndike St., Arlington, MA 02174.

July 21, **Triple States RAC Wheeling, WV Hamfest & Computer Fair,** Wheeling, WV. Contact KD8GL, RD 3 Box 238, Wheeling, WV 26003 (304-232-6796), or TSARC, Box 240, RD 1, Adena, OH 43901 (614-546-3930).

July 26–28, **Oklahoma Ham Holiday & ARRL State Convention,** Oklahoma City, OK. Contact Central Oklahoma Radio Amateurs, P.O. Box 15013, Oklahoma City, OK 73155.

July 26–Aug. 2, **Oshkosh/EAA 85,** Wittman Field, Oshkosh, WI. Contact Forest Schafer, WD9IWL, 417 Willows St., Omro, WI 54963.

July 27–28, **Western Carolina ARS Hamfest,** Asheville, NC. Contact KI4UO, 17 Emory Rd., Asheville, NC 28806.

July 27–28, **Pacific Northwest DX Convention,** Richmond, BC, Canada. Contact VE7BXG, 12467 53rd Ave., Surrey, BC, Canada V3W 1A4.

July 27–28, **85 U.P. Hamfest,** Manistique, MI. Contact WD8IBT, 509 Range St., Manistique, MI 49854 (906-341-5694 after 3 pm).

July 28, **BRATS Maryland Hamfest & Computerfest,** West Friendship, MD. Contact W3GXK, BRATS, P.O. Box 5915, Baltimore, MD 21208.

July 30–31, Aug. 1, **Amateur Radio Motorcycle Club Rocky Mountain Roundup III,** Denver, CO. Contact Gary McDuffie, AGØN, Rt. 1, Box 464, Bayard, NE 69334 (SASE).

Having a DXpedition to a rare one, and including the world's greatest contest and an exciting sightseeing vacation, seems the ultimate dream. This dream came true twice.

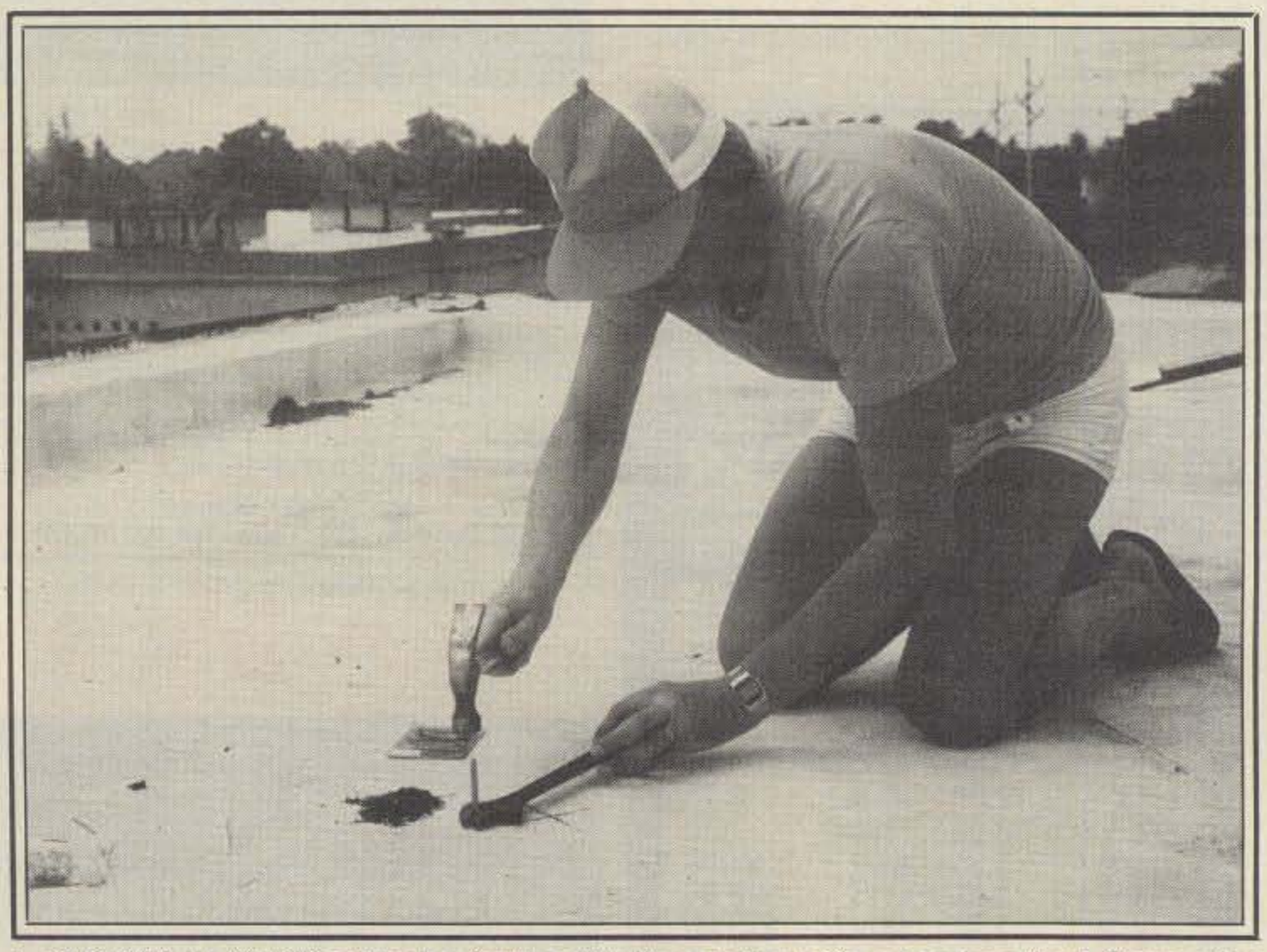
Two Contest DXpeditions To Tanzania or Do 19 Dits in the Callsign Make 5H3BH Hard To Work?

BY JOHN HALLENBERG*, SMØDJZ

After having been in the contest business for more than 10 years and after having always chased the good DX stations all over the globe during *CQ* WW DX Contests, we sometimes wondered how it would sound from "the other end" of a pileup. What mysterious things make a lot of amateurs travel around the globe just for a nice contest QTH and the chance to work thousands of QSOs during a specific weekend in October or November every year? Well we—Leif, SMØAJU, and I—decided to find out, so we started to look for a rare enough spot where we could stay during *CQ* WW CW Contest.

We are both also very interested in DXCC and especially CW, so we looked for a place not just rare as a good multiplier in the contest, but also rare as a country on CW for DXCC. We hoped to reward contestants with a new point on the DXCC CW ladder to higher total stickers.

To start with, we quickly made up one rule for the whole DXpedition: the guest-operator method. Our experiences with custom clearances and licensing in other countries were nil, so we looked around for a friendly amateur who could accommodate us during the last weekend in November. We got in touch with Bjorn, 5H3BH, in Dar es Salaam in Tanzania and found the target very interesting. Not too many stations would be active from zone 37 and probably no one else would activate 5H3 on CW. So, the chances of being a double multiplier in the contest would be rather big, and 5H3 would be a semi-rare DXCC country on CW.



Leif, SMØAJU, "drilling" holes for the guy-line anchors via a local method. Some of us use that same method here.

We started talking to Bjorn, but we really didn't know how to phrase the suggestion until one day he asked us, "Can't you come down and visit me sometime?" We really knew the right answer to such a question and of course accepted the nice invitation.

That was the situation in the summer of 1982. We made all the arrangements for a takeoff on November 22, 1982, and we would then stay with Bjorn for two weeks. The "only" things we were supposed to bring were an extra rig, headsets, keyers,

*Siriusgatan 106, S-195 00 Marsta, Sweden

John, SM0DJZ, on the roof with the teak pole which supports the 80 meter dipole. The other antennas are to the left.

and paddles, and also some wires for an 80 meter antenna. The main station (FT-101Z, FL2100Z, TH3MK3, and 14AVQ) was already in operation at Bjorn's QTH without any problems, until some weeks before our departure, when we got the message that the three-element beam had fallen down from the roof. Of course we got very suspicious and curious as to how much damage the beam had sustained. Through Bjorn's second antenna (14AVQ) we were told that the beam was nearly intact, although the fall was of about 35 feet straight down to the ground. We were therefore asked by Bjorn to bring some new guywires and hooks to refasten the antenna to the roof.

Well, we finally boarded the airplane at Arlanda International Airport at 0730 a.m. Monday, November 22, and after 18 long hours we landed on African soil for the first time in our lives. When leaving the aircraft we were struck by the very high humidity; all our clothes were instantly wet, and streams of sweat ran down our faces. Was this the climate we were supposed to stay in for two weeks? At that moment we really longed for the snow we had just left back in Stockholm.

The first part of this adventure then began—the customs clearance. We had been told that the only answer to any question from any officer was, "personal belongings." Well, Leif managed to get the transceiver through as well as his suitcase without any inspection at all, but I was asked to open mine. Okay, here I was standing in front of a sleepy officer explaining what my headset, keyer, cables, and extra batteries had to do in his country. He just didn't believe me when I told him that all these items were "personal belongings." If I was wet before this show started, I was now floating. But as an angel out of the sky, Bjorn managed to come up to me and spoke some words in Swahili—something like "hamna tabu" (no problems)—to the officer, and that seemed to loosen him up. Suddenly he took his little piece of chalk and made a cross on my bag and it was all over. I really felt relieved and was very grateful to Bjorn for getting me out of the situation.

The next day we were very busy inspecting the beam and made all the preparations to get it up again. We had to drill some new holes in the flat concrete roof, and that had to be done manually, as no electrical drill was available. With the sun almost on top of our heads in 120° heat, it was not very easy. We had to take a lot of breaks all day, but we finally got the beam in position and everything worked out 100%. Unfortunately, the 80 meter dipole didn't come up too high, which we really regretted later on. However, there was absolutely no other way to put it higher at that time. The heat really weakened us by evening, and not very many QSOs were made.

On November 24 we got up quite early and started to operate. Unfortunately, we found the propagation not too good, but we worked a lot of Europeans on 15 and

Leif, SM0AJU, at the 5H3BH operating position for the 1982 CQ WW DX CW Contest.

From left to right: John, SM0DJZ, Leif, SM0AJU, and Bjorn, SM0EAI/5H3BH.

10 meters. These two bands were the only ones workable during daytime hours, and we had to wait until the afternoon before the first W's started coming through. By afternoon the bands really started to boil. Ten meters was expecially good into W-land from 1500Z to 1800Z. Then we just switched over to 15 meters and continued to 20 meters later on at about 2100Z. We also tried out 40 and 80 meters, but were not too lucky there. On 40 meters we put up several more radials for the 14AVQ, which seemed to help a lot. On 40 meters we managed to work Europe and Japan the first evening and at about 0200Z we had a good opening into the US. The big disaster was 80 meters. The only thing we managed to work was JA's. We really wanted to have more than a JA and zone 25 on 80 meters during the contest, but it didn't look as if it would happen.

When we tried to load the linear, we couldn't notice any increase in output. After a short investigation, we found the bandswitch was broken. I won't tell you what we said to each other, but it wasn't nice in English or Swedish. Trying to fix the linear wasn't worth it, so we had to accept our situation of going QRP on 80 meters in the contest.

After the first day spent in huge pileups, we were ready to enter the *CQ* WW Contest on Friday evening. The alarm clock was set on 2330Z, but my paranoia of the alarm not working properly kept me awake the whole evening. I had to pay for that later in the morning. Anyway, the alarm did *not* work, and I put Leif into starting position at 0000Z. We were in business. I was set to pick up new multipliers on the TS-120 barefoot (the one we brought from home), and managed to make a few QSOs while Leif really worked W's at a rate of 100 QSOs/hour for the first few hours. The first night everything went as planned, and although I was tired, we managed to keep a planned scheme UNTIL . . . the A/C line went off! The electrical situation in these countries is a little bit doubtful, and Bjorn had warned us about this. Well, what to do? Nothing but wait. Some message reached us telling us that it wouldn't be too long. Never have minutes looked so much like hours, and just sitting looking at each other wasn't really why we had traveled to Africa. Anyway, after 30 minutes the air conditioner started up again, and filled with joy, we jumped back to our positions. Happily, no more A/C cutoffs happened during that weekend.

Finally the 48-hour mark arrived and our first DXpedition/Contest was over. We managed to work 3,300 QSOs with 280 country multipliers and 113 zones—a good result, as only 10 QSOs were made on 80 meters due to the PA failure. We just hoped that our effort could stand up against the attacks from NP4A, RG6G, and others, but that's another story. We ended up as number seven worldwide, and we feel proud of that position. Just think about the callsign on CW: 19 dits. Try that one at 25 wpm.

The next week we just worked as much as possible on all bands. We also took some breaks from the shack to take a swim in the Indian Ocean and to get a sunburn to show our families when we got home. We had a marvelous time, and on the second weekend Bjorn took us on a ride up in the country for a safari. We drove up to Mikumi National Park, stayed overnight in a bungalow, and looked at many typical African animals, such as elephants, giraffes, zebras, and wildebeests. It was really fantastic to see all those animals walking around in their own environments without any fences as in a zoo.

On Monday evening December 6th we worked our last and final QSO for this trip. We had told Bjorn upon our arrival that 10,000 QSOs would be a nice goal, and on that evening we totaled 10,656 QSOs by working DL6WD on 80 meters. Now we just had to pack all our own gear and put the station together for Bjorn as he had it, and then go to sleep before our long journey back to Sweden. The next morning Bjorn took us to the airport, where we thanked him for the great hospitality he had shown us.

During the whole stay we used Bjorn's personal callsign, 5H3BH, and worked as second operators. When we got back home, I found my family swimming in envelopes requesting QSL cards. They kept coming the next month as well. All to-

gether some 2000 letters arrived, and as the cards were already printed, I used the whole Christmas holiday to write them. We hope that those of you who worked us got something good out of this DXpedition—maybe a new country for your DXCC or 5H3 on a new band for the 5BDXCC. Anyway, we really had a great time, and it was a good experience.

During the summer of 1983 we discussed where to go during *CQ* WW CW 1983. Once again Bjorn invited us to Africa. We remembered the hospitality we received in 1982 and gladly accepted this invitation. We thought we could make some improvements this time by bringing an extra linear and also by putting the 80 meter dipole up much higher.

We went down on November 21, almost exactly one year after our first trip. This time none of us wanted a repeat of the customs incident in 1982, so Bjorn had prepared all the necessary documents they needed. We more or less walked through without any trouble at all. That was a relief, especially for me.

As 1983 was declared "World Telecommunications Year," Bjorn had also managed to arrange a special callsign, 5H3WCY, for us during our stay. That was a good way of handling the QSL cards instead of using 5H3BH. We hoped that the mix-up between QSL managers would be less than the last time.

During our 1982 DXpedition we only made about 100 QSOs on 80 meters, so we now tried to raise our 80 meter dipole higher. To do that we needed a wooden pole about 20 feet long to mount on the roof. We asked Bjorn if there was any chance of finding such a pole. The only way to arrange this was a visit to the local carpenter. He was a very busy man. It took him 4 days to make a 15 foot long teak pole, and it was a masterpiece. I think it will be the only time in my life that I will use teak for a supporting mast for my antennas.

We got it working just one day before the contest, and together with a working linear amplifier we were able to make more contacts on 80 meters. In the contest we never got an answer to our "CQ." We had to call each station worked. People *never* listen, but just call and call and call. Many big and loud stations from Europe didn't listen carefully enough for a weak DX station, and they missed their double multiplier.

Regarding the contest, the 5H3WCY expedition worked out better with a higher total score than the 5H3BH expedition, although the conditions were poorer. We now had an extra linear to go with our multiplier station, which was good. We netted almost the same number of QSOs (3,300) and had 332 countries/126 zones, which is more than 60 additional multipliers. The total score was 4.2 million points.

The second weekend outting was booked for a safari trip out into the jungle. Bjorn had chartered a small aircraft to take us down to Soleous National Game Reserve, where we stayed two nights in a tent very close to the Rufiji River. It was a real thrill sleeping to the many different sounds of African wildlife. During the day we took a boat ride on the river and saw thousands of hippopotamuses and crocodiles. We also went on a walking safari early one morning and saw wild lions and water-buffaloes. This was really something to remember.

Well, all good things come to an end, and so did our second DXpedition. We returned to Dar es Salaam. During our last day there we were told that the entire capital city had been without electricity on Sunday morning from 0800 to 1500 local time. Just think if this had happened one week earlier. I tremble when I think about it.

Finally, we wish to express our great gratitude to Mr. Bjorn Humble, 5H3BH, for the gracious hospitality he showed us during these two DXpeditions. We will never forget this.

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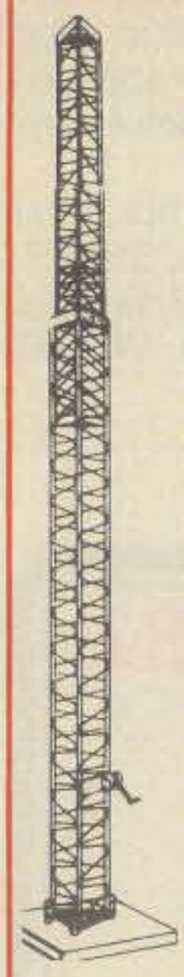

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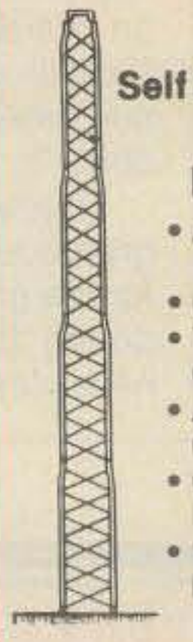

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New 80/40 Meter Vertical Antenna HF2V $129 Delivered (Continental USA)

- Optional 160 Meter Resonator Kit Model TBR 160S $49

Delivery Anywhere In The Continental USA At No Additional Cost. (Free Shipping On Butternut Accessories Also When Purchased With Antenna.)

RG-213U

$.29/ft $279/1000 ft
Up to 600 ft via UPS

- RG-213/U—95% Bare Copper Shield
- Mil-Spec Non-contaminating Jacket for longer life than RG8 cables.
- Our RG-213/U uses virgin materials.
- Guaranteed Highest Quality!

RG-8X

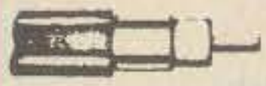
$.19/ft $179/1000 ft

- RG8X—95% Bare Copper Shield • Low Loss
- Non-contaminating Vinyl Jacket Foam Dielectric

Coaxial Cable Loss Characteristics (DB/100 ft)

Cable Type	Imped.	10MHz	30MHz	150MHz	450MHz
RG-213/U	50	.6	.9	2.3	5.2
RG8X	52	.8	1.2	3.5	6.8
RG-58/U	52	1.4	1.9	6.0	12.5
½" Alum	50	.3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

HARDLINE/HELIAX™



Lowest Loss for VHF/UHF!

½" Alum. w/poly Jacket ..... $.79/ft
½" LDF4-50 Andrew Heliax ™ $1.69/ft
⅞" LDF5-50 Andrew Heliax ™ $3.99/ft
select connectors below.

HARDLINE & HELIAX ™ CONNECTORS

Cable Type	UHF FML	UHF MALE	N FML	N MALE
½" Alum	$19	$19	$19	$25
½" Heliax ™	$22	$22	$22	$22
⅞" Heliax ™	$49	$49	$49	$49

AMPHENOL CONNECTORS

Silver PL259 ..... $1.25
UG21B N Male ..... $2.95 UG23D N Female $2.95

Antenna Wire & Accessories

Copperweld Antenna Wire (steel core, copper coated
Solid 12 ga ..... $.12/ft 14 ga ..... $.10/ft
Stranded 14 ga ..... $.10/ft 16 ga ..... $.09/ft
¼ mile 18 ga copper-clad steel wire $30
6 inch heavy-duty end insulator ..... $2.00/ea.
Dog-bone insulator ..... $.79 Coax seal $2.50

Van Gorden

1:1 Balun ..... $11 Center Insulator $6
Dipole Kits D80 $31/D40 $28
Short Dipole Kits SD80 $35/SD40 $33
All-band Dipole w/ ladder line $29
Eavesdropper SWL Antenna $64

CUSHCRAFT

MULTI-BAND HF ANTENNAS

A3 3-el Tribander	$219	A4 4-el Tribander	$289
R3 20/15/10mtr Vert	$279	A743/A744 40mtr Kit	$75

HF MONO-BAND ANTENNAS

10-3CD	$ 95	10-4CD	$109
15-3CD	$119	15-4CD	$129
20-3CD	$199	20-4CD	$279
40-2CD	$289	D40	$149

VHF/UHF BEAMS

A50-5	$ 79	617B	$199
214B	$ 79	3219	$ 95
220B	$ 95	424B	$ 79

OSCAR/TWIST ANTENNAS

A144-10T	$ 52	A144-20T	$ 75
A147-20T	$ 63	416TB	$ 59
A14TMB	$ 29	PS4	$ 69

VHF/UHF FM ANTENNAS

A147-4	$ 29	A147-11	$ 49
214FB	$ 79	228FB	$219
A449-6	$ 29	ARX2B	$ 39

HY-GAIN

Discoverer 2-el 40-mtr Beam	**$339.00**
Discoverer 3-el Conversion Kit	**$219.00**
EXPLORER-14 SUPER SPECIAL	**$329.00**
QK710 30/40 mtr Add-On-Kit	$85
V2S 2-mtr Base Vertical	$49
TH5MK2S Broad Band 5-el Triband Beam	$419
TH7DXS 7-el Triband Beam	$479
TH3JRS 3-el Triband Beam	$199
TH2MK3S 2-el Triband Beam	$179
205BAS 5-el 20-mtr Beam	$369
155BAS 5-el 15-mtr Beam	$219
105BAS 5-el 10-mtr Beam	$149
204BAS 4-el 20-mtr Beam	$269
64BS 4-el 6-mtr Beam	$69
66BS 6-el 6-mtr Beam	$139
18HTS 80-10 mtr Hy-Tower Vertical	$439
LC-160 160-mtr Coil Kit for 18HTS	$45
214BS 14-el 2-mtr Beam	$49
2BDQ 80/40 mtr Trap Dipole	$69
5BDQ 80-10 mtr Trap Dipole	$129
BN86 80-10 mtr KW Balun W/Coax Seal	$22

HUSTLER

6BTV 80-10 mtr Vert. $129 5BTV 80-10 mtr Vert. $109
4BTV 40-10 mtr Vert. $89 G7-144 2-mtr Base $119
G6-144B 2-mtr Base $89

Mobile Resonators	10m	15m	20m	40m	75m
400W Standard	$16	$17	$19	$22	$26
2KW Super	$20	$22	$25	$29	$39

Bumper Mounts - Springs - Folding Masts in Stock!

MINI-PRODUCTS HQ-1
LIST $182.50 SALE $159

Wing Span - 11 ft Wind Area - 1.5 sq ft
Boom - 54 in. long 1200W P.E.P. Input

ALPHA DELTA COMMUNICATIONS

Transi-Trap Surge Protectors—In Stock Now!

Model LT 200W UHF Type	$19
Model HT 2KW UHF Type	$29
RT 200W Deluxe UHF Type	$29
RT/N 200W Deluxe N Type	$32
HV 2KW Deluxe UHF Type	$32
HV/N 2KW Deluxe N Type	$35

KLM

KT34A 4-el Broad Band Triband Beam	$339
KT34XA 6-el Broad Band Triband Beam	$489
40m-1 40-mtr Rotatable Dipole	$179
40m-2 2-el 40-mtr Beam	$309
40m-3 3-el 40-mtr Beam	$459
40m-4 4-el 40-mtr Beam	$649
2m-13LBA 13-el 2-mtr Beam	$79
2m-14C 14-el 2-mtr Satellite Antenna	$89
2m-16LBX NEW-16-el 2-mtr Beam	$99
2m-22C NEW-22-el 2-mtr Satellite Antenna	$119
432-30LBX NEW-30-el-432 MHz Antenna	$99
435-18C 435 MHz Satellite Antenna W/CS-2	$119
432-16LB 16-el 432 MHz Beam	$69
435-40CX 435 MHz Satellite Antenna w/CS-2	$159

ROTORS

Alliance HD73 (10.7 sq ft rating)	$109
Alliance U110 (3 sq ft rating)	$49
Telex HAM 4 (15 sq ft rating)	$219
Telex Tailtwister (20 sq ft rating)	$269
Telex HDR300 Heavy Duty (25 sq ft rating)	$519
KLM EL-3000 Moon Tracker Elevation Rotator	$369
Kenpro KR400 Azimuth Rotator	$129
Kenpro KR500 Heavy Duty Elevator Rotator	$159
Kenpro KR600 Azimuth Rotator	$199
Kenpro KR2000 Heavy Duty Azimuth Rotator	$379
Kenpro KR5400 AZ/EL Rotor Package	$259
Kenpro KR5600 Heavy Duty AZ/EL Rotor Pkg	$329

ROTOR CABLE

Standard 8 cond cable $.19/ft
(vinyl jacket 2-#18 & 6-#22 ga)
Heavy Duty 8 Cond cable $.36/ft
(vinyl jacket 2-#16 & 6-#18 ga)

UNR-ROHN GUYED TOWERS

10 ft Stack Sections

20G $39.50	45G $112.50
25G $49.50	55G $134.50

All 20G, 25G, 45G and 55G Accessories In Stock at Discount Prices - CALL!

Foldover Towers	Model	Height	Ant Load*	Price
	FK2548	48 ft	15.4 sq ft	$899
	FK2558	58 ft	13.3 sq ft	$949
	FK2568	68 ft	11.7 sq ft	$999
	FK4544	44 ft	34.8 sq ft	$1199
	FK4554	54 ft	29.1 sq ft	$1299
	FK4564	64 ft	28.4 sq ft	$1399

25G Foldover Double Guy Kit $219
45G Foldover Double Guy Kit $249

*Above antenna loads for 70 MPH winds and Guys at Hinge & Apex.

TOWER/GUY HARDWARE

3/16" EHS Guywire (3990 lb rating)	$.15/ft
1/4" EHS Guywire (6000 lb rating)	$.18/ft
5/32" 7 × 7 Aircraft Cable (2700 lb rating)	$.15/ft
3/16" CCM Cable Clamp (3/16" or 5/32" Cable)	$.45
1/4" CCM Cable Clamp (1/4" Cable)	$.55
1/4" TH Thimble (fits all sizes)	$.45
3/8EE (3/8" Eye & Eye Turnbuckle)	$6.95
3/8" EJ (3/8" Eye & Jaw Turnbuckle)	$7.95
1/2" EE (1/2" Eye & Eye Turnbuckle)	$9.95
1/2" EJ (1/2" Eye & Jaw Turnbuckle)	$10.95
3/16" Preformed Guy Grip	$2.49
1/4" Preformed Guy Grip	$2.99
6" Diam - 4 ft Long Earth Screw Anchor	$14.95
500D Guy Insulator (5/32" or 3/16" Cable)	$1.69
502 Guy Insulator (1/4" Cable)	$2.99
5/8" Diam - 8 ft Copper Clad Ground Rod	$12.95

PHILLYSTRAN GUY CABLE

HPTG2100 Guy Cable (2100 lb rating)	$.29/ft
HPTG4000 Guy Cable (4000 lb rating)	$.49/ft
HPTG6700 Guy Cable (6700 lb rating)	$.69/ft
9901LD Cable End (for 2100/4000 cable)	$7.95
9902LD Cable End (for 6700 cable)	$8.95
Socketfast Potting Compound (does 6-8 ends)	$14.95

GALVANIZED STEEL MASTS

Heavy Duty Steel Masts 2 in OD - Galvanized Finish

Length	5 FT	10 FT	15 FT	20 FT
.12 in Wall	$29	$49	$59	$79
.18 in Wall	$39	$69	$99	$129
.25 in Wall	$69	$129	$189	$249

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NEW Top-of-the-Line
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- 100% Duty Cycle
- 40 Memory Channels

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TR2600A - 2mtr
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High Tech
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NEW
Ultra-
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TH21AT 2mtr
TH31AT 220 MHz
TH41AT 440 MHz
CALL FOR SPECIAL PRICES—
SAVE $$$!!

MIRAGE AMPLIFIER SALE!

B3016
ONLY $199!

Model	Band	Pre-amp	Input	Output	Sale Price
A1015	6M	Yes	10W	150W	$249
B23	2M	No	2W	30W	$ 79
B215	2M	Yes	2W	150W	$259
B108	2M	Yes	10W	80W	$159
B1016	2M	Yes	10W	160W	$249
B3016	2M	Yes	30W	160W	$199
C22	220	No	2W	20W	$ 79
C106	220	Yes	10W	60W	$179
C1012	220	Yes	10W	120W	$259
D24	440	No	2W	40W	$179
D1010N	440	No	10W	100W	$289

ICOM

IC735 NEW General Coverage
HF Transceiver Full Featured
-Ultra Compact - Economical
List Price $849
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Dual Band Xcvr List $549
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IC02AT - 2mtr
IC04AT - 70cm
High Tech
HT XCVRS

IC2AT - 2mtr
IC3AT 220 MHz
IC4AT 440 MHz
ALL IN STOCK—
CALL FOR SPECIAL PRICES!

ASTRON POWER SUPPLIES

Heavy Duty - High Quality - Rugged - Reliable

- Input Voltage: 105-125 VAC Output: 13.8 VDC ± .05V
- Fully Electronically Regulated—5mV Maximum Ripple
- Current Limiting & Crowbar Protection Circuits
- M-Series With Meter—A-Series Without Meter

Model	Cont. Amps	ICS Amps	Price
RS4A	3	4	$ 39
RS7A	5	7	49
RS12A	9	12	69
RS20A	16	20	89
RS20M	16	20	109
RS35A	25	35	135
RS35M	25	35	149
RS50A	37	50	199
RS50M	37	50	229

YAESU

FT-757GX LIST PRICE $829
CALL FOR SPECIAL SALE PRICE!

FT-726R LIST PRICE $899
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FT2700RH NEW 2m/70cm
Dual Band Transceiver
Full Duplex — Cross Band
Operation! List $579
CALL FOR PRICE—SAVE $$!

FT-209RH
NEW High Tech
2mtr HT
5 Watt Output
NOW IN STOCK

CALL FOR YOUR
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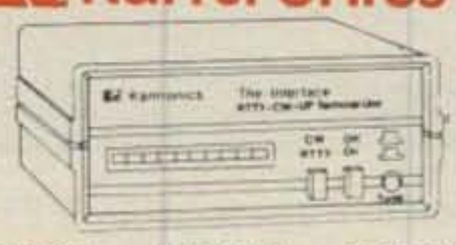
CP-1 COMPUTER PATCH
List $239.95 SALE $189.95!

CP1-1 Computer Patch	$189.95
CP-1/20 Computer Patch W/VIC20 MBATEXT	$219.95
CP-1/64 Computer Patch W/C64 MBATEXT	$219.95
CP-100 Deluxe Computer Patch	$299.95
MP-1 Micropatch	$129.95
ATU-1000 Advanced Terminal Unit	$949.95
MBATOR Software C64 or VIC20 (Specify)	$89.95
Doctor DX CW Band Simulator Software	$99.95
Doctor QSO Morse Code Trainer Software	$79.95
PKT-1 Packet Controller	$469.95

Isopole 144MHz, 220MHz & 440MHz Antennas
In Stock — CALL FOR SPECIAL PRICES!

Kantronics



The Interface	List $169.95	SALE $129.95
Interface II	List $269.95	SALE $239.95
Challenger	List $99.95	SALE $89.95
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UTU Terminal Software (IBM/CPM/TRS80)		$19.95
Hamsoft/Amtorsoft (Atari/C64/VIC/TRS80C)		$79.95
Apple Hamsoft $29.95 Atari/VIC Hamsoft		$49.95
TRS80C Hamsoft $59.95 TI994A Hamsoft		$99.95
Hamtext (Apple/Atari/C64/VIC20)		$99.95
Amtorsoft (C64/VIC20)		$89.95
Amtorsoft (Apple)		$139.95

AMERITRON

AL80A NEW 1000W 3-500Z Amplifier $689

AI-84 600W PEP Output (4-6MJ6 Tubes)	$379
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RCS-8 5 Pos Remote Antenna Switch	$119
ATR-15 1500W Antenna Tuner	$289

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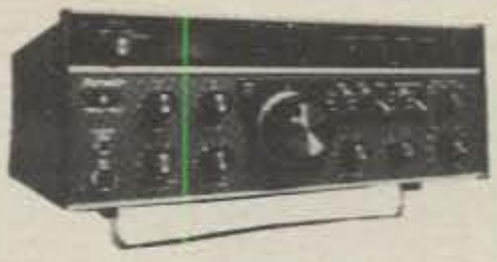

NEW CORSAIR II
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425 Titan New 3KW amplifier
in stock-only $2195!

J.I.L.

