73 Amateur Radio Today

DECEMBER 2002
ISSUE #505
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CANADA $4.95

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New

DR-620T VHF/UHF
Dual-Band Mobile/Base
First Amateur Twin Band Mobile To Support Optional Digital Voice Communications*

- RX-VHF 108-173.995 MHz, UHF 335-480 MHz
- TX-VHF 144-147.995 MHz, UHF 430-449.995 MHz
- Receives Airband and Wide FM
- Front control unit separation (optional EDS-9 kit required)
- Advanced 10F3 digital mode with speech compression technology (EJ-47U required)*
- 200 memory channels
- Advanced EJ-50U TNC (optional) supports digi-peat mode
- Remote control features including parameter setting and direct frequency entry through the microphone
- Dual-Band receiver with V/U, V/V, U/U capability
- CTCSS/DCS encode/decode and European Tone-bursts
- OUTPUT: H/M/L-50/10/5 watts VHF
- OUTPUT: H/M/L-35/10/5 watts UHF

DR-605TQ VHF/UHF
Dual-Band Mobile/Base
Full 2 Meter/440 Performance

- 100 memory channels, + a "call" channel for each band
- CTCSS encoded+decoded and tone scan
- Cross-band repeat and full duplex capability
- 9600 bps packet ready with dedicated terminals
- Internal duplexer - one easy antenna connection
- RX-VHF 136-173.995 MHz, UHF 420-449.994 MHz
- TX-VHF 144-147.995 MHz, UHF 430-449.994 MHz
- MARS capability (permit required)
- OUTPUT H/L - 50/5 watts VHF, 35/5 watts UHF
- Time-out timer (ideal for repeater and packet operation)

DJ-V5TH VHF/UHF
Dual-Band FM Transceiver
5 watts of output power, in a compact package.

- Alphanumeric Display, up to 6 characters
- TX-VHF 144-147.995 MHz, UHF 420-449.995 MHz
- 200 memory channels plus two call channels
- Full VHF + UHF Amateur Band Coverage
- Receive Range, (76 - 999MHz) includes Wide FM capability
- Up to 5 watts output, 3 output settings
- CTCSS encode+decode DTMF squelch and European Tone bursts
- 4 scan modes, 5 programmable scan banks
- MARS capability (permit required)

IronHorse®

Ask your dealer about the full line of Iron Horse antennas & accessories!

DJ-596T VHF/UHF Dual-Band HT with Digital Voice Option*
Loaded with features! The breakthrough design supports optional digital voice communications and you can easily switch the unit between analog and digital modes!

- Full 4.5 watts output VHF/4w UHF
- Powerful NiMH battery
- 100 memories in any combination of VHF or UHF channels
- Direct frequency input from keypad
- Each memory capable of "odd split" operation.
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- Programming/Clone software available

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Specifications subject to change without notice or obligation. *Digital communications require at least two similarly equipped transceivers. Digital mode may not be legal in some countries. See FAQ on digital at www.alinco.com. Products intended for use by properly licensed operators. Permits required for MARS use. Specifictions subject to change without notice or obligation.

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FEATURES

DEPARTMENTS

E-Mail
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Web Page
www.waynegreen.com

COVER: This beautiful gold-plated key is the 2002 Christmas Key. Each key has a serial no., and there are only 250 of them. $60 each from Morse Express (www.MorseX.com/xmas; 303-752-3382). Photo by N1FN.

Manuscripts: Contributions for possible publication are most welcome. We'll do the best we can to return anything you request, but we assume no responsibility for loss or damage. Payment for submitted articles will be made after publication. Please submit both a disk and a hard copy of your article [IBM (ok) or Mac (preferred) formats], carefully checked drawings and schematics, and the clearest, best focused and lighted photos you can manage. "How to write for 73" guidelines are available on request. US citizens, please include your Social Security number with submitted manuscripts so we can submit it to you know who.

QRX . . .

Bye-Bye Betamax

A legend is being put to rest. After twenty-seven years in production, Sony Corporation says that it will finally put its famed Betamax tape format to bed forever.

It's said that Betamax opened the world of home video as the first practical consumer format. Sony, JVC, and Panasonic first tried with the famed 3/4-inch U-Matic machines, but consumers were reluctant to buy a videotape machine that was bigger than most TV sets of that era and looked more at home in a television station than their livingroom.

My own first home VCR was a Sony SL-7200 Betamax. It would record a whole hour of pretty-high-quality video and audio on a tape cassette that was only 3-1/2 by 6 inches in size. I paid almost $2,000 for the machine, and each cassette cost me close to $25. That was in the late 1970s, and despite losing the 1980s video format war to VHS, Betamax has held on as a niche product all these years.

Continued on page 6

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MODEL SS-12IF

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SPECIFICATIONS:

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OR 220 VAC 50/60HZ
SWITCH SELECTABLE
OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¼ x 7 x 9⅝	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

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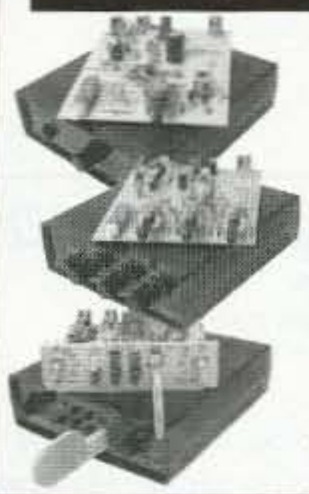

QRP TRANSMITTER
Available in 20, 30, or 40 Meters, these neat little transmitters put out 1 Watt!

HR RECEIVER
Available in 20, 30, or 40 Meters, 1.0 uV sensitivity rivals the big rigs...at a fraction of the price!

CW700 KEYER
With adjustable pitch & speed from 3-60 wpm, features true iambic keying and EPROM memory!

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$155 Sold Separately
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$99 price includes QRP Transmitter kit, HR Receiver kit, and CW700 Micro-Memory Keyer kit, all the matching case & knob sets shown.
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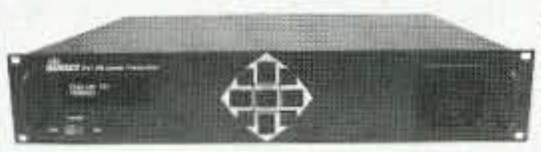
35 WATT LPFM STEREO TRANSMITTER



- ✓ 35W RF output, VSWR protected
- ✓ Automatic audio & power controls
- ✓ Digital synthesized PLL
- ✓ Full front panel control
- ✓ 110/220VAC, 12VDC operation

Whether your application is export or LPFM, the PX1 has you covered. From the over-rated continuous duty power supply & power amplifier to the 2 line vacuum fluorescent display, your station will be the easiest to setup and the most reliable for continuous operation. Full microprocessor controls provide a "virtual engineer". Check out www.highpowerfm for full details.

PX1	**35W Professional FM Stereo Transmitter**	**$1,795.95**

TOUCH-TONE TONE GRABBER NEW!

- ✓ New-built-in RJ11 phone jack
- ✓ Large memory holds over 500 numbers
- ✓ Big bold 8 digit display, auto insertion of dashes
- ✓ New-output latch jack

Dialed phone numbers on the radio, repeater codes, control codes, anywhere touch-tones are used, you can read and store them! All new design for 2002. Capture those tones with the TG2!

TG2	**Tone Grabber Tone Reader Kit**	**$59.95**
CTG2	**Matching Case & Knob Set**	**$14.95**
AC125	**110 VAC Power Adapter**	**$9.95**

ELECTROCARDIOGRAM HEART MONITOR

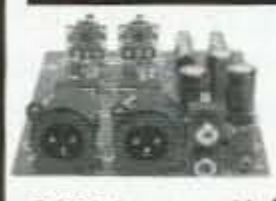
- ✓ Visible and audible display of your heart rhythm
- ✓ Re-usable sensors included; just like visiting the hospital!
- ✓ Bright LED "beat" indicator
- ✓ Monitor output for oscilloscope display

NEW!

Enjoy learning about the inner workings of the heart while covering the stage by stage electronic circuit theory of ECG/EKG systems. Be heart smart and learn at the same time!

ECG1	**Electrocardiogram Heart Monitor Kit**	**$34.95**
CECG	**Matching Case & Knob Set**	**$14.95**
AC125	**110 VAC Power Adapter**	**$9.95**
ECGP10	**Replacement Reusable Probe Patches (10-Pack)**	**$7.95**

XLR TO RCA AUDIO CONVERTER NEW!



- ✓ Connect consumer outputs to XLR inputs
- ✓ Left & right audio gain adjustments

So you're trying to connect consumer audio outputs with RCA connectors (unbalanced) to XLR (balanced) inputs. Always a problem...Not anymore with the R2XL1!

R2XL1	**Unbalanced to Balanced Audio Converter Kit**	**$49.95**
CR2XL	**Matching Case & Knob Set**	**$14.95**
PWR25	**12VAC Power Adapter**	**$9.95**

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PROFESSIONAL FM STEREO RADIO STATION

- ✓ Synthesized 88 to 108 MHz with no drift !
- ✓ Built-in mixer – 2 line inputs and one microphone input!
- ✓ High power module available for export use
- ✓ Low pass filter for great audio response

Our FM100 is used all over the world by serious hobbyists as well as churches, drive-in theaters, and schools. Frequency synthesized PLL assures drift-free operation with simple front panel frequency selection. Built-in audio mixer features LED bargraph meters to make setting audio a breeze. The kit includes metal case, whip antenna and built-in 110 volt AC power supply.

FM100	**Super-Pro FM Stereo Radio Station Kit**	**$249.95**
FM100WT	**1 Watt, Wired Export Version**	**$399.95**

SYNTHESIZED FM STEREO TRANSMITTER

- ✓ All new design & features for 2002!
- ✓ Fully adjustable RF output

NEW!

Our #1 kit for years has just gotten better for 2002! Totally redesigned, the FM25B has all the features you've asked for. From variable RF output, F connector RF output jack, line input, loop output, and more. Includes case, power supply, whip antenna, audio cables.

FM25B	**Synthesized FM Stereo Transmitter Kit**	**$129.95**

AUTOMATIC COLOR/BW IR CAMERA

- ✓ Color during the day, IR B&W at night!
- ✓ Automatically turns on IR Illumination!
- ✓ Waterproof to IP57 standards!
- ✓ Black anodized housing with universal mount

NEW!

Best of both worlds! This video camera is a waterproof COLOR camera during the day. When the light level drops, it automatically changes to B&W and turns on its built-in IR illumination, with 10 IR LEDs. Powered by 12VDC and terminated with a professional BNC connector. B&W only model also available if color is not needed. Both in heavy anodized black housing.

CCD309	**Color/B&W IR Waterproof Bullet Camera**	**$169.95**
CCD308	**B&W IR Waterproof Bullet Camera**	**$109.95**
AC125	**110 VAC Power Adapter**	**$9.95**

MINI B&W CAMERA WITH IR ILLUMINATION

- ✓ Built in IR illumination!
- ✓ Sees in total darkness!

NEW!

What a deal! This miniature B&W video camera has 6 high power IR LEDs built into it to provide illumination in total darkness! No need for external IR illuminators. Attractive black aluminum housing easily mounts at any angle with the built-in swivel bracket. Runs on 12VDC, and includes professional BNC output plug-in harness.

CCD303	**Mini B&W IR Illuminated Camera**	**$59.95**
AC125	**110 VAC Power Adapter**	**$9.95**

Check out all our other new cameras at www.ramseykits.com

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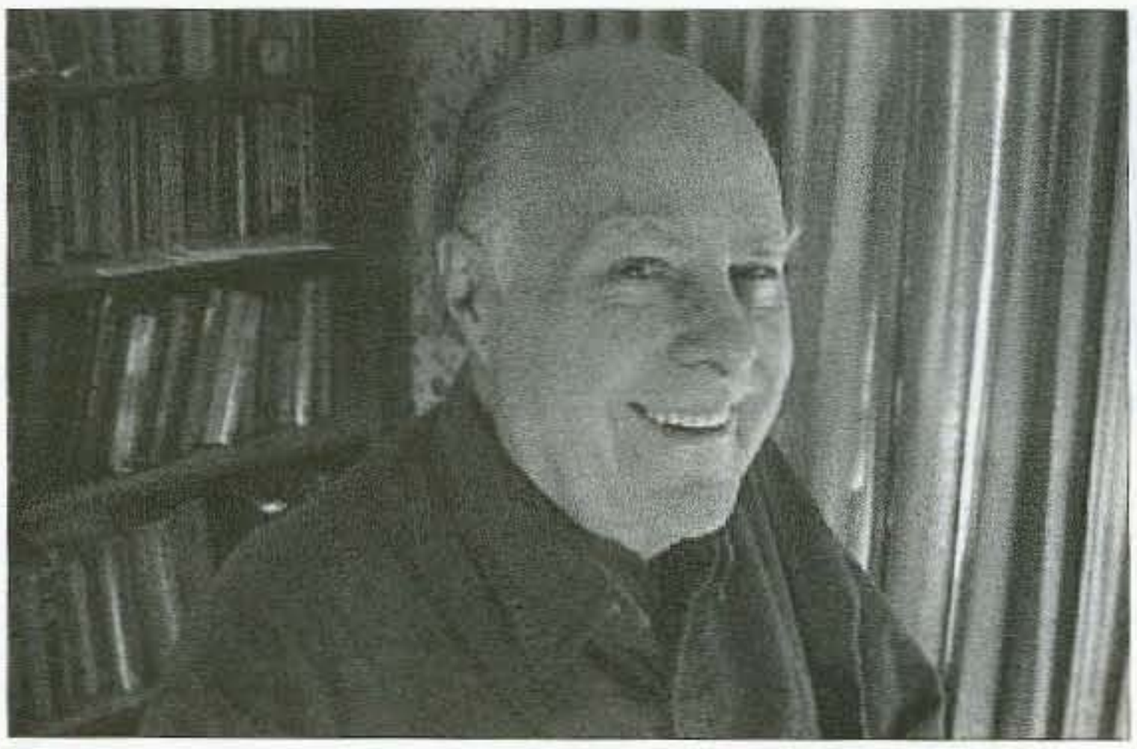

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Director Duty

Maybe you've noticed that we're attracting fewer and fewer new hams, with the fewer particularly concentrated in the youth department. Hey, you read the papers and watch TV — when's the last time you saw an article in a newspaper or magazine, or anything on TV or radio about amateur radio?

If you're a League member there's a remote possibility that you've read the reports in *QST* on the board of directors' meetings. Have you seen any hint of a movement by HQ to get the hobby better known so we can attract more newcomers?

The League directors have a serious decision to make. They have to decide whether they are on the board to represent HQ to the members, or their members to HQ. In the over 60 years that I've been a member, I've seen almost no sign of the directors making an effort to represent the members. They've been kept busy bringing messages from the Newington ivory tower to the unwashed. Indeed, in my talks with many of them, I've been appalled at the contempt they've had for their members. "Sheep," they've called them.

As an entrepreneur who's started a bunch of successful businesses, I know that if you want to sell a product you have to advertise and promote it. This is called marketing. Promotion gives a business the best bang for the buck — when it's done right.

So, with wireless technology exploding, and with it an increasing demand for more spectrum space, here we are with a declining number of hams, and with only a small percentage really active. I'll bet we don't have 50,000 active hams anymore — less than we had 60 years ago. Experimenting and pioneering today? Tell me about it.

Thirty years ago we developed and pioneered repeaters, bringing the world cell phones. Soon after WWII, Jack Babkes W2GDG developed NBFM for us. A few years later, we pioneered SSB and RTTY, then slow scan. Heady times.

Please explain to your director that he's supposed to represent you and that you want him to get HQ to start promoting the hobby. Tell him you want to start seeing stuff in print and on TV about amateur radio. And if the HQ gang hasn't a clue on how to do it, have 'em give me a call. I'll send them a video I made on how to get plenty of free promotion for any product or service. It's my $1 Million in Added Sales video. And if he doesn't have the balls to speak up, then find someone who has and elect them. It's time for a serious shakeup in Newington.

Am I "trashing the League"? No way — I'm trashing the League members for being sheep and allowing the only national ham organization to let our hobby slowly die.

I first got involved when I was 14, and the hobby has provided me with a lifetime of excitement and adventure. It sure got me into high tech businesses, and I learned all I could about electronics because it was so much fun. So I'm anxious for us to get as many kids involved as possible. Unless Planet X wipes us out, America is going to need all of the high tech people it can get. The day of the uneducated blue collar worker is long gone. The day of the semi-literate white collar worker is fading fast. We're in a tech world that's getting techier every minute.

Football and soccer are fun, but sure are lousy career choices for most kids. I'd rather see kids with QRP rigs in their backpack, with a whip sticking up and them making DX contacts as they are going to and from school.

Dr. Doom

So what's doin' with Planet X, which Mark Hazelwood predicts will wipe out around 90% of humanity next summer? At this writing the media, en masse, is consumed with the DC area sniper. Well, the looming end of civilization as we know it isn't on their radar yet.

The "Out There" program, which is a radio talk show on TV with Richard and Kate Mucci as co-hosts, did a nice show with Hazelwood. And one with me about the Moon hoax. Then one with remote viewer Ed Dames, a.k.a. Dr. Doom, because of his usual dire predictions. Kate sent me a tape of the Dames show in which Ed agreed that Planet X was on its way and would cause a pole shift which would get rid of our coastal cities and bring us 300 mph winds in some areas for a week after the shift. His prediction of a 12° pole shift could put the new equator through Cuba, bringing New England Georgia weather in the future. Mmm, love those Vidalia onions.

The idea of such a monumental catastrophe is so preposterous that it has no reality for me. I don't want to believe it.

Now that I've learned how children can easily learn to speak and think in a dozen languages, how their IQs can be raised by around 50 points, how they can easily be taught to speed-read at over 10,000 words per minute, and how we can provide them with an incredible education at a fraction of today's school cost, I feel we're on the brink of a new kind of world civilization — one without wars, where we'll be able to control the weather and where poverty and hunger will no longer be problems. I'd sure hate to see all that blown away.

Is Planet X, if it's real, unstoppable in its regular 3,630-year sweep through our solar system? The one chance I see for changing things would be for earth's entire population to concentrate on praying for it to change its course. The combined prayers of billions of people might be a powerful enough force to do the job.

Meanwhile, let's enjoy the extended sunspot cycle the nearing Planet X may be causing and work that DX.

You can get a tape of the Ed Dames "Out There" TV

Continued on page 8

Big Savings on Radio Scanners

Uniden® SCANNERS

Bearcat® 785DGV APCO P-25 Digital Ready with free deluxe scanner headset
CEI on-line or phone special price $339.95
1,000 Channels • 27 bands • CTCSS/DCS • S Meter
Size: 6 15/16" Wide x 6 9/16" Deep x 2 3/8" High

New Product. **Scheduled for initial release January 10, 2003. Order now.**
Frequency Coverage: 25.0000-512.0000 MHz., 806.000-823.9875MHz., 849.0125-868.9875 MHz., 894.0125-956.000, 1240.000-1300.000 MHz.