SX400 Deluxe Scanner

SX400 26-520MHz Scanner/Radio	$499
RF1030 100kHz-30MHz Converter	$239
RF5080 500-800MHz Converter	$199
RF8014 800-1400MHz Converter	$199
ACB300 Antenna Control Box	$79
P-1A Regulated Power Supply Unit	$39

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KDK Scanning 10 Memory FM Transceivers
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FM7033 440MHz $299

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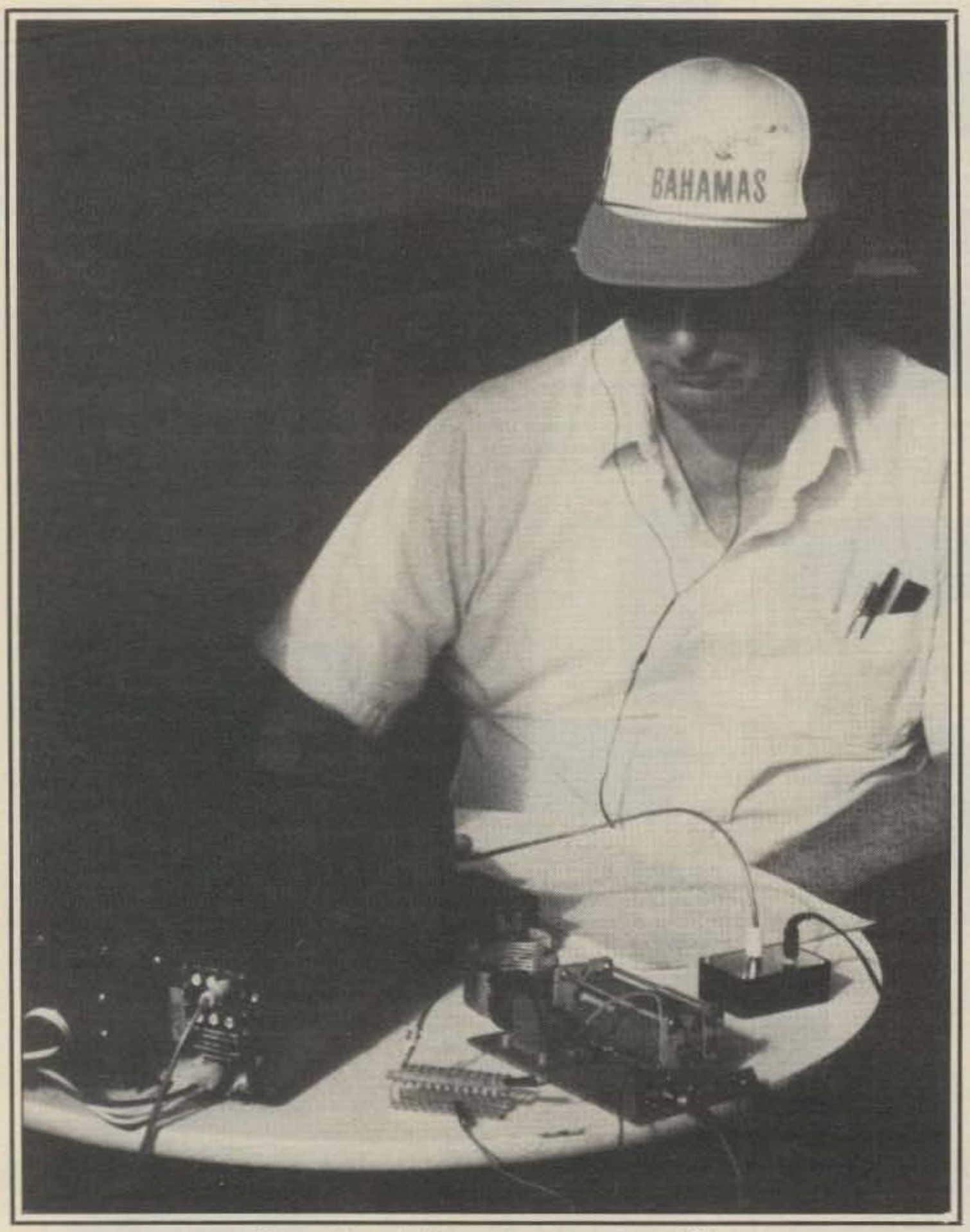
CIRCLE 75 ON READER SERVICE CARD

Not all Dxpeditions involve thrashing through a primeval jungle wielding a machete. Some can be quite nice and include all the amenities, such as room service.



The author picking out a rare one on 80.

Try A Bahama Break

BY E.L. RAUB, JR.*, W1RAN/C6A

Everyone knows where the Bahama Islands are. They are due south of Pennsylvania. Some of them are farther north than Miami, and Long Island (the other one) is one of them. The daily 1015 mile 9 a.m. flight out of JFK/NYC delivers you in 3.5 hours to January 80°F weather and hot sun, with constant tempering breezes of occasionally door-slamming intensity.

We skipped Nassau, the capital, for the quiet of Freeport (45K pop.) on Grand Bahama Island. ("Baja mar" means shallow sea.) The people appear to live well on tourism, with banking, construction, the free port, a distillery, and the oil refinery contributing relatively much less. The island offers big-time golf, tennis, parasailing, and unsurpassed swimming in the turquoise sea, plus fine international stores selling haute couture products, Paris perfumes, Waterford Crystal, fine English china, rums at one-half U.S. prices, and gold jewelery made in the islands. There are genuine bargains for the discerning. There is also a notable 12-acre botanical garden, where small curly-tailed lizards scurry among the dead leaves. Bahamian and U.S. dollars are used interchangeably, one for one.

San Salvador Island was Columbus's first landfall. However, settlers were slow to arrive. Royalists fleeing the American Revolution brought with them their black slaves, the descendents of whom still live on the islands. In supplying the Confederacy, the British also helped the economy of Nassau, which was a hotbed of pirates. (Some modern-day casino-goers will say that little has changed on that score.) The British carried off all of the mahogany in the 1700s. Attempts to farm cotton and citrus, and operate a fishery all failed. The citrus was used to start Florida's orange crop. The soil is a deathly gray and supports little but 30-foot scrub pine. After WW II tourism was encouraged, but it wasn't until the casinos were allowed in that tourism took hold. Weekend high rollers from Florida still contribute much to the island's well-being. The U.S. military are on several of the larger islands. All of the fast-food franchises are present, and a Wynn-Dixie hardware store will back up a forgetful DXpeditioner. The small free port and refinery are at the western extremity of Grand Bahama, where large parabolic screens capture TV signals from Miami, 120 miles to the southwest. There is an impressive amount of building going on, mainly small colorful concrete-block homes of tastefully varied designs, starting at $45K. Developers' roads cut through the scrub, with lots already staked out. Living on the island could be easy, but in truth, beyond what I have mentioned there is little to do, negligible industry, and living is not cheap.

*12 Deerfield Rd., Waterford, CT 06385

Our high-rise resort hotel, an excellent choice based on the advice of Don Karvonen, K8MFO, was located on the south shore, towering over big-name competition, well away from the business districts, adjacent to marinas and the golf course. Upon arrival, a 20 meter folded dipole was half unfolded and left on the floor. It scared up ZS6ME and DX to the south. After dark a 30 meter end-fed wire was lowered from our twelfth floor window on the south side, but signal levels in the states were poor, even though stations were worked on 80, 40, and 20 meter CW. Coupling to the steel frame of the high rise was bad, and the continual breezes caused the wire to swing slightly, driving the SWR wild and dumping out the power supply on 80 meters. Nevertheless, the Argosy II worked as far north as VE1 on 80 meter CW.

With a new $100K sealed vinyl roof, the management was at first unenthusiastic about having people go topside. However, the hotel's Operations Director, Mr. Michael F. Wicky, a personable Swiss from Lausanne, had been through antenna siting with a number of visiting amateurs and took charge of the problem. With QRP CW and the dipole on the roof, I could work about any DX I could hear, regardless of very poor propagation. In January in the depths of the sunspot cycle, far-out DX is a dawn-and-dusk proposition, with W's S-9 all day long. Long-path VK's were easy, and 700 QSOs and WAC were tallied in a relaxed week which included island tours, lots of swimming, and Mai Tais on the beach at four. It's really the good life!

It turns out that 1 inch styrafoam board cutouts about the new Argosy II just fit into a flight bag, along with log and antennas, and caused no stir in going through customs. Register your equipment with U.S. customs or carry the sales receipt with you so there can be no questions about tariff on it as you return to U.S. soil. A photo-bearing driver's license or birth certificate is adequate identification for customs.

A year's permit for operation in the Bahama Islands is available from Bahama Telecommunications Corp., P.O. Box N-3048, Nassau, Bahama Islands. Direct your inquiry with the $6 US fee, two copies of your FCC license, and two copies of your birth certificate to Mr. Johnson. Allow 8 to 10 weeks and follow up your request by telephone (809-323-4911) after 2 weeks. They have recently computerized and handle many ship-to-shore applications, so figure on delay. Things happen slowly in the islands, and impatient Americans will meet with little success.

As for accommodations, the Swiss-owned Atlantik Beach Hotel (P.O. Box F-531, Freeport, tel. 809-373-1444) suited our requirements perfectly, with particularly good food in the bargain. Our travel agent put us in with a mid-week tour group on Pan Am for a nice saving. A note to Mr. Wicky will reserve for you a well-situated room (#1620) or studio apartment (#1618), plus expectation of some help with antennas.

There is little on the roof to which to secure things beyond a pipe hand rail on the elevator roof house steps and air-conditioning equipment 45 feet east, but at that elevation over the ocean, not much of an antenna is required. As K8MFO said, "A vertical gets out like gang-busters." The roof is roughly 40 feet N/S by 150 feet E/W and flat. Due to the usual electrical noises in any commercial building, use a balanced feeder to balanced antenna or properly terminated coax to minimize noise pick-up by the feeder. During the day with weak DX, there is some problem with noise. Evenings are quiet. For an easy winter's hiatus without jet lag from NYC, a Bahama Break is the way to go!

RTTY FOR ALL

MPT3100 + DSK3100 + ST6000:
MPT3100—the acknowledged top-of-the-line system for both commercial and serious amateur RTTY and CW stations. HAL pioneered the radio mailbox technique with the MPT3100, and now the new DSK3100 disc drive option gives you 326,000 characters of message storage. The system is designed particularly for the amateur, commercial, or military operator who has to handle a large amount of traffic. You can collect, edit, and retransmit traffic perfectly with a minimum of effort. The ST6000 is renowned for its weak-signal performance and reliability. Add the ARQ1000 for full AMTOR operations, including an AMTOR mailbox. If you are serious about your code and need high performance and reliability, this system is the proven world leader.

CT2200 + KB2100 + ARQ1000 + RS2100 + KG12:
The CT2200 and KB2100 give you an integrated system that includes video, RTTY demodulators (high, low, modem low, and modem high tones), and many advanced features. Operate Baudot or ASCII at 45–1200 baud and CW at 5–99 w.p.m. Add the ARQ1000 for ALL AMTOR features (not just *some* of them). The RS2100 RTTY Scope gives you the acknowledged best tuning indicator for a complete RTTY system. Also included in the CT2200 is selective-call ASCII printer output, split screen, 36 or 72 characters per line, smooth scroll, and 2 or 4 pages of display memory. In addition, the CT2200 has 2 HERE IS and 8 large "brag-tape" memories that are programmable and non-volatile. This is our most popular system, used by thousands of amateurs around the world.

CRI-200:
At last, a computer interface that *really* works and has an accurate tuning indicator. Take advantage of HAL's years of experience in RTTY and see how good computer RTTY can be. Best of all, it's universal and you can select the computer and software of your choice. Why be frustrated with computer RTTY? Hook-up the CRI-200 and work ALL the stations!

CWR6850:
Have a space problem or want portable RTTY? The CWR6850 is a one-package complete RTTY system. All you need is your transceiver and 12 VDC—the rest is in the CWR6850, including the screen. The high-performance RTTY demodulator for all shifts and either high or low tones is built-in. AND, the system is expandable! Add the ARQ1000 for AMTOR, the RS2100 RTTY Scope, and an ASCII printer, and you have a no-compromise base station for all modes.

HAL COMMUNICATIONS CORP.
BOX 365
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CIRCLE 20 ON READER SERVICE CARD

While we all read the stories in the newspapers and saw the events unfold on TV, many of us were unaware of the role amateur radio played in the relief efforts for Bhopal.

Amateur Radio Provides Emergency Communication During Bhopal Disaster

BY GRACE DASAN*, VU2AIG

On December 2, 1984 Bhopal was a city in India that was virtually unknown to the rest of the world. The next day the whole world knew of Bhopal, and to some extent the thousands who died there, bringing the name of Bhopal to the world's press.

On December 3, 1984 there was an accidental leak of MIC gas from the Union Carbide fertilizer plant. Union Carbide, a multinational company, first came to India 50 years ago, when they built a small plant to manufacture batteries. Through the years they diversified and grew into a major chemical-producing company. The accident claimed the lives of over 2,000 people and injured many thousands more. Early reports on radio and television could not convey the magnitude of the disaster, and it was only after a few days had elapsed that the world realized the enormity of the situation.

Bhopal had become a virtual ghost-town in the first few hours of the tragedy, as almost half of its population of 8,000,000 fled into the countryside to escape the effects of MIC gas. Due to acute manpower shortage, vital services and communication links were stretched to the breaking point. Indian amateurs stepped in to fill the breach. On December 5, the third day of the tragedy, VU2AID, VU2RX, and I put together a team that would leave for the stricken city the next morning. They would travel by car, taking all of the necessary communications equipment with them.

So on very short notice, and not knowing what to expect when they got there, VU2AID dispatched VU2EMJ and VU2NAX to Bhopal. Without stopping for rest, the pair drove some 600 miles over rough and dusty roads to arrive the next morning, December 7. By noon they had canvassed the city and found the QTH of VU2NB. VU2NB and his XYL, VU2SKN, had started to broadcast the news the day before. The couple invited the weary travelers to stay with them.

**PAPI, 12 Greenkiss Gardens, Waksai, Lonavala-Pune, India*

After a brief rest the team set out to learn about the serious magnitude of the accident and to arrange for a meeting with the Chief Executive of Bhopal. The meeting would determine and meet the civil administration's communication requirements. The Commissioner of Bhopal welcomed the group and detailed his requirements. The vital communications links needed were inter-hospital, Police Headquarters Central Control, factory site, supply center, Missing Persons Bureau, and Commissioner's office.

To form this network, HF and VHF equipment would be deployed. Five local amateurs (VU2PRO, VU2RUZ, VU2HEL, VU2ARK, VU2SKN, and VU2NB) stepped in to augment the group. The demand for personnel, as well as the demand for equipment, increased. It wasn't an easy job. On the 10th of December the train from Bombay brought four young college students who were amateurs and their equipment. The four students—VU2JAC, VU2HPR, VU2VSK, and VU2MPX—fit right in with the others who were putting in long hours to get the job done. The job was done much to the satisfaction and admiration of the civil authorities.

After the gas leak, production was halted and the factory itself was shut down. However, 40 tons of the lethal gas was still in the storage tanks and still presented a real problem. In order to ensure the city's safety, the authorities thought it best to use up the stored gas by completing the manufacturing process and turning it into pesticide. This operation was code-named "Operation-Faith" for good reasons. When news of this further development reached the people, a new and bigger exodus began. Despite the assurances of the government, people left the city in droves by every means possible, trying to find a safe haven.

The people traveled by foot, on the rooftops of trains, by wagons, scooters, cars, bullock-carts, and bicycles in a never ending caravan, carrying with them their prized possessions just like war refugees. The city again reeled under the shortage of manpower. All of the amateurs elected to stay at their posts and see the thing through to completion. After a very tense five days "Operation Faith" was completed successfully.

The amateurs began to wind up their work and prepare to go home. The civil authorities, however, once again asked for help. They needed the amateurs to stay a little longer and help with the distribution of food and civil supplies in the disorganized city. The Commissioner himself requested the amateurs stay and assist in monitoring the communications for the distribution program, a request which the overworked and tired amateurs readily accepted. The work that the authorities had planned would take ten days was completed in four due to the assistance of communications provided by the ever-willing amateurs.

The Bhopal operation came to an end on the evening of December 23rd. The college students had left a day or so before to catch up on their studies for final examinations. The remaining team drove day and night to be with their families for Christmas.

The amateurs who operated out of Bhopal, in addition to meeting the communications requirements set out by the civil authorities, coordinated communications with other relief organizations. They also helped friends and relatives trying to locate missing loved ones. As would be expected, countless amateurs extended their help and assistance to the Bhopal team. The Airnet India group maintained a day and night watch for the entire period, handling traffic and relaying messages. Everyone gave their all.

In tragic situations people come forward to help ease the pain and suffering. Amateur radio operators came forward once again, following a long, worldwide tradition of being there when needed and of getting the job done. We can all be proud of these, our fellow amateurs.

Addendum

Our thanks go to Darleen Magen, WD5FQX, for bringing this story to our attention. —K2EEK

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Like all *CQ* contests, the new *CQ* World-Wide VHF Contest coming up this month is a world-wide competition and does qualify as a first. However, it's not the first *CQ* VHF Contest, as we sponsored a VHF contest back in the '50s.

SCORE has taken on quite an ambitious project in making this a world-wide affair. Not being knowledgeable about overseas VHF activity, my comments may be a little out of line, but it would seem to me that the US has a distinct advantage over other areas in competing for top honors. With the exception of Great Britain, Japan, and possibly the USSR, the number of prefix multipliers is rather limited, keeping in mind that coverage on the VHF bands is mostly limited to local areas.

Since all entries will be receiving a commemorative certificate, no one will be left without an award. However, the final results of this first contest should present a clearer picture, and proper adjustments can be made the next time around.

Going on to another subject, the May 3rd issue of "The DX Bulletin" covering the Fresno Convention was rather confusing in its report of the awards presented. Hopefully a correction will be made in the bulletin, but I want to set the record straight, even at this late date.

Herb Becker, W6QD, did not originate the *CQ* WPX program. That was Dick Spenceley's idea when he was *CQ*'s DX Editor back in the early '50s. There may have been a YASME award at the Convention for the late Vic Clark, W4KFC, but it had no connection with KV4AA, also a Silent Key. There was a Dick Spenceley, KV4AA Memorial Plaque presented to Dick Norton, 9Y4VT, for making the most QSO's in the *CQ* 1983 WW CW Contest (donated by Dick's 14270 kHz Group). Hope this sets the record straight.

Several other *CQ* contest awards were also made at the Fresno Convention. The Hall of Fame award to W6QD was for his early contribution to DX and because he was the "grandfather" of the *CQ* World-Wide DX Contest and the WAZ program back in the late '40s (with an assist from Larry LeKashman, W2IOP).

Deadline for material for the October issue is July 15th, and August 15th for the November issue. Sending it to my home address will give you a few extra days leeway.

Have you checked the expiration date of your license lately?

73 for this time, Frank, W1WY

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

Jul.	1	Canada Day Contest
Jul.	4-5	Colorado 6 Meter Net Party
Jul.	6-7	Venezuelan SSB Contest
Jul.	13-14	IARU Radiosport Contest
Jul.	13-14	West Coast 160 SSB Contest
Jul.	13-14	Colombian Contest
Jul.	**20-21**	**CQ WW VHF Contest**
Jul.	20-21	SEANET CW Contest
Jul.	20-21	AGCW-DL QRP CW Contest
Jul.	27-28	Venezuelan CW Contest
Jul.	27-29	County Hunters CW Contest
Aug.	3-4	Wild Bunch 160 SSB Contest
Aug.	3-4	ARRL UHF Contest
Aug.	10-11	European CW Contest
Aug.	17-18	SARTG RTTY Contest
Aug.	17-18	SEANET SSB Contest
Aug.	17-19	New Jersey QSO Party
* Aug.	24-25	All Asian CW Contest
Aug.	24-25	GARTG RTTY Contest
Sep.	9-15	QCWA Invitational Party
Sep.	14-15	European Phone Contest
Oct.	19-20	Boy Scouts Jamboree
Oct.	**26-27**	**CQ WW DX Phone Contest**
Nov.	**23-24**	**CQ WW DX CW Contest**

**See June Calendar.*

Canada Day Contest

0000 to 2400 UTC Mon., July 1

Sponsored by the Canadian Amateur Radio Federation, this contest is held twice a year, July and December. Everybody can work anyone, 2 through 160 meters, single operator, single and all band, multi-operator, single transmitter all band only. The same station may be worked on each band and mode for QSO and multiplier credit.

Exchange: RS(T) and QSO number, and province for Canadian stations.

Scoring: 10 points for each Canadian contact; 4 points if with anyone else. Add 20 bonus points for each QSO with any CARF official station using the suffix TCA or VCA.

Multiplier: Number of Canadian prov./terr. worked on each band and each mode. Total of 26 per band using both modes.

Frequencies: 1810/1840, 3525/3775, 7025/7070/7155, 14025/14150, 21025/21250, 28025/28500, 50040/50110, 144090/146520. Try SSB on the hour and CW on the half hour.

Awards: Certificates to the top-scoring stations in each class, in each Canadian prov./terr., U.S. call area, and DX country. Trophies for the overall single operator all band winner and multi-operator all band station.

Include a summary sheet showing the scoring, etc., and a dupe sheet with your entry. Official log forms are available from the CARF. Include a large SASE for log forms and results.

Mailing deadline is July 31st, and logs go to: CARF Contest, c/o N. Waltho, VE6VW, P.O. Box 1890, Morinville, AB, T0G 1P0 Canada.

Note: A 50 point bonus to stations providing communication from a national park or to stations using the special prefix for the National Parks Centennial during the Canada Day Contest.

Colorado 6 Meter Net Party

1400Z Thurs. to 0300Z Fri., July 4–5

The Colorado 6 Meter Net invites all 6 meter operators to participate in this activity on July 4th.

Exchange: Signal report, state, name, and SIN number for members.

Scoring: Contacts with SIN members are worth 3 points, with non-members 2 points. Multiply total points by number of states worked for final score.

Awards: Certificate to the #1 and #2 scorers. Endorsement stickers if you contact 25 or more SIN members.

Send your log within 30 days to: W0ETT, P.O. Box 6602, Denver, CO 80206. Include an SASE for any awards.

Venezuelan Contest

Phone: July 6–7 C.W.: July 27–28
0000Z Saturday to 2400Z Sunday

This is the 23rd yearly contest celebrating Venezuela's independence. It's a world-wide type contest; therefore, do not confine your activity to working YV's only. Use all five bands, 10 through 160 meters. There are four classes: Single operator, single and all band, and multi-operator single and multi-transmitter.

Exchange: RS(T) plus a QSO number starting with 001.

Points: Contacts between stations in different countries, 2 points. Between stations in the same country zero (0), but permitted for multiplier credit.

Multiplier: One for each YV call area, each U.S. call area, and each country (including own) worked on each band.

Final Score: Total QSO points from all bands multiplied by the sum of the multiplier from each band.

Awards: A plaque to the highest scorer in each class. Medals to the highest scoring single operator in each continent and the Bolivarian countries (Bolivia, Colombia, Ecuador, Panama, Peru).

Certificates to stations in the Americas working 15 YV stations and 10 different countries; European and African stations

working 10 YV's and 10 countries; and Asia and Oceania stations working 5 YV's and 10 countries.

Use a separate log sheet for each band, and a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration. It is requested that all award applicants include a remittance of $2.00 or its equivalent in IRC's.

Mailing deadline is August 15th for phone entries and September 15th for c.w. They go to: Radio Club Venezolano, P.O. Box 2285, Caracas 1010-A Venezuela.

West Coast 160 SSB Contest

0000Z Sat. to 2359Z Sun., July 13–14

This is the summer edition of the "West Coast Bulletin" 160 meter contest. Only single operator stations are eligible. There are two classes, subscribers and non-subscribers. There are five subclasses: 3 kw, 2 kw, 1 kw, 250 watts PEP, and QRP.

Exchange: RS and QTH.

Scoring: 20 points per QSO. Multiply total by (US states + VE provinces + DX countries) worked for final score. Three QSOs will be deducted for each duplicate contact that has not been removed from the log.

Awards: Certificates to winners in each state, province, and DX country for both classes. Plaques to the two overall winners.

A signed declaration indicating the power used is requested. Reporting a false power rating means disqualification and also being banned from participation for three years.

Mailing deadline for logs is August 31st and they go to: R. Koziomkowski, KA1SR, 5 Watson Drive, Portsmouth, RI 02871.

IARU Radiosport

0000Z Sat. to 2400Z Sun., July 13–14

The format is the same as it was last year. It's a worldwide competition, all bands, 160 through 2 meters, single and multi-operator.

Categories: Single operator, c.w. only, phone only, and mixed mode. Multi-operator use mixed mode, single transmitter.

Single operator stations are limited to 36 hours of operating time. Off times must be at least 30 minutes and must be indicated in your log. There is no time limit for multi-operator stations, but you must remain on a band at least 10 minutes at a time. The same station may be worked only once per frequency band regardless of the mode.

Exchange: RS(T) and your ITU zone.

QSO Points: Contacts within your ITU zone, 1 point. Contacts within your continent but a different zone, 3 points. Contacts with a different continent, 5 points.

Multiplier: Sum of different ITU zones worked on each band.

Final Score: Total QSO points from all bands times the sum of the multipliers from each band.

Awards: Certificates to the top scorers in each category, in each ARRL section, each ITU zone, and each country. Achievement awards are available for making 250 and 1000 QSOs and/or contacting 50 or more zone multipliers. In case of multiple award levels achieved, only the highest award will be issued.

Disqualification rules will be observed for taking credit for duplicate contacts in excess of 2% and also for not observing rules and regulations of the contest.

U.S. and Canadian entries are requested to use official log and summary sheets, which may be obtained from the ARRL. A large s.a.s.e. with at least 39¢ postage will get you a good supply, and also an ITU zone list.

All entries should be sent to IARU Headquarters, Box AAA, Newington, CT 06111 U.S.A. Mailing deadline is August 15th.

Colombian Contest

0000Z Sat. to 2359Z Sun., July 13–14

There have been a few changes in the format of this year's contest, so a close check of the rules is suggested. It's still a world-wide contest on all six bands, 1.8 through 28 MHz, CW only and SSB only.

Classes: Single operator, single and all band, multi-operator, single and multi-transmitter. (There is only one single band class, that used on 14 MHz.)

Exchange: RS(T) plus a three-figure QSO number starting with 001.

Scoring: *For non-HK's*—QSOs with HK's 10 points, with other countries 5 points, with own country 1 points.

For HK's—QSOs with other countries 10 points, with other HK's, 5 points.

Multiplier: Number of different countries and HK call districts worked on each band.

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

Awards: Certificates to each station showing a minimum of 50 contacts, at least 10 of which are HK's on SSB or 5 if on CW. Plaques to the overall winning HK and non-HK in each class and each mode, and for second-place winners and HK's in each call area.

Use a separate log sheet for each band. Indicate the multiplier in a separate column only the first time it is worked on each band. A summary sheet showing the scoring and other essential information and the usual signed declaration are also required.

Disqualification rules regarding taking credit for duplicate contacts, violation of rules and regulations, etc., will be strictly enforced.

Mailing deadline for all entries is August 30th to: L.C.R.A. Contest Committee, Apartado Aereo 584, Bogota, Colombia.

"Eshee," 9M2FK, well-known DXer who has given out many contacts from the Far East. Eshee apologized for his old gear, "old junk" he calls it, but it puts out a good signal in the SEANET. Look for him in the SEANET contest this month.

CQ WW VHF WPX Contest

0000Z Sat. to 2400Z Sun., July 20–21

This is the first *CQ* World-Wide VHF Contest, and it received extensive coverage in the February and May issues. However, a repeat of the rules may be in order for the newcomers who do not have those issues.

Bands: All bands from 6 meters through 23 cm may be used (50, 70, 144, 220, 432, 1296 MHz).

Modes: All modes may also be used, but not repeater contacts. Satellites are considered repeaters.

Exchange: Your call and a consecutive QSO number starting with 001.

Multiplier: Each different prefix worked on each band.

Scoring: 1 point per QSO on 50, 70, or 144 MHz; 2 points for QSOs on 220 and 432 MHz; and 4 points on 1296 MHz.

Final Score: Total QSO points times the sum total of prefixes worked on each band.

Unlike the HF WW WPX Contest, the same station can be worked on each band for multiplier credit.

Classes: Single operator, single and all band, high or low power (low power defined as 25 watts or less PEP output). Multi-operator, single and all band. Portable using temporary power source. And FM only.

Awards: All participants will receive a commemorative certificate in celebration of this, the first *CQ* WW VHF Contest. Special certificates to the top-scoring stations and to those making a special effort in each class, in each call area or country.

Official log forms are available from *CQ*. Include a large SASE with your request to the office, 76 N. Broadway, Hicksville, NY 11801.

Your logs, however, go to: SCORE, P.O. Box 1161, Denville, NJ 07834.

AGCW-DL QRP Contest

1500Z Sat. to 1500Z Sun., July 20–21

This is the summer edition of this QRP c.w.-only contest. The same station may be worked on each band, 1.8 through 28 MHz. There are five classes:

Class A—3.5 watts or less input. *Class B*—10 watts or less, for single operators. *Class C*—10 watts or less for multi-operators. *Class D*—QRO stations, over 10 watts input (may work only QRP stations). *Class E*—s.w.l.'s.

Class C may operate the full 24 hours; others must take a 9-hour break.

Exchange: RST, QSO no., and power input, i.e., (559001/5) (579001/QRO). Add "X" if using crystal control.

Scoring: QSO within own country, 1 point. With other stations in own continent, 2 points. With DX outside own continent, 3 points. (Double points if using crystal control.)

Multiplier: One for each DXCC country, and one for each DX station worked. Call areas in JA, PY, VE, W, and ZS count as separate multipliers.

Final Score: Total QSO points from all bands times the multiplier as indicated.

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

Using a separate log sheet for each band, and a summary sheet showing the scoring, name and address, and other essential information. Mail logs within six weeks of the end of the contest to: Siegfried Hari, DK9FN, Spessartstrasse 80, D-6453 Seligenstadt, West Germany (include 1 IRC for a copy of the results).

SEANET DX Contest

C.W.: July 20–21 S.S.B.: Aug. 17–18
0001Z Sat. to 2359 Sun.

The object of the contest is to contact stations within the SEANET area. The same station may be worked once on each band. Cross-band or cross-mode contacts are not permitted, and multi-operator stations are limited to one signal during the same time period.

Classes: Single operator, single and all band, and multi-operator all band.

Exchange: RS(T) plus a three-figure QSO number starting with 001.

Scoring: *Stations outside SEANET area,*

(a) Contacts with stations within the NET area with the following prefixes: 20 points on 160; 10 points on 80 and 40; 4 points on 20, 15, and 10 (DU, HS, YB, 9M2, 9M6, 9M8, 9V1, V85).

(b) With stations in other NET areas: 10 points on 160; 5 points on 80 and 40; and 2 points on 20, 15, and 10.

(c) Contacts between stations outside the NET area have no value.

(d) Multiplier of three for each NET country worked.

Stations within SEANET area,

(a) Contacts with stations outside NET area: 10 points on 160; 5 points on 80 and 40; 2 points on 20, 15, and 10.

(b) Between stations within the NET area: 6 points on 160; 3 points on 80 and 40; 1 point on 20, 15, and 10.

(c) Contacts with stations in own country have no value.

(d) Multiplier of 2 for each NET country worked, 3 if country outside NET area.

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

SEANET Prefixes: A4, A5, A6, A9, AP, BV, CR9, C21, DU, EP, HL, HS, H44, J (etc.), JD1, JY, KA, KC6, KG6/KH2, KH6, KX6, P29, S79, VK, VQ9, V85, VS6, VS9K, VU2, XU, XV5, XW8, YB, YJ8, ZK, ZL, 3B6/7, 3B8, 3D2, 4S7, 4X, 5W1, 5Z4, 8Q7, 9K2, 9M2, 9M6/8, 9N1, and 9V1.

Results will be announced at the SEANET Convention. Logs must be received no later than October 31st and go to Eshee Razak, 9M2FK, P.O. Box 13, Penang, Malaysia.

The SEANET Convention will be hosted by the PARA this year and will be held in Cebu City, the Philippines on Nov. 22–24. Contact Antonio F. Joson, Jr., DU1OD, 131 Guadalope St., Morning Breeze, SUBD., Caloocan City, M.M., Philippines for more information.

County Hunters C.W. Contest

0000Z Sat. to 0200Z Mon., July 27–29

The C.W. County Hunters Net is promoting this year's contest. Mobile and portable operation from less-active countries is welcome and encouraged.

The same station may be worked on each band, mobile and portables from each county change, for QSO credit. Mobiles operating on county lines give and receive one QSO number, but each county is valid as a multiplier. (Mobiles and portables must identify by signing /M or /P after their call.)

Exchange: QSO no., RST, category, county and state for U.S. stations, province or country for others.

Scoring: QSOs with fixed stations are worth 1 point; with mobile and portables, 3 points. Multiply total QSO points by sum of U.S. counties worked for your final score.

Frequencies: 3575, 7055, 14065, 21065, 28065. On 20 and 40, mobiles and portables should call CQ below the suggested frequency. Fixed stations use above the suggested frequency.