When you buy your Bearcat 785D state-of-the art Digital Capable Trunktracker III package deal from Communications Electronics, you get more. The GV means "Great Value." With your BC785D scanner purchase, you also get a **free deluxe scanner headphone** designed for home or race track use. The Bearcat 785D has 1,000 channels and the widest frequency coverage of any Bearcat scanner ever. When you order the optional **BCi25D, APCO Project 25 Digital Card** for $299.95, when installed, you can monitor Public Safety Organizations who currently use conventional, trunked 3,600 baud and mixed mode APCO Project 25 systems. APCO project 25 is a modulation process where voice communications are converted into digital communications similar to digital mobile phones. You can also monitor Motorola, EDACS, EDACS SCAT, and EF Johnson systems. Many more features such as S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control with RS232 port, Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, operate your scanner from your computer running Windows. Order Scancat Gold for Windows, part number **SGFW** for $99.95 and magnetic mount antenna part number **ANTMMBNC** for $29.95. Not compatible with 9,600 baud APCO digital control channel with digital voice, AGEIS, ASTRO or ESAS systems. For fastest delivery, order on-line at www.usascan.com.

Bearcat® 895XLT Trunk Tracker
Manufacturer suggested list price $499.95
Less -$320 Instant Rebate / Special $179.95
300 Channels • 10 banks • Built-in CTCSS • S Meter
Size: 10 1/2" Wide x 7 1/2" Deep x 3 3/8" High
Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

The Bearcat 895XLT is superb for intercepting trunked analog communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning pleasure, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. **CAT895** Computer serial cable $29.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.

Bearcat® 245XLT Trunk Tracker II
Mfg. suggested list price $429.95/**CEI price $189.95**
300 Channels • 10 banks • Trunk Scan and Scan Lists
Trunk Lockout • Trunk Delay • Cloning Capability
10 Priority Channels • Programmed Service Search
Size: 2 1/2" Wide x 1 3/4" Deep x 6" High
Frequency Coverage:
29.000-54,000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

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QRX . . .

continued from page 1

Now, according to Larry Bloomfield's Tech Notes news service, Betamax for consumer use is being phased out. This is because of the new consumer digital tape formats like Mini D V that are literally delivering a death blow to Betamax's future prospects.

Sony reportedly will manufacture only 2,000 more Betamax machines before discontinuing the product altogether. But Beta will live on in the world of television journalism. That's where a spinoff tape format called Betacam with suffixes like SX and SP became the de facto news gathering videotape of choice and have remained so for the past decade and a half.

Me? I've got an SL 7200 Betamax still sitting someplace out in the garage — gathering dust.

Thanks to Bill Pasternak WA6ITF, editor, in Newsline.

North to Alaska ... er, Sorta

The magnetic north pole could soon abandon Canada and migrate to north of Alaska.

The e-newsletter *Science Today* tells of Larry Newitt. Newitt is a researcher with the Geological Survey of Canada. And Newitt says that the magnetic pole is on the move.

The researcher says that the pole, which has steadily drifted for decades, has picked up speed in recent years. He says that at its current speed, it could exit Canadian territory as soon as 2004. And, says Newitt, if the pole follows its present course, it will pass north of Alaska and arrive in Siberia in a half century.

If you are worried that you may soon have to trade in your old compass for a GPS to know where you are, don't. Researcher Newitt cautions that such predictions could be wrong.

Thanks to Newsline, *Bill Pasternak WA6ITF, editor.*

Blame It on Him

Philo T. Farnsworth was the inventor of modern-day television. Legend has it that he conceived the idea of making a picture by scanning back and forth, top to bottom, across a screen while tilling a potato field in Idaho at age 13!

In 1927, while a student at Brigham Young University, he transmitted a television image using the scanning method he had conceived years before. The image was produced on an oscilloscope screen by the scanning electron beam within the tube. Sixty horizontal lines were used to make the image. Allegedly a dollar sign was the first image transmitted.

Farnsworth became disenchanted when his invention was used commercially, and told his son, "There's nothing on it worthwhile, and we're not going to watch it in this household, and I don't want it in your intellectual diet."

Thanks to the Southeastern Massachusetts Amateur Radio Association, Inc., newsletter, Zero Beat, *August 2002.*

Oops Oops

Thanks to Dave Turner N7QP for pointing out that in Figure 2 of W6WTU's September article, "Mobile Ham Repeater," the 1N4148 diode across the relay coil is shown reversed; as drawn, it is forward-biased. In Figure 3, the diode is shown correctly.

And speaking of W6WTU, we thank him too for 'fessin' up to the fact that he is not the author of November's "Solid State Junk Box Thermometers," as our Table of Contents would have you believe. W6WTU notes that correct author Burl Rogers K4VYL/6 is indeed duly cited on the title page of the article, although "I would have liked to have done the work — he did a nice job!"

Our apologies to all for these oversights.

One Whale of a SONAR Enterprise

In what sounds like it's right out of a *Star Trek* movie plot, will Captain Kirk and Mr. Spock have to go rescue some whales from oblivion after all? And what does this have to do with radio communications?

In the movie *Star Trek: The Voyage Home,* the crew of the starship *Enterprise* — without the *Enterprise* — takes on the job of saving our planet from annihilation by a space probe. The probe is angry because it is programmed to contact humpback whales, but it cannot find any because all the whales are long gone from the planet. To save the world, Kirk and crew travel back in time to get some whales and bring them into the future.

With that in mind, picture this: The Administration has now given the Navy permission to begin using a powerful new low-frequency SONAR to identify enemy submarines.

SONAR, which stands for Sound Navigation and Ranging, is usually used to observe objects in water to determine distance. According to the Navy, each of the new SONAR's 18 transducers produces an audio signal equivalent to the noise level you would hear if you stood next to an F-15 fighter jet while it was taking off. It is this high power that makes it possible for the sound waves to travel several hundred miles and return an accurate target echo.

But environmentalists are worried. They note that the new SONAR system operates in the same band of frequencies used for communication by many large whales, including humpbacks. They say that whales are particularly susceptible to SONAR interference because they rely on sound for communication, feeding, mating, and migration. In fact, they navigate the oceans of the world using a kind of natural SONAR of their own.

Some scientists believe that whales will mistake the Navy SONAR signals for other whale pods and swim in the wrong direction. And they believe that if this happens, the world's whale population will decrease. Others disagree. This group of researchers believes that the two can co-exist with careful monitoring of the whales for any adverse effects which might be noticed. Adjustments could then be made to the SONAR system's operation to minimize or eliminate any problems.

The bottom line is that it's a tradeoff in communications — that of the whales versus the need of the public to be safe from enemy attack.

The National Marine Fisheries Service says that with proper monitoring and safeguards, the Navy's new SONAR is not likely to injure whales or any other marine mammals. But to be on the safe side, we hope that Captain Kirk, Mr. Spock, and Scotty are standing by.

Thanks to Henry Feinberg K2SSQ, via Newsline, *Bill Pasternak WA6ITF, editor.*

Techno-Junk Piling Up

A new study called "Waste in the Wireless World: The Challenge of Cell Phones" says that 130 million wireless devices will be discarded annually in the United States. This equals 65,000 tons of two-way radio garbage.

The study makes several recommendations regarding both the design of cell phones and the disposal of them. It says that the use of toxic substances in them should be reduced. It also suggests that device standardization be implemented so that users are not forced to purchase new phones when they change service providers or for travel. Finally, the study says that cellular telephones should be designed for disassembly, reuse, and recycling.

It should be noted that the study was limited to cellular phones and other two-way radio devices. It does not include the tons of VCRs and TV sets that are disposed of each year.

Thanks to Newsline, *Bill Pasternak WA6ITF, editor, and its listeners.*

X-Ray Eyes

If you thought only cartoon superheros like Superman could see through walls to detect the villains, guess again. New technology called ultra-wideband will soon allow mere mortals to detect objects buried underground and to build cars enhanced with sensors that help avoid collisions.

According to press reports, ultra-wideband uses millions of narrow pulses each second to get an accurate reading of location and distance,

opening the door for new applications in radar tracking, precise positioning, and wireless communications. The possibilities vary from short-range computer networking for homes to devices that determine the location of golfers on a course.

What regulators like even better is that ultra-wideband devices can work within frequencies already allocated for other radio services — helping to maximize this dwindling resource. The Federal Communications Commission believes the technology is so promising that the agency has proposed allowing it to be used on an unlicensed basis.

But it may be a while before the new technology is available. First, government agencies and private groups are testing to make sure ultra-wideband can safely coexist with other services, like the Global Positioning System. More information is on the ultra-wideband working group Web site at [www.uwb.org].

Thanks to Science Today, *via* Newsline, *Bill Pasternak WA6ITF, editor.*

Do You Know Who You Are?

Since the 9/11 disasters, lawmakers and business leaders have been clamoring for a better ID system for everyone. ID cards that contain specific biometric data, making them harder to forge than your driver's license, may be in our future. Privacy advocates are in strong opposition to this, but Congress and businesses are looking real hard at it. Besides your photograph, which will probably be laser-engraved, they would contain such vital statistics as your social security number, date of birth, name, and an ID number issued by the government. It would most likely contain an optical memory strip, which could only be read by an optical scanner; it could contain your fingerprint as well as an eyeprint (iris). It could contain smart card technology with the addition of an integrated microprocessor. An internal memory strip could be rewriteable, and could contain many megabytes of data — as much as would fit on a dozen floppy disks. These could contain health records such as heart rate, face scans, fingerprints, DNA sequences, and much more health and body data that can be compared. It could even contain a 2-D bar code. So you think the government doesn't know who you are? This is almost a surety for the near future, especially if the U.S. suffers another terrorist attack.

Thanks to The Modulator, *the News and Views of the Fort Myers (FL) ARC, Inc., August 2002.*

A. Prose Walker W4BW — SK

A. Prose Walker W4BW, the man considered as the father of the "WARC bands," has died. Walker headed up the FCC's old Amateur and Citizens Division from 1971 to 1975. While there, he made the initial proposal for the creation of the 10, 18, and 24 MHz bands at a conference in Geneva in 1972. Later, Walker organized and chaired the United States Advisory Committee of Amateur Radio. This committee took the initial steps to turn the idea into reality at the 1979 World Administrative Radio Conference.