Awards: Certificates will be awarded to the winners in three categories: F—Fixed or fixed portables in each state, province, and country with 1,000 or more total score; P—Portable in each state operating from a county other than his normal location with 1,000 minimum score; M—Mobile in each state operating from 3 or more counties with a minimum of 10 QSOs at least from each of 3 counties.

Plaques to the top-scoring mobile, portable, and fixed station in the US who also meet the above requirements.

A summary sheet showing the scoring is requested, and a check sheet of counties worked is a must for entries with 100 or more contacts. Mailing deadline is September 1st to: C.W. County Hunters Net, c/o Jerry Burkhead, N6QA, 7525 Baltic St., San Diego, CA 92111 (include a large s.a.s.e. for a copy of the results).

The "KARSHI-84" DXpedition

Alf, UA4WCE, facing us, and Willy, UA4WF, with his back towards us, trudge up a barkhan carrying the transceiver to the operating position. A barkhan is a moving crescent-shaped sand dune.

Willy, UA4WF (wearing shorts), and Alf, UA4WCE, are shown in the Kara-Kum Desert. They both are wearing the official DXpedition T-shirts.

Last September a group of young Russian amateurs got together for the "KARSHI-84" DXpedition. Using the call RI8CA, the group operated from Mubarek, which is located in the Kara-Kum Desert. The town of Mubarek is in Oblast 049, Uzbekistan. Over 8400 QSOs were made with 112 countries and 173 USSR oblasts. Due to limited propagation conditions, only 50 US stations were worked during this event. Included among the DXpeditioners were SWLs who got a taste of on-the-job training.

The temperatures in this area peak at well over 100° and help produce the principal products grown there: watermelons, musk melons, and grapes. The operators of RI8CA included UA4WCE, UA4WF, UA4PFR, UA3GEA, UA3GEG, UV1AA, UI8GAM, UI8LAO, UI8LC, RI8CE, UB5-080-70, UB5-065-494, and UA4-095-531. "KARSHI-84" lasted from September 2–25, 1984. CQ

At the mike of the RI8CA DXpedition station is Alf, UA4WCE. Willy, UA4WF, samples some of the local fare, watermelon, as Oleg, an SWL, looks on.

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- **Built-in ferrite bar antenna** for LW and MW reception
- **Telescopic antenna** for FM and SW reception

SPECIFICATIONS

Frequency Range: AM: 150-29,999.9 kHz; FM: 76-108 MHz; Air: 116-136 MHz

Antenna System: LW, MW: Built-in Ferrite Bar Antenna; FM, Air, SW: Telescopic Antenna

Inputs: DC-In 4.5V, External antenna input (minijack x 2)

Outputs: Earphone (minijack); Record output (minijack)

Speaker: 4-inch dynamic

Power Requirements: Batteries "D" x 3 (4.5V) (optional); "AA" x 2 (3V) (optional) for programmable clock/timer; AC 120 Volts, 60 Hz with AC Adaptor (supplied); DC-12 Volts with DCC-127A Car Battery Cord (optional)

Dimensions: 6¼" H x 11⅜" W x 2⅛" D

Weight: 3 lbs. 12 oz (with batteries inserted)

Color: Black

Supplied Accessories: AC Adaptor; Earphone, Shoulder Strap, Long Wire External Antenna, External Antenna Connector (x 2), Short Wave Handbook

Optional Accessories: DCC-127A Car Battery Cord; AN-1 Active Antenna

CONVENIENCE FEATURES

- **Full AM band coverage (LW, MW, SW) plus FM and Air Band reception**
- **Band select** function for quick access to SW broadcast bands
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- **Sleep timer** for 15, 30, or 60 minutes of music as you go to sleep
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THEODORE J. COHEN, N4XX

THE INS AND OUTS OF THE WASHINGTON SCENE

FCC Moves To Permit Land Mobile Use of Band 421–430 MHz in Certain Parts of Country

In a move that is sure to meet strong amateur disapproval, the Commission has proposed to permit land mobile use of the 421–430 MHz band in Detroit, Cleveland, and Buffalo. This move is being taken to provide spectrum relief for the Land Mobile service in three of the largest U.S. cities bordering Canada.

Since the three cities are within the FCC's coordination zone north of "Line A," amateur operation in the 421–430 MHz band is already limited by Footnote NG125 of the national Table of Allocations. These limitations are sufficient to protect Canadian users and the proposed land mobile users in Detroit. However, it is insufficient to permit land mobile operation in Cleveland and Buffalo. The Commission notes, however, that substantial additional protection is provided because the Amateur service's allocation south of Line A is Secondary (i.e., of such a nature that its operations may not interfere with services having a Primary allocation).

At this time the FCC is not proposing to change the amateur allocation. It places the burden on us to ensure that the land mobile users, who will have a Primary allocation, do not suffer interference from amateur operations. But the Commission warns that if the Secondary (amateur) allocation is not sufficient, they would consider prohibiting amateur operations in the 421–430 MHz band within approximately 100 miles of the centers of Buffalo and Cleveland.

Given the increasing need for VHF and UHF spectrum space in all services—including the Amateur service—restrictions of any kind on our bands is a serious matter. The League is expected to vigorously respond to the Notice of Proposed Rulemaking (NPRM) on this matter, and to protect the Commission's proposal. For the record, comments were due 28 May 1985, with reply comments due 12 June 1985, about the time this issue is distributed.

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Commission Expected To Approve Spread Spectrum Use

As we go to press, sources in Washington told your Editor that the Commission is soon expected to release a Report and Order on the use of spread spectrum (SS) modulation techniques in the Amateur service (Docket 83-413). It is expected that SS operations will be approved at frequencies of 420 MHz and higher, though there will be a one-year delay in implementing the new rules. This delay is intended to give the amateur community time to develop voluntary standards for SS use. The use of these standards would facilitate the monitoring of SS transmissions by the Commission and amateurs who are participating in the voluntary enforcement program. They would also promote the orderly growth and development of SS within our service.

Amateurs wishing to experiment with SS modulation techniques during the period when standards are being developed are encouraged to apply for Special Temporary Authorizations (STAs).

Nonionizing Radiation Increasingly The Subject of Concern in the Popular Press

Two articles in *The Washington Post*, published within weeks of one another, raised the question whether nonionizing radiation poses a health risk. The first, written by Sally Squires, a *Washington Post* staff writer, described a Swedish study that linked brain damage and unusual changes in spinal fluid in radar maintenance workers exposed to microwave radiation. To be sure, the exposure levels for the workers were 10,000 to 100,000 times higher than the levels to which most people are exposed. But neurologists and biophysicists are taking the results of the study as a warning.

The second article, also by Squires, discussed the Environmental Protection Agency's (EPA's) "hot spot" list of more than 231 sites in the U.S. where levels of nonionizing radiation from FM stations are higher than is considered safe by the American National Standards Institute (ANSI). The radiation from FM stations is of particular concern because it easily couples into an adult's body. The reason for this is that the wavelengths involved are comparable to the height of an adult. In fact, the longer and thinner you are, says Squires, the better an antenna you are.

Despite the attention now being focused on the problem of health risks posed by nonionizing radiation, many scientists question whether sufficient data are available to make an objective decision regarding what constitutes a "safe" exposure level for a human being. Regardless, as the debate continues, some communities around the country are beginning to consider the imposition of laws that would limit levels of nonionizing radiation from radio frequency sources within their jurisdictions. And in communities where such laws are passed, or are even being considered, there is little question that radiation from amateur (and CB) stations will increasingly become an area of community focus.

At present, the FCC, in a Further NPRM (General Docket 79-144), proposes to exclude the Amateur service from the requirement to file a factual "narrative statement" addressing the prevention of excessive exposure to high levels of RF energy. This requirement was adopted in a Report and Order on General Docket 79-144, and becomes effective 1 October 1985. The Commission also proposes to exclude other radio services, including operations involving land mobile, microwave point-to-point, aviation, and marine stations.

The Commission did give the issue of federal preemption serious consideration in its deliberations of General Docket 79-144. However, to take such action now, said the FCC, was premature, since the state and local governments that have proposed or adopted RF exposure standards did so only because of the lack of federal standards. "Should non-federal RF radiation standards be adopted, adversely affecting a licensee's ability to engage in Commission-authorized activities," said the FCC in its Report and Order," the Commission will not hesitate to

consider (federal preemption at that time."

Action on Receive-Only Satellite Earth Stations Portends Favorable Outcome on PRB-1

In response to a petition from United Satellite Communications, Inc. requesting the Commission to preempt local zoning ordinances that unreasonably interfere with an individual's right to operate receive-only satellite earth stations, the Commission proposed the following rule:

"State and local zoning or other regulations that discriminate against satellite receive-only antennas in favor of other communications facilities are preempted unless they have a direct and tangible relationship to reasonable, valid, demonstrable, and clearly articulated health, safety, or aesthetic objectives and constitute the least restrictive method available to accomplish such objectives."

The proposed rule, contained in an NPRM (CC Docket 85-87), is limited only to satellite dish antennas. However, amateurs, and particularly the League, view the FCC's proposal as a "good omen" toward adoption of a similar rule for federal preemption on amateur antennas. The latter is now under consideration in PRB-1.

Interference Handbook Revised Edition Available

Of all the subjects covered in this column, few have brought a response to equal that received for our treatment of the power-line interference problem. It is clear from correspondence received that the problem is widespread, and in many cases is not being addressed adequately by the utilities involved. Adding to the problem is the fact that few good books exist on the subject of power-line interference, and that the resolution of "line noise" is often more of an art than a science!

Amateurs plagued with power-line interference will be glad to know, therefore, that Radio Publications, Inc. has just released the second edition of its popular *Interference Handbook*. This revised work, which covers subjects such as how to locate and cure power-line radio frequency interference (RFI) and how to resolve interference problems associated with electronic home-entertainment equipment, was written by William R. Nelson, WA6FQG, former RFI investigator for Southern California Edison Company.

The first edition of the book sold well, with hundreds purchased by the military and civil agencies of the government. In addition, the book has found favor among the more forward-looking electric utilities in the U.S., who are concerned not only with the interference produced by line noise, but also with the loss of revenue that results from power-line leakage.

For more information on the *Interference Handbook* write to Radio Publications, Inc., Box 149, Wilton, CT 06897.

FCC Predicted To Authorize New 40 Meter Frequencies in Caribbean

According to sources in Washington, it is likely that the FCC will soon authorize any FCC-licensed amateur outside the contiguous 48 states to use phone in the band segment 7075–7100 kHz (FCC-licensed amateurs in Alaska and Hawaii already have this privilege). In taking this action, the Commission is responding to a petition from David Novoa, KP4AM, which argued that in the Caribbean the band above 7100 kHz is virtually useless because of interference from broadcast stations. Novoa further argued that use of the 7075–7100 kHz band segment by FCC-licensed stations in the Caribbean would promote international goodwill, and would not cause detrimental interference to the CW operations of continental U.S. amateurs.

FCC Authorizes Broadcast Stations On 40 Meter Band in Pacific

The Commission has released a Report and Order on Mass Media Docket 84-706, authorizing use of the 40 meter band segment 7100–7300 kHz by FCC-licensed broadcast stations in the Pacific outside ITU Region 2. The ARRL opposed the measure, citing possible interference to amateur operations in Region 2 (North and South America). However, the League did offer a compromise, suggesting that hours of operation in the 7100–7300 kHz band be carefully controlled.

In concluding its work on the docket, the FCC did specify that none of the broadcasting stations affected may use antennas oriented toward Region 2, and that during certain hours sidelobe radiation that intersects Region 2 must be limited in accordance with the rules set forth in the Report and Order.

According to *The ARRL Letter*, the League is now studying the radiation-limitation rule to determine how much protection it actually affords.

Amateur's Station License Revoked, Operator License Suspended

The FCC has revoked the station license of James W. Smith, W6VCE, and has revoked Smith's Advanced Class operator license (for the remainder of its term) for repeated violations of the Commission's rules pertaining to malicious interference, failure to identify, and broadcasting. Specifically, Smith was found to have willfully and maliciously caused interference to the input of a repeater operating on 147.99 MHz by transmitting country and western music on top of transmissions made by legitimate users of the repeater.

During the Commission's proceedings, Smith acknowledged that he had done "stupid things" in the past, but noted that he had suffered harassment at the hands of other amateurs who were members of the San Diego Repeater Association (SANDRA). In fact, the FCC discovered that there was a history of antagonism between Smith and other amateurs in the San Diego area, with name calling, haranguing, and harassment common occurrences. Smith's response to the harassment was to retaliate.

Regardless of the circumstances in-

volved, the Commission emphasized that malicious interference in the Amateur service is a most serious offense and warrants the most stringent penalty of revocation. Thus, even if Smith had the view that his jamming was in retaliation for the actions of other amateurs, his actions could not be justified. Vigilante tactics, noted the FCC, will not be tolerated, and the use of such tactics becomes part of the problem and only aggravates the situation. These violations, concluded the Commission, mandate the revocation of Smith's station license and the suspension of his operator license.

Pacific Packet Radio Society Announces "Golden Packet" Award

The Pacific Packet Radio Society has established an award to encourage the completion of the first terrestrial transcontinental network link. The award, known as the "Golden Packet" Award, will be given to those amateurs who participate in an effort that meets the following requirements:

1. A transcontinental link must be established, with each terminus located within 100 km of the Atlantic and Pacific oceans.

2. The system must consist of fixed terrestrial digital store-and-forward radio links using frequencies of 144 MHz or higher. No use may be made of HF, satellite, tropo, metscat, or moonbounce.

3. A valid two-way transmission and acknowledgement of previously unknown information (256 characters or more) must occur in real time (less than 10 minutes).

4. This competition is open only to validly licensed North American amateurs, and no commercial links or services may be used in the path. Club stations are permitted.

5. Proof of the exchange must be adequately documented and submitted to the Society.

6. Each participating station shall receive either a suitably engraved plaque or a certificate.

7. Final decision on the award is subject to review and approval by the Society.

Frequency and Emission Tables Changed To More Usable Formats

The FCC has released an Order that amends Part 97 of its Rules by arranging the frequency and emission tables for the Amateur service in more usable formats. The action was taken in response to numerous inquiries made by amateurs regarding material in the old tables, and to the determination that clarification was required. However, since the amendments simply clarify the rules and are nonsubstantive in nature, the notice and comment provisions and the effective date requirements of the Administrative Procedure Act were not applicable.

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Novice Licensing Data—Part I of VI

Most of these Novice columns cover various aspects of operating because the majority of readers are licensed and they want operating information. However, this series of columns is directed to the unlicensed reader who wants to become an FCC licensed Novice. It covers everything one must know to earn an FCC issued Novice class amateur radio operator license. This article provides licensing information that is the same as the data I furnish to my students.

Several previous Novice columns contain information that is useful to prospective Novices. Such columns are mentioned in this article, but no attempt is made to repeat the material. Previous issues of *CQ* can usually be obtained at two dollars each from *CQ*, 76 North Broadway, Hicksville, NY 11801. Most of my Novice columns are derived from printed aids I have written for use in the amateur licensing courses I have instructed since 1948. A list of these printed aids is available at no charge to anyone who requests it and sends a self-addressed stamped envelope (SASE) to my address.

The Federal Communications Commission (FCC) licenses amateur radio operators and amateur radio stations in America, its territories, and its possessions. Part 97 of the FCC rules and regulations covers our amateur radio service. Part 97 can be bought from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. If you are willing to spend more money, a better publication on this subject is the FCC Rule Book that is published by the American Radio Relay League (ARRL). This ARRL publication is stocked in most stores which sell amateur radio equipment. If you cannot locate a copy of this excellent publication in your area, you can request a list of publications and prices from the ARRL, 225 Main Street, Newington, CT 06111.

The Personal Radio Bureau of the FCC (1919 M Street N.W., Washington, D.C. 20554) publishes the Study Guide for FCC Amateur Radio Operator License Examinations. This document is PR Bulletin 1035. It provides the written examination syllabus for each of the following elements:

Element 2—Novice
Element 3—Technician/General

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Here are Michelle Samson, KA7TUI, and her boyfriend, Lyndel Thiesen, KA7TVT, of Bozeman, Montana. Michelle has been licensed since September 1984, and Lyndel obtained his license one month later. Michelle is a Montana State University student and she manages a video store evenings, which limits her operating time. Her station includes a Yaesu FT-107M transceiver, Butternut vertical, and 40 meter dipole. She prefers operating on 15 meters, when it is open. Lyndel is an announcer at AM broadcast station KBMN (1230 kHz). He works about five contacts per day, and he enjoys being the first Montana contact for many amateurs. His station includes a Yaesu FT-107M, Ham-Key/Bencher combination, Gem Quad, plus 80 and 40 meter bazookas. Both expected to have upgraded before this picture appeared in print. I hope they made it.

Elaine is less than two years old. Elaine's father is Stanley Scott, N6EGS, of Calexico, California. She was watching her dad operate his Yaesu FT-107M transceiver, and when he walked away, she took over. It appears that Adriana Elaine Scott may be a future amateur radio operator.

Element 4A—Advanced
Element 4B—Extra

Elements 1A, 1B, and 1C are code tests at 5, 13, and 20 words per minute (wpm), respectively. An applicant has to pass element 1A (5 wpm code) and element 2 (Novice written exam) to qualify for a Novice license. The February 1985 Novice column details requirements of all five amateur radio operator licenses. Briefly stated, these requirements are as follows:

Novice—1A, 2
Technician—1A, 2, 3
General—1B, 2, 3
Advanced—1B, 2, 3, 4A
Extra—1C, 2,3,4A, 4B

One is not re-examined for an element that had to be passed to obtain one's current license. As an example, a General class licensee just has to pass element 4A to upgrade to an Advanced ticket.

PR Bulletins 1035A, 1035B, 1035C, and 1035D list the exact questions and wording that must be used in Novice, Technician/General, Advanced, and Extra class licensing examinations, respectively. Each group is updated yearly. The Novice PR Bulletin 1035A is updated each August. The Technician/General (1035B), Advanced (1035C), and Extra (1035D) PR Bulletins are updated November, February, and May, respectively.

PR Bulletin 1035A is entitled "Questions for the Element 2 Amateur Radio Operator Examination." It has nine general categories of questions, which are called sub-elements and are as follows:

A. Rules and Regulations, 7
B. Operating Procedures, 1
C. Radio Wave Propagation, 1
D. Amateur Radio Practices, 3
E. Electrical Principles, 3
F. Circuit Components, 1
G. Practical Circuits, 1
H. Signals and Emissions, 1
I. Antennas and Feedlines, 2

There are 20 questions in a Novice written exam, and one must answer at least 15 of them correctly to pass element 2. In the preceding list, the number to the right of each sub-element is how many questions each Novice written exam must contain on each subject. Note that 7 of the 20 questions are about rules and regulations.

The Novice exam is not part of the VEC (volunteer examiner coordinator) program that involves teams of three Extra class licensees (volunteer examiners) conducting Technician, General, Advanced, and Extra class operator exami-

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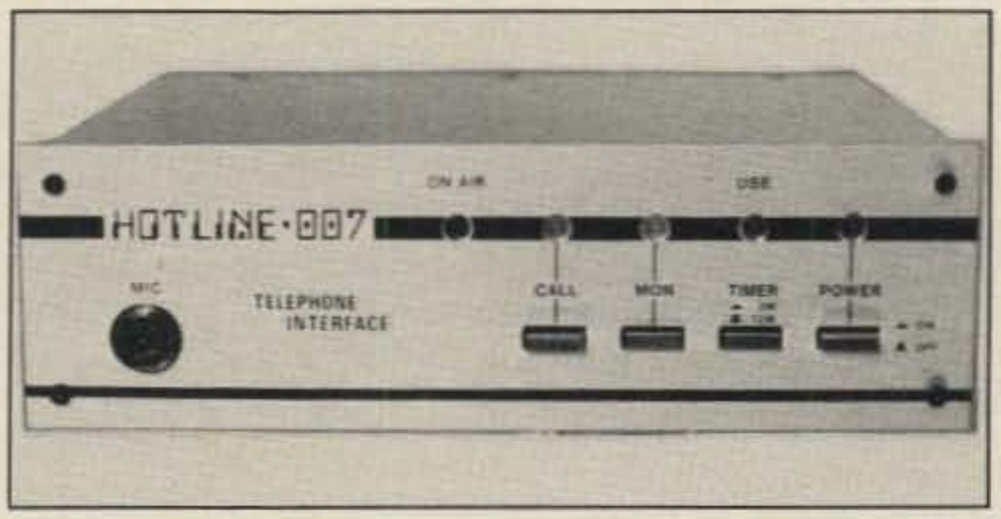

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nations. Novice tests are constructed and administered by individual amateurs who hold valid General (or higher) class licenses. The volunteer examiner is allowed to use the test format that suits her/him best. In other words, the applicant can be required to fill in the blanks, select correct multiple-choice answers, answer true or false, or provide essay (written) replies. However, no matter what format is used, the examiner must see the exact wording of each question selected from PR Bulletin 1035A.

This article does not follow the sequence in which the Novice questions are listed in PR Bulletin 1035A. Instead, the material is covered in the following sequence, which is easier to comprehend:

E. Electrical Principles
F. Circuit Components
G. Practical Circuits
H. Signals and Emissions
B. Operating Procedures
D. Amateur Radio Practices
A. Rules and Regulations
C. Radio Wave Propagation
I. Antennas and Feedlines

PR Bulletin 1035A contains ten questions for each question that is included in an exam concerning each sub-element. As an example, sub-element 2A contains 70 questions about rules and regulations, and each written Novice test includes 7 questions on this subject. This article repeats each exact question and provides the reply, plus any suitable additional information. Where the same question is reworded and used more than one time, the answer is not always duplicated; one is often simply referred to the previous coverage.

I just have a limited amount of space in each issue. Consequently, it is unlikely that the largest sub-element (rules and regulations) can be printed in one issue. If space permits me to do it, the breakdown will be as follows:

Part I—Introduction and Electrical Principles

Part II—Circuit Components, Practical Circuits, Signals and Emissions, plus Operating Procedures

Part III—Amateur Radio Practices

Part IV—Rules and Regulations

Part V—Rules and Regulations, cont.

Part VI—Radio Wave Propagation, Antennas and Feedlines, and Conclusion.

If this article attracts enough interest, I will write a sequel for Novices who want to upgrade to Technician or General class tickets.

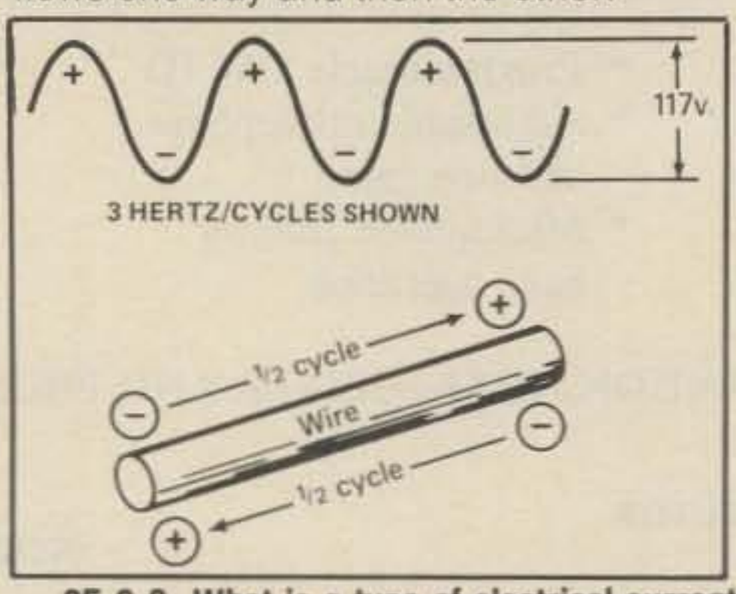
Electrical Principles

2E-1.1. Electrons will flow in a copper wire when its two ends are connected to the poles of what kind of source? A source of voltage, such as a battery, generator, solar cell, or power supply. Voltage is the pressure that forces electrons to flow through a closed (complete) circuit.

2E-1.2. The pressure in a water pipe is comparable to what force in an electrical circuit? Voltage, which is also called electromotive force (EMF), potential difference, and IR drop.

2E-2.1. What are the two polarities of a voltage? Positive, also called plus (+), and negative, also called minus (−).

2E-2.2. What type of current changes direction over and over again in a cyclical manner? Alternating current, which is commonly called a.c., as provided by generators. Typical house power is 117 volts, 60 Hertz (cycles per second). Sixty Hertz is comprised of 60 positive half-cycles and 60 negative half-cycles per second. Alternating current derives its name from the fact that the current flows in one direction during one half-cycle, and then it flows in the other direction during the next half-cycle. In other words, current alternately flows one way and then the other.



2E-2.3. What is a type of electrical current called that does not periodically reverse direction? Direct current, which is commonly called d.c. D.c. is provided by batteries, solar cells, and other sources.

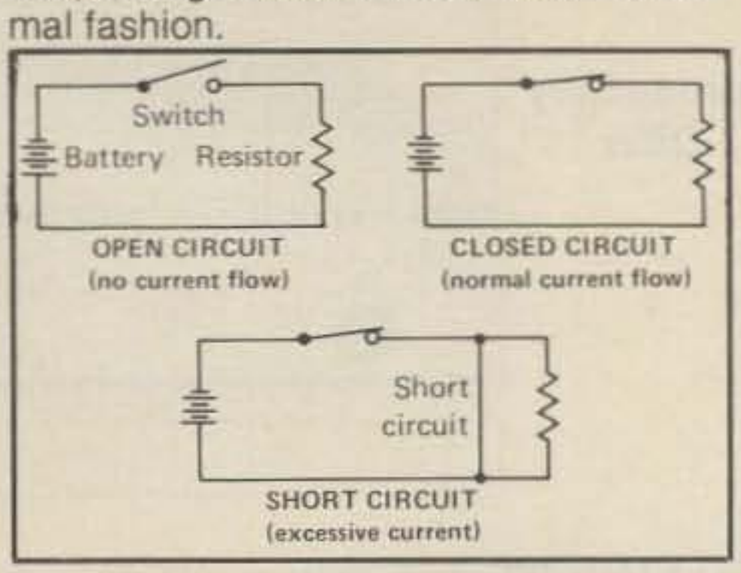
2E-3.1. List at least four good electrical insulating materials. Glass, rubber, wood, isolantite, steatite, bakelite, mica, etc. Electrical insulators provide extremely high opposition to current flow.

2E-3.2. List at least three good electrical conductors. Platinum, gold, silver, aluminum, copper, etc. Electrical conductors offer very little opposition to current flow. Most good electrical conductors are also good heat conductors, whereas most good electrical insulators have good heat insulation characteristics.

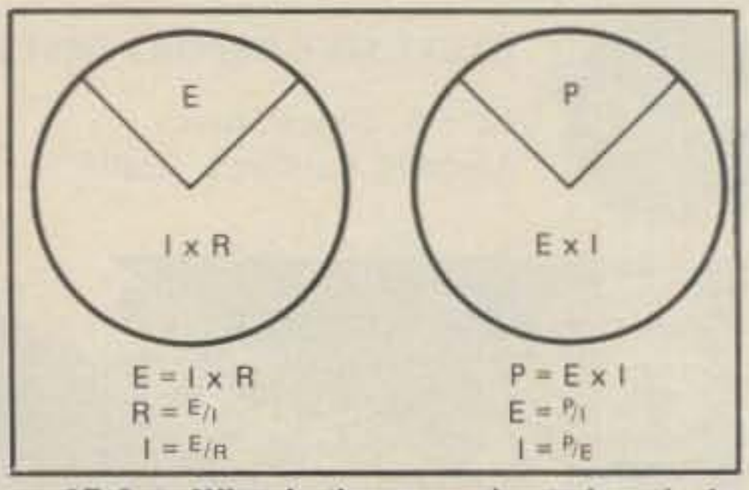
2E-3.3. What is the term for the lowest voltage which will cause a current in an insulator? It is called the breakdown voltage. Insulators should not conduct current; however, they will conduct current if conductive contamination is allowed to accumulate on the surface, or if an excessively high voltage is applied across an insulator.

2E-4.1. What is the term for a failure in an electrical circuit that causes excessively high current? Short circuit. It is an alternate and unwanted lower resistance path which causes an excessively high current to flow. Typical causes of short circuits are failed components (usually capacitors) and frayed wiring insulation that allows inadvertent contact between metal conductors.

2E-4.2. What is the term for an electrical circuit in which there can be no current flow? Open circuit. It offers almost infinite resistance to current flow. The opposite of an open circuit is a closed (complete) circuit, through which current flows in a normal fashion.



2E-5.1. When a voltage is applied to a circuit, causing an electrical current to flow, what is consumed? Power. The basic unit of power is the watt. Power (watts) equals voltage (volts) times current (amperes). The pies shown here enable one to solve basic electrical problems. Simply cover the desired (unknown) electrical property (voltage, current, resistance, or power) and perform the indicated multiplication or division. (E = voltage, in volts; I = current, in amperes; R = resistance, in ohms; and P = power, in watts.)



2E-6.1. What is the approximate length, in meters, of a radio wave having a frequency of 3.725 MHz? 80.5 meters.

$$\lambda = \frac{300}{f(MHz)} = \frac{300}{3.725} = 80.5 \text{ meters}$$

λ = wavelength, in meters
f(MHz) = frequency, in megaHertz

Note that frequency and wavelength have a reciprocal relationship. When either goes up, the other goes down, and when either goes down, the other goes up. As examples of this relationship, 10 meters is 30 megaHertz, whereas 40 meters is 7.5 megaHertz.

Amateur radio theory involves extremely small through extremely large numbers, which would involve decimal points and many zeroes, if they were always stated in full values. This cumbersome problem is eliminated by using prefixes which allow us to state values in convenient numbers. A capacitance of 0.000010 is expressed as 10 microfarads. Similarly, a frequency of 3,725,000 Hertz can be expressed as 3.725 MHz or 3725 kHz, with the latter (kHz) preferred because it does not require a decimal point.

The accompanying chart, Unit Prefixes, shows the meaning of each prefix, shows each symbol, and states its power of 10 meaning. The second portion shows how many places the decimal point should be moved (left or right) to convert from any stated prefix to any desired prefix. After using this latter chart for a while, the student will become familiar with prefix conversions and will no longer need this aid.

2E-6.2. What is the relationship between frequency and wavelength? It is an inverse relationship.

$$\lambda = \frac{300{,}000{,}000}{f} = \frac{300{,}000}{f(kHz)} = \frac{300}{f(MHz)}$$

$$f = \frac{300{,}000{,}000}{\lambda} \quad f(kHz) = \frac{300{,}000}{\lambda} \quad f(MHz) = \frac{300}{\lambda}$$

2E-6.3. What is the approximate length, in meters, of a radio wave having a frequency of 21.120 MHz? 14.2 meters. Since 1 meter equals 3.28 feet (39.37 inches), this 14.2 meter radio wave is about 46.58 feet (46 feet 7 inches) long. This also means that one sine wave of a 21.12 MHz signal is 46.58 feet from its start to its end.

2E-7.1. Which are higher: radio frequencies or audio frequencies? Radio frequencies. Radio frequencies (RF) is a general term that is applied to all frequencies above 20 kHz. The audio frequency (AF) hearing range is about 50 to 15,000 Hz to an average person during their prime of life. High-frequency hearing drops off (decreases) as one ages, accompanied by some decrease in ability to hear low frequencies. A frequency of about 2000 Hz can usually be heard best throughout one's lifespan. Almost all of an average person's speaking tones (frequencies) are between 300 and 3000 Hz. Consequently, communications equipment (such as single-sideband voice) is designed to transmit and receive this range of audio frequencies. It is common to have a bandpass (range of frequencies that are passed/processed) of 2.4 to 2.7 kHz.

2E-7.2. Is 3,500,000 Hz a radio frequency or an audio frequency? It is a radio frequency, since it is above 20 kHz.

2E-7.3. Radio frequencies are considered to be those above what frequency? 20,000 Hz, which is 20 kHz.

Unit Prefixes

Symbols	Prefixes	Multiples and Submultiples
E	exa	1 000 000 000 000 000 000 = 10^{18}
P	peta	1 000 000 000 000 000 = 10^{15}
T	tera	1 000 000 000 000 = 10^{12}
G	giga	1 000 000 000 = 10^{9}
M	mega	1 000 000 = 10^{6}
k	kilo	1 000 = 10^{3}
h	hecto	100 = 10^{2}
da	deka	10 = 10^{1}
—	(Basic)	1 = 10^{0}
d	deci	0.1 = 10^{-1}
c	centi	0.01 = 10^{-2}
m	milli	0.001 = 10^{-3}
u	micro	0.000 001 = 10^{-6}
n	nano	0.000 000 001 = 10^{-9}
p	pico	0.000 000 000 001 = 10^{-12}
f	femto	0.000 000 000 000 001 = 10^{-15}
a	atto	0.000 000 000 000 000 001 = 10^{-18}

Notes:
Pico replaced micromicro
Nano replaced micromilli
Giga replaced kilomega
Tera replaced megamega

Prefix Conversion Chart

This chart allows you to convert a unit with any stated prefix to one with any desired prefix. Follow the stated prefix line horizontally to the block where it bisects the vertical line for the desired prefix and simply move your present decimal point the number of places (and in the direction) indicated on the graph.

Stated Prefix	Desired Prefix: E	P	T	G	M	k	h	da	Basic	d	c	m	u	n	p	f	a
	E	0	R3	R6	R9	R12	R15	R16	R17	R18	R19	R20	R21	R24	R27	R30	R33	R36
	P	L3	0	R3	R6	R9	R12	R13	R14	R15	R16	R17	R18	R21	R24	R27	R30	R33
	T	L6	L3	0	R3	R6	R9	R10	R11	R12	R13	R14	R15	R18	R21	R24	R27	R30
	G	L9	L6	L3	0	R3	R6	R7	R8	R9	R10	R11	R12	R15	R18	R21	R24	R27
	M	L12	L9	L6	L3	0	R3	R4	R5	R6	R7	R8	R9	R12	R15	R18	R21	R24
	k	L15	L12	L9	L6	L3	0	R1	R2	R3	R4	R5	R6	R9	R12	R15	R18	R21
	h	L16	L13	L10	L7	L4	L1	0	R1	R2	R3	R4	R5	R8	R11	R14	R17	R20
	da	L17	L14	L11	L8	L5	L2	L1	0	R1	R2	R3	R4	R7	R10	R13	R16	R19
	Basic	L18	L15	L12	L9	L6	L3	L2	L1	0	R1	R2	R3	R6	R9	R12	R15	R18
	d	L19	L16	L13	L10	L7	L4	L3	L2	L1	0	R1	R2	R5	R8	R11	R14	R17
	c	L20	L17	L14	L11	L8	L5	L4	L3	L2	L1	0	R1	R4	R7	R10	R13	R16
	m	L21	L20	L15	L12	L9	L6	L5	L4	L3	L2	L1	0	R3	R6	R9	R12	R15
	u	L24	L21	L18	L15	L12	L9	L8	L7	L6	L5	L4	L3	0	R3	R6	R9	R12
	n	L27	L24	L21	L18	L15	L12	L11	L10	L9	L8	L7	L6	L3	0	R3	R6	R9
	p	L30	L27	L24	L21	L18	L15	L14	L13	L12	L11	L10	L9	L6	L3	0	R3	R6
	f	L33	L30	L27	L24	L21	L18	L17	L16	L15	L14	L13	L12	L9	L6	L3	0	R3
	a	L36	L33	L30	L27	L24	L21	L20	L19	L18	L17	L16	L15	L12	L9	L6	L3	0

2E-8.1. Are audio frequencies higher or lower than radio frequencies? AF is lower than RF.

2E-8.2. Audio frequencies are considered to be below what frequency? 20 kHz. The audio frequency (AF) range is considered to be 20 to 20,000 Hz.

2E-8.3. What frequency range is 2500 Hz: audio or radio? 2500 Hz is an audio frequency.

2E-9.1. What is the unit of electromotive force? The volt.

2E-10.1. What is the unit of electrical current? The ampere.

3E-11.1. What is the unit of electrical power? The watt. The accompanying chart, called E-I-R-P Data, provides basic data about current, power, resistance, and voltage.

2E-12.1. Of what is Hertz the unit measurement? Frequency. The formula symbol is the lowercase letter *f*.

2E-12.2. What is another popular term for Hertz? Cycle per second, or cps. M c/s and K c/s were used to indicate megacycles and kilocycles, respectively.

2E-13.1. A frequency of 40,000 Hz is equal to how many kHz? 40 kHz (kilo means thousand).

2E-13.2. A current of 20 millionths of an ampere is equal to how many microamperes? 20 microamperes, or 20μA (micro means millionth).

2E-13.3. A current of 2000 milliamperes is equivalent to how many amperes? 2 amperes, or 2A (milli means thousandth).

2E-13.4. What do the prefixes mega and centi mean? Mega means million, so 21.15 MHz is 21,150,000 Hz. Centi means hundredths, so 70 cm is 0.70 meters.

2E-13.5. What do the prefixes micro and pico mean? Micro means millionth, so 1 microvolt is 0.000001 volt. Pico means trillionth, so 1000 picofarad is 0.000000001 farad.

E-I-R-P DATA

Electrical Quantity	Formula Symbol	Basic Unit	Basic Meter	What It Is/Does
Current	I	Ampere	Ammeter	The electron drift that occurs through a closed circuit
Power	P	Watt	Wattmeter	The "work" done
Resistance	R	Ohm	Ohmmeter	The opposition that limits current flow
Voltage	E	Volt	Voltmeter	The push that causes current to flow through a closed circuit

Part I Summary

This concludes the first segment of this six-part article. Each part is useful by itself, but all six parts are required to obtain all of the information an applicant should know before attempting to pass a Novice (FCC Element Two) written examination. Next month's Novice column will contain Part II of this article. It will cover circuit components, practical circuits, signals and emissions, and operating procedures. If you know someone who is interested in becoming an amateur radio operator, you should bring this article to his/her attention. Prospective amateurs and new amateurs have very few sources of help available to them, and they often have trouble locating the sources that do exist.

73, Bill, W6DDB

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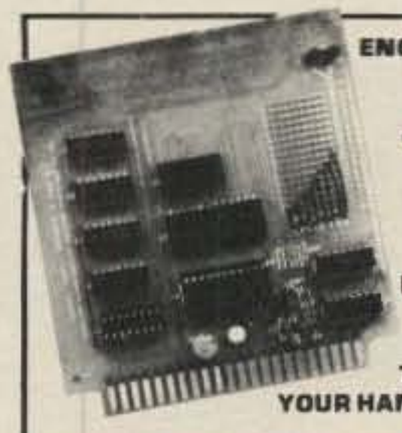

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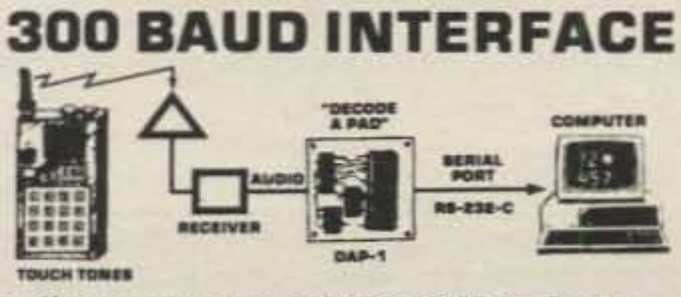

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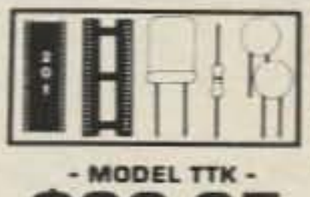

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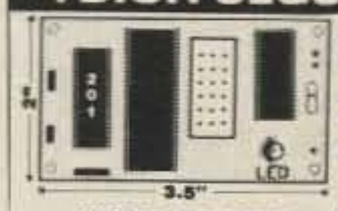

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Awards

a monthly feature by
DOROTHY H. JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The story of the month as told by Jack is:

Jack Kupp, Jr., W3ARK
All Counties #444, All CW
11-19-83

"I started 'hamming' in 1926 and was first licensed in 1929 as W3ARK. I have also held the calls W2CUS and XU8KP.

"From 1935 to 1938 I served in the United States Marine Corps on China Station. During WW II, I served with the United States Navy Reserve in the Naval Air Transport, flying both the Atlantic and Pacific. I have worked as a radio operator aboard ship and aircraft, for police, the FCC, and as an AM/FM/TV broadcast engineer. I have also worked in electronic equipment manufacturing in chemical field-stress analysis and ultrasonics.

"In 1950 I began county hunting under the aegis of W1JTD and K1ZFQ. It took me 33 years to obtain USA-CA All Counties on CW. Of course, I took a few years out to raise a son. I still have a few to go to complete my SSB endorsement.

"I have been retired since 1980. My other hobbies are flying, music, and travel.

"A tip of the hat to all County Hunters; may you enjoy the chase as much as I have. Above all, to those stalwarts who run mobile stations, and without whom the search would probably never end, three rousing cheers from one of the 'old goats.' 73, Jack, W3ARK"

Jack Kupp, Jr., W3ARK, USA-CA All Counties #444, All CW, 11-19-83.

Station W3ARK, showing some of Jack's fine collection of awards. W3ARK is frequently among the high-scoring stations in contests.

Awards Issued

Le Roy Ullrich, WA0LMK, has made one more step toward All Counties by adding to his count USA-CA 3000 #521, Mixed, 3-11-85.

Lars Erick Bohm, SM5CAK, sent for USA-CA 2500 #582, Mixed, 3-25-85.

Ed Palagi, KN4Y, added three new seals to his certificate: USA-CA 2000 #637, USA-CA 1500 #708, and USA-CA 1000 #873, All CW, all dated 3-11-85.

Harry B. Roberts, N4HZA, waited until he had 2000 completed and then sent for USA-CA 500 #2014, USA-CA 1000 #874, USA-CA 1500 #709, and USA-CA 2000 #638, all 20 M/Mobile/SSB, all dated 3-14-85.

Radio Club "Mihajlo Pupin," YU7BCD (ex-YU1BCD), added the gold seal for USA-CA 1500 #710, Mixed, 3-22-85, to their certificate.

Germano Bezzina, TG9GI, claimed USA-CA 500 #2019 and USA-CA 1000 #875, All SSB, 3-19-85.

USA-CA 500 certificates went to:

Herb Rode, KA7MPJ, #2009, All CW, 3-8-85.

James A. Imhof, KP4CZ, #2010, Mixed, 3-11-85.

Clarence E. Allen, KA1GJV, #2011, All 20 M/Mobile/SSB, 3-11-85.

Evillo Abreu, KH6DRT, #2012, Mixed, 3-11-85.

Jesus Mendez Senande, EA1JO, #2013, Mixed, 3-13-85.

Harry B. Roberts, N4HZA, #2014, All 20 M/Mobile/SSB, 3-14-85.

Joe M. Chambers, KA5HTF, #2015, Mixed, 3-15-85.

Bob Matthews, KG8I, #2016, Mixed, 3-15-85.

Marco Eftimiadi, IV3YRN, #2017, all SSB, 3-18-85.

Kathryn McMichael, WD0ARX, #2018, All CW, 3-19-85.

Germano Bezzina, TG9GI, #2019, All SSB, 3-19-85.

Kai M. Mauseth, LA2TO, #2020, All SSB, 3-22-85.

Luis M. Kemper Perera, ZP5JCY, #2021, All SSB, 3-25-85.

USA-CA Honor Roll

3000		1000		500			
WA0LMK	521	KN4Y	873	KA7MPJ	2009	KA1GJV	2011
		N4HZA	874	KP4CZ	2010	KH6DRT	2012
2500		TG9GI	875			EA1JO	2013
SM5CAK	582					N4HZA	2014
						KA5HTF	2015
2000						KG8I	2016
KN4Y	637					IV3YRN	2017
N4HZA	638					WD0ARX	2018
						TG9GI	2019
1500						LA2TO	2020
KN4Y	708					ZP5JCY	2021
N4HZA	709						
YU7BCD	710						

Awards Available

Hong Kong Amateur Radio Transmitting Society. The Hong Kong Amateur Radio Transmitting Society offers three beautiful awards. They are as follows.

Catch 22 Award. Applicant must submit verified evidence of two-way contact with other amateur stations located on the 22nd parallel of latitude north (see list). A contact with a Hong Kong station is obligatory. Only contacts after 1 January 1980 are valid. Endorsements for mode and band may be requested.

The award is available in three classes:

Class 3—contacts with at least 15 countries.

Class 2—contacts with at least 20 countries.

Class 1—contacts with all 25 countries.

Fee is $7.00 US or equivalent currency. All awards will be returned by airmail and upgrade stickers may be applied for with a fee of $1.00 US. The countries list is as follows:

VS6 Hong Kong, CR9 Macau, BY China, BV Taiwan, XV Vietnam, XW Laos, XZ Burma, S2 Bangladesh, VU2 India, A4X Oman, A6X U.A.E., HZ Saudi Arabia, ST Sudan, SU Egypt, 5A Libya, TT8 Chad,

The "Catch 22" Award from HARTS.

333 South Lincoln Ave., Mundelein, IL 60060

5UT Niger, 7X Algeria, TZ Mali, 5T5 Mauritania, CN Morocco, C6 Bahamas, CO Cuba, XE Mexico, and KH6 Hawaii.

The Nine Dragons Award. One contact with a country in each of the following zones: 18, 19, and 24 to 30 inclusive. Contact for zone 24 must be VS6. Stations within the 9 zones require 2 contacts with each zone, with 2 VS6 contacts. Contacts after 1 January 1979 only are valid. The fee is US $3.00, Aust. $3.00, pound 1.50, postal order, or 25 IRC's.

The Hong Kong Firecracker Award from the Hong Kong Amateur Radio Transmitting Society.

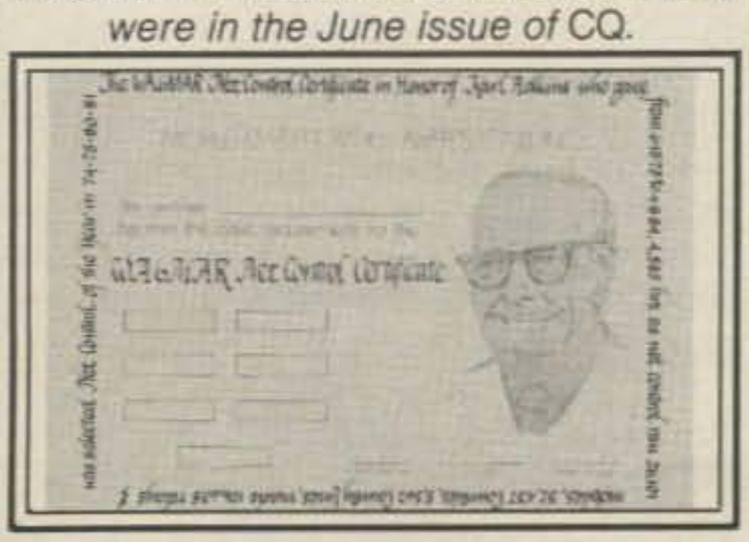
Firecracker Award. Six contacts with different VS6 stations. Stations in zones 18, 19, 24 to 28 require 10 contacts with different VS6 stations. Contacts after 1 January 1964 only are valid. Fee is US $2.00, Aust. $2.00, pound 1, postal order, or 10 IRC's.

Usual conditions for Hong Kong Awards. Certified log extracts only, no QSL cards required. Payment is to be made in cash or checks payable to HARTS. If sending postal orders, please leave "payee" blank. Award applications should be sent to Award Manager, HARTS, G.P.O. Box 541, Hong Kong.

Zone 12 Award. This is a handcrafted copper plate available to those who have worked 12 different zones (including zone 12). It is issued for phone, CW, RTTY, SSTV, or OSCAR operation. Send list of QSL's certified by a local club, plus $5.00 US or 15 IRC's (for airmail delivery) to Awards Manager, Radioclub de Chile, Casilla 13630, Correo 21, Santiago de Chile, Chile.

WAPY Award. This award is issued for contacts made on or after 15 May 1981. One QSO is needed with each of the nine Brazilian continental PY call areas, PY1–PY9 (only PY prefixes, not PP, PR, etc.). Endorsements will be given for two-way CW, two-way phone, and QRP (less than 10 watts input; send declaration to that effect). One PY0 may be counted in place of another area if needed. Send certified list of QSO's plus 5 IRC's for postage to: Antenna Editorial Group, Caixa Postal 1131, 20001 Rio de Janeiro, R.J. Brazil.

WA6MAR Net Control certificate. Details were in the June issue of CQ.



Of Special Interest To County Hunters

The Mobile QSL Bureau has moved and is now being operated by Gwen, N0COL, and Jerry N0CKN. The new address is Mobile QSL Bureau, P.O. Box 1806, Des Moines, IA 50306. For further information send an SASE to this address.

The B & B Print Shop has new issues of the *County Hunters Directory* and the *County Hunters Handbook*. The *Directory*, price $6.00 US, contains names and addresses of the most active County Hunters, as well as previous calls and telephone numbers. The *County Hunters Handbook* contains approximately 100 pages of information for the County Hunters. The *Handbook* is $3.00 sent postage paid via first-class mail, or $4.25 US postage paid airmail to DX stations. If you wish a current catalog of supplies available, send 22 cents postage. Address for the B & B Shop is 1348 Pinewood Drive, Woodbury, MN 55125.

Notes

If your club or group is interested in participating in the 1986 Armadillo Run, be sure to contact Tom Taormina, K5RC, Route 1, Box 307, Manvel, TX 77578. Tom is the coordinator for the Run, during which the Texas DX Society will attempt to put all counties in the United States on the air. This effort will be made in order to share the Sesquicentennial Celebration of the Great State of Texas with the rest of the radio amateurs all over the world. In 1983 the TDXS activated all 254 Texas counties, and in 1984 they activated all counties in Louisiana, Arkansas, and Mississippi.

Whether you are traveling for the summer holidays or spending them at home, I hope it is a pleasant time for you.

73, Dorothy, WB9RCY

NO-79-80

DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATIONS AROUND THE WORLD

Morning, evening, noon and night,
"CQ DX!" sang the DX blight . . .

Last week one of the Locals came up the hill, the marks of the declining sunspot cycle written on his face. "Things are really getting tough these days," he said, and we had to agree with him. In the higher frequencies most days the bands fade out at sunset; some days they don't even last that long. We suspected that misery was looking for company, and we were ready to share ours with him. What else would a DXer be expected to do? After awhile the Local spoke.

"Do you remember a couple of years back," he said slowly, his brow furrowed with thought, "when I would stay up all night working DX in the *CQ* World-Wide DX Tests, and the only problem I had was that eventually there would come an end to the tests? As far as I was concerned, they could have gone on forever."

We remembered. DXers always remember the good days. But the Local was not yet through with his reminiscing. "I guess I was pretty new to the game back then," he continued, "but I never once stopped to wonder why I would spend so much time just jumping in and working every DX station I heard. I got acquainted with DXers all over the world, and it didn't matter at all if most were countries I already had for DXCC counters. It was fun and I wanted to work them all. And I sure tried my best to make sure that nothing got by me." The Local paused a moment, then continued, a question in his voice.

"You know something," he said, "when I first got interested in amateur radio I remember someone at a meeting saying that DXers are different, that eventually somewhere along the way you would recognize that DXers are the top echelon in the activity, and that if one had to have a personal goal, it should be to be a true-blue DXer. Be that and you would be on top of the world." The Local fixed an eye on us and we braced ourselves for the question. "Did you ever hear that said?" he asked.

We thought that was a peculiar question to ask, for we have been expounding on that idea for a couple of decades. This was no Mystery of the Ages; this was one of the Eternal Truths. But then we got to thinking that perhaps this Local was only leading us to something else on his mind. "Yes," we said, "we've heard that idea.

77 Coleman Dr., San Rafael, CA 94901

In downtown Jakarta, Niko Indarto, YB2BLI, shows the operating position from which he has gained most of the major awards in amateur radio. Niko holds DXCC, BARTG RTTY Honor Roll, U.S. County Award #1891, the CQ DX Award, the first Chesire Award given in Asia, and a host of others. Three years running he took the BARTG Spring RTTY Contest for Asia. Gear includes a Kenwood TS430S with a Kenwood TL922 and an Alpha 78 amplifier, a Robot 800C for RTTY, and a Robot 400 for SSTV. The antennas include a Hy-Gain TH7DX, a TH3Jr. for the higher frequencies, and a 2-element AFA40 for 7 MHz.

In fact we have repeated it many times ourselves."

We were right. The Local did have more questions. "If that is so," he said, "and DXers are supposed to be so smart, then why will they stay up all night when conditions are good to work the *CQ* World-Wide DX Tests? I sometimes wonder why, if they have already worked most, if not all, of the countries heard, they are so persistent in working them all again in a contest. Can you tell me why?" Of course we could.

"Because DXers are different," we quickly interjected, but that wasn't good enough. "But why are DXers different?" the Local asked, and we wondered whether we should even try to answer. When you are a DXer you are different! That's for sure, and most DXers know they are different—but *better* different, not *odd* different. DXers are always listening for those distant drums. DXers know things that others do not. But how do you explain these things to a questioning Local who suspects there is something that he may not yet understand but eventually will, and who has not as yet even gone through his complete sunspot cycle? It was then we decided to haul him farther up the hill to the Old Timer. There is one who has seen a lot of sunspot cycles—an awful lot!

It did seem that this Local was a thinker about DX and other interesting things. He put the same questions to the Old Timer and, as we expected, largely got the same answers. But Old-Timer DXers always seem to have a better grasp of things and say them better than we do. The Old Timer took a little time to start answering.

"You are right in recognizing that DXers are the top echelon," he said, "but then again, that's the way it has always been. You find a consistency in the records of the DXers. They are always on the leading edge, the most technically proficient, the most innovative, and the most persistent. They seem always to be imbued with the spirit to be on top of things, the Honor Roll included. Some may tend to believe that DXers are but ordinary people with big antennas and bigger linears. That is not so. They are the ones with the big incentive drive and the unflagging interest in DXing." The Old Timer leaned close to the Local to make his point. "And remember! A true-blue DXer never loses his interest in DXing. Once he has it, he has it forever!"

There we were, listening and nodding our heads at all of this. We had no doubts whatsoever when the Old Timer spoke. At times it did seem that if we closed our eyes and listened we would hear the rumble of distant thunder among the far peaks. Again we were having the familiar feeling that someday from up on the top of the hill we would hear the deafening crashes of thunder and the Old Timer would come strolling down the hill carrying the Eternal Truths of DXing engraved in stone. We always live in expectation.

The Old Timer and the Local continued their conversation. There were words such as DX reflexology, the length of DX polarity, how a DXer must work towards a mind-body integration with the universal DX-giving forces, and even a reference to Rolfing, which we knew had nothing at all to do with DXing. We just sat and listened. We were believers when the Old Timer spoke.

Later as we headed down the hill we asked the Local if he felt better after talking with the Old Timer. He still had some things on his mind. "Why is it when the Old Timer tells me that DXers are different I am so satisfied just to hear his words? I came here today worrying about band conditions and the way the sunspots have gone downhill along with the nagging worry that perhaps things will never be the same again. Heck! I even wonder if I will find anything to work in the *CQ* World-Wide DX Tests this fall. But I listen to the Old Timer for a few minutes and

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"Uncle Ben" Snyder, W2SOH
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Kenwood TR-2600, TR-3600

Kenwood TS-711A

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The WPX Program

Mixed

1150	3A2LF	1151	EA1CIM

S.S.B.

1718	9J2JI	1724	HI8GB
1719	KP4CZ	1725	JH8BJG
1720	OH1DG	1726	EA8AKN
1721	I4GHW	1727	N3BGY
1722	EA2SN	1728	KE6KT
1723	KA2MBC		

CW

2312	JA7KPE	2314	JG2UUS
2313	VE3IAY	2315	N3BGY

Endorsements

Mixed: 450 3A2LF, EA1CIM, KC4YY. 500 3A2LF, KC4YY. 550 3A2LF. 600 3A2LF. 650 3A2LF, JH8NYK. 700 3A2LF, JH8NYK, F8BO. 750 3A2LF, JH8NYK, KO2Q. 800 3A2LF, JH8NYK, JA7FFN, KO2Q. 850 3A2LF, JH8NYK. 1050 WD9IIC. 1200 W8UMR, I2MQP. 1250 W8UMR, I2MQP.

S.S.B.: 350 KP4CZ, OH1DG, I4GHW, EC4BIR, HI8GB, JH8BJG, EA8AKN, N3BGY. 400 KP4CZ, OH1DG, I4GHW, EC4BIR, HI8GB, JA8EZR, JH8BJG, EA8AKN. 450 KP4CZ, OH1DG, I4GHW, EC4BIR, HI8GB, JA8EZR, JH8BJG, EA8AKN. 500 HI8GB, W3IJT, JH8BJG, EA8AKN. 550 CP8HD, HI8GB, JH8EJG, EA8AKN. 600 CP8HD, HI8GB, JH8BJG, EA8AKN. 650 CP8HD, K8HF, HI8GB, EA8AKN. 700 CP8HD, WO4L, K8HF, HI8GB, EA8AKN. 750 CP8HD, WO4L, HI8GB. 800 HI8GB. 850 HI8GB, W0ULU. 900 HI8GB. 950 HI8GB. 1000 HI8GB. 1050 KL7AF. 1200 I2MQP. 1250 I2MQP. 1550 I6ZJC. 1600 I6ZJC. 1800 W0YDB.

C.W.: 350 N3BGY. 400 N3BGY. 450 N3BGY, JA2KVD. 500 N3BGY, KT2C, JA2KVD. 550 JA2KVD, N3BGY. 600 OK2EC, JA2KVD, N3BGY. 650 OK2EC. 700 VE7WJ, OK2EC. 750 VE7WJ, OK2EC. 800 VE7WJ, OK2EC. 850 VE7WJ, OK2EC. 900 VE7WJ, OK2EC, W9VEN. 950 VE7WJ, W9VEN. 1000 VE7WJ. 1350 W3TVB. 1850 N6JV.

10 meters: JG1RYQ, HI8LC, N5TV.
15 meters: JH8NYK, OK2EC, N5TV.
20 meters: JH8NYK, KO2Q, N5TV.
40 meters: CT1UA, WO4L, N5TV.
80 meters: KO2Q, N5TV.
160 meters: KL7AF, N5TV.

Asia: JH1RYQ.
Africa: HI8LC.
So. America: SM6AYM, WD9IIC.
Europe: JG1RYQ.
Oceania: JA2KVD.

Award of Excellence: DK5AD with 160 meter endorsement.

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K6XP, K2VV, VE3GCO, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, YU2DX, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, I0JX, WA1JMP, K0JN, K4IEX, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YZ/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N6NX.

Award of Excellence Holders with 160 meter endorsement: K6JG, W4CRW, K5UR, OK1MP, W8CNL, W1JR, W5UR, W8RSW, W8ILC, W1BWS, G4BUE, LU3YL/W4, VE7WJ, W9NUF, N4NX.

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.

After a long drought, Turkey has again been issuing licenses for amateur operation, this starting early this year. When Dr. Unal Akbal, TA1A, sent this photo, he noted that he was the first and only Class A licensed amateur in Turkey. In fact, he holds the only license issued—Class A, B, or C. Here is TA1A with his XYL at the operating desk. Note that he holds his favorite reading material. He operated from 1.8 MHz to 28 MHz, both CW and SSB. His favorite frequencies are 14025 kHz, maybe 10 kHz either side, and 21025 kHz ±10 kHz for CW work. For SSB Dr. Unal likes 14195 kHz and will move ±50 kHz looking for a clear spot. Regularly TA1A operates between 0500 and 1800Z on Saturdays and Sundays. QSLs go to Box 787, Istanbul, Turkey.

I feel good. Later, however, the doubts return. How do you explain that?"

We didn't even try to answer his question. "Tell us something," we said. "Just why are you interested in DX at all? You know the bands are fading and that there will be days when 15 and 20 meters are hardly worth listening to and 10 meters probably will be gone for a couple of years. You know this, yet you continue to seek information about DX and nothing catches your attention as quickly as any reference to DX. Why?"

If we thought that we would make the Local pause and review his thinking, we were mistaken. He may have had his worries about Cycle 21 and DX conditions, but apparently there still were things about which he had no doubt at all. Actually, there was a bit of joy in the smile on his face.

"Why?" he asked, echoing our question. "Why do I think of DX even with the bands flat? I think of DX because there is nothing else at all like it. You should know that! I find DX always new and exciting, and nothing has ever held my attention like DXing. It's not that I've lost any of the joy of DXing. It just hurts to think that things might be a bit slow for a year or so. That's what I really worry about." Suddenly there was a shadow on the Local's face. "What can one do when there is no DX on 20 or 15 because the bands are out? That's what's bothering me!"

We were getting the idea that it might be time to try a bit of steering. "Have you given much thought to the lower frequencies?" we asked. "Don't forget what you've often heard Sam down on the Blithedale Ridge say: 'When 20 goes out, 80 comes in.' The next couple of years will see improved conditions on the lower frequencies, on 40, 80, and 160. And have you ever thought of working for 5B WAZ?" The Local acknowledged he had.

"Then why don't you figure to clean up the lower bands," we continued. "Things will be best there during the bottom of this cycle, but they will fade when Cycle 22 gets started. Heck! You might work enough to qualify for 6B WAZ. How about that?"

The lights were back, there was joy again, and the Local was on his feet. "I will do it," he almost shouted. "I will, I will!" Then he stopped. "You know something," he said after a slight pause, "I think I'm beginning to understand why DXers are different. Maybe I can understand why a true-blue DXer has to be the noblest of them all. True-blue DXers are the ones who never give up, not even at the bottom of the cycles. They are DXers! Always!"

Understanding comes to most everyone, eventually. But for now we were satisfied that we had traveled with the Local to this point and beyond this day. For one always learns that there is nothing like DX, but this is something that only a DXer can truly understand. Only a DXer understands DXing, and only a DXer can understand another DXer! But that is the way it has always been, and that is the way it will always be.

Should you have any question left as to where the true-blue DXers might tend to be found in the next couple of years, just remember that if you don't find them on 40, look to 80, and maybe even 160. In every cycle these are the hurricane holes where DXers go to wait out the return of the Great Days of DXing. Cycle 22 will bring them!

The WAZ Program

10 Meter Phone

297	W4KHW

15 Meter Phone

215	W4KHW	217	A-71AD
216	K4KUZ		

20 Meter Phone

529	W4KHW	531	KC2KU
530	VE3CYX	532	A71AD

80 Meter Phone

29	K5YY

20 Meter CW

228	W7YCK

40 Meter CW

52	K2TQC

All Band WAZ

S.S.B.

2942	K2TQC	2945	JA2ODS
2943	KR9A	2946	SV1PL
2944	HL1EJ	2947	SM6JAO

C.W. and Phone

5863	K2TQC	5867	JA1OVF
5864	K2TQC (CW)	5868	LZ2DF
5865	W0LYM	5869	WA2AUF
5866	W6AUG		

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.

5 Band WAZ

Standings as of April 1, 1985

All 200 zones worked:

1.	ON4UN	33.	W0MLY	64.	LA6OT
2.	K4MQG	34.	I0RIZ	65.	UR2QD
3.	SM4CAN	35.	ON5NT	66.	UK2RDX
4.	AA6AA	36.	OH6JW	67.	ZS5LB
5.	W8AH	37.	OK1AWZ	68.	F6DZU
6.	W6KUT	38.	IV3PRK	69.	DL4YAH
7.	EA8AK	39.	DJ6RX	70.	LA7ZO
8.	LA7JO	40.	OH3YI	71.	W9ZR
9.	EA3SF	41.	I4RYC	72.	W1NG
10.	OH1XX	42.	ZL1BIL	73.	VK9NS
11.	EA8OZ	43.	I4EAT	74.	N4KG
12.	W0SD	44.	ZL1BQD	75.	YU7DX
13.	K0ZZ	45.	TG9NX	76.	DL8MAG
14.	ON6OS	46.	XE1J	77.	OK3DG
15.	OK3TCA	47.	F5VU	78.	ZL1BOQ
16.	K6SSS	48.	W3AP	79.	EA9IE
17.	ZL3GQ	49.	YO3AC	80.	DL7HZ
18.	OK3CGP	50.	K3TW	81.	DJ9RQ
19.	SM0AJU	51.	XE1OX	82.	EA5SP
20.	OZ3PZ	52.	VE7IG	83.	EA2IA
21.	I3MAU	53.	OK1ADM	84.	SP3BQD
22.	I2ZGC	54.	CT1FL	85.	LZ1NG
23.	4Z4DX	55.	WA1AER	86.	N4JF
24.	N4KE	56.	N4RR	87.	CT2AK
25.	K5UR	57.	UW0MF	88.	HB9CIP
26.	K9AJ	58.	W4DR	89.	OK1MG
27.	SM3EVR	59.	OK1MP	90.	CT1BD
28.	LA5YJ	60.	W1NW	91.	VK6HD
29.	DL3RK	61.	OE1ZJ	92.	EA6ET
30.	N4WJ	62.	HB9AHL	93.	VK3QI
31.	G3MCS	63.	HB9AMO	94.	LZ2DF
32.	SM5AQD				

The top 14 contenders for 5 Band WAZ:

1.	DK5AD, 199	8.	LA9GV, 198
2.	JA3EMU, 199	9.	W6GO, 198
3.	N4WW, 199	10.	K4CEB, 198
4.	EA8XS, 199	11.	W2YY, 198
5.	K6YRA, 199	12.	SM5AKT, 198
6.	W8UVZ, 199	13.	G3GIQ, 198
7.	K2TQC, 199	14.	CT3BM, 198

310 Stations have attained the 150 zone level

Albania

Most DXers have worked Yugoslavia and Greece. So why the concern to work Albania? Because it's there! And because it is a DXCC counter and hard to come by.