But there was another side of Walker that hams in the world above 50 MHz do not remember very fondly. It was a set of highly restrictive repeater regulations promoted by Walker back in the early '70s. Among other things, these rules required the submission of what are today called engineering feasibility studies in order to get a required WR prefix repeater license. The regulations were so strict that repeater growth almost ground to a halt for the better part of half a decade. Eventually, the ham community, led by *73 Magazine* publisher Wayne Green W2NSD, rebelled against the Walker-inspired rules. They were repealed as a part of repeater deregulation a few years later.

Walker was living in Rochester NY at the time of his death. He was 92.

Thanks to the ARRL, Repeater Remailer, and W9JUV, via Newsline, *Bill Pasternak WA6ITF, editor.* 73

NEVER SAY DIE

continued from page 4

show for $20 + $3 s/h by calling 775-751-2379. Tell Kate Wayne sent you.

Oh, one more item. I understand that an astronomer, concerned enough over the Planet X situation to take the trouble and expense, went to Australia so he could look through a telescope there for the incoming brown dwarf. He called home, saying he had some spectacular pictures. Then someone killed him and the pictures have disappeared. He's coming back in a box.

Tolja

The August issue of the *European Journal of Cancer Prevention* published an article on the Swedish research which showed that cell phone users had a much higher rate of brain tumors than average … and the more they used them, the higher the rate.

A Finnish study showed that one hour of cell phone use measurably affected brain cells.

The American cell phone industry is, of course, disinterested in any research, or in reading the published work of Ross Adey K6UI, the world's leading researcher in this field. But, if you watch what these guys do, you'll see 'em using a headset wire to their cell phones.

We may soon see a headline-making trial as brain-cancer stricken neurologist Christopher Newman sues the cell phone industry. He's represented by the Peter Angelos firm, which has gotten huge fees from its actions against asbestos and cigarette firms.

With over a billion people now using cell phones worldwide, this may be the biggest biological experiment in history.

It's something to think about the next time you pick up a cell phone or an HT. And we hams are the ones who developed cell phone technology for the world some thirty years ago.

The Secret

The fact that any illness can be cured without drugs is something doctors never hear about in their years in medical school. And since it would put them out of business in short order, it's something they don't want to hear about. It's their worst nightmare. There's just Dr. Lorraine Day in San Francisco, Dr. Bruno Comby in Paris, and Wayne Green up in New Hampshire preaching to empty pews.

Instead of people griping about the cost of prescription drugs, I recommend their spending a tiny fraction of their drug cost on educating themselves so they won't need to waste all that money.

More Mercury

The medical industry is becoming more and more aware of the dangers mercury has for us. When I was a kid it was something we played with. We'd coat dimes with it to make them shine. No big deal.

Wrongo. Again.

It turns out that one lousy gram of mercury can contaminate a 20-acre lake for up to a year! So now there's a growing concern about capturing the mercury residue dental patients spit out when they're told to rinse. This goes down the drain into the sewage system, polluting the environment for years.

So what's the big deal? 98% of multiple-sclerosis patients have mercury poisoning. Mercury is a deadly poison which seriously impairs brain function.

So, what about all that mercury you are not spitting out when the dentist asks you to rinse? That stays in your amalgam filling — for a while. It gradually is released as mercury vapor and goes into your body … and your brain.

Well, I've written about that before, and it's covered in my *Secret Guide to Health.* If you still have amalgam fillings, get 'em replaced with plastic.

Meanwhile, as the concern over mercury pollution grows, they're working to remove all of the mercury switches from old cars before they are melted down, and the EPA got on the case of the sneaker company that put mercury switches in their shoes to switch on lights in their shoes when kids were running. The mercury in thermometers has been replaced with some sort of less toxic red stuff.

Americans

A recent PBS series on Australia almost got me thinking. Close call.

One of the big concerns in Australia has to do with recent immigrants, who arrive complete with their homeland languages, customs, religions, and ways of dressing, and then tend to live in enclaves to help perpetuate their heritages. The older Australians view is that if they come to Australia they bloody well should become Australians. They should speak the Australian language, adopt the Australian customs, and integrate with the Australians rather than live in separate ethnic groups.

We have this same situation here in America, and I've seen it played out in one country after another.

When the Europeans arrived in Africa they found it peopled with almost stone-age-ignorant savages, so they had no trouble taking over the whole continent. The natives were no problem, it was just the other European countries that they had to deal with. Germany grabbed big chunks, as did France, Belgium, Spain, Portugal, and the Dutch.

In East and South Africa, the British got busy exploiting their territories. In South Africa, it was gold and diamonds. In East Africa, it was growing crops such as coffee. But all this business activity required workers, and no way had been discovered to get the native blacks to work … so they brought in Indians to build the roads and railroads, and to work on the farms.

With Africa being tropical, the living was easy. The black way of life was to live in small mud-hut villages, with the women doing all the work … growing the crops, bringing up the children … and the men hunting and killing their neighboring tribes. This had been going on for thousands of generations, so it wasn't going to be easy to change. The whole concept of work was totally alien to the men. That was for women! And any man who worked was ridiculed and humiliated by the others for being woman-like. Sissies.

Education? The only purpose of education was to fit a man to work, so just as many American blacks humiliate others who try to learn to speak American as trying to become white, the African black men avoided education. And that made them sitting ducks for the invading Europeans.

The slave trade developed when the black men discovered that there was money to be made by selling instead of killing the prisoners when they raided a neighboring village.

The Indians who were brought in to do the work settled into enclaves, where they avoided almost all contact with either the whites or the blacks. They opened stores and, by cooperating with each other, easily drove any competing black or white-owned stores out of business.

I saw this same pattern in Kenya, Uganda, and Tanzania, when I first visited the area 35 years ago. This was shortly after colonialism had been replaced by black rule.

It didn't take long for the black hatred of the Indians to result in their being forced by the new black leaders to leave the East African countries, and that led to the disintegration of the cities and towns as things went back to the bush. The white farmers were also forced to leave and their farms also went back to the bush. With little to export, these countries skidded into poverty.

Here in America we've seen similar situations where immigrant groups who live in enclaves and avoid assimilation are hated.

When I visited Fiji the island was on the verge of a revolution. The Fijians were furious with the Indians, who

Continued on page 39

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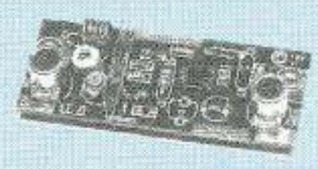

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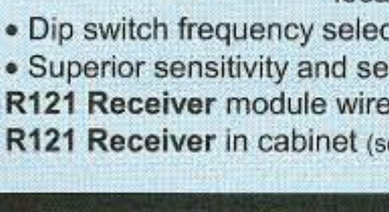

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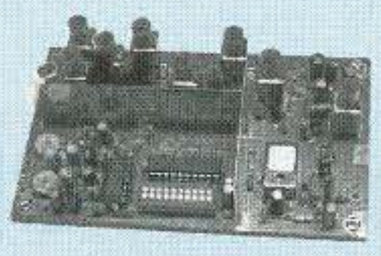

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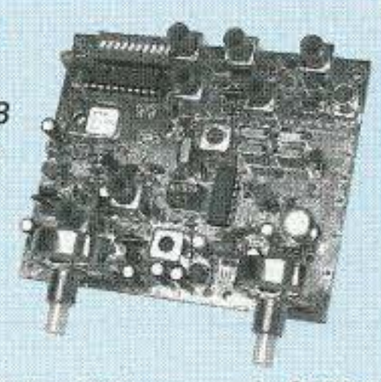

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- **TD-5** CTCSS Encoder/Decoder Kit **$39**
- **TD-5** CTCSS Encoder/Decoder Wired/tested **$59**

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A microprocessor-controlled repeater with full autopatch and many versatile dtmf remote control features at less than you might pay for a bare bones repeater or controller alone!

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50-54, 143-174, 213-233, 420-475 MHz.
(**FCC type accepted** for commercial service in 150 & 450 MHz bands.)

Digital Voice Recorder Option. Allows message up to 20 sec. to be remotely recorded off the air. Play back at user request by DTMF command, or as a periodic voice id, or both. **Great for making club announcements!** ..... **only $100**

REP-200C Economy Repeater. Real-voice ID, no dtmf or autopatch. .....**Kit only $795, w&t $1195**

REP-200N Repeater. Without controller so you can use your own. .....**Kit only $695, w&t $995**

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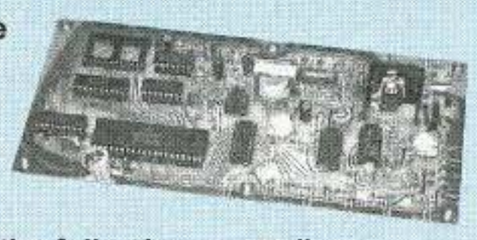

COR-3. Inexpensive, flexible COR module with timers, courtesy beep, audio mixer. .....**only $49/kit, $79 w/t**

CWID-2. Eprom-controlled ID'er. ....**only $54/kit, $79 w/t**

DVR-1. Record your own voice up to 20 sec. For voice id or playing club announcements. ..... **$59/kit, $99 w/t**

COR-4. Complete COR and CWID all on one board. ID in eprom. Low power CMOS .....**only $99/kit, $149 w/t**

COR-6. COR with real-voice id. Low power CMOS, non-volatile memory. ..... **kit only $99, w/t only $149**

COR-5. µP controller with autopatch, reverse ap, phone remote control, lots of DTMF control functions, all on one board, as used in REP-200 Repeater. ..... **$379 w/t**

AP-3. Repeater autopatch, reverse autopatch, phone line remote control. Use with TD-2. ..... **kit $89**

TD-2. Four-digit DTMF decoder/controller. Five latching on-off functions, toll call restrictor. ..... **kit $79, w/t $129**

TD-4. DTMF controller as above except one on-off function and no toll call restrictor..... **w/t $89**

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11570 Taylor Wells Rd.
Claridon OH 44024-8910

Commercial-Quality Function Generator

How about this addition to the bench?