Enver Hoxha, who has ruled Albania with an iron and repressive fist since 1944, died in mid-April. During all those years, 40 or so, Hoxha maintained a grip that foiled plots, directed purges, and instituted mass imprisonments. Initially turned towards Communist absolutism, Hoxha broke with Russia and China because of what he thought were revisionist tendencies. Maybe this might help you understand why there has been so little activity from Albania.

As in some other instances which you may recall, amateur activity only showed in some of the rarer countries after there were some internal political changes. At this time it is too early to really note whether there has been any change to loosen up things in Albania. However, the Hoxha regime had a well-defined ability to find fault with every friend it ever had. Half the original cadre that brought Hoxha to power were eliminated along the way. Some may long for the good days when King Zog was ruling Albania, but there are others who just long for a valid ZA QSL. With the changes in the guard, things might be moving towards a better prospect—maybe.

Antigua

Grant Mitchell, V2ACW, is sporting a new callsign and works CW only from 10 through 160. A member of the South Florida DX Association, Grant previously has signed KA2DIV/V2A. QSLs go to WB4OSN. Just in case you want to set up a schedule with V2ACW for some of the more exotic bands, his address is POB 209, St. Johns, Antigua, West Indies.

Botswana

Dan, AK1E, gives some African information in a letter which follows:

"I am sad to report that operations from A22ME and A22TE ended about February 20th. Mel was returning to the states to work in the VOA studio in Washington. QSLs for the entire operation, from 1983 to 1985, will be available from me, AK1E.

"Since December 1983 I have sent out 4800 such QSLs answering requests, but this represents less than half the QSOs during the period Mel and Tammy were active.

"A22 will still be active via A22CA, A22DX, A24DM, and A24AS. All these QSL through AK1E. A24DM also works RTTY, should any need this mode. Many more new hams are receiving tickets in Botswana and will be active from club stations, and, as equipment becomes available, from their home QTHs.

QSLs for 9Q5CT will be available eventually from AK1E. There may be some delay but they definitely will come. I have some problems in communicating with Fred/9Q5CT, but he is advising all to QSL via me. Many problems exist in the Zaire bush country, which complicates Fred's activities. However, Fred will be active whenever possible.—Dan, AK1E"

DX & Computers

A good number of DXers have found computers to be an aid to keeping track of things. Some even have figured out that it is easier to have the computer handle QSO's. Easier, perhaps, but where is the joy? Back a bit Norm Koch, K6ZDL, fed the entire WPX file into his computer, and he is still wondering how so many duplicates ever got into the record. They are there no longer, and Norm is watching.

For amateur awards, AMPRO has produced software to help keep track of where you are or where you were in various programs. These programs are available for the IBM-PC and compatible computers, as well as for many other MS-DOS machines. A 256K RAM and one disk drive are needed, and a printer is preferred but not necessary. The initial release has four separate packages for DXCC, 5BDXCC, WAZ/5-Band, and WAS/5-Band. There is a cross-referenced data base for DXCC. You can even run off lists of needed countries, which all your friends will appreciate having for one-ringer service. For more information, drop a line to AMPRO Software, 101 Maple Lane, Annapolis, Maryland 21403.

Xantek has added a program for their DX Edge, the initial program aimed at the Commodore 64 computer. The computerized version of the DX Edge will give you optimum conditions, the gray lines, sunrise/sunset times, and will even show on a monitor the areas of the world in daylight or darkness, this being a de-

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. Deleted countries do not count and are dropped from listing as they occur. Total countries are now 315. 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.

C.W.

W6PT	315	W6ID	311	AB4H	304	EA2IA	293	K7ZR	280
K4CEB	315	K4XO	309	WØIZ	303	K9IW	292	I5XIM	280
ON4QX	315	W4BQY	309	WA8DXA	302	N5DX	291	W2LZX	280
W9DWQ	315	DL3RK	308	YU2TW	301	I3OBO	290	K1VHS	280
DL7AA	314	N4MM	308	SM3EVR	300	WD9IIX	290	N8MC	277
W3GRS	314	W9BW	308	W6SN	299	W1WLW	289	WB4RUA	277
N4PN	314	W4OEL	307	WØSR	299	W4BV	289	W6YQ	277
W8KPL	314	AA6AA	307	K3FN	298	WA2HZR	286	DL1QT	277
K9MM	314	W1NG	306	W7CNL	298	K8LJG	284	NN4Q	276
K6LEB	314	K1MEM	306	DJ7CX	297	WD9IIC	284	KA3R	276
N6AV	313	OK1MP	306	SM6CST	297	K8PYD	281	K4SE	275
K6JG	313	K9QVB	306	K3UA	295	WA4JTI	281	WA4DAN	275
K6EC	312	N4KG	304	W9RY	293	WØHZ	281	K4CXY	275
N6CW	311								

S.S.B.

K2FL	316	K8LJG	312	KM6B	304	NA5W	297	W9NUF	284
K6WR	316	K4MQG	312	WD8MGQ	304	K4CXY	296	WB3HAZ	283
W4UG	316	N4MM	312	VE3MRS	304	W4UNP	296	WD8PUG	283
W4EEE	316	I2LLD	312	VE7HP	304	KE3A	296	XE1OW	283
W6EUF	315	VE7WJ	312	XE1KS	303	WZ4I	296	VE3CKP	283
W3GRS	315	K6EC	311	W2LZX	303	WB3GPR	296	VE3MV	283
KD8VM	315	W4SSU	311	KU9I	303	I8ACB	295	IN3ANE	283
DL9OH	315	I4LCK	311	IØMBX	303	I3OBO	295	AE5B	282
VE3MR	315	N7RO	311	KB8DB	303	K9UAA	295	CT1UA	282
IØAMU	315	W9SS	311	K1MEM	302	WA9PWN	295	KC8YM	282
F9RM	315	LU3YL	311	N5FG	302	XE1OX	295	AI9R	282
VE3MJ	315	OZ5EV	311	W6FET	302	WØIYR	295	VE3DLR	282
I8AA	315	N2SS	311	W2FGY	302	KKØC	295	TG9EP	282
IØZV	315	EA4LH	310	K9HQM	302	I8ZTE	294	K4LR	282
KS2I	315	K6XP	310	KV2S	302	NN4Q	294	I1POR	281
4Z4DX	315	OE2EGL	310	WD9IIX	302	WDØBNC	294	KD5ZM	281
W9DWQ	315	DK2BL	310	W6SN	302	I5BDE	294	K9TI	280
W9JT	315	K4XO	310	VE3FJE	301	K4SE	293	N5FW	280
I8KDB	314	IV3YRN	310	WB4NDX	301	WD8MOV	293	ZL1BOQ	280
K6YRA	314	W2SUA	310	WA3HUP	301	KC8JH	293	KA8T	279
ZL1AGO	314	YU1DZ	310	K8CMO	301	AI5I	293	KB5DN	279
ZL3NS	314	LA7JO	310	W8ILC/QRPp	301	WA4LOF	292	EA3KW	279
VE3GMT	314	K9BWQ	310	AI8S	301	ACØA	292	EA6DE	279
EA2IA	314	VE3GCO	309	K9IW	301	I2MOP	292	W9OKL	279
W4NKI	314	DL6KG	309	W1LQQ	301	VE3FEA	292	JH8NYK	279
YV1KZ	314	N4PN	309	W9RY	301	VP9CP	292	KX5V	279
DJ9ZB	314	K1UO	309	YU2TW	301	VE3IPR	291	AI8M	278
N4WF	314	W8JXM	309	W4OHZ	300	N5AWS	291	K4BYK	278
W3AZD	314	W1NG	308	I5EFO	300	WB6GFJ	291	I5EFO	278
OZ3SK	314	VK4VC	308	W8IMZ	300	W4JFE	291	VE3IUE	278
W4DPS	314	YV5AIP	308	K9QVB	300	KB3OQ	291	K3LUE	278
VE2WY	314	ZL1BIL	308	KB5FU	300	K1VHS	291	KB3KV	278
K9LKA	313	N6AV	308	KB9KD	300	W6MFC	291	WA2FKF	278
K9MM	313	AA6AA	308	K3UA	300	KBØU	291	KB8O	277
XE1AE	313	N6OC	308	KB8KW	300	KQ9W	291	KP4EQF	277
I4ZSQ	313	WA4JTI	308	VE4AT	300	W4BQY	290	WBØUFL	277
ZS6LW	313	VE4SK	307	I8KCI	300	KZ2P	290	W4PTT	277
ON5KL	313	K8PYD	307	WB3DNA	300	YU7KV	290	KBØSY	277
K6JG	313	N4KG	307	WAØTKJ	299	IØSGF	290	I8XTX	277
OE3WWB	313	IØMBX	307	I6PLN	299	JA5PUL	289	VE6PW	277
OK1MP	313	WØSR	307	KB9OC	299	W9TA	289	N7ASL	276
YV5DFI	313	W7FP	307	W6NLG	299	K8ZZU	289	WA6DTG	276
VE1YX	313	W6DN	307	DJ7CX	298	KØGT	288	WA4OPW	276
WØSFU	313	9H4G	307	K9SM	298	OK1AWZ	288	AI9U	276
W9BW	313	N4KE	306	I8LEL	298	I8KCI	288	KC2RS	276
WØYDB	313	W8PCA	306	K8NA	298	N2ATD	288	W5LLU	276
W8ILC	313	W7OM	306	JH4PRU	298	WØULU	288	I8INW	275
F2MO	312	WAØDCQ	306	K8VFV	298	AB9E	287	W8LKG	275
N6AW	312	W2CC	305	WB4UBD	298	W6BCQ	286	WB3CQN	275
W3GG	312	VK3JF	305	EA9IE	298	N3ARK	286	WB1EAZ	275
I8YRK	312	EA1QF	305	XE1NI	298	VE3CYX	285	VE7BSM	275
CT1FL	312	SM4CTT	305	HP1JC	297	KC8EU	284	K8NWD	275
WØSD	312	G4CHP	305	K5DUT	297	KB5RF	284	KI3L	275
K9RF	312	XE1J	304	WA4DAN	297	N8BKF	284	KA9ABC	275
K5OVC	312	WB1DQC	304	KR9O	297	N8BJQ	284	G3XTT	275

tailed world map. All this is to help you at the bottom of the sunspot cycle and to expedite cleaning up all the low-frequency bands when HF is either a fading memory or a happy anticipation of what's to come.

Do DXers bother with computers? A lot do. A couple of years back at the Northwest DX Convention (one gets mixed up with a lot of Boeing-type people at such events) the table talk about computers was not only revealing, but somewhat startling. Yes, DXers do use computers, some more than others. And some have figured out exotic uses for them in their DXing.

Early this year there was something of a shakeout among the computers, prices being slashed, models being discontinued, and other interesting developments. It might be a good time to consider whether computers are compatible with DXing. There are a lot of DX types who lean that way. Xantek, Inc., who produces the DX Edge, both the plastic version and the computer program, can be found in mid-town New York at P.O. Box 834, Madison Square Station, New York, NY 10159.

International Travel

It is mid-summer and most travelers have either already gone and returned or are ready to depart. However, there are DXers who are starting to make plans to travel for the *CQ* World-Wide DX Tests, which will be upon us about the time the snow flies.

Here Rudolf Klos, DK7PE/3B9, shows on his QSL card his operating position in a sheep corral when he was on Rodriguez some months back. Rudolf gave up a comfortable hotel room to move close to the tower in the background, which he was allowed to use for his antennas. He says the trip was so enjoyable and the residents so friendly that he will go again.

Naoki Akiyama, JH1VRQ/N1CIX, has turned out more information for the traveling and deserving DXer. A month or so back Nao forwarded some information on the International Travel Host Exchange and a copy of the general information manual for overseas operating. Both are interesting.

The International Travel Host Program lists a number of amateurs in overseas spots including Australia, France, Iceland, Italy, Jamaica, Kenya, Lesotho, the Netherlands, Sierra Leone, Sweden, Switzerland, Syria, and the United Kingdom. These are reciprocal exchange arrangements. The list of callsigns can be scanned for some familiar DX types. We even found Dick Baldwin, W1RU, and Bruce Frahm, KØBJ, listed.

On the licensing manual, Nao answers a lot of questions, tells you how to make arrangements to operate, and other necessary things. Nao has compiled over 200 packets to help the traveling DXer over the rough spots on the trail. Write to Naoki Akiyama, International Programs Manager, ARRL, 225 Main Street, Newington, CT 06111, and enclose a self-addressed envelope with two rates of postage or two IRCs. Tell Nao what you intend to do, and you will have a lot of good answers. This is excellent information for anyone planning to operate outside the country, and it is also good for amateurs coming to the States from other countries. Why do we know that Nao does good work? We first came up with Nao years back when he was the big-gun DXer in Tanashi in the Tokyo area.

It's time to plan for the *CQ* World-Wide DX Tests. Think ahead! Think DX!

Rodriguez Island

Last fall Rudolf Klos signed DK7PE/3B9 from Rodriguez Island in the Indian Ocean. Always somewhat of a rare country, it may be even a bit more rare for the next couple of years with the band conditions as they are. The island is 63°E and 19°S, and 335 miles east of Mauritius. The island has been independent since 1968 and once used the VQ9 prefix. On his trip Rudolf found an unused 75 foot tower available and promptly hoisted an 80 meter Delta Loop, a 160 halfwave sloper, and rigged up a 40 meter vertical out of a fish-

ing rod and was deep into CW operating.

Rudolf traveled from Mauritius to Rodriguez in a light twin-engine plane, 2½ hours over the ocean to the volcanic island with its deep valleys. Getting from the airstrip to Port Mathurin, the capital of the island, took a lift from some friendly people passing in a Land Rover.

The initial effort was with antennas strung from the trees around the hotel. This was only moderately successful. A visit to the engineer for the radio-telephone service on the island resulted in permission to use the idle tower for his antenna. The only difficult part was to leave a comfortable hotel room with semi-efficient antennas and to set up business in a well-used sheep corral and adjacent shack with access to efficient antennas hung on the tower. DK7PE did what any dedicated DXer would do: he shoveled out the corral. That took care of most problems. There only remained the indigenous cockroaches, some 10 inch millipedes which are a bit on the virulent side, and some displaced sheep who tended to hang out around their old quarters to check the action. The Delta Loop was fed with 450 ohm open feeder line and was used as an all-band antenna to work the higher bands.

With the decline of Cycle 21, Rudolf found that conditions were not much during the day except for occasional 10 meter openings into Europe. In the afternoons 20 meters would start to come to life, but his main concern was to bring some Rodriguez-3B9 activity to the lower frequencies, this always being a scarce item for the Deserving.

On 80 meters AA6AA was the first QSO, coming through at 1550Z on the long-path with 599 signal. This was evening on Rodriguez and morning in California. On the same day, November 18th, JH3BGG was heard in a pile-up, Tommy already known to Rudolf as one of the most active JA DXers on the low bands. Later in a letter JH3BGG said that it is believed that that was the first ever 80 meter QSO between JA and 3B9.

On 160 meters there were good openings to North America. The first 160 meter QSO to that area was with W1OO in Maine. His signal was 559 over a distance of 1500 km (9000 miles). It was a memorable experience to hear 160 open, at times there being good openings around the world lasting over 30 minutes with good signals both ways. His last contact on 40 meters was with ND7E about two hours after sunrise on Rodriguez. This was at the time of the last *CQ* World-Wide CW Test, but he could not hang on any longer, as he had to catch a plane back to Mauritius and home to Europe.

The residents on Rodriguez were always friendly and helpful. It was a delightful trip, and Rudolf met many friendly people. Anyone who worked him at Mauritius as DK7PE/3B8 or at Rodriguez as DK7PE/3B9 can QSL either via DARC or direct: Rudolf Klos, Kl. Untergasse 25, 6501 Nieder-Olm, West Germany.

Thailand

Back in 1982 the members of the Radio Amateur Society of Thailand (RAST) voluntarily went off the air when the government was considering legislation on amateur radio. Since that time most, if not all, of the Thailand activity has been from the club station of the Asian Institute of Technology at Rangsit, HSØA or HSØHS being signed at times. Unfortunately, the stations are heard only during major contests or related activities. To justify operating during such events, details of the activity have to be submitted to the authorities in advance so that permission to operate can be obtained. Generally, such permission has been granted, and the club stations during the last year were active in the All-Asia DX Test, the *CQ* World-Wide DX Tests, and the European DX Test.

Tony Waltham, HS1AMH/G4UAV, on behalf of RAST, is looking for early information on contests or other special events. The committee of the Thai Post and Telegraph Department which reviews such requests meets but once a month, and generally two months lead time is needed to be certain of approval once an application is made.

The club stations, HSØA and HSØHS, have a 100% QSL record. Tony is asking that he be advised of any planned contest or special activity. The club's goal is to be on the air at least once a month, and perhaps even more if possible. As most of the information in the past has come from activity calendars in magazines, surface transportation means a two or three month transit time for these, and often the information is received too late to make application to the authorities.

RAST continues to work towards full recognition and legalization of amateur radio in Thailand, and there are continuing talks with the authorities. Currently HS1WB is the president of RAST, HS1DS the vice-president, HS1YL the second vice-president, HS1BG the secretary general, and HS1DC the treasurer.

You might look for HSØA in the SEANET DX Test next month (August), in the European DX Test in September, and in the *CQ* World-Wide DX Phone Test the last weekend of October. They have a TH6DXX at the station, and when conditions are favorable they are noticeable on the bands. If you can help with schedules, drop a line to Tony Waltham, HS1AMH, GPO Box 2008, Bangkok 10501, Thailand. It will be appreciated.

Labrador

Scott Richardson, WA1YXL, will be in Labrador for the Radiosport Test sponsored by the IARU the second weekend in July. The contest covers everything from 160 to 2 meters single and multi-op. If you work Scott, QSL to Box 974, Scarborough, ME 04074.

Some DX Notes For Mid-Summer

The Fraser Valley DX Club up in the border country by Vancouver has some new drivers. Bob Johnson, WA7ZWG, is the new president and Dick Moen, N7RO, the vice-president. Both are out of Bellingham, Washington. Mark Hansen, VE7CA, of North Vancouver is the treasurer and Bruce Light, VE7BSM, of Clearbrook is the Secretary, the latter towns being in British Columbia. Possibly not new but worth mentioning again is the cooperation and good spirit that exist among amateurs in this northwest corner and on both sides of the border. Jean and Charley Shaffer, KM7E and K7NW, spent some months last year traveling in Russia as ordinary tourists and not part of a tour. Jean speaks Russian and hoped to acquire a Russian dictionary—Russian to Russian. Her inquiries only brought puzzled looks. Apparently there is no such thing in the Russian bookstores. Queries of Russian amateurs confirmed this.

The "Static Sheet" of the Des Moines Radio Association recently noted with some alarm the "graying" of amateur radio, judging the average age of its members to be in the fifties, while a shortage of young whippersnappers in their thirties is becoming more obvious. The club is not alone. Some think that the cost of equipment is a problem, others the examination, and some blame computers and video

CQ DX Awards Program

S.S.B.

1407	KR9A	1409	N3BGY
1408	N6DKN		

C.W.

630	LA4FBA	632	NJ4F
631	N3BGY		

S.S.B. Endorsements

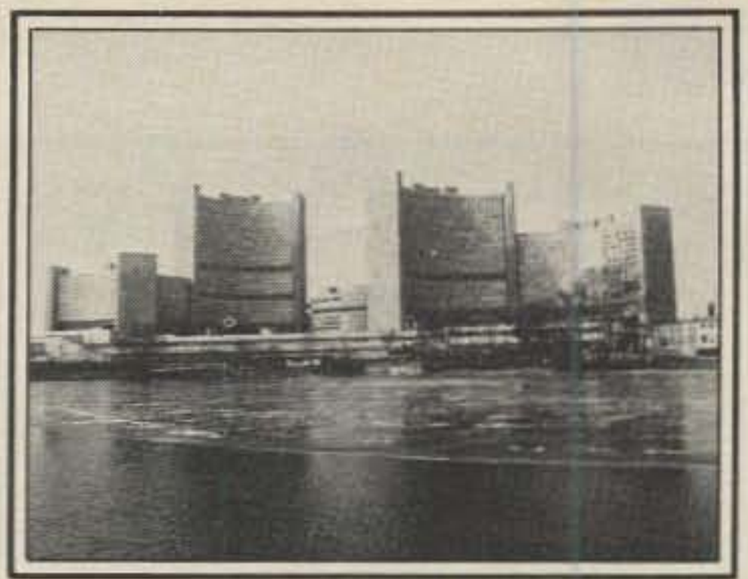
310	W4EEE/316	310	LA7JO/310
310	W9DWQ/315	300	W8JXM/309
310	W9JT/315	300	WB3DNA/300
310	W3AZD/314	275	JH4PRU/298
310	W9BW/313	275	KC2RS/276
310	W8ILC/313	250	KR9A/257
310	WØYDB/313	28 MHz	KR9A
310	N4MM/312	3.5/7 MHz	KR9A

C.W. Endorsements

310	W9DWQ/315	310	N4MM/308
310	K6LEB/314	275	EA2IA/293
300	W9BW/308		

Total number of active countries is 315. 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. Please make all checks payable to the awards manager.

The busy operating position at 4U1VIC with members of the Vienna International Centre Amateur Radio Club, providing the Deserving with a "new one." In the background we have John, NK4N/OE3ZOC doing the logging and Tom, K3TG at the key. QSL via Vienna International Centre, P.O. Box #200, A-1400 Vienna, Austria. (Photo via Jack, W2LZX)



This is the home of the Vienna International Centre Amateur Radio Club, 4U1VIC, with the antenna up on top at 130 meters overlooking the city. (Photo via Jack, W2LZX)

games. All may be part of the problem. One who is not yet gray, or who has a cache of Grecian Formula, notes that for the teenage population amateur radio has to compete with something like girls and wheels.

There is a report that 3B7 St. Brandons should be active this month. New officers for the Madison DX Club in southern Wisconsin are president, Dennis Ruskin, K9BIL; vice-president, Bernie Albright, N9EJL; and secretary-treasurer, Art Saboe, W9ZM. AB4Y has been doing some on-the-air promotion while operating from Mozambique as C9OA with a provisional license. As there is some question as to whether a "provisional" license will be acceptable for DXCC, he wants amateurs to write to the Director of CTT, Laurenco Marques, Mozambique. There has been some shifting in the political outlook in that area in the last year and things could improve. Ask the Director/CTT to issue licenses and authorize amateur radio.

The Southern California DX Club bulletin lists a number of interesting and on-going DX possibilities, such as St. Helena with ZD7XY often meeting WA3HUP at 14190 kHz at 1900Z as well as ZD7CW at 21334 kHz at 1800Z. Also there is Pakistan with AP2ZR on 80 meters around 0100Z, usually operating around 3800 kHz or 3645 kHz. VE3KFE/4U is operating from the Golan Heights at 14200 kHz at 2030Z or 7084 kHz at 0100Z. From Guinea-Bissau J5WAD keeps a schedule at 7005 kHz at 0130Z or thereabouts, and on 20 meters at 14020 kHz at 2000Z and 14240 kHz at 2130Z. ZL7OY on from Chatham is on 3818 kHz or up a couple from 0700Z, and J6LNU is on from St. Lucia around 3789 kHz at 0500Z. Concentrating on the low frequencies, C21DX on Nauru often shows around 3791 kHz after 1330Z; SV8RX on Saturdays after 0530Z listens around 3805 kHz but transmits down around 3700 kHz; and UA1OT from Franz Josef Land is said to frequently show on 80 and 160, while YN5RR is sometimes found at 3780 kHz from 0300Z. From the Republic of Guinea 3X4EX is reported as being on 1828 kHz most days from 0600–0800Z, and 9M2FK alternates between 3505 kHz and 7005 kHz from 1100Z onwards, sometimes as late as 1700Z.

At this time and until the fall 8J1XPO should be on from the Tsukuba Science Exhibition in Mito City. The station at the exhibition only runs 10 watts, but is used to remote-control the main stations some kilometers away. They are using 3.5 MHz to 435 MHz. QSL to JARL. If you are headed for downtown Vienna this summer, guest operation is possible at 4U1VIC if you have your amateur license, identification such as your passport, and if one of the club members is present. Write to OE1ZOS/K7AWD for more information.

Before we quit this month, we will again note that often the N/S path is open when nothing else is. Thus with the cycle decaying, aim to that direction, or, if nothing else works, to where the signal is being heard. That takes a lot of planning and thinking. Also, the *CQ* World-Wide Tests will be showing over the horizon shortly. If you are planning any action in distant or exotic DX areas the information has to be with us by the first week in July for the *CQ* WW Phone Test and the first week in August for the *CQ* WW CW Test, this to make the October and November issues. Any information on DXpeditions concentrating on the lower frequencies is also welcomed.

73, Cass, WA6AUD

QSL Information

KA6A notes that KØGVB is not the route for J87GL, but rather it goes to K9QVB. All of the following has been compiled with the help of W9LNQ, KA6A, and other Watchers of the Lonely Night.

AI5P/TF to W3HNK
A22ME to AK1E
A22TE to AK1E
CTØBI to CT4UW
CEØEEO to CE3EEO
CX9AAK/D to CX1AA
DJ6SI/5V to DJ6SI
ER3A to UA3AZO
EU2P to UP1BWW
EV4AP to UZ4PWR
EU4A to UA3AZW
F5II/FY to F5II
F6REF/HY8 to F6ISN
FM5WD to W3HNK
FB8XV to F5VU
FB8XW to F5VU
FM7CD to F5VU
FM5CD to F5VU
HJØLR to HK1QQ
J87GL to K9QVB
J87VV to KB9AW
K2BS/FS7 to K2BS
K8CV/VP2E to K8CV
K8WW/VP9 to K8WW
K9DXO/V4 to K9DXO
KA2DIV/V2A to WB4OSN
KV4FZ to W2GHK
LU2BC to SMØKCR
P42J to W1KDD
PJ7A to K1AR
V2ACW to WB4OSN
SMØDQE/C9 to SM4CLR
TI9J to TI2J
VP2EAG to KJØD
VP2MP to W2KF
VP2VEG to WØDVZ
VP5GEX to KØGVB
VP5SBX to KC2RS
WP4F to WP4AQK
ZF2AY to K9LA
ZF2HI to KZ2E
3C1BS to K4PHE
3C1YL to N4NX
6Y5NR/KP1 to 6Y5NR
K5LZO/KP4 to K5LZO
9Q5CT to AK1E
9Y4F to VE7BRW
CM8AR to POB 9028, Havana, Cuba
EA9KD to Box 291, Ceuta, Spanish North Africa
EL2FJ to Nobuhide Tateyama, 1541-5, Ohyashiki, Nakashidami Moriyama-ku, Nagoya-shi, Japan 463
HC1BW to Roy Gould, KT1N, POB 'DX', Stow, MA 01775 USA
J28EI to POB 2417, Djibouti
YV5JUX to Box 52, La Guaira, Venezuela
5N8FOC to G3TXF or B.P 12369, Kanno, Nigeria
ZS3IL to POB 33, Tsumeb 9000, Namibia, Africa

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar activity continues to decline steadily, much as expected. The Royal Observatory of Belgium, the world's official keeper of sunspot data, reports a monthly mean sunspot number of 12 for March 1985. The highest level recorded during the month, on the 24th, was only 34. On five days during March there were no spots visible on the sun's surface.

March's observations result in a smoothed sunspot number of 33 centered on September 1984. A smoothed number of 23 is forecast for July 1985. Solar activity is expected to continue to decline until the end of the present cycle, which is not expected to occur before late 1986.

Four Centuries of Sunspot Data Available

The National Oceanic and Atmospheric Administration (NOAA) has recently announced the publication of a set of four graphs which display sunspot data recorded since 1700. These graphs represent the complete archive of such data on file with the World Data Center-A in Zurich, and the more recent International sunspot numbers recorded by the Royal Observatory of Belgium. The set of four graphs consists of the *Yearly Mean Sunspot Numbers, 1700–1983; Monthly Mean Sunspot Numbers, January 1749 to December 1983; Smoothed Monthly Sunspot Numbers, July 1749 to June 1983; Daily Sunspot Numbers January 8, 1818 to December 31, 1983.* Produced by computer graphic technology, these high-quality displays will be updated regularly, usually every April when the final numbers for the previous year are in.

The complete set of four graphs is available in three formats: black-and-white prints suitable for publication, 7.5" × 10" image size for $22; black-and-white film transparencies, for use with overhead projectors, size 8.5" × 11", for $38; color 35 mm slides, $8 per set. Additional information can be obtained by either calling (303) 497-6136 or by writing to the National Geophysical Data Center, Solar-Terrestrial Physics Division (E/GC2), 325 Broadway, Boulder, CO 80303.

July Propagation

With longer hours of daylight and the sun high in the northern sky, HF propagation conditions should be considerably more stable during July than they were during the spring months.

Twenty meters should be the optimum band for DX propagation during the month. The band should remain open to one area of the world or another from sunrise through midnight, and at times almost around the clock. Peak conditions should take place for several hours after local sunrise, and again during the late afternoon and early evening hours. During these peak periods *20 meters* may be open in almost all directions at the same time.

With declining solar activity and the doldrums of summertime propagation, not much DX propagation is expected on *15 meters*, and even less on *10 meters. Fifteen* should still open fairly frequently towards the south. Short-skip openings into the Caribbean area and Central America may be possible as early as 10 a.m. Longer-skip openings should take place later in the day, between 3 and 6 p.m., local daylight time. The band may occasionally open during the late afternoon to Africa, and during the early evening to the Pacific area and Australasia. On *10 meters* the only DX looks like short-skip openings during the day towards the Caribbean and Central America and a very occasional longer-skip opening towards South America during the afternoon.

During the hours of darkness, *40 meters* should open to many areas of the world, but seasonally high static levels may often mar DX reception. High static levels are also expected to hinder DX conditions on *80 meters*, although some good long-distance openings are forecast during the hours of darkness. Not many DX openings are expected on *160 meters* during July because of seasonally high levels of static and solar absorption.

DX Propagation Charts for July appeared in last month's column. For an assessment of day-to-day conditions expected during the month, see the Last Minute Forecast, which appears at the beginning of this column.

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1985

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 6, 16	A	A	B	C
High Normal: 3-4, 7, 15, 21-22, 29, 31	A	B	C	C-D
Low Normal: 1-2, 5, 11-13, 17, 20, 23-24, 27-28, 30	A-B	B-C	C-D	D-E
Below Normal: 8, 10, 14, 18-19, 25-26	B-C	C-D	D-E	E
Disturbed: 9	C-E	D-E	E	E

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, 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 the 1st and 2nd, excellent-to-good (A-B) on the 3rd and 4th, good-to-fair again (B-C) on the 5th, excellent (A) on the 6th, etc.**

Peak Short-Skip Conditions

This month's column contains Short-Skip Propagation Charts for July and August, as well as charts centered on Hawaii and Alaska. The Short-Skip Chart contains propagation forecasts for distances between 50 and 2300 miles from your transmitting location.

Short-skip propagation conditions are expected to be optimum during July as a result of a seasonal peak in sporadic-*E* propagation. During the daylight hours considerable short-skip openings are forecast for *10* and *15 meters* over distances ranging between approximately 500 and 1300 miles, with some openings extending out to beyond 2000 miles. Around-the-clock short-skip openings are expected on *20 meters* between distances of 300 and about 2300 miles. Conditions on *20* should peak during the late afternoon and early evening.

Good daytime short-skip openings on *40 meters* are forecast for distances between 100 and 750 miles, with good nighttime openings expected between 250 and 2300 miles. Conditions on *80 meters* are also expected to be good during the daylight hours, with openings up to approximately 300 miles. During the hours of darkness, good openings should be possible up to the one-hop limit of 2300 miles. While no short-skip openings are expected on *160 meters* during the daylight hours, some good openings should be possible during the hours of darkness up to at least 1300 miles, and as long as 2300 miles.

For a more detailed discussion of sporadic-*E* propagation, and methods for

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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) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur 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 *daylight* time is used at the *path midpoint.* For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones *add* 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. *Add* 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA *subtract 7* hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 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 10 dB loss, it will lower by one level.