How many times have you needed a function generator to provide a source of sine or square waves to test your ham equipment or a new circuit idea? More than a couple, at least if you are anything like most experimenters. A good, high-quality, dual-tone sine wave generator is a really needed item also, if you need to check out your SSB transmitter and linear amplifier performance.

Well, here is such an instrument that does those jobs nicely, with the added feature of a frequency counter that is also a nice extra to have. So let us take a look at what is required.

First, we must understand what I was interested in when doing the design phase. The absolute number one

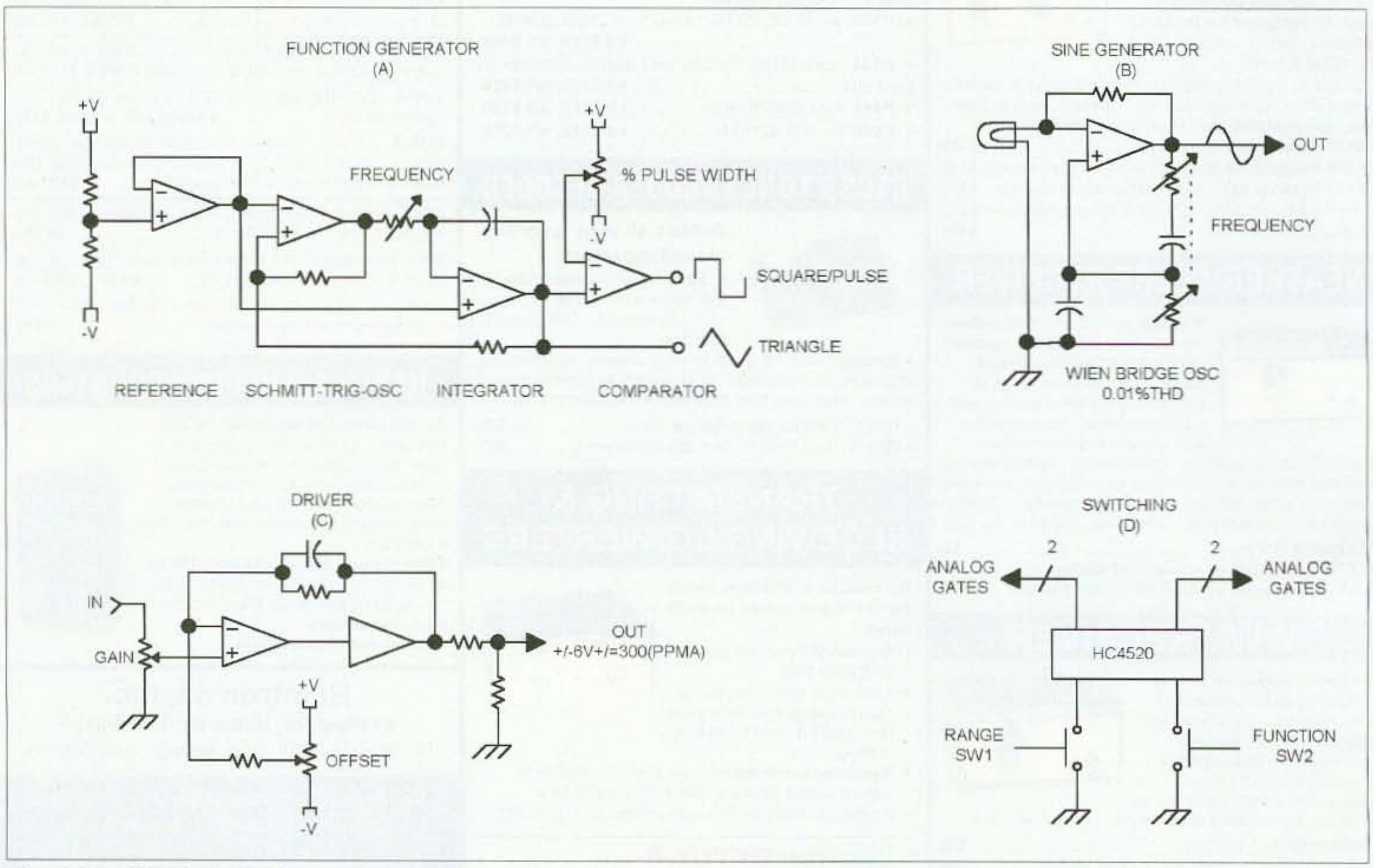
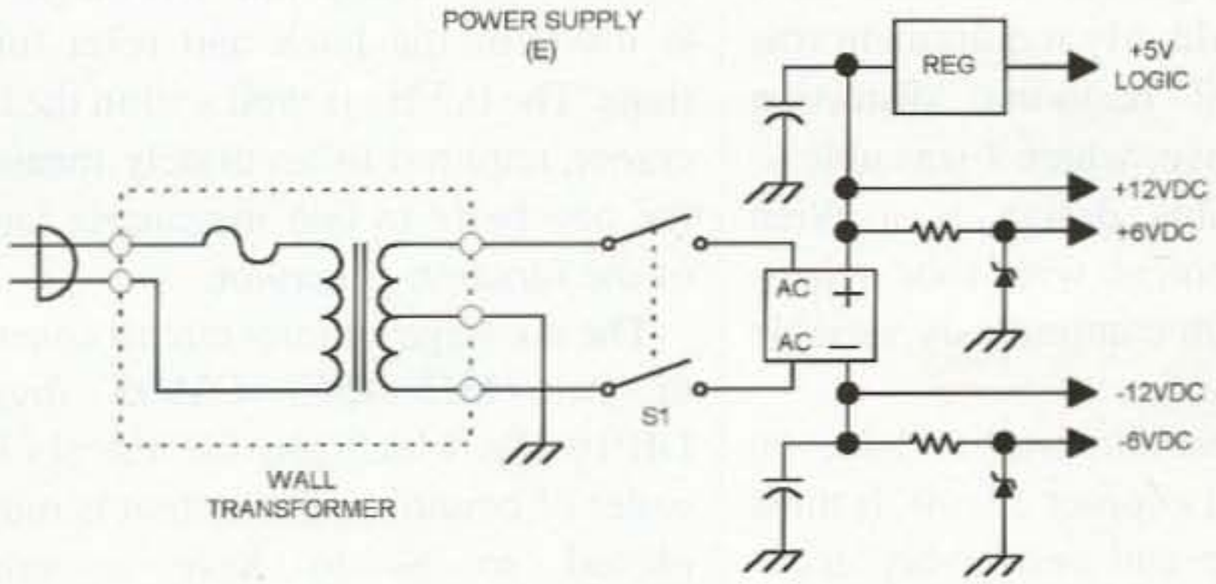
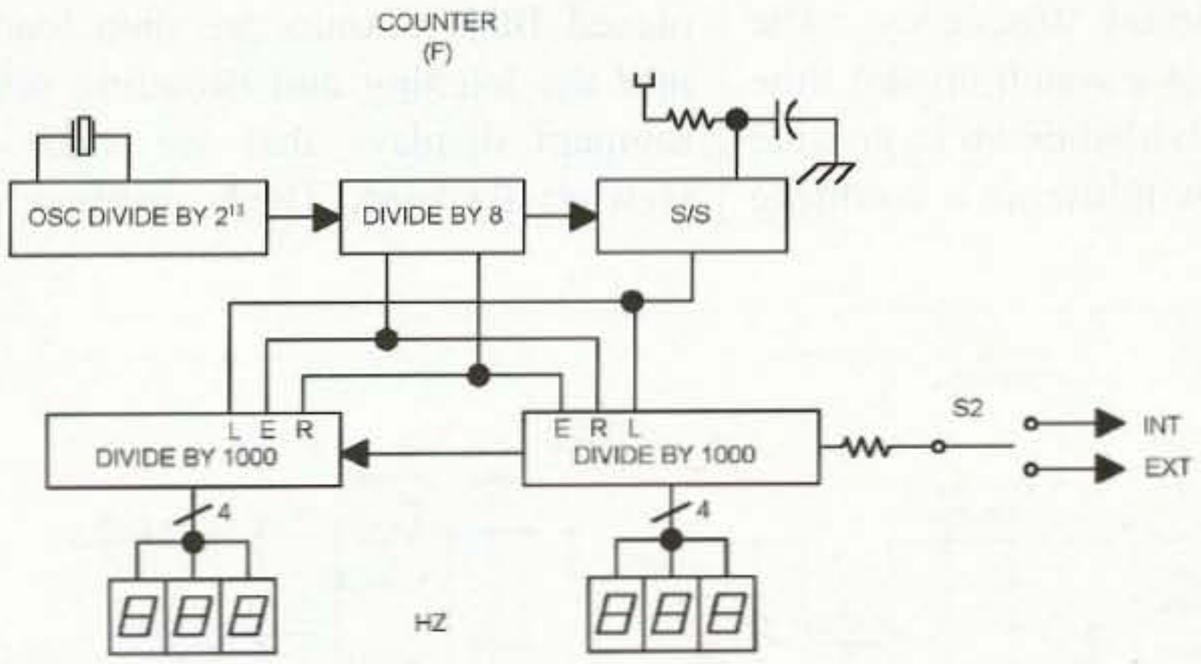


Fig. 1. *Simplified schematics.*





NOTES:
1. RANGE AND FUNCTIONS SELECTED BY ANALOG GATE ICs U7,U8, U13, U14 (NOT SHOWN).

REFERENCES:
1. NATIONAL SEMICONDUCTOR OPAMP DATA BOOK, PAGE 1-465 "FUNCTION GEN."
2. SINEWAVE OSCILLATOR FROM EDN MAGAZINE "INNOVATIVE LINEAR CIRCUITS," PAGE 144.

Fig. 1. Simplified schematics (continued).

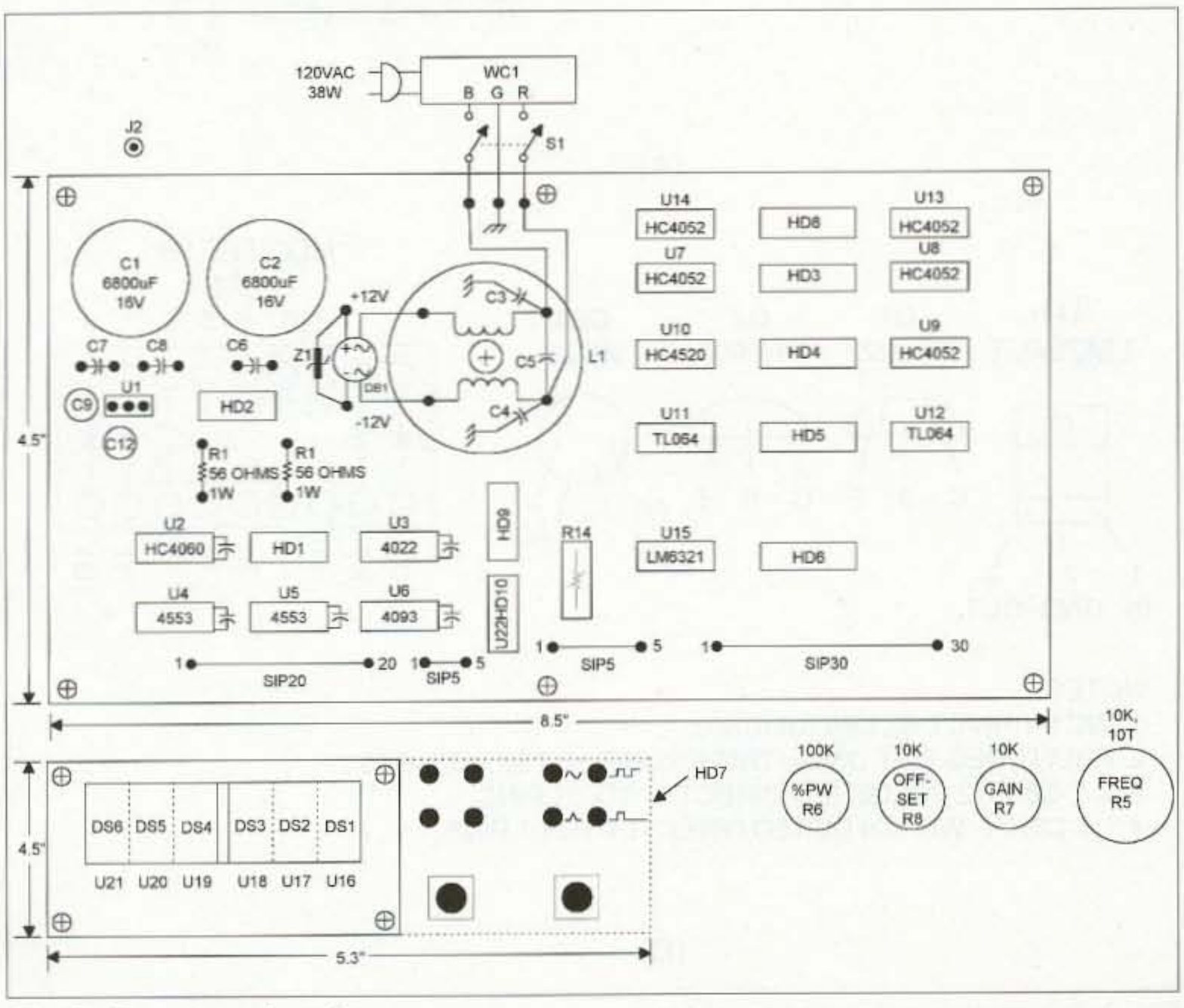


Fig. 2. Component locations.

priority was to get the best sine wave oscillator I could. My requirement was a 0.01% total harmonic distortion (THD) sine wave, which I was able to accomplish. This design is a Wien bridge arrangement with four selectable ranges with continuously variable overlapping bands.

The next absolute was to have an onboard digital counter circuit. It must be inexpensive and reasonably accurate, with an external input for measuring a test circuit frequency. The counter circuit is a watch crystal time base which is divided down to provide a one second window as a counting period. The second one second period is used for the latch and reset functions. The 0.5 Hz is well within the tolerance required to accurately measure the one hertz to one megahertz range of the function generator.

The six stage counter circuit consists of two MC-14553 CMOS digital DIP16 ICs which provide the six decades of counting. The output is multiplexed so as to have a small, inexpensive IC package. These multiplexed BCD outputs are then loaded into the latching and decoding seven segment displays that are made by Hewlett Packard. These displays are