5. Propagation data contained 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
July & August, 1985
Local Daylight Savings Time At Path Mid-Point

Band (Meters)	Distance Between Stations (miles) 50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1) 10-14 (0-3) 14-18 (0-1) 18-22 (0-2) 22-08 (0-1)	08-10 (1) 10-14 (3) 14-18 (1-2) 18-22 (2-3) 22-08 (1)	08-10 (1-0) 10-14 (3-0) 14-18 (2-0) 18-22 (3-0) 22-08 (1-0)
15	Nil	08-10 (0-2) 10-14 (0-3) 14-18 (0-2) 18-20 (0-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2) 10-14 (3) 14-18 (2) 18-20 (3) 20-22 (2) 22-00 (1-2) 00-08 (1)	08-10 (2-0) 10-14 (3-0) 14-16 (2-0) 16-18 (2-1) 18-20 (3-1) 20-21 (2-1) 21-00 (2-0) 00-08 (1-0)
20	10-00 (01)	00-07 (0-1) 07-10 (0-2) 10-16 (1-4) 16-21 (1-3) 21-00 (1-2)	21-00 (2-3) 07-10 (2) 10-16 (4) 16-19 (3) 19-21 (3-4) 00-07 (1-2)	21-23 (3-2) 07-10 (2) 10-16 (4-2) 16-19 (3) 21-23 (3-2) 23-00 (3-1) 00-05 (2-0) 05-07 (2-1)
40	08-12 (1-2) 12-16 (1-4) 16-20 (2-4) 20-23 (1-2) 23-08 (0-1)	08-10 (2-3) 10-12 (2) 12-16 (4-2) 16-18 (4-3) 18-20 (4) 20-23 (2-4) 23-08 (1-3)	08-10 (3-1) 10-16 (2-0) 16-18 (3-1) 18-21 (4-3) 21-23 (4) 23-06 (3-4) 06-08 (3)	08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-21 (3-2) 21-06 (4) 06-08 (3-1)
80	07-12 (3-4) 12-17 (4-3) 17-22 (4) 22-05 (3-4) 5-07 (3)	08-10 (4-1) 10-12 (4-0) 12-17 (3-0) 17-19 (4-1) 19-21 (4-2) 21-23 (4-3) 23-05 (4) 05-07 (3) 07-08 (4-2)	08-10(1-0) 10-17 (0) 17-19 (1-0) 19-21 (2-1) 21-23 (3-2) 23-05 (4) 05-07 (3) 07-08 (2-1)	08-19 (0) 19-21 (1-0) 21-23 (2-1) 23-04 (4-3) 04-05 (4-2) 05-06 (3-1) 06-07 (3-0) 07-08 (1-0)
160	18-19 (1-0) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 09-10 (1-0) 09-10 (1-0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 08-09 (1) 08-09 (0-1)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0) 06-08 (2-1)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0)

ALASKA
Openings Given in GMT

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	Nil	12-15 (1) 22-01 (1) 01-03 (2) 03-05 (1)	07-10 (1)	Nil
Central USA	00-03 (1)	13-16 (1) 23-01 (1) 01-04 (2) 04-05 (1)	08-12 (1)	Nil
Western USA	02-05 (1)	14-16 (1) 16-18 (2) 18-00 (1) 00-02 (2) 02-05 (3) 05-06 (2) 06-08 (1)	07-09 (1) 09-13 (2) 13-15 (1)	10-13 (1)

Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

HAWAII
Openings Given In Hawaiian Standard Time

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	14-16 (1)	02-05 (1) 05-07 (2) 07-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-00 (2) 00-02 (1)	20-21 (1) 21-23 (2) 23-01 (1)
Central USA	09-13 (1) 13-16 (2) ** 16-19 (1)	04-05 (1) 05-07 (3) 07-09 (2) 09-13 (1) 13-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1)	20-22 (1) 22-01 (2) 01-02 (1) 21-02 (1)*
Western USA	08-11 (1) 11-14 (2) ** 14-16 (1) 16-18 (2) ** 18-19 (1)	04-06 (1) 06-08 (2) 08-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-06 (1)	19-20 (1) 20-22 (2) 22-02 (3) 02-03 (2) 03-04 (1) 23-03 (1)*

See explanation in "How To Use Short-Skip Charts" which apears in the box at the beginning of this column.
* Indicates possible 160 meter openings.
** Indicates possible 10 meter openings.

predicting its occurrence, refer to the Propagation column in the July 1984 issue of *CQ*, or to the chapter entitled "Unusual H.F. and V.H.F Ionospheric Propagation" contained in *The Shortwave Propagation Handbook*, by G. Jacobs and T. Cohen, available from *CQ*.

VHF Ionospheric Openings

Intense sporadic-*E* ionization expected during July is very likely to result in numerous *6 meter* openings and an occasional *2 meter* opening. Fairly frequent *6 meter* openings should be possible over distances ranging between approximately 600 and 1300 miles, with some openings extending out to as much as 2300 miles. While sporadic-*E* short-skip openings can take place at just about any time of the day or night, statistics indicate that conditions peak for a few hours before noon and again during late afternoon and early evening.

During intense sporadic-*E* ionization, as the skip distance is observed to be *decreasing* on *6 meters*, the MUF will be *increasing*. When skip stations as near as 500 miles are heard on *6 meters*, check *2 meters* for possible openings in the same direction. As a good rule of thumb, when the *6 meter* skip distance falls below 500 miles, *2 meter* openings may be possible between distances of about 1000 and 1400 miles.

Check during the last days of July for some possible meteor-scatter-type openings on the VHF bands. These should result from the *Delta Aquarids* shower, which is expected to take place with a predicted maximum meteor count on the order of 20 an hour.

Some VHF openings are also likely to occur during auroral activity. Check the Last Minute Forecast at the beginning of this column for periods that are expected to be Disturbed or Below Normal during July. These are the dates on which auroral-type short-skip openings are likely to occur on the VHF bands.

73, George, W3ASK

Antennas & Accessories

a monthly feature by
KARL T. THURBER, JR., W8FX

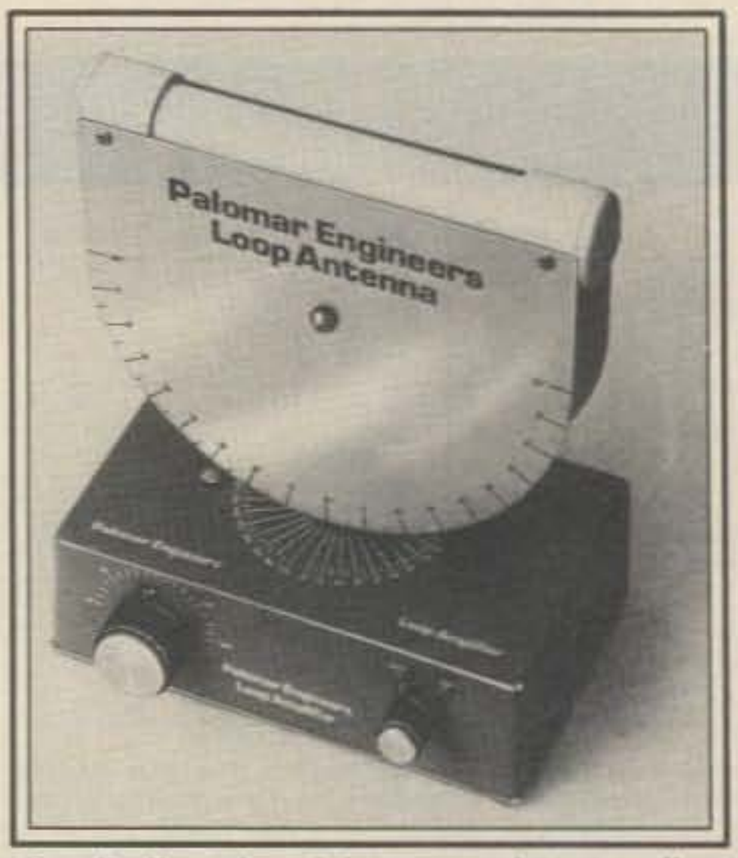
A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

From the Notebook—Part IV

This time columnist W8FX picks up in his "Notebook" series with a rundown on the venerable loop antenna, and he hopscotches around a number of other interesting antenna and related software topics. Stay with us. —*K2EEK*

Last month in Part III of the "Notebook" series we first discussed coaxial cables in the hamshack. We also described a novel hardware product, the FrameMaker™ clamps, useful in antenna tower construction and other projects that require a mechanical framework. We also highlighted two new sloper antennas from Vector Radio, and we looked at the latest in computer software for the hamshack.

This time it's on with Part IV of the series. We'll begin with some facts and observations on loop skywires, touching upon both small and large loops. We'll cover half-wave and full-wave loops, as well as the Delta and Half-Delta Loop. We'll update our coverage of antenna parts suppliers, and also take a "what's new" look into hamshack software. Let's begin by examining the loop.



Small directional loops make excellent receiving antennas, particularly when used in tandem with a low-noise preamplifier. Indoor antennas of this type are very popular with 160 meter ops, broadcast band DXers, and VLF ("lowfer") enthusiasts because of the extreme directivity of the antennas and the ability to null out interference and noise. (Photo courtesy Palomar Engineers)

Enter the Loop

The loop skywire has been around for a long, long time. Loops were first used as compact receiving antennas. Such antennas were unsuitable for transmission, with their very low feedpoint impedance and heavy loss, but for receiving purposes small loops could take the place of very long antennas, and they could be highly directional, too. Such loops are still used in commercial work, particularly at VLF and LF, and by amateurs on 80 and 160 meters. In fact, a small loop, when used in conjunction with a low-noise preamp, can be the next best thing to a Beverage antenna for DX reception on these frequencies.

The loop is a closed-circuit antenna in which a conductor is formed into one or more turns such that its two ends are close together. There are two basic classes of loops: (1) the "small" loop, in which dimensions are quite small with respect to wavelength—really a large coil, like the receiving loops described above; and (2) the "large" loop, in which the current is not the same, either in amplitude or in phase, in every part of the loop. Large loop characteristics, arising from the change in current distribution, give rise to use as a transmitting antenna.

The "large" loop, in turn, is seen in two main forms: (1) the half-wave loop; and (2) the full-wave loop.

The half-wave loop consists of a single "turn" of wire having a total conductor length of ½ wavelength. The current distribution is about the same as in the regular half-wave dipole, and the radiation resistance (at a current antinode) is about 50 ohms. However, there is no direction in which radiation from the loop is zero (unlike the dipole), with a 4 to 6 dB front-to-back (F/B) ratio being typical. Because of the shape of the directive pattern and the antenna's small size, there is a slight loss (on the order of 1 dB) when compared with a dipole's radiation in its optimum direction. The half-wave loop's performance, in terms of directivity and gain, can be improved upon somewhat by inductively loading the "sides" of the loop. Doing so tends to maximize the loop's radiation in its plane.

The one-wavelength loop, a cousin to the familiar folded dipole, has characteristics different from those of the half-wave loop: the antenna's radiation is maximum perpendicular to the plane of the loop, but minimum in all directions in the plane which contains the loop. The resonant full-wave loop has a radiation resistance on the order of 100 ohms. Interestingly, the feedpoint impedance remains "reasonable" (probably under 300 ohms) at all harmonic frequencies (both even and odd), so the full-wave loop can give a good account of itself as a multiband antenna. Radiation efficiency is high, and the loop shows a small gain over a reference half-wave dipole—up to 2 dB.

A flexible antenna, the loop's feedpoint and apex placement may be arranged in different ways to affect radiation angles and polarization. This allows one to tailor the antenna's radiation characteristics for short- and long-haul work.

While the loop can be used alone (and frequently is, with good results), the loop's flexibility lends itself to use as elements of a directive array, such as the multi-element Quad. Most such loops are mounted in the vertical plane and are fed at the bottom to provide horizontal polarization, though various feeding and mounting schemes abound.

The equilateral-triangle form (the Delta Loop) is usually the most convenient type of loop to install, and is therefore most written about. This type of antenna, a good performer, seems to exhibit all of the good properties that make an antenna popular with the DXer. A number of array configurations have been developed using the Delta Loop as a practical basis for stacking antenna elements for compactness and gain. It is quite feasible to install the antenna not only alone, but in pairs, threes, and even fours, with the Delta Quad a familiar variant.

It's worthwhile to note that the Delta Loop format is not sacred to good loop performance. The loop may also take the form of a circle, square, or right triangle. In fact, given an overall wire length of one-wavelength, the antenna form that maximizes area should give the best overall performance. A little trigonometry shows that from this standpoint the circle is best, followed by the square, the equilateral triangle, and the right triangle, in that order.

Fig. 1 shows a sampling of some possible full-wave loop configurations, while fig. 2 shows a practical square-shaped loop radiator that may be coax-fed and should give a good account of itself on all

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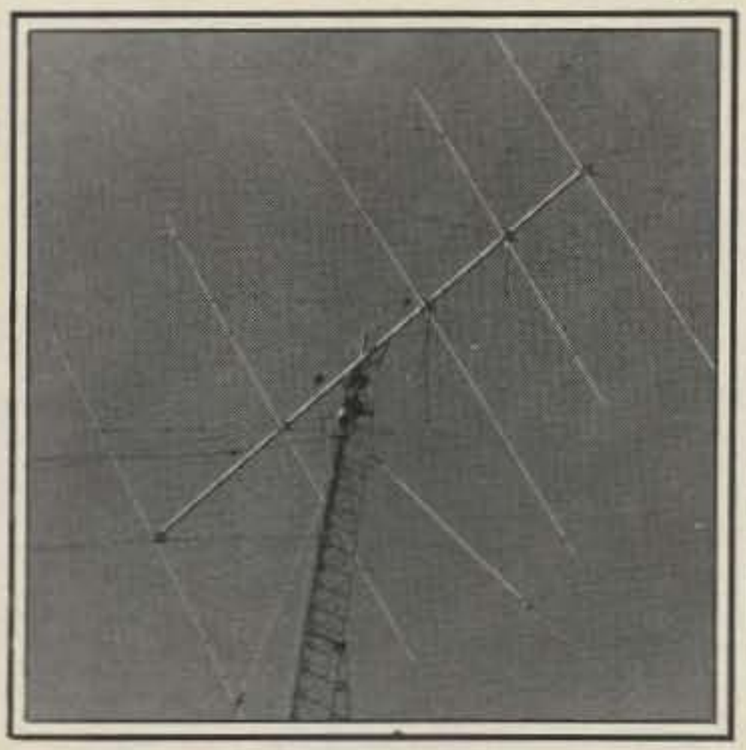
The large (full-wave) loop generally exhibits a feedpoint impedance of about 100 ohms on the fundamental frequency for which it is cut. It also shows a "reasonable" (several hundred ohm) impedance on harmonics, both odd and even. A simple Delta or Quad Loop can be expected to work well on most HF bands when fed with openwire line using an antenna tuner. (Photo courtesy MFJ)



One special variety of the loop antenna is the Cubical Quad, shown here. The antenna is named for its appearance—four sides which form a square, and two (or more) squares which make a cube.

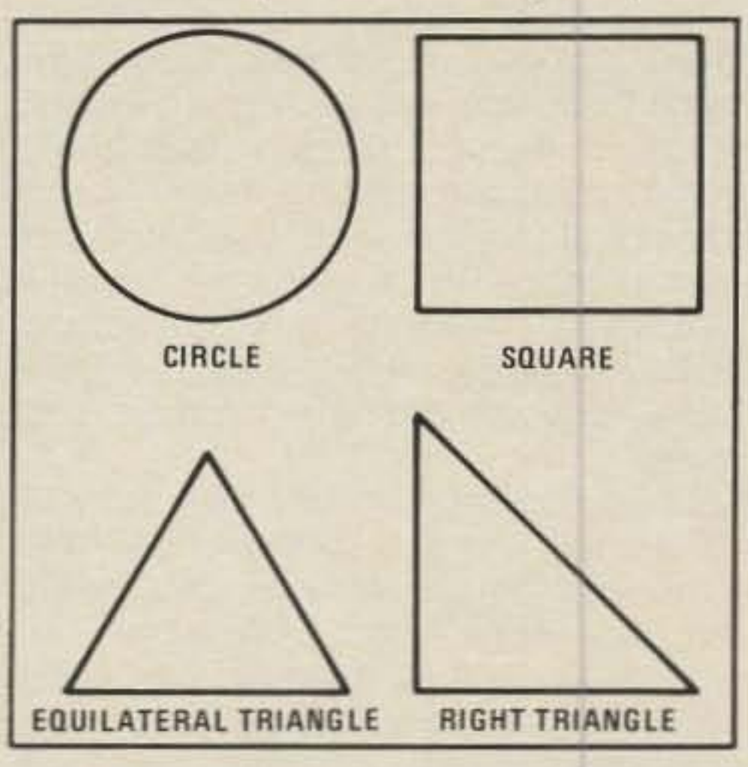


Fig. 1– Full-wave loop configuration. The full-wave loop may be configured in various geometric shapes—squares, circles, equilateral triangles, right triangles, and so on. A general rule of thumb is that for a given wire length (normally one wavelength), the objective is to maximize the loop's area for best results. In the four examples shown above, the circle has the greatest area, followed by the square, the equilateral triangle, and the right triangle. A wide variation in radiation angles and polarization characteristics is possible, dependent on the plane of the loop with respect to ground and the location of the feedpoint. (For a discussion of these factors, consult the bibliography at the conclusion of the column).

HF bands. Fig. 3 shows a Delta Loop that should give good results on all bands from 40 through 10 meters if you use both an antenna tuner and openwire line.

The performance of both dipoles and full-wave loops varies widely with height above ground and other factors. Also, changes in the loop's installation configuration (mounting plane and feedpoint arrangement) muddy any loop/dipole comparisons. In general, however, the full-wave loop has a low-angle "DX advantage" over the dipole at all heights. The loop also has a somewhat broader horizontal pattern than does the dipole, and its significant vertical component can be of real benefit for DX work under poor band conditions. The loop is also known as a less noisy antenna than the dipole, certainly a factor in urban operation.

Our discussion of loops would be incomplete without mentioning still another loop variant, the Half-Delta Loop. This relatively small, delta-shaped, grounded half-wavelength loop can yield performance equivalent to half- and full-sloper antennas, and is particularly suitable for low-band DX.

This antenna typically consists of a sloping wire, approximately ⅓ wavelength long. This wire is attached to the top of a grounded tower about ⅛ wavelength high. The antenna is fed between the lower end of the sloping wire and ground, and ground radial wires are attached to both the feedpoint ground and the grounded end of the tower. While this antenna is a "natural" freebie if you already own a tower, all is not lost if you

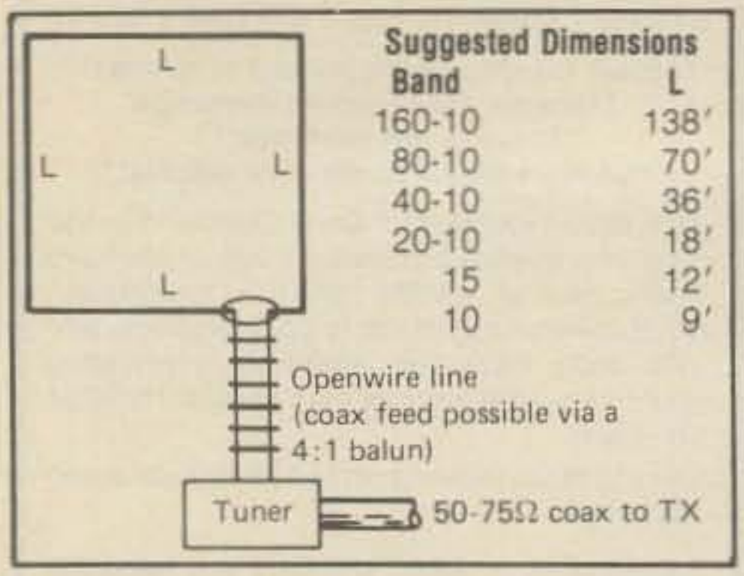


Fig. 2– Multiband square loop antenna. This square loop antenna can be used on a variety of bands using the dimensions shown above for starters. Although shown fed using openwire line, direct coax feed is possible, but on some bands or band segments SWR may run high. Note that each leg (L) above is somewhat longer than one-quarter wavelength at the lowest frequency to be used. The antenna shown here is mounted in the horizontal plane and should be elevated 35-40 feet for best results. The feedpoint may be varied from the location shown above.

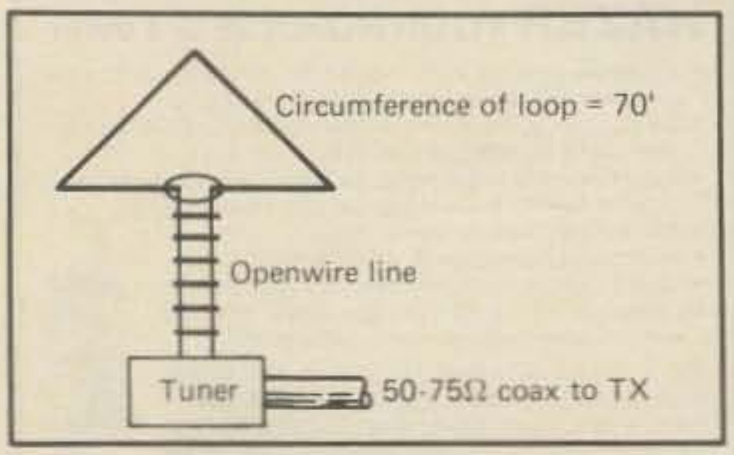


Fig. 3– Multiband Delta Loop antenna. A single Delta Loop can be made to work well on several bands. A loop, as shown above with a circumference of 70 feet, should give a good account of itself on 40 through 10 meters, if openwire line and an antenna tuner are used to provide a balanced feed from coaxial cable. This antenna would normally be installed with the apex up, suspended from an available support in the vertical plane. (Performance on 40 meters may be impaired due to the loop's relatively small circumference—on the order of ½ wavelength).

don't. You can use a telescoping mast as the vertical member of the loop, or you can use a tree as the vertical support, using a "drop wire" in place of the tower. The radiation produced by the antenna is primarily vertically polarized.

However, a large array on top of the tower will upset the Half-Delta Loop's operation, in that the tower is heavily top-loaded by the beam, giving you a sort of shunt-fed tower antenna rather than a true Delta Loop. Articles in the bibliography at the conclusion of this column provide approaches to overcoming the top-loading problem which generally involve running a separate vertical wire element and stub-tuning the tower.

Another interesting fact about the Delta Loop and Half-Delta Loop is that unlike dipoles (which are resonant at integral, odd multiples of the design frequency), the loops' higher-order resonant frequencies (which occur at all multiples, not just the odd multiples), are "off" by a small amount. Thus, the physical size and resonant conditions for multiband operation must be a compromise, with a "scale factor" being employed.

Reading Matter

Scanning some new books and other publications, we note that longtime amateur radio author Joseph J. Carr, K4IPV, has written *The TAB Handbook of Radio Communications*, a massive volume that constitutes a sort of "bible" for hams and professionals alike. A comprehensive communications guide, it covers a wide range of radio communications subjects. These include early wireless telegraphy; basic electricity and electronics theory; licensing material (both amateur and commercial); propagation; antennas and transmission lines; and receivers and transmitters. Also covered are basic physical science; electrical components and measurements; digital electronic circuitry; troubleshooting techniques; and more.

The 1,056-page volume sells for $45 hardbound and $28.95 paperback. For more information, write to TAB Books Inc., Blue Ridge Summit, PA 17214.

Question: What antenna has been used by generations of novice and veteran radio amateurs; consists of only "bits of wire," yet is highly efficient, simple to build and tune; is a natural match to readily available coaxial cables; and can easily handle full legal power?

The antenna is, of course, the basic dipole, and the preceding is drawn from the opening paragraph of a new 24-page dipole mini-handbook, *The Dandy Dipole.* This new book is offered by the Microwave Filter Co., 6743 Kinne St., East Syracuse, NY 13057, for $3.95 plus $1 for shipping. The book, by Daniel Bostick, WA2ZYR, and Donald Shatraw, describes the construction of dozens of dipole variants, including the inverted-Vee, duobanders, and multiband trapped types. Written in a simple and straightforward manner, it has sufficient technical detail to be quite useful. Among the topics covered are wire length computations; pruning to resonance; proper height for best SWR and radiation pattern; and components such as baluns, traps, insulators, and wire.

Though the book represents an excellent tutorial on dipoles of various sorts, the emphasis is on the trap dipole, and the installation of the family of traps and baluns which Microwave Filter manufactures. Nevertheless, it is a useful book and well worth the price.

QZX, anyone? *QZX* is the name of the journal of the Timex-Sinclair Amateur Radio Users Group, which is made up of computer users who seek to put their Timex and/or Sinclair computers to use in the hamshack. The monthly journal is one of the main benefits of membership. The magazine publishes hardware projects and complete programs submitted by readers, as well as information about operating events and personal items about members.

The loop is inherently a "balanced" antenna. Loops may be fed with coaxial cable using a balun transformer either mounted at the feedpoint or through a section of openwire line. For best multiband results, the openwire line should run all of the way to the station antenna tuner or coupler, with the balun mounted at that point. (Photo is courtesy Palomar Engineers)

Membership, which includes the journal, is $12 per year for members in the U.S., Canada, and Mexico. For more information both on *QZX* and the Timex-Sinclair Amateur Radio Users Group, contact Alex Burr, K5XY, 2025 O'Donnell Drive, Las Cruces, NM 88001.

Antenna Parts Supplier Update

In last October's column we mentioned the difficulty many amateurs experience in securing a good selection of reasonably priced antennas and, especially, antenna parts. For the amateur who is distant from a walk-in supplier, or who does not follow the hamfest circuit, obtaining antenna parts such as fittings, insulators, wire, feedline, connectors, and the like can be frustrating. We pointed out that mail order can be a good bet in such situations, and we presented a small sampler of suppliers in that issue, updating the listing from time to time since then.

This month we would like to add to our list the H. C. Van Valzah Co., 1140 Hickory Trail, Downers Grove, IL 60515. Proprietor Howard Van Valzah, WB9IPG, tells us that he carries an extensive stock, and he also specializes in furnishing replacement parts for a wide range of antennas, rotators, and other accessories, plus supplies antenna components for home-brewers.

Van Valzah publishes two catalogs which are updated regularly. The first is the basic antenna catalog, which covers

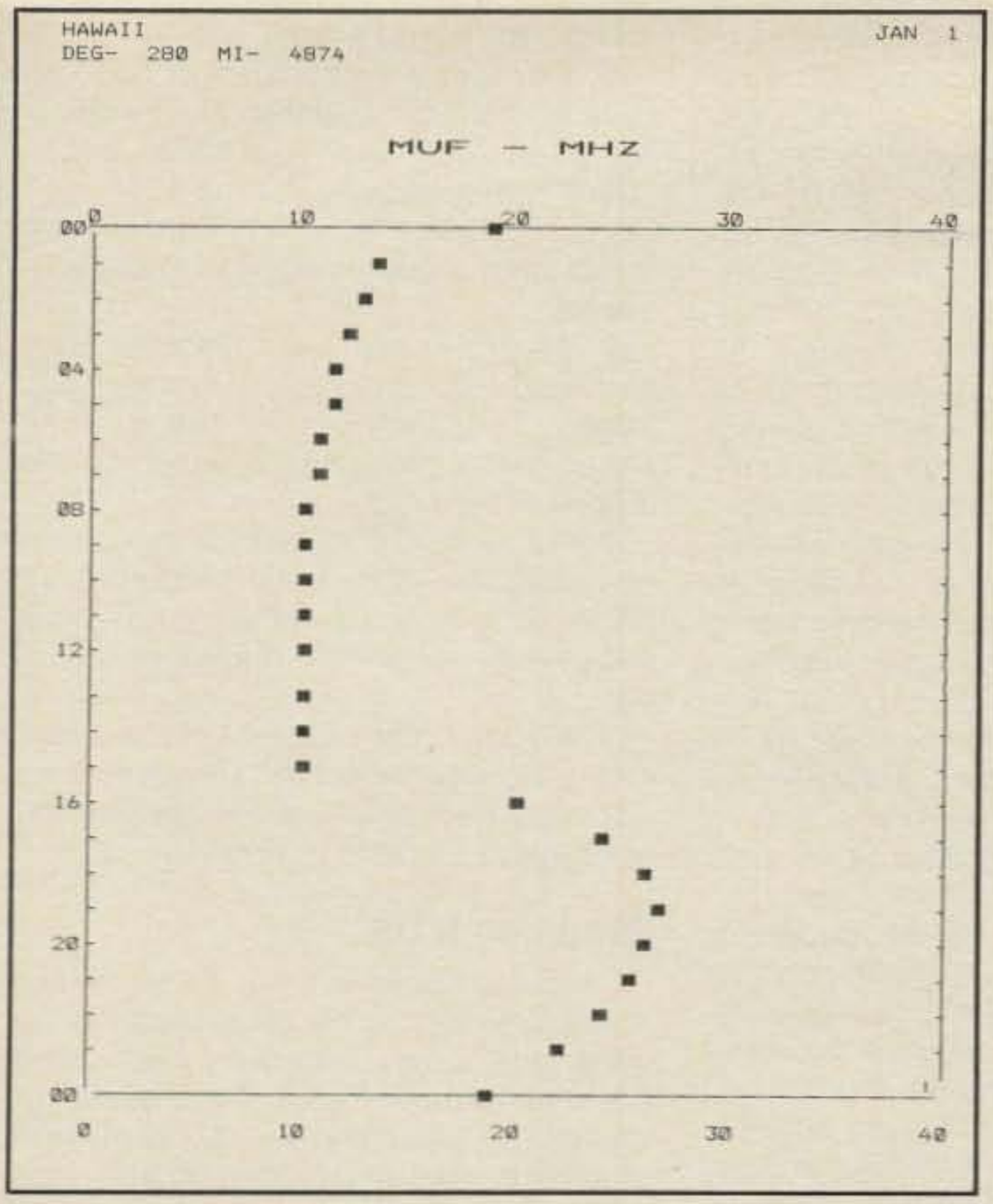


Fig. 4– CCMUF prediction program printout. The output from the CCMUF prediction program may be directed to screen or printer and may take the form of a table or graph. A sample printed graph output is shown here. See the description of the program in the text.

ready-made commercial antennas and related components and accessories. The second catalog, the antenna parts catalog, describes thousands of parts in detail to serve three distinct groups of customers: (1) those who need to repair existing antennas; (2) those who wish to build from scratch their own antennas; and (3) commercial and industrial users. Many generic and surplus components are included in the catalog.

Refreshingly, the company is willing to discuss, over the phone, the suitability of particular parts for specific applications, and parts ordered carry a refund privilege. The basic antenna catalog is available for 50 cents, while the antenna parts catalog is $3.50. Interestingly, WB9IPG notes that for every item cataloged he has perhaps five more that are not listed, so call if you can't find what you need in the catalog.

Another antenna distributor not included in our original October listing is Sultronics, 15 Sexton Drive, Xenia, OH 45383. Operated by Dan Sullivan, WD8IDZ, and Nina Sullivan, N8ANU, the firm is a direct importer-distributor for the TET product line. The firm boasts of their own copyrighted antenna assembly manuals, which are included with each antenna purchased to ease construction woes. The firm also prides itself in having the backup parts and knowledge of the antennas sold to provide useful post-sales support. The Sultronics catalog states that only licensed amateurs man the firm's telephone lines.

Sultronics also sells a line of multiband (160/80/40 and 80/40 meter), no-trap HF "Super Sloper Systems," preassembled antennas that also boast of excellent documentation. A variety of antenna and station parts and accessories are also stocked.

A final item of interest: Antenna maker Anixter-Mark is now known as Mobil Mark, Inc. The renamed firm manufactures a wide range of amateur, CB, two-way, land mobile, and marine communications antennas. Their address is 9001 Exchange Avenue, Franklin Park, IL 60131. A toll-free number is available: 1-800-648-2800.

Software Notes

Yes, Virginia, there is a CoCo in many hamshacks, and right now a number of them are being used to make radio propagation predictions. CCMUF is a disk- or tape-based program for the CoCo, formally known as the Radio Shack TRS-80 Color Computer. The program includes two versions, 16K and 32K, both of which require Extended Color Basic for operation. Both program versions (CCMUF1 and CCMUF2) calculate the maximum usable frequency (MUF), and direction and distance between your location and a user-selected target. Results are displayed in table or graph form on the screen or on a printer.

CCMUF is based on the landmark MINIMUF 3.5 program developed by the Naval Ocean Systems Center, and described by Robert B. Rose, K6GKU, in his December 1982 *QST* article. CCMUF, being based on the MINIMUF 3.5 program, has similar accuracy and limitations. Tests of MINIMUF 3.5 indicate that it has an accuracy of ±3.5 MHz for predictions in the frequency range of 2 to 50 MHz at distances between 250 and 6000 miles. This degree of accuracy should be adequate for most hamshack purposes.

The CCMUF program is priced at $14.95 on disk or tape and is available from William Borchers, K1WB, 460 Hale St., Suffield, CT 06078. A sample program printout is shown in fig. 4.

For the Commodore 64 user, GaGen Software has a new universal CONTEST LOG, a rapid machine-language program that eliminates duplicate QSO's and prints permanent contest logs and "dupe sheets." Its universal design allows it to be used in most all contest situations, allowing duplicate checks by callsign alone or by callsign, band, and mode. A single disk file will log and check up to 2500 contacts, and a full log can be fully dupe-checked in but 2.6 seconds!

Other features of the program include automatic entry of basic QSO data; 24-hour clock display and on-screen dis-

play of contest status and QSO rate (contacts/hour); menu-driven selection of all program choices; "help" menus; printer routines for contest logs and dupe sheets; and an update mode which enables the operator to change or add to any log entry whenever necessary.

This useful operating aid is priced at $25.00 and is available from Carey Brown, W4HIR, at CaGen Software, 4821 Rosecroft Street, Virginia Beach, VA 23464. It is furnished on disk, personalized with the user's callsign on the operating screen.