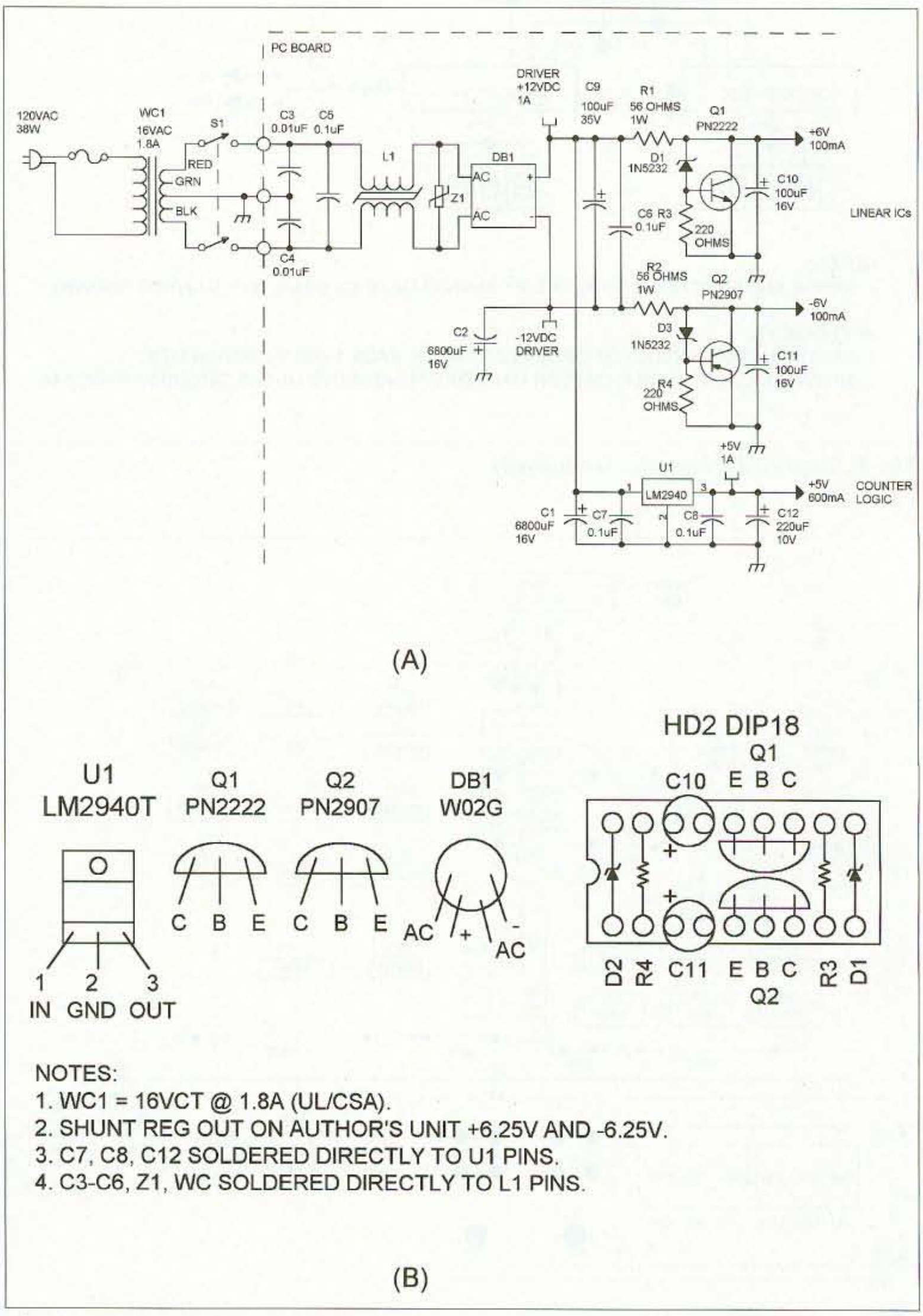


Fig. 3. *Schematic, power supply section.*

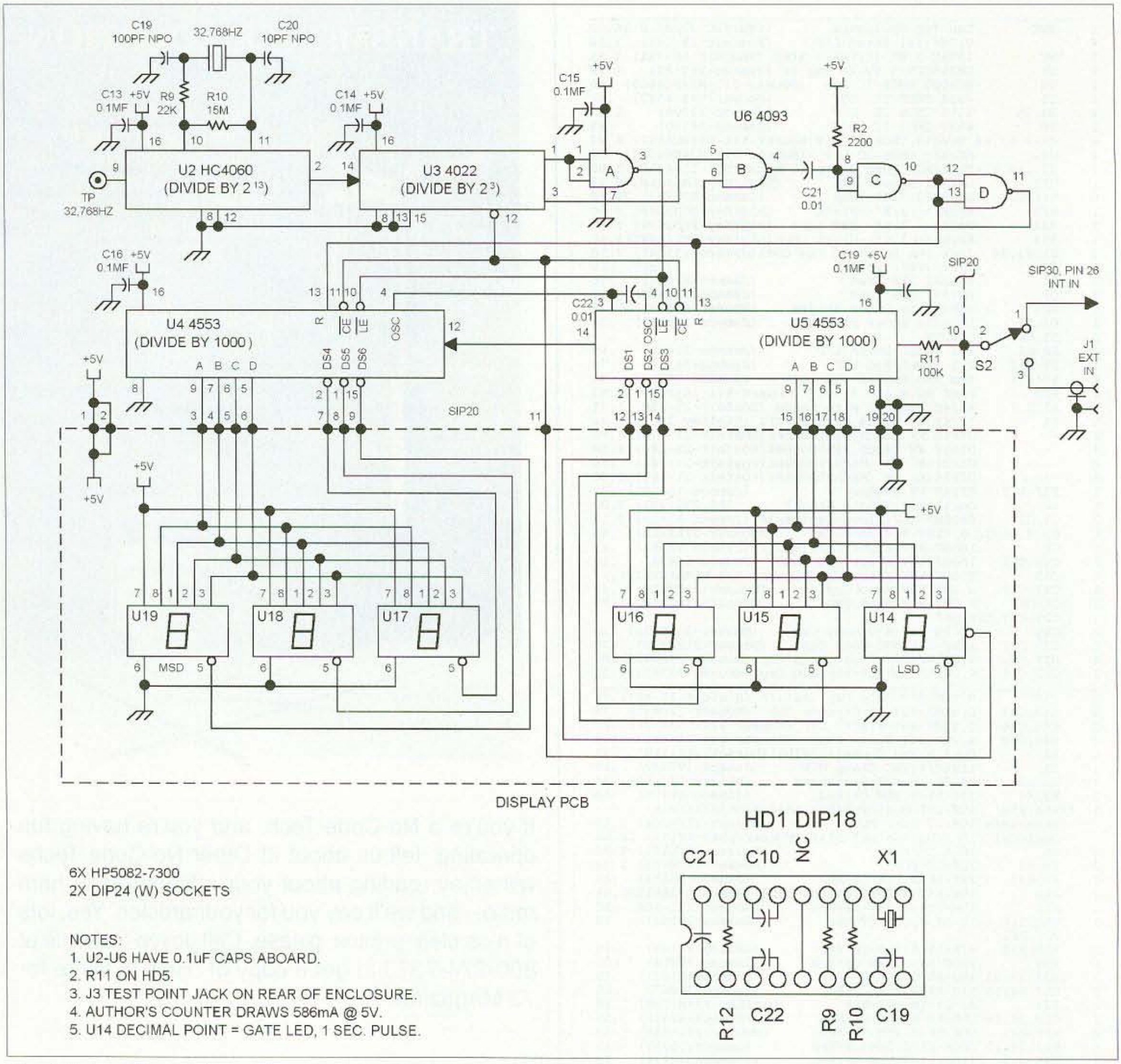
1	ENC	Ten-Tec Enclosure	(TEN-TEC-JW10)	$ 16.00
6	---	0,75"(#4) Stand-Off	(Hosfelt-28-146)	1.50
1	*WC	15VAC-1,8A (CT)Wall Xfmr	(Hosfelt 56-781)	2.95
1	U1	LM2940CT-5 5V-1A Reg IC	(Jameco-107182)	1.29
1	U2	HC4060 CMOS IC DIP	(Mouser-511-M74HC4060)	.64
1	U3	4022 CMOS IC DIP	(Mouser-511-4022)	.66
2	U4,U5	4553 CMOS IC DIP	(Jameco-13709)	5.90
1	U6	4093 CMOS IC DIP	(Jameco-14300)	.29
5	U7-9,13,14	HC4052 CMOS IC DIP	(Mouser-511-M74HC4052)	4.20
1	U10	HC4520 CMOS IC DIP	(Mouser-511-M74HC4520)	.62
3	U11,12,22	TL064ACN Quad OPAmp IC	(Mouser511-TL064ACN)	3.00
1	U15	LM6321 Linear IC	(Digi-Key LM6321N)	5.28
6	U16-U21	HP-5082-7300 7Seg IC	(Jameco-173833)	29.70
1	BZ1	Bezel-- 3,5"--Black	(DigiKey-PRD250B)	2.00
1	BZ2	Bezel-- 3,5"--Red Lens	(DigiKey-PRD250R)	1.60
1	BZ3	Bezel-- 3,5"--Clear Lens	(DigiKey-PRD250W1)	1.60
3	J1,J3,J4	Jack SMA Bulkhead Fem Coax	(Jameco-153285)	7.50
1	J2	Jack (Test Point)	(Any)	.25
1	Q1	PN2222 NPN Tran	(Jameco-178511)	.16
1	Q2	PN2907 PNP Tran	(Jameco-178520)	.16
1	DB1	200V-1,5A Diode Bridge	(Mouser-625-W)2G)	.35
2	D1,D2	1N5232B Zener Diodes	(Jameco-179055)	.14
2	D3,D4	DELETE		---
4	D5-D8	T-1 (3mm) Green LED	(Jameco-34606)	.60
4	D9-D12	T-1 (3mm) Red LED	(Jameco-94529)	.76
8	BZ4-11	3mm LED Bezels (LH-100)	(Jameco-95513)	.96
1	PCB	Perf PC Board 4.5x17"	(Mouser-574-169P44)	10.59
3	B1,2,3	#1240 Lamp T1 Wire Leads	(Hosfelt-25-290)	1.05
1	X1	32768 HZ Watch Crystal TF2	(DigiKey X801)	.30
8	---	DIP16 WW (Mach Pin)Socket	(Hosfelt-21-174)	4.00
9	---	DIP18 WW (Mach Pin)Socket	(Hosfelt-21-180)	4.50
2	---	DIP24(W) WW (MachP)Socket	(Hosfelt-21-184)	.70
8	---	DIP24(S) WW (MachP)Socket	(Hosfelt-21-183)	2.80
2	SIP-1,2	SIP40 WW Header	(Jameco-160881)	.80
1	---	Decal Kit (Radio Shack)	(RS-270-201)	3.00
2	C1,C2	6800MF-16V-Elect-Cap(18x36)	(Jameco-31510)	2.18
4	C3,4,21,22	0,01MF-50V-Mono-Cap	(Mouser-21RX410)	.44
1	C9	100MF-35V Elect Cap (8X11)	(Jameco-93551)	.19
2	C10-C11	100MF-16V Elect Cap (6x5)	(Jameco-94431)	.18
1	C12	220MF-10V Elect Cap	(Digikey 140-MLRL10V220)	.17
6	C13-C17	0,1MF-50V Mono Cap	(Mouser-21RZ310)	.48
21	C5-C8 C23-C37,C50,C52	0,1MF-50V Mono Cap	(Mouser-21RZ310)	1.72
2	C19	100PF-50V-NPO-Mono Cap	(Mouser-21RD610)	.10
2	C20,C51	10PF-50V-NPO-Mono Cap	(Mouser-21RD710)	.20
4	C38-C41	0,002MF-50V-5%-Styrene Cap	(Mouser-23PW220)	.96
2	C42,C46	0,001MF-50V-5%-Styrene Cap	(Mouser-23PW210)	.22
1	C18	0,1MF-50V-Mono Cap (Axial)	(Hosfelt-15-407)	.08
2	C43,C47	0,01MF-50V-5%-Styrene Cap	(Mouser-23PW310	.38
2	C44,C48	0,22MF-50V-Elect. Cap	(Mouser-140-L50V,22)	.09
2	C45,C49	4,7MF-16V-Elect Cap	(Mouser-140-L16V4,7)	.09
1	L1	Dual 8,2MH Choke(PE96180)	(Hosfelt-18-129)	.35
1	Z1	11VAC/18VAC Clamp MOV	(Jameco-190449)	.25
2	R1.R2	56-5%-1W-MOF-Resistors	(Mouser-281-56)	.38
2	R3,R4	220-5%-0,25W-CF-Res	(Jameco-30470)	.10
1	**R5A,R5B	10K-10T-Dual POT	(Bourns#84A2DB28J15/J15)	---
	Alternate	10K-1T-Dual POT	(Mouser-31VW401)	2.10
	Optional	15:1 Mechanical Dial	(Mouser-5940-16111)	12.00
1	R6	100K-1T-POT	(Mouser-31CN501)	1.02
2	R7,R8	10K-1T-POT	(Mouser-31CN401)	2.04
2	R9,R27	22K-5%-0,25W-CF-Res	(Jameco-30453)	.10
1	R14	10K-15T-T-POT (Bourns-3006)	(Hosfelt-380135)	.85
1	R10	15M-20%-0,25W-CF-Res	(Mouser-291-15M)	.10
3	R15,R16 R20,R22	1K-5%-0,25W-CF-Res	(Jameco-29663)	.15
2	R18,R19	47K-5%-0,25W-CF-Res	(Jameco-31149)	.10
1	R12	2200-5%-0,25W-CF-Res	(Jameco-30314)	.05
3	R13,32,33	150-5%-0,25W-CF-Res	(Jameco-30162)	.15
3	R17,24,25	330-5%-0,25W-CF-Res	(Jameco-30867)	.15
1	R21	33-5%-1W-MOF-Res	(DigiKey-P33W-2BK)	.30
3	R22,23,26	10K-5%-0,25W-CF-Res	(Jameco-29911)	.15
2	R28,R31	56K-5%-0,25W-CF-Res	(Mouser-291-56K)	.10
3	R11,29,30	100K-5%-0,25W-CF-Res	(Jameco-29997)	.15
2	R35,R36	1200-5%-0,25W-CF-Res	(Jameco-29735)	.10
1	R35	1800-5%-0,25W-CF-Res	(Jameco-Bulk)	.05
1	R37	560-5%-0,25W-CF-Res	(Jameco-31376)	.05
0	R38	DELETE		
8	R39-R46	CAL Res 5%-0,25W,CF-Res	(Any)	.40
1	---	Knob-0,25"-Black (Large)	(Jameco-138481)	1.25
3	---	Knob-0,25"-Black (Small)	(Jameco-162499)	3.75
1	RN*	100Kx8-2%-DIP16-RNET	(Jameco-108644)	.60
2	SW1,2	PB Switches (KRS-1273-B)	(Jameco-155379)	.80
2	SW1,2	PB Caps (KRS-CAP-B)	(Jameco-155408)	.30
1	S1	DPDT (2-Pos)SubMini Toggle	(Jameco-75977)	1.29
1	S2	SPDT (2-Pos)SubMini Toggle	(Jameco-75969)	1.15
1	S3	SPDT (3-POS)SubMini Toggle	(Jameco-72557)	1.15
1	---	0,25" Rubber Gromet	(Any)	.10
8	---	0,25" Nylon Standoffs #4 screws	(Hosfelt)	

APPROX. TOTAL: $ 132.00

NOTE:
(1) ACE Hardware #1003979 Almond Spray Paint (15oz) $3.00
(2) Minwax Polyurethane #33050 Clear Gloss Spray (11oz) $4.00
(3) * WC is GroupWest #57A-15-1800CT (38W) Wall Transformer.
(4)** Author used Bourns 10turn pot because it was available
Tests show Mouser part is O.K.(Optional) 15:1 Dial.
(5) Out/In=6FT Coax with male SMA's (Jameco-159450) $5.75.