Shifting gears, word has it that the Ham Radio Net is a 24-hour landline bulletin board system (BBS) accessed by dialing 203-665-1114. Operated by WA2FTC, the BBS supports several specialized message and downloading areas. This net is also a part of "FidoNet," a utility which provides automatic message and file transfer between other FidoNets in the U.S.—sort of a low-cost, public electronic mail (E-MAIL) service.

Finally, for Commodore buffs there is a Commodore users' radio net which reportedly meets each Sunday morning at 0900 Pacific time on 7162.5 kHz. Alternatively, 3830 kHz is used if 40 meter propagation conditions are poor.

Short Bursts

While still thinking of computers, we are reminded of one of the "new-technology" variants of Murphy's Laws. It seems that the computer-based Murphy would engrave into stone the following wisdom:

Any given program, when running, is already obsolete.

If a program is truly useful, it will have to be changed.

If a program is useless, then it will have to be documented.

Programs will expand to fill all available memory.

The value of a program is directly proportional to the weight of its printed output.

Profanity is one language all programmers know perfectly.

Almost every time I sit down at the computer, I realize how much truth this "wisdom" seems to contain!

With the mobile season well underway, it's interesting to recall an article by Carl S. Zelich, AA4MI, which appeared in the August 1984 issue of *CQ*. In this article Carl pointed out the causes for the gradual weakening of the magnetic base in mobile antennas, which can lead to disastrously expensive and dangerous antenna losses at highway speeds.

There are two primary causes of weakened base-mount magnets. The first is the tendency of many operators to regularly remove the magnetic mount and to (literally) toss it onto the floor of the vehicle behind the driver's seat. Repeated sharp shocks to the magnet will eventually result in its magnetic domains becoming "disoriented," thereby causing the magnet to lose strength.

A second cause is that when even a so-called "permanent" magnet is left lying around without a "keeper," the magnetic flux lines reach out to grasp other ferrous materials. A "keeper" is a soft iron or steel piece used to provide a bridge between the poles for the flux lines to follow, which allows the magnetic lines to confine themselves to the "keeper." As AA4MI pointed out, this device can be as simple as a round, steel electrical ceiling box cover, about 3½ inches in diameter. These covers can be obtained at most hardware and electrical supply houses for under 50 cents. Placing the keeper on the base mount's magnet before tossing the mount in the back seat should not only contain the magnet's magnetic flux, but also serve to limit the damage to the magnet if it is dropped accidentally. Try this simple but effective precaution to help preserve your mag-mount antenna's longevity.

We at the Antennas column receive a good deal of reader mail. This is good, as it indicates that the column is being widely read and that what is said in it has some apparent value to someone! But when corresponding with us, please observe the following guidelines so that we may provide the best possible service to the greatest number of *CQ* readers.

1. Please include your name, callsign (if licensed), and full address for a reply. Due to the often technical nature of the questions and their replies, at this point Uncle Sam's mail is more appropriate than over-the-air messages and E-MAIL.

2. Please do a little research before writing. Sometimes the answer you seek is in your own files of *CQ* and other publications or is available locally.

3. When referring to a previous Antennas column or other magazine article, be sure to indicate the article and author, magazine, issue, and page number to which you refer.

4. Use a typewriter if possible, or print clearly. When writing, please be as specific as possible, and share with us any experience you have had with the problem at hand—to avoid covering ground you've already been over. (If a particular item appears to have broad appeal to readers, we'll often repeat the answer in the column several months downstream).

5. If you send us a photo or computer program printout you would like to share with readers, please check them for good contrast and reproducibility, and only send us copies that you can spare.

6. Write to me directly at 317 Poplar Drive, Millbrook, AL 36054. Sending Antennas column material to the New York editorial offices merely delays matters. Please include an SASE for our response; IRCs are fine for overseas amateurs.

7. If you have in mind writing a stand-alone antenna-type article for *CQ*, rather than making a contribution to the column, send the article directly to the magazine's New York offices, not to us.

Now, for the no-no's:

1. Please be reasonable in your requests. Limit your questions to specifics. We often receive letters which begin, "Send me everything you have on . . ." Obviously, we're not a research service and cannot properly respond to such requests.

2. We prefer that you not ask for comments on articles published in other magazines. Your best bet, of course, is to write to the magazine's editor or the author of the article.

3. Realize that if you ask for my opinion of a particular commercial product, it will be, in fact, a personal opinion, and will not necessarily reflect the magazine's position.

4. Please don't request complex custom designs for antennas. However, if we can help, we'll point you toward the right publication, person, or firm.

Wrapping It Up

That's it for this time, folks. In this month's Notebook we have revisited the venerable Loop antenna, highlighted some antenna parts suppliers, made our customary foray into the world of ham-shack software, and topped off with a few miscellaneous comments. Next month we'll continue with Part V of the Notebook. See you then.

73, Karl, W8FX

Loop Antenna Bibliography

In addition to publications such as *The ARRL Antenna Book*, other standard antenna texts, and previous Antennas columns, the following may be of interest to you in building a working knowledge of Loop antenna theory and operation.

1. Belcher, D. K., WA4JVE, and P. W. Casper, K4HKX. "Loops vs. Dipole—Analysis and Discussion," *QST*, August 1976.

2. Belrose, John S., VE2CV, and Doug DeMaw, W1FB. "The Half-Delta Loop: A Critical Analysis and Practical Deployment," *QST*, September 1982.

3. DeMaw, Doug, W1FB, and Lee Aurick, W1SE. "The Full-Wave Delta Loop at Low Height," *QST*, October 1984.

4. Gray, Jim, W1XU, "A Pair of Loops for Fun and Gain," *Ham Radio Horizons*, September 1979.

5. Leeming, Harry, G3LLL. "The Delta-Loop Antenna Rides Again," *Ham Radio Horizons*, June 1979.

6. Neste, Roy A., WØWFO. "Dissecting Loop Antennas to Find Out What Makes Them Tick," *CQ*, August 1984.

7. Orr, William, W6SAI. 'Ham Radio Techniques' column, *Ham Radio*, August 1984.

8. Thurber, Karl T., Jr., W8FX. "A Primer: The Cubical Quad Antenna," in three parts: *CQ*, August and December 1981; and April 1982.

9. Tyskewicz, John P., W1HXU. "The Grounded Half-Quad Loop—An All-Band Antenna," *CQ*, April 1984.

VHF

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

First off, I'd like to apologize for the rather hysterical errors which crept into my column in the May issue of *CQ*. for those who really read the column, the cut-and-paste job on page 118 of the May *CQ* was pretty funny. The text of page 117 was continued on the 27th line of page 118. Then the text continued to the bottom of the first column on page 118, where it resumed on the first line! The text from the 26th line on page 118 was continued on the top of the second column on the page. I don't know how all that happened, as my original manuscripts are very clean, but I guess a poltergeist crept into the works at *CQ*. Hope you were able to make some sense of it.

Now for some new business. This month features a brand-new operating event for VHF/UHF enthusiasts: the first **CQ World-Wide VHF WPX Contest,** which was orginally announced in the February issue and was discussed again in the May issue (page 70). Thankfully, my fellow VHF columnists Joe Reisert *(Ham Radio)* and Bill Tynan *(QST)* have seen fit to mention our new contest, and we've also received some good publicity in *73, Worldradio,* and other publications. I receive dozens of club newsletters each month, many from VHF/UHF societies which have also reported on our new WPX contest, and this has been very gratifying. I don't know about you, but I plan to be on the air for this one! Personally, I'll be operating with my club, SCORE, from a northern New Jersey QTH and signing the call K2XR. We intend to be on 50 through 1296 MHz from an excellent VHF location, and we'll be looking for *you*!

The VHF WPX Contest, July 20–21 (actually beginning 8 pm EDT Friday here in the U.S.), should enjoy great band conditions and activity. With any luck we'll have some active weather fronts helping along with E-skip on 6 and 2 meters. Maybe we'll have a temperature inversion to create some tropospheric ducting to faraway places. You never know for certain until you get on the band. So, by all means *get on*. And when you do, please call "CQ Contest" or something so we'll know you're there. The silence is deafening when everybody listens.

Our K2XR group (SCORE) is willing to set up skeds for the VHF WPX, although the K2 prefix isn't exactly rare. Still, anyone desiring a sked with us (this makes the most sense for 50 MHz meteor scatter or 432/1296 MHz tropo) can contact

The QSL card for K2XR, SCORE, which will be on the air from northern New Jersey for the CQ WW VHF WPX Contest on July 20–21, 1985.

me at (201) 376-2004 Monday through Friday, days. I'm always willing to print this kind of information for anybody desirous of making schedules for VHF work, so please let me know if you want the word spread.

Speaking of skeds, how are we all doing on 220 MHz? Is there enough activity in your geographic area to warrant expanding your 125 cm facilities? In an attempt to determine what's *really* happening on 220 MHz, I have corresponded recently with Art Reis, K9XI, our national 125 cm maven, who publishes "220 Notes," a newsletter for enthusiasts of this band. I initially asked Art what he thought of my idea to start *another* effort toward granting Novice licensees voice privileges on the 220 MHz band. Art's reply, in short, was for me to wait until RM4829 and RM4831, issued by the Commission's Office of Science and Technology, have been reviewed. As you are probably aware, we hams have come reasonably close to losing this band to commercial interests more than once. I, for one, cannot imagine why any reasonable business person would have interest in a radio frequency as low as 220 MHz in this day and age. This band is still very much part of the VHF spectrum, with all its unique and variable propagation creating the potential for severe interference problems with channelized communications. "Two-twenty" is a far more likely *amateur* band—a place where experimenters can indulge themselves; a place where local, coordinated, channelized emergency communications activities are effective; a place for bouncing signals off the moon!

Art, whose authority on 220 MHz activities I would never try to question, feels that the "saving grace of this band will be packet communications." He also feels that "220 should be utilized as an uplink band for Amateur packet duty in the Amateur Satellite service . . . it would be a very good idea, with, say, 902 MHz being the down-link band. We could promote a lot of packet, 220, and 902 all in the same breath." Maybe Art's right, but I think granting Novices "phone" privileges would go farther, faster. Why? I can think of all kinds of reasons. Here are a few, and they all sound pretty valid to me.

- To assist us in achieving our acknowledged national goals of reducing the mean age of licensed amateurs and increasing our total population;
- To increase the percentage of Novices who renew or upgrade;
- To give more nontechnical prospective amateurs an incentive to become licensed;
- To increase the population of active VHFers;
- To promote the use of the 125 cm band and help assure its future as an amateur allocation;
- To relieve some of the crowding that occurs on the 2 meter band in densely populated areas.

In a recent local "roundtable" chat on 2 meter SSB I found myself promoting this idea: Give Novices 220 MHz all-mode privileges. Not a soul on frequency—and this was a rather large group—disagreed. All of us were licensed back in the mid-1960s when Novices had 146–148 MHz phone privileges, and we fondly recalled the fun of the "Gooney Box" era. Two meter AM DX was anything beyond a hundred miles, and most of us had never heard of meteor scatter—but we sure enjoyed ourselves.

Technology has advanced considerably since the sixties. There is essentially zero AM activity (the full-carrier, high-level modulated kind) on VHF nowadays. The upper portions of all our VHF bands are full of FM repeaters, which serve a far more useful purpose for emergency communications than anyone could have imagined back in 1962. The lower portions of our VHF bands are dedicated to weak-signal work: CW, SSB, and probably narrow-band digital modes in the future. Yet an amateur allocation with so much potential remains so little used.

Here in the New York metropolitan area—I'll call that the area centered on New York City and having a radius of 50 miles (i.e., about 7854 square miles)—one can tune the low end of the 125 cm band for hours and become quite adept at identifying "birdies" from TV Channel 13, "blips" from neighborhood scanners, lightning static, ignition noise, and all

*24 Louis Dr., Budd Lake, NJ 07828

sorts of interesting sounds. But the liklihood of hearing any volume of amateur activity is slim. Tuning the high end of the band, one can exercise the ability to "kerchunk" dozens of repeaters that will return with a friendly ID. But are many of those nifty repeaters in use? Probably not.

This is ridiculous. The 220 MHz band offers propagation nearly identical to 144 MHz. Antennas for 125 cm are small and lightweight, feedline losses are only slightly higher than on 2 meters, and equipment is reasonably available. True, 220 MHz is an amateur allocation only in North America at this time, so the opportunities for DXCC are weak. And the big Japanese manufacturers are hesitant to develop equipment for a "limited market" such as ours. Limited market? With 400,000 licensed amateurs in the U.S. alone, the market is not very limited. If we allowed Novices voice privileges on 220, we could add considerably to the number of eager consumers of commercial gear for the band. Maybe this would give ICOM, Kenwood, and Yaesu the "push" they need.

Yes, 220 is a great band. There can be TVI problems, as with any VHF band, but I find they are more easily resolved here than on the "lower" bands (50, 144 MHz); possibly this is because the antennas are usually of narrower beamwidth and the spacing between the amateur and TV antennas is a greater number of wavelengths. As well-engineered cable services (and ultimately direct-broadcast satellites) become more popular, TVI will be a problem of the past rather than the present. I think.

How do we get on this band, when no multimode transceivers from our friends across the Pacific are available? Well, first let me point out that there may be no "multimodes" available for 220 *yet*, but that doesn't mean there won't be any. I've heard rumors of JA-manufactured 220 MHz SSB/CW gear being readied for U.S. unveiling. I hope these rumors can be substantiated, and I shall be happy to report if and when they are. Next, be aware that 220 MHz FM transceivers are in abundant supply in the U.S., so there's no excuse for our not proliferating on the repeater subband (222–225 MHz). Further, there are 125 cm transverters fully compatible with our HF transceivers and capable of splendid performance, as reported in this column for March '85. And the dearth of commercially-made multimode gear for 220 should be no excuse to those of us who are homebrewers; this is not so high a frequency that microwave techniques are required!

There are established "activity nights" and calling frequencies for the 125 cm band; hopefully, these are followed nationally. The traditional 220 MHz activity night is Tuesday, and the calling frequency is 220.1 MHz (weak-signal modes). There are 220 MHz "nets" all around the country. Here in my local area the "Packrats" of the Mt. Airy VHF Club run multiband VHF/UHF nets every Monday evening beginning at 1930 hours local time (on 50 MHz) and changing bands "upwards" every half-hour thereafter until the 1296 MHz net is called to order at 2130 hours local time. The "Packrats" 220 MHz net is unique: They have an FM net on their club-owned repeater at 2030 hours, and follow with an SSB net at 2045 hours. Check-ins can come from anywhere and frequently are as far away as ME or NC. If there's a good 220 MHz net in *your* area, let me know and I'll print the information in this column.

Before I change the subject, let me point out that this is being written on April 24, the day following the 220 MHz ARRL "Sprint." For the uninitiated, a "Sprint" is a brief-duration contest, and in this case the operating period was just four hours, from 7–11 PM local time. Personally, I was active for about 3 of the allowed 4 hours and worked 63 stations in 20 "grid squares" on 220 MHz last night. My best DX was about 400 miles. All modes were allowed, but I worked SSB/CW only, never tuning more than 50 kHz away from the 220.1 calling frequency. In this area "big guns" like W1VD (CT) and N3CX (PA) surely did better than I. Maybe one of these fellows broke the 100 QSO barrier. So there *is* activity on 220, but we need more!

If you're interested in subscribing to K9XI's "220 Notes," contact Art by writing to him at 308 Eastgate Court, New Lenox, IL 60451. The "Notes" is truly "The National 220 MHz Newsletter."

Thanks Department

I'd like to offer thanks to Harry Arsenault, K1PLR/4, for offering me a complimentary subscription to his "SWOT (Sidewinders on Two) Newsletter." Although I've been active on 144 MHz for almost 20 years, I never got around to joining that fine organization, and I've really missed their newsletter. I'm happy to be receiving it again. Those who are interested in joining SWOT should write to Howard Hallman, WD5DJT, 3230 Springfield, Lancaster, TX 76134. Membership, with SWOT bulletin, is $10 yearly.

I'd also like to thank Roger Cox, WBØDGF, editor of the "Midwest VHF Report," for sending me complimentary copies of this fine publication. I am really impressed that the midwesterners have so much enthusiasm for VHF/UHF work. These guys are top-notch. Those who have been active on VHF for years remember that many milestones in VHF work have been made by midwesterners, such as KØMQS who qualified for the first 144 MHz WAS years before most of us

heard our first echo. Anyone wishing to subscribe to the "Midwest VHF Report" should write to WB0DGF at 3451 Dudley, Lincoln, NE 68503.

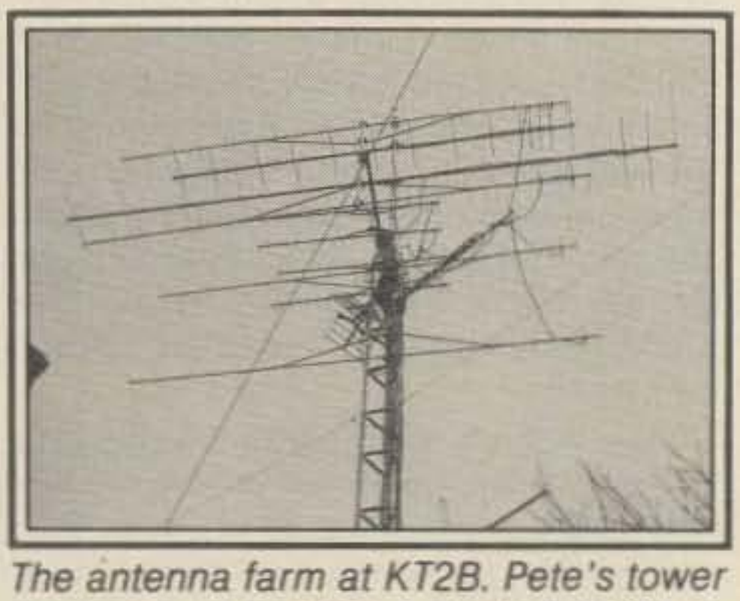
Thanks also to Tom, W6ORG, proprietor of P.C. Electronics, for adding me to his mailing list for "The ORGy Notes," a newsletter dedicated to ATV (amateur television). Tom's company is the only U.S. manufacturer of dedicated ATV equipment that I know of, and these folks have done an amazing job of promoting the mode with high-quality, affordable gear. ATV, being a wide-band mode (unlike SSTV, which occupies SSB bandwidth), is allowed only on the amateur bands above 420 MHz. ATV activity, especially on the national calling frequency of 439.25 MHz, is really picking up, and we'll surely feature this mode in a future column. In the meantime, if you're interested in ATV, there's nobody better to ask than Tom, W6ORG. Write to him at 2522 Paxson Lane, Arcadia, CA 91006.

Finally, thanks to Ivars Lauzums, KC2PX, a personal friend who was kind enough to put me in touch with Chris Bartram and Steve Prior of Mutek, Ltd. (Devon, U.K.), a major manufacturer of a very broad range of specialized VHF/UHF products. After a lengthy telephone conversation with Steve, during which we discussed everything from setting up 50 MHz skeds for me to work Chris, G4DGU, via extended scatter, to the details of some of the new Mutek products, Steve promised to send me data sheets describing their line. These arrived yesterday, with a note from Steve: "A little light reading matter!" The package weighed about a pound and contained 62 pages of information, including reprints of magazine reviews from *Amateur Radio, Ham Radio Today, Practical Wireless,* and *Beam,* four European publications. This is an example, I guess, of dry British humor. Anyway, Mutek has some exciting new products which *are* available in the U.S. via their distributor, The VHF Shop, 16 S. Mountain Road, Mountaintop, PA 18707. Tom Waldrin, KQ3R, is that shop's proprietor, and he has promised me his cooperation in supplying samples for review, etc. We'll be reviewing a few of the unique Mutek products in this column shortly. If you need more info on Mutek, Ltd., contact Tom at (717) 474-9399.

Stations Across the Nation

This month's set of terrific photos come from Pete Putman, KT2B, and Larry Reiser, WB9MSV. Pete is a professional photographer, so there's little wonder about the high quality of the prints he submitted. Pete is also co-chairman of the *CQ* WW VHF WPX Contest, and he's put in a lot of effort in helping to create and promote this event.

The shack at KT2B, Morris Plains, NJ. Pete is active on 144–1296 MHz and intends to be on 50 MHz as well by the time this is printed.



The antenna farm at KT2B. Pete's tower manages to support a total of 210 elements for 144–1296 MHz (!), although he's recently removed the 92-element 23 cm array to make room for 7 elements on 50 MHz. The 84-element F9FT (4×21 element Yagis) system is el-az (elevation-azimuth) rotatable for future EME work.

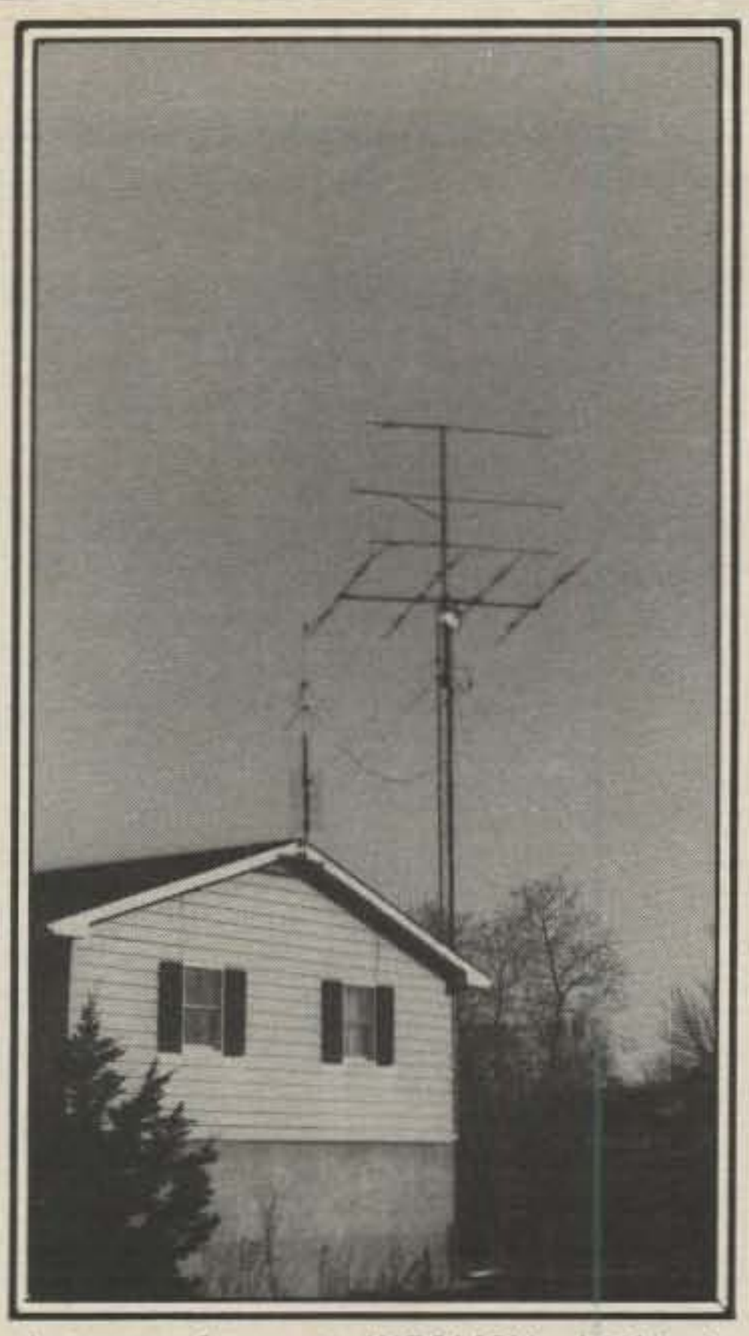
As you can see in the "shack" photo, KT2B's VHF station is pretty elaborate. Pete runs a KW on 144 MHz, 120 watts on 220 MHz, 500 watts on 432 MHz, and 20 watts on 1296 MHz from his home in Morris Plains, NJ. At this writing, he was in the process of removing his 92-element F9FT 23 cm array from his tower to make room for a new 7-element KLM Yagi for 50 MHz. Pete found, much to his dismay, that being surrounded by hills in some directions was really detrimental to his 23 cm work. Undaunted, he's decided to dedicate his 1296 MHz operations to portable work—undoubtedly from hilltops! Pete's 23 cm station, a TS430S with a Microwave Module transverter and single 7289 tube amplifier, plus a four-bay of stacked 23-element F9FT Yagis, is portable enough to set up very quickly. He recently acquired a new Mutek, Ltd. (U.K.) 6 meter transverter and should be on 50 MHz by the time this is printed.

A lot of Pete's VHF/UHF gear is homebrewed, some from his home and some from other people's. Pete enjoys building and modifying equipment, and he is famous for his amazing multi-projector 35 mm slide shows on amateur radio con-

Here's Larry Reiser, WB9MSV, active VHFer and contester from Dunlap, IL. Larry is active on 144 and 432 MHz from his impressive shack shown here. How does he keep it so neat?

testing. These have been shown at the ARRL National convention and the Dayton Hamvention and are really enjoyable.

Larry, WB9MSV, is a very active VHFer from Dunlap, IL. When I first received Larry's letter, I didn't remember him. However, after reading it I realized that I knew Larry as WB2KBH from Newton, NJ back in the early 1970s. It's a small world. Larry holds ARRL VUCC (VHF/UHF Century Club, an award for working gridsquares on the VHF/UHF bands) #2 for 144 MHz, and this is quite an accomplishment. In fact, Larry says he has 165 "grids" confirmed on 2 meters, although the VUCC qualifying requirement is "only" 100—not that easy. WB9MSV also has 53 grids on 70 cm, where the VUCC award criteria is 50. Good show!



Antenna farm at WB9MSV: 14/14-element "Jr. Boomers" on 144 MHz, with a 24-element "Boomer" for 70 cm stacked between the 2 meter Yagis. Below is a 4-element KLM tribander.

Larry runs an FT-726R multimode exciter driving a W2GN KW amplifier for 144 MHz, where his antenna system is a pair of stacked "Jr. Boomers," for a total of 28 elements at 70 feet. His 432 MHz station consists of the FT726R driving a Mirage D1010N solid-state amplifier (110 watts output) to a single 24-element "Boomer" at 65 feet. Despite the rather modest antenna system, Larry has confirmed four EME QSO's on 144 MHz and says, "While I have worked only the very large EME stations, it was still thrilling to make such a contact." I'm a believer, having worked a couple of stations "off the moon" using *really* modest antennas.

The photograph of Larry at his station tells the story. His is a very neat and professional layout, which I'm sure is a pleasure to operate. Larry is interested in joining our *CQ* WW VHF WPX Contest Committee, representing his geographic area, and by the time you read this he may well be part of our team.

Next month I'll devote some space to discussing what was new at the Dayton Hamvention (sorry I couldn't make this column, but our lead time is two months), and we'll feature another personal interview with a noted VHFer. Keep those cards and letters coming!

73, Steve, WB2WIK

World of Ideas

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

Shortwave Listening Revisited

The recent flurry of both HF transceivers including general-coverage reception and deluxe-style shortwave receivers has rekindled many amateurs' interest in shortwave listening. If you haven't tuned in a few of these non-ham activities lately, you may have missed some quite interesting communications. Considering today's widespread emphasis on weather watching, world attitudes regarding "Star Wars" philosophies, mysterious "spy" and drug smuggling activities, etc., such "pulse monitoring" ideas seem like a natural sideline to our daily amateur radio pursuits. While we obviously can't include a full directory of shortwave activities in this *CQ* column, we can highlight your "deluxe" rig's capabilities to directly tune various information sources as desired. Whether your timely concerns involve hurricanes, airplane hijackings, civil or political disturbances, survivalist activities, or merely keeping an active ear on international happenings, today's rigs literally place the world at your fingertips. We are, or potentially can be, "information centrals" for ourselves, our communities, and our nation. That's a rather impressive role from any viewpoint.

One of the more elusive aspects of shortwave monitoring is knowing what frequencies to tune at what times for a particular situation. Old-style radios were often dial-marked with various frequency allocations, but every frequency seems the same on today's digitally tuned rigs. Up-to-date books and magazines are extremely helpful here, with self-drawn tuning charts providing quick reference when needed. Trying to tune shortwave activities without these guides reminds me of touring the country without a road map; you might stumble upon a few views of interest, but you'll surely miss the better attractions. I've personally found *CQ*'s sister publication, *Popular Communications*, an excellent guide to all kinds of shortwave activity, including overseas broadcasts in English, clandestine radio, "spy" numbers stations, weather stations, survivalist communications, pirate radio, and much more. Another outstanding monthly publication is *Monitoring Times* published by Bob Grove, P.O. Box 98, Brasstown, North Carolina 28902.

**Eastwood Village No. 1201 So., Rt. 1, Box 499, Birmingham, AL 35210*

The advent of deluxe shortwave receivers with infrared remote control and full-coverage HF transceivers has opened new doors in shortwave listening. (The ICOM R71A shown can be fully enjoyed from an across-the-room easy chair.

Among the kaleidoscope of specialized shortwave books are Universal Electronic's new *Clandestine Confidential* (a fascinating book written by *Pop'Comm* Editor Gerry Dexter, and available from *CQ/Pop'Comm*) and Bert Huneault's *Worldwide Weather Broadcasts* (available from Monitoring Times and chockfull of useful information and weather codes. Check out some of these publications the next time you think propagation is down or the band is dull. You'll be scurrying for your transceiver and eyeballing some of our new "super rigs" at the same time. Of course, if you had both of these units . . .

A small collection of the many books and magazines available to avid shortwave listeners. Selecting publications according to one's interest ensures maximum enjoyment for invested time.

International Shortwave Broadcasts

This area of the HF spectrum is an absolute smorgasbord of information, entertainment, and news that's available on a 24 hour a day basis. If you enjoy genuine Dixieland jazz music, the "Rock of New Orleans," WRNO worldwide, hosts two or three fantastic programs each week. Even the commercials on this station are exciting—MFJ tuners and converters, amateur gear, amateur radio and SWL outlets. That's my kind of radio! WRNO broadcasts on various shortwave frequencies according to yearly seasons. Listen for them in the 49, 25, and 19 meter bands (see Table I).

It's often interesting to question news media reports on international affairs by tuning in direct broadcasts from those involved distant areas. One must always be somewhat leery here, however, as the concepts of "propaganda" have many faces. Conversely, what tangible proof do we have that what we originally heard or read wasn't a form of propaganda itself? Are we not subjected to reporting sources views, regardless of who they are? Remember, however, that many international broadcasters advantageously use world attention directed toward them. If you tuned in Radio Moscow in the wake of Chernenko's death, for example, you may have heard some interesting discussions regarding the U.S. invasion of Grenada. Sometimes tuning in a "third" or "fourth" opinion helps clear the air.

Clandestine Radio

Although most international shortwave broadcasts are usually "conventional" in

Meters	MegaHertz
120	2.300–2.500
60	4.750–5.060
49	5.950–6.200
41	7.100–7.300
31	9.500–9.900
25	11.650–12.050
19	15.100–15.600
16	17.550–17.900
13	21.450–21.850
11	25.600–26.100

Table I– International SW broadcasting bands and their frequency relationships.

nature, there's a vague line separating those activities and clandestine radio. As Gerry Dexter points out in his *Clandestine Confidential* book, "A clandestine transmission is one that's considered illegal in its target country" (an open-ended statement quoted from *The World Radio TV Handbook*). Nearly every station has the capability of crossing that line, possibly unknowingly to its operators or listeners.

One of the most recent and widely known examples of true clandestine broadcasting centered around "Argentina Annie" during British takeover of the Falkland Islands. Beginning soon after British forces set sail for that tiny island and continuing through the war siege itself, this modern-day "Tokyo Rose" voiced morale-weakening statements toward the British military and humorously criticized their task-force commander. The origin point of those transmissions is still unknown. However, "Argentina Annie" was eventually unveiled as a television station announcer in Buenos Aires.

Are other forms of clandestine radio being heard on the shortwave bands today? Yes, indeed! While timely magazines are your best guide to their reception, try keeping your eyes and ears tweaked for Latin American countries experiencing revolution and chaos while tuning the 6050 to 6250 kHz range during evening hours. If activity seems slack, continue tuning up to 6900 kHz while listening for weaker signals. That range is a hotbed of both legitimate and clandestine broadcasts, pirate radio, "spy" numbers stations, and various coastal waters activity.

Weather Broadcast Services

As an apparent spinoff of satellite-supported and computer-enhanced weather watching, numerous individuals have become true meteorological devotees. If your interests lean in that direction, the shortwave bands can be a haven of information. In addition to the well-known NOAA broadcasts on 162.550 MHz and aircraft weather services between 200 and 400 kHz, numerous additional operations are nestled into little-known frequencies between 4 and 15 MHz. A brief sampling of those broadcasts is included in Table II. I've especially found the New York Radio transmissions on 10,051 kHz interesting. They include aircraft-type descriptions for nearly all major cities in the north and eastern U.S. (great if you're planning a trip to Dayton, New York, Chicago, etc.), and they're a dandy beacon for checking 30 meter propagation.

"Utility" Communications

This open-ended area includes all types of interesting activities, and a general knowledge of "what's happening and where" could prove invaluable at some future time. We've all seen, for example, news items such as "Ham Operator Receives Distress Call from Ship," "Ham Monitors Airplane Hijacking," etc. Do those events occur by sheer luck, or do such callers magically answer our blind 40 meter CQ? Does the Coast Guard check for stray ships in the Nevada desert? Not really. The amateurs in point had ideas of HF "channels" used for various utility operations—another asset of today's magazines and full-coverage transceivers.

Utility communications include ship to ship/shore operations (6521 kHz is a quite active spot), in-flight aircraft conversations (we followed a British airline bound for London last evening on 10,071 kHz), underworld activity, FBI, CIA (an elusive bunch; try monitoring between 7300 and 7800 kHz), and much more. The space shuttle, presidential and military aircraft, foreign ships/submarines, and even vice squads or gambling casinos also frequent "oddball frequencies" between 5,000 and 19,000 kHz. As radio

Station Identification	Frequency(s) Of Transmission	Times Of Transmission
New York Radio	6604 kHz and 10,051 kHz	00 to 20 minutes after each hour and 30 to 50 minutes after each hour
Oakland Radio	8828 kHz and 13,262 kHz	05 minutes after each hour and 35 minutes after each hour
Canadian Aviation Weather	6,753 kHz and 15,035 kHz	20 and 30 minutes after each hour
Great Lakes Weather (WLC)	4369 kHz	17 minutes after each hour

Table II– A brief sampling of stations transmitting aviation-type weather information daily on shortwave bands.

amateurs, we understand signal propagation on HF and know how to investigate any of those areas from home or auto.

"Spy" Numbers Stations

The ongoing intrigue of random numbers transmitted in four- or five-digit series is one of the strangest, yet most heard, activities on the shortwave bands. What is the purpose of those encrypted messages, for whom are they transmitted, where do they originate, and why are they allowed to continue without government investigation? Those are only a few of the questions being raised by this cloak-and-dagger–type activity. Most of the transmissions are interference free—right out in the open, with the apparent air of a real-time James Bond caper. Some transmissions are English spoken, some are Spanish, and some are German. Female voices are quite commonly used. There are theories and opinions that those stations are based in Florida, Cuba, near Washington, D.C., and even near Moscow. Personally, I've become quite curious over a couple of strange-looking and apparently disguised transmitting facilities I've noticed near a desolate southern coast. Maybe this year's visit (with a full-coverage transceiver along) will shed some light. I suspect that if a facility was uncovered and annihilated, no one would claim or confirm it. If you would like an experience in cryptology, tune in some of the "spy" numbers broadcasts shown in Table III. Their format may seem unusual, but they'll sure pique your curiosity!

Popular Frequencies	Popular Times
0100 to 0300 GMT Daily	3,060–3,090 kHz
0300 and 0330 GMT Daily	4,550–4,670 kHz
0430 and each 30 minute interval afterward Daily	6,000–7,000 kHz
0430 and each 30 minute interval afterward on weekends	3,300–3,500 kHz

Typical Format: "ATENCION 10684 10186," etc.

Table III– A brief sampling of the many "spy" numbers transmissions presently operating on the shortwave bands.

Some Additional Thoughts

While our overview of shortwave activities is by no means complete, it illustrates some very interesting points. (1) Today's transceivers with full-coverage receivers open unlimited areas of useful operation on a personal or group basis. (2) Every radio amateur can potentially be a priceless asset to his community. Possibly a hypothetical example will clarify my views. Let's say you hear of an in-progress airplane hijacking with some particular significance. You tune that airline's frequencies, Tulsa Central and Miami Air. If you're fortunate, you're now directly monitoring "both sides" of in-progress activities. You check FBI and popular underworld frequencies. You then include copying ground activities of the terrorists talking with hijackers. Are there any military airplanes involved? Have you checked Cuban Radio transmissions? Are newspaper reporters banging at your door yet?

In concluding this month's column, I'm proud to share an event of personal significance with all of you. I've now crossed the point of 300 published articles and 12 full length books on amateur radio (can anyone top this record?). I wish to thank everyone for continuous on-the-air support and favorable letters. Knowing our efforts are respected and appreciated is the ultimate reward. Our mailbag occasionally bulges, but we strive to answer all inquiries with five days of their receipt. If you operate 20 meters, remember I still frequent 14,180 kHz (±QRM) Sundays around 2230 GMT and would really enjoy chatting with you. As this column pointed out, your transceiver is practically a direct line to anyone, any activity, anywhere. Enjoy, enjoy!

73, Dave, K4TWJ

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COMMODORE 64 CW INSTRUCTOR PROGRAM. Generates C.W. on TV speaker. Random code, keyboard input, or prerecorded "CW Tests." Character speed and spacing set independently. Designed for classes and increasing code speed. $15.00—diskette or cassette (specify). N7BCU, Dennis Oliver, 22000 S. Tonya Ct., Beavercreek, OR 97004.

RETAIL STORE being liquidated by mail auction. Parts, tools, test equipment, ham supplies. SASE to ESI, Box 328, Mesa, AZ 85201.

ROHN TOWERS: Wholesale direct to users. 23% to 34% discount from dealer price. All products available. Write or call for price list. Also we are wholesale distributor for Heliax antenna cable. Hill Radio, 2503 GE Road, P.O. Box 1405, Bloomington, IL 61701-1405, phone 309-663-2141.

FOR SALE: GEM QUAD, NEVER USED. Two elements, complete with spider, fiberglass spreaders, wire & balun. Ten, 15, 20 meters & wire for 2 meter band. Handbook and instructions. US $165 or nearest offer. You pay shipping. VE7EHD, 604-265-3175.

WANTED: FT-241-A surplus crystals, channels 68, 72, 359, and 361. Manual and schematics, original or copy, for Atlas RX-110 Special and TX-110. Anders Rosengren, SM7BOZ, Sexmansvagen 3, S-230 30 Oxie, Sweden.

NOW you can transmit Morse (CW) on your VIC-20 keyboard and receive Morse code on your television screen, in large letters and numerals. For the complete kit of parts for transmit and receive CW including CW program and interface and easy-to-follow instruction manual send only $30 postpaid to: L. Preston, 215-28 Spencer Avenue, Queens Village, NY 11427.

FOR SALE: Microcraft Code Star and Microcraft Morse-A-Keyer, never used, new. Price $215 shipped. Call (518) 883-5007.

FOR SALE: Heath HW-101 $175.00, Robot 400 $225.00, Heath 2K Tuner $85.00, TH5DX $175.00. KCØPT 913-625-7141.

DXPEDITION TO MONTSERRAT only $250/week. Details: VP2ML, Box 4881, Santa Rosa, CA 95402.

ROSS $$$$ NEW SPECIALS (July only): If you don't see what you want, send Call letters, name & phone # for personal price quote. Over 6500 ham-related items in stock. ICOM # IC-735 $PHONE, IC-45A $299.90, IC-745 $768.90, IC-04AT $285.90, IC-271A $529.90. KENWOOD # TS-940S/WAT $1699.90, TH-21AT $194.90 + EXTRA PB-21 .10, TR-8400 $379.90, TR-7950 $356.90, TS-430S $667.90, TM-211A $299.90, VFO-240 $139.90, TW-4000A $489.00, TS-780 $759.90. YAESU #SP-107 $24.50, FT-757GX $719.90, FT-708R $219.90, FRG-7700 $369.90, FRG-8800 $589.90, FC-102 $229.90. All major lines stocked, L.T.O. MENTION AD. PRICES cash, FOB Preston. We close at 2:00 on Saturdays & Mondays. ROSS DISTRIBUTING COMPANY, 78 South State, Preston, Idaho 83263 (208-852-0830).

ELECTRONIC TECHNICIAN: Proto type work, ability to read schematics & construct working models. Familiarity with all common instruments & microwave test equipment is especially helpful. ELECTRONIC TECHNICIAN/PRODUCTION: Good dexterity required. If you know the fundamentals we will teach you the rest. B&H ELECTRONICS is located 40 miles north of N.Y.C. Full benefits. Please send your resume & all pertinent references in full confidence to B&H ELECTRONICS CO., P.O. Box 490, Chester, NY 10918.

COMPUTERIZE YOUR IC-720. Keyboard frequency entry, 64 memories, scanning (frequency, memory, and mode), many more features! Requires no interface, just cable—directions included. For Commodore 64. Cassette $14.75, disk $16.75, ppd. Cables also available. David Oliver, W9ODK, Rt. 2, Box 75A, Shevlin, MN 56678.

1985 BLOSSOMLAND BLAST, Sunday, October 6, 1985. Write "BLAST," Box 175, St. Joseph, MI 49085.

RADIO AMATEUR AWARDS DIRECTORY OF THE WORLD 1985 REVISED EDITION: $8 US to stateside, or $10 US to DX, from VE3XN, Garry Hammond, 5 McLaren, Listowel, Ontario, N4W3K1 Canada.

WANTED: OVARA "DX Bulletin" by W4KVX No. 22 and single sheets No's 1 thru 6. Jock, ZL2GX, 152 Lytton, Gisborne, New Zealand.

WANTED: Used or sick CDE/Hy-Gain rotor control for HAM IV or T2X Tailtwister. Rod, W7OM, 5632 47th Ave. SW, Seattle, WA 98136.

SELL QRP STATION. TEN-TEC Century/22 50 watt CW transceiver with calibrator and keyer, Astron RS-12A power supply, MFJ-941C antenna tuner. FB condition. First $300 cashiers check. I ship surface. Dr. Martin, AH6N, 98-427 Kilihea Way, Aiea, HI 96701.

SELL 2 METER STATION. Kenwood TR-2500, ST-2 Base Stand, Mirage B23 amplifier. I ship. First $200 cashier's check. Dr. Martin, 98-427 Kilihea Way, Aiea, HI 96701.

YOU, TOO, CAN "OWN" a piece of 80 or 160 meters! Send $2.50 to N7DF, Box 125, Holton, KS 66436 for complete details on an 80/160 meter discage that you can homebrew.

WANT: Heath DX35, DX40, & Johnson Ranger. L. Smith, Box 1416, Albany, GA 31702.

WANT: Buy or copy schematic or manual Ray Jefferson Mod. 905 C.B. XCVR (5 ch XMIT—Broadband RCV) circa 1950–55. KA4ZBK, Mike, Callbook or P. O. Box 6745, Portsmouth, VA 23703.

DRAKE R4 with 160 meter xtal $100, Hy-Gain 18 AVT/WB-S $85, Duofone TAD III Telephone answering machine $85. All in MINT condx. You pay shipping. Larry Jones, WB5KYK, 1836 N. Sumner, Pampa, TX 79065, Ph. # 806-669-3833.

CX7 with many improvements, $3400. Mark Mandelkern, 2315 Derby St., Berkeley, CA 94705, phone 415-549-9210.

WANTED: Hallicrafter SX-101A receiver. W2JTP, 431 Woodbury Rd., Huntington, NY 11743. Phone (516) 692-2862 p.m.

ROBOT Model 70 with 256 lines, works but needs alignment. $65 you ship. W8ATK, 4148 School Section, Cincinnati, OH 45211.

SALE: HALLICRAFTERS S-118 Receiver $50. Drake WV-4 RF Wattmeter $30. Both w/manuals. I pay U.P.S. M. Simmons, 23 Townsend Cir., Ringgold, GA 30736, phone 404-937-3365.

WANTED: VHF/UHF/ant. systems, hardline & heliax. Clem, W8VO, 33727 Brownlea, Sterling Hts., MI 48077.

FOR SALE: Sencore Model CR31 Super Mack CRT tester and beam builder. Mint $395 inc. UPS. Knight Star Roamer SW Receiver. No manual. Good condition. $30 inc. UPS. Call (312) 354-6031. Robert Bradley, W9WGD, 1002 Forest Road, La Grange Park, IL 60525.

TRADE: Hang glider for ham gear. Frank Hicks, 683 E. Hillside Oaks, North Salt Lake, UT 84054-1533, tel. 801-292-6850.

CLEANING OUT SURPLUS equipment. Send SASE for list. Les Basham, W7TCT, 735 Caves Hwy., Cave Junction, OR 97523.

PLUG-IN AMPLIFIER, converter B-T Model CS-1 or UC-1 for TV channels 16, 18, 22, 28 and 36 to use in B-T Model MA 4-1-M Line Mixer Amplifier. Also want schematic for Jerrold Model 2300 broadband amplifier. T. K. Brown, 35 Lakeview MC, Sebring, FL 33870.

SELLING: 50 year collection vacuum tubes. Send list of requirements for availability and quotes. Wanted manual for S.B.E. 34, shortwave craft magazines, 1930 periods. W5QJT, Levy, 4141 Krupp Drive, E.P., TX 79902.

WANTED: LP's, EP's, or singles of Conway Twitty. Will buy or trade ham items for. Please send list to VE1RY, Stan Parsons, P.O. Box 640, Kingston, N.S., Canada B0P1R0.

FOR SALE: Collins 75S-1 $150; Drake TR4/RV4/AC4/MS4 $325. Pkg. only. Very good cnd., clean. Will ship UPS free. WB6ZJM 213-653-6993.

WANTED: Pre-1950 bugs and Spark keys for my collection. Vibroplex, Martin, McElroy, Marconi, DeForest, etc. K5RW, Neal McEwen, 1128 Midway, Richardson, TX 75081.

WANTED: Instruction manual or schematic of Allied Radio, Knight Kit VTVM, Model KVT-1. I will pay for copy, or copy & return. C. Beis, K5UWD, P.O. Box 3128, Richardson, TX 75080.

FOR SALE: Kenwood AT-200 Antenna Tuner, original box, manual, dust-cover, like new, $65. KA5KHI (803) 249-6522.

TRADE: Mint Drake TR7, PS7, Aux 7500 Hz, 7077. Want: ICOM IC-745/FM, PS-35. KØMK 218-865-6541.

WANTED: VHF-UHF TV Signal Strength Meter. Sell: 120 foot very strong guyed steel tower in 20 foot sections. $150 per section, whole tower $700. U Pick up only. Tim Colbert, 13609 Colony, Burton, OH 44021.

WANTED: 3 sections Rohn 25G tower, rotor plate AS25G, Heath "Cantenna" dummy load. Con Helber, KØRAX, Star Route 1, Box 96, Middle Brook, MO 63656.

COLLINS Station 75S-3, 32S-1, 312B-4, 516F-2 and D-104 mike. Excellent condition $599.95. ICOM 730 XCVR with FL45 filter $549.95. KA1HRZ 207-487-5217.

WANTED: Chandler High-Speed Typewriting Course. Write WA2GJY with condition and price.

TEN-TEC 229 antenna tuner, new in original carton, not a kit, $200. UPS paid. N4IJW, 109 Elliott Circle, Oak Ridge, TN 37830, phone 615-483-5132.

WANTED: Yaesu FT-7 or other small SSB for experimental bicycle installation. Write to: Daniel Hey, 600 Aubrey Circle S., Greenwood, MS 38930.

SELL: GSB-100, HT37 $95 ea (pick up). SX111, HQ145 $95 ea. GT550, RV550, AC, CAL $175. All good or better cond., work FB, w/manuals. N7GMJ, 3806 6th Ave., No. Gt. Falls, MT 59401, phone 406-453-1989.

VINTAGE COLLINS COLLECTION is being liquidated because of bankruptcy. Send SASE to receiver, WB8IPG, 183 Tacoma Blvd., Troy, MI 48084.

WANTED to TRADE FT-101ZD and FV-101Z in mint condition for FT-102 or $650. Rod, W7OM, via Callbook.

VERTICAL VIBROPLEX and other telegraph keys wanted. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

WANTED: Collins accessories in any condition. Also 75S-1 running or not. Mike Ludkiewicz, 143 Richmond Road, Ludlow, MA 01056.

MFJ 408 Deluxe Electronic Keyer II wanted. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

FOR SALE: Azden PCS 3000 Mobile Unit w/army MARS XTAL, mobile mount, manual, mint condition, $200 firm. Hi-speed Vibroplex key, made in Japan w/see thru plexiglass cover, trade for straight key, electronic keyer, or? N7ETP.

CAPACITOR TEST SET $10, MFJ Ant matchbox $20, MFJ 3-50 MHz preselector $30, RCA mobile test set $15. K6KZT, 2255 Alexander, Los Osos, CA 93402.

PLEASE CONSIDER DONATING old equipment, code cassettes, HT's and books to our school amateur radio program. G. Skloot, KE2N, Junior High School 180, 320 B 104th Street, Rockaway Park, NY 11694.

FOR SALE: Swan 600 transmitter and 600 receiver, Swan 350C with PS and manual. Swan 350A with blt-in ac/dc, also has manual. IC-230 with manual and mike covers 146-148. Midland 13-500, covers 144-148, has eight (8) set of crystals, comes with mike and manual. Lafayette receiver covers 6-80 meters, has manual. FT-101E covers 10-160 with mike and manual. Works on a/c only. For more info send SASE to: P.O. Box 518, Whitehouse, FL 32220.

WANTED: ICOM IC-60, Drake WV-4 or Bird Ham-mate 4352, 6m amplifier, Escort Radar detector, Ten-Tec 229. KØMK, 690 Vermilion Trail, Gilbert, MN 55741.

450 MHz FM YAESU FT-720RU $200. Azden 2 mtr. PCS-3000 $165. (Plus Shipping.) Clem, W8VO, 33727 Brownlea, Sterling Hgts., MI 48077.

CLANDESTINE CONFIDENTIAL NEWSLETTER: Latest info on secret broadcasters. Six issues $10 US, $13 foreign, US funds. PR4 Box 110, Lake Geneva, WI 53147.

120 FOOT GUYED STEEL Microwave Tower. 18" square in 20 foot sections. $150 per section of $700 for entire tower, pick up only. WANT extremely mint round S-line, other round Collins. T. N. Colbert, WA8MLV, 13609 Colony Lane, Burton, OH 44021.

WURLITZER JUKEBOX AMP, Model 501 (Antique) with matching Control Unit #1015 and matching 14 inch speaker. Works well, $100. WØOWY, 1348 Pinewood Dr., Woodbury, MN 55125.

SELL: Info-Teck Keyboard, Model 150, $150 or trade for a general-coverage receiver. Joseph Schwartz, 11 Windham Loop, Staten Island, NY 10314, phone (718) 698-8069.

CQ's FOR SALE: 1947-1975 complete set, beautifully bound. Best offer. Joe Mullan, W3RLR, 217 Northway, Baltimore, MD 21218, phone (301) 467-3500.

TEN-TEC ARGONAUT 509, Linear Amplifier 405, 251 Power Supply, Mike, $350. N5HBK, 504-785-2062.

NC300 OWNERS: Help, beginner needs help in using NC300 on CW and SSB. Frank Hicks, 683 E. Hillside Oaks, North Salt Lake, UT 84054.

FOR SALE: COLLINS 30L1 Linear Amplifier. MINT condition, $400. Joe, NP4FI, (305) 783-4677.

B&W DIPOLES, AC 3.5–30 10–80M Folded Dipole $85, AES 160 160/30M Trap Dipole $75. U-Ship, KA3LNN, Callbook.

HEATHKIT General Course, New Condition, $25. U-Ship. KA3LNN Callbook.

FOR SALE: New Autek QF-1A SSB/CW/AM Filter $45 plus shipping. Frank Andrei, W3OEL, 320 Phyllis Dr., Saltsburg, PA 15681.

WILL PAY for copies of manual and or schematics for Central Electronics R. F. Analyzer MM-1. A. L. Marsden, 449 North Concourse Avenue, Montebello, CA 90640.

WANTED: Kenwood TL-922, ICOM's IC-745/FM, IC-551/FM, IC-271A, Cushcraft 32-19, 214FB, 215WB Boomers. KØMK 218-865-6541.

WANTED: Audio transformer T1 for old Johnson Pacemaker SSB rig. W4BLX, POB 97, New Hope, VA 24469, phone 703-363-5797.

WOULD LIKE TO HEAR from anyone who has performed modifications to an IC-2AT or IC-745. R. Thompson, 626 Valkyrie, KI Sawyer AFB, MI 49843.

FOR SALE: QST, CQ, 73, Ham Radio, Ham Radio Horizons magazines @ 15¢ each plus shipping. SASE for list. WA8AWU, 3069 Dumont Rd., Allegan, MI 49010.

JUNIOR HIGH SCHOOL needs old equipment and code tapes to help young people learn amateur radio. Please help. G. Skloot, KE2N, 320 B. 104 Street, Rockaway Park, NY 11694.

120 FT. GUYED STEEL TOWER, 20 ft. sections, 18 inch square. Extremely strong and heavy. $150 per section or whole tower $700. Wanted: TI-58/59 books, PC-100 printer, mag cards, modules. Any National equipment. T. N. Colbert, 13609 Colony Lane, Burton, OH 44021.

TRADE: Hi-speed bug, 30 wpm up, for slow-speed bug, 5 wpm up. Howard Halperin, N7ETP, 4122 W. Flower Street, Phoenix, AZ 85019.

SALE: Bird wattmeter slugs, (2) 100W 2-30 MHz $30 each, 100W 200-500 MHz $15, 100W 250 MHz $10. Joe, NP4FI, 305-783-4677.

FOR SALE: Swan 600T & R with manuals, Swan 350C with PS, Azden 10 FM, Midland 2 meter, IC-230 with mike and manual, FT-101E with manual. More info send SASE to P.O. Box 518, Whitehouse, FL 32220.

80 METER DXCC in 30 days! 160 WAS in 12 hours! You too can do it. Rush $2.50 to Discage, Box 125, Holton, KS 66436 for details on the antenna that makes it happen.

FOR SALE: Two 3-1000Z complete with shields and sockets, good, $45 each. Two 3-400Z complete with sockets, $25 each. You pay shipping. Lee L. McKee, 1820 Briarwood, Muscatine, IA 52761.

FOR SALE: Swan 350 XCVR, matching PWR supply and speaker, matching wattmeter, microphone. All clean and in good working condition with manuals. Make offer. Hammarlund TR105 XCVR, mint condition with manual. Make offer. B. L. Lane, P.O. Box 576, Chocowinity, NC 27817, or 919-946-8788 after 7 p.m. EST.

HEATH DX60B Xmitter, VFO H9B10B $75 for both. Phone 419-784-4349, KA8SMR, Defiance, OH 43512.

WANTED: Three sections Rohn 256 tower, rotor plate AS25G, and Heath "Cantenna." Con Helber, KØRAX, Star Route 1, Box 96, Middle Brook, MO 63656.

FOR SALE: Panasonic RF2600 $50, Kenwood R2000 w/ Y6455C mint $400, Hy-Gain 18V 10-80M vertical mint $25, Ten-Tec 227 Tuner 1K new $50, Sharp PC1500A $100, VIC-20 w/16K and Datasette $75. All plus shipping. Peter Sutter, 4125 N. Monticello, Chicago, IL 60618.

FOR SALE: Misc. lengths of RG8U coax cable 20¢ per foot, slightly used, in good condition, send your requirement with SASE. U pay shipping. Want plug-in amplifier-converter B-T model CS-1 or UC-1 for TV channels 18 and 36 to use in B-T model MA4-1-M line mixer amplifier. Also schematic for Jerrold Mod. 2300 broadband amplifier. T. K. Brown, RD1 Box 225, Forksville, PA 18611.

CLANDESTINE, pirate, spy broadcasters! Free information. LSASE to ACE, Box 452, Moorhead, MN 56560.

FOR SALE: Swan 600T & R with manuals, Swan 350C with manual and PS, Swan 350A with built-in AC/DC manual, Lafayette receiver 6-80 meters with manual, IC-230 2 meter with manual, Midland 13-500C 2 meter rig with manual and mike, Azden FM 10 meter with mike and manual. More info send SASE to P.O. Box 518, Whitehouse, FL 32220.

WANTED: Squire-Sanders SS-1R, spkr., noise blanker, working only. Sell: TS-130S/PS, Autek QF-1, chrome Bencher/cover, Heath U-Matic keyer, 120 ft. guyed square steel microwave tower, 20 ft. sections 150, whole thing, too. T. N. Colbert, WA8MLV, 13609 Colony, Burton, OH 44021.

WANTED: Terminal program for Kantronics UTU and TI 99/4A. Will pay all costs. FOR SALE: Kenwood TS820S, 820 VFO, TV-506, $700 or best offer, U pay UPS. TI-99/4A Morse code tutor, cassette, $6.00. Bill Trojanowski, N2EZG, RD #2, Alpine, NY 14805 (phone 607-594-3544).

FOR SALE: TS520, SP520 $400; AT200 $100; KWM2, PM2 $400; KWS1, 75A4 $750; 75S3-P, 32S3, 516F2, 312B4 $895; 75S1 $225. James Craig, W1FBG, 32 Birchwood Drive, Rye, NH 03870.

HAM RADIO PARADISE: Selling my superior one acre site residence, Cornwall, England. 60,000 pounds sterling. Rush $2.00 for airmail details and photo. G3NQU, Bonacre, St. Gennys, Bude, Cornwall, England.

MBA READER by AEA copies CW-RTTY-ASCII, like new, in original carton, $195. D. Mollan, WB7FDE, 7805 N.E. 147th Ave., Vancouver, WA 98662.

NOVICE NET proposed. Suggest dates, times, freqs., etc. *HARK HOTLINE: 1-612-874-9561 (0200Z) weekends, QRZ?* KA0TPZ.

WANTED: Heath SB-220 linear with 10 meters, top condition. Prefer northeast Cleveland pickup area. W8FDN, 371 Claymore Blvd., Richmond Hts., Ohio 44143.

KENWOOD TR-7625 2 meter FM transceiver. Service manual included, $200 or best offer. WB3KJH, 228 Tremont Ave., Greensburg, PA 15601, phone (412) 836-4987.

WANTED: YAESU FR-101 SD or D receiver and ICOM SP-2 speaker. C. T. Huth, 130 Hunter St., Tiffin, OH 44883.

MAGAZINES CQ & QST 1946–54 Q-Multi., 5" Scope, Z-Bridge, RME DB23 Amp. Send SASE for list. K9ZMQ, 1012 Philippen, Manitowoc, WI 54220.

WANTED: Cathedral radios, any condition for personal collection. Send info to: WB9RAD, 1050 N. Paulina St., Chicago, IL 60622.

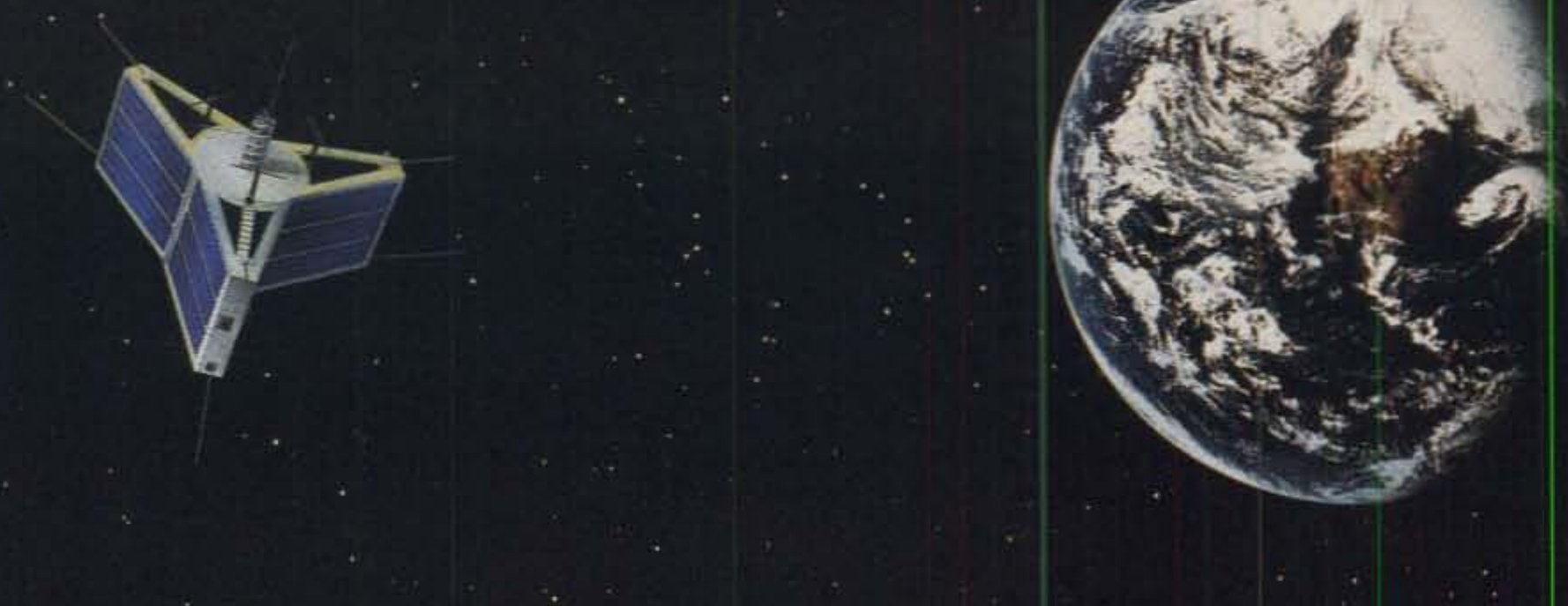
FOR SALE: Brand new Hallicrafter VFO HA-26 (2 and 6 meters) $25. National rcvr SW-54, excellent condition, collector's item, $25. Lafayette 2 meter converter, excellent condition, $20. Phone 516-731-3868.

FOR SALE: SBE transceiver 80-10 meter $300. SBE linear amplifier 80-10 meter with SB3DCP power supply $295. Zenith 3000-1 Transoceanic AM-FM receiver $100. TH-4 Hy-Gain Tribeam 20-10 meter $95. HT33A Hallicrafter 1 KW linear amplifier 80-10 meter $400. CO-1015 Heath ignition analyzer with high energy adapter and 120 VAC and 12 VDC power supply $160. HA-6 Hallicrafter 6 meter transverter with P26 power supply $150. T. K. Brown, P.O. Box 225, Forksville, PA 18616.

HEATH IG-62 Color Bar Gen $10, Eico 944 Flyback Test Set $10, old HRO coil set w/case A to E $75. K6KZT, 2255 Alexander, Los Osos, CA 93402.

Advertiser's Index

We'd like to see your company listed here too. Contact Jack Gutzeit, W2LZX, or Arnie Sposato, KA2TYA, at 516-681-2922 to work out an advertising program tailored to suit your needs.



The DX is better out here. Ask anyone who owns an FT-726R.

It's true. Linking up to OSCAR 10 is the one sure way to bring the world into your ham shack. No matter where your shack is.

FT-726R owners know. You'll find them working the world from their apartments. Attics. And from their antenna-restricted neighborhoods.

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In fact, the FT-726R is the world's most popular link to OSCAR 10.

And for good reason. This 2-meter, 10-watt rig gives you full cross-band duplex capability. Simply plug in two optional modules, one for 435-MHz operation, another for cross-band duplex.

You can set up your earth station just about anywhere. All you need is the 726 and two Yagi antennas: 435-MHz for transmit and 2-meters for receive.

Even as a conventional base station, the FT-726R is a real standout.

You can choose from three operating modes: SSB, FM or CW. Expand to three-band operation with your choice of optional modules for 10 meters, 6 meters, 430-440 MHz and 440-450 MHz.

Then store your preferred frequencies and modes into the eleven memories for instant recall. With pushbutton transfer capability to either of two VFO registers. And versatile scanning functions you'd expect from a Yaesu radio.

Plus you get a lot more extras, including a built-in speech processor, all-mode squelch and a noise blanker.

So no matter where your shack is, let Yaesu's FT-726R introduce you to OSCAR 10. The world is waiting.

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The new ICOM IC-735 is what you've been asking for...the most compact and advanced full-featured HF transceiver with general coverage receiver on the market. Measuring only 3.7 inches high by 9.5 inches wide by 9 inches deep, the IC-735 is well suited for mobile, marine or base station operation.

More Standard Features

Dollar-for-dollar the IC-735 includes more standard features...FM built-in, an HM-12 scanning mic, FM, CW, LSB, USB, AM transmit and receive, 12 tunable memories and lithium memory backup, program scan, memory scan, switchable AGC, automatic SSB selection by band, RF speech processor, 12V operation, continuously adjustable output power up to 100 watts, 100% duty cycle and a deep tunable notch.

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It's a high performer on all the ham bands, and as a general coverage receiver, the IC-735 is exceptional. The IC-735 has a built-in receiver attenuator, preamp and noise blanker to enhance receiver performance. PLUS it has a 105dB dynamic range and a new low-noise phase locked loop for extremely quiet rock-solid reception.

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The large LCD readout and conveniently located controls enable easy operation, even in the mobile environment. Controls which require rare adjustment are placed behind a hatch cover on the front panel of the radio. VOX controls, mic gain and other seldom used controls are kept out of sight, but are immediately accessible.

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See the IC-735 at your authorized ICOM dealer. For superior performance and innovative features at the right price, look at the ultra compact IC-735.

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