Table 1. *Bill of materials.*

high-quality, dot matrix hybrid types which are very compact and high-contrast. They are small enough that three digits can be handled by a standard DIP24 socket. I use the least significant digit's decimal point to show the



6X HP5082-7300
2X DIP24 (W) SOCKETS

NOTES:
1. U2-U6 HAVE 0.1uF CAPS ABOARD.
2. R11 ON HD5.
3. J3 TEST POINT JACK ON REAR OF ENCLOSURE.
4. AUTHOR'S COUNTER DRAWS 586mA @ 5V.
5. U14 DECIMAL POINT = GATE LED, 1 SEC. PULSE.

Fig. 4. *Schematic, counter section.*

Photo A. *The completed function generator with wall converter.*

count gate action. Since upon power-up we do not know what the oscillator time base chain has in it, a couple of seconds is sometimes required to clear and get the first one second count period. The flashing decimal point indicates that everything is working correctly.

The next section of the generator is the triangle, square, and pulse generator. Since we do not normally need an extremely low THD for these functions, a simple quad op amp IC was used to perform these functions. An IC such as the 8038 could have been used but again, something a little better than

the 1% specified (THD) was desired. So a voltage reference, Schmitt trigger, integrator, and comparator circuit was designed using a quad JFET op amp IC, TL064A. The circuit also uses a couple of analog gate ICs to do the resistor and capacitor selections. The timing resistor and capacitors are the same ones that are used in the Wien bridge sine wave oscillator. Two additional analog gate ICs were also used to select the LED indicators for range and function. These gates are selected digitally with push-button switches to a dual binary counter IC, U-10.

The multiwave output is then sent out to the gain and offset controls so that amplitude and position relative to ground can be adjusted by the user. The frequency is controlled by the ten-turn dual 10k-ohm pot, R5. The output of the generator is run through a special current mode driver IC. This IC provides 200 mA of continuous drive and is short-circuit and thermal protected. Quite a bargain at under six dollars and in a DIP-8 package!

The power supply circuit was my next concern. The use of a wall converter is most desired so as to keep the high voltage AC out of the enclosure. These wall converters or transformers are UL and CSA approved for safety and are very inexpensive. Ours brings a 15 volt centertapped winding to the PC board and is rated at 1.8 amps. This AC voltage is put through a bridge rectifier to get our POS and NEG 12 VDC at over 1 amp. Note that at 1.8A the voltage would be about 8 VCT, but since we have a maximum of 12 VDC @ 200 mA requirement, we do not level. The two shunt regulator circuits draw another 200 mA to achieve the POS and NEG 6 VDC power for the

Continued on page 16

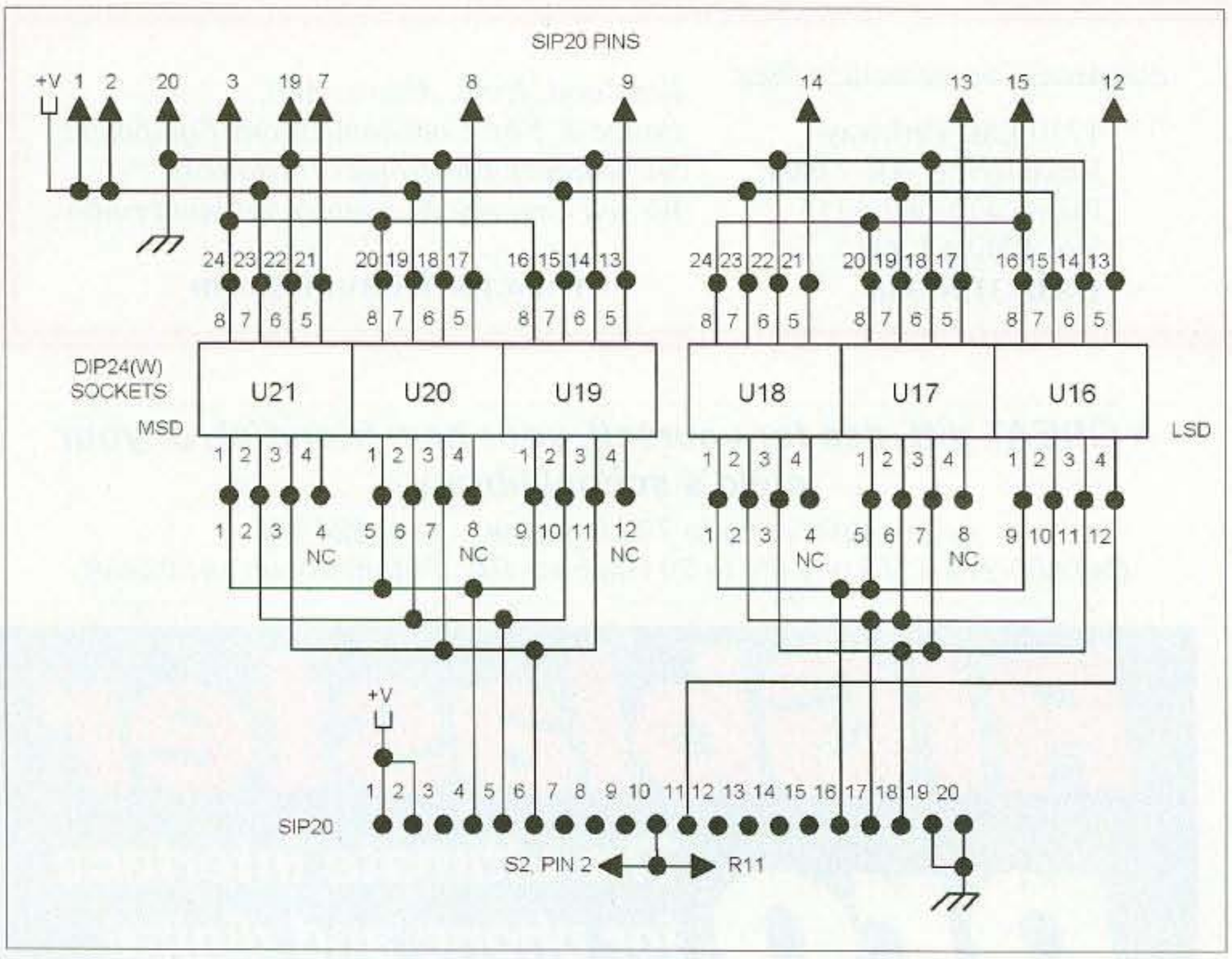


Fig. 5. Schematic, counter display section.

Commercial-Quality Function Generator

continued from page 15

op amps and CMOS logic components.

Now, the digital logic TTL display hybrids which draw about 100 mA each will need that high-current 5V source. I took the +12VDC line and put the U-1 series voltage regulator IC on it for the 5VDC 600 mA requirement. The regulator IC LM-2940-5 is a low dropout type which can work down to the one half volt differential point, so no problems in our application. The 5 VDC 600 mA display requirement does not throw our bridge rectifier circuit out of balance. The regulator is rated for 1 amp, so 600 mA does not exceed its specification, but do expect a little heat on the TO-220 package running at about four watts. No heat sink is required!

Some folks might ask why the shunt 6V regulators instead of the series ICs? Well, we find that transients, noise and such, will not get through as sometimes happens with series regulators. The use of a dual 8 mH choke L-1 is to eliminate the common mode parts of that power line stuff!

Now, we look at how to put it together. No etched and drilled PC board is available to my knowledge. There does not seem to be an interest in that for this project. I chose to use wire-wrap technology, as always, with this project. The use of machine pin–type wire-wrap sockets to accommodate both ICs and passive components works very well. I also use SIP (single-in-line) wire-wrap binding posts for the termination of wires. These wires go between boards, controls, switches, and the like.

I chose my usual Ten-Tec enclosure and PMI plastic display bezel so that we can get a good professional looking instrument. All of the connectors, switches, and test lines are the sub-mini types. They look and work good, and the cost is very reasonable.

I added an additional two Wien bridge oscillators to provide an SSB test circuit. This is a 700 and 1900 Hz dual tone source. When you put the signals into the microphone jack of an SSB transmitter, you will have the required envelope test to check the rig and linear amplifier for linear operation.

I provided simplified schematic functions in **Fig. 1**. All of the component placements are also shown in **Fig. 2**. All of the header details are in **Fig. 3**. I provided a bill of materials (**Table 1**), the approximate cost, and the sources I found for them. A template is also provided as a guideline for the metalwork necessary on the JW-10 Ten-Tec enclosure. I recommend that a nice coat of enamel spray paint be used after the metal work. The decals make things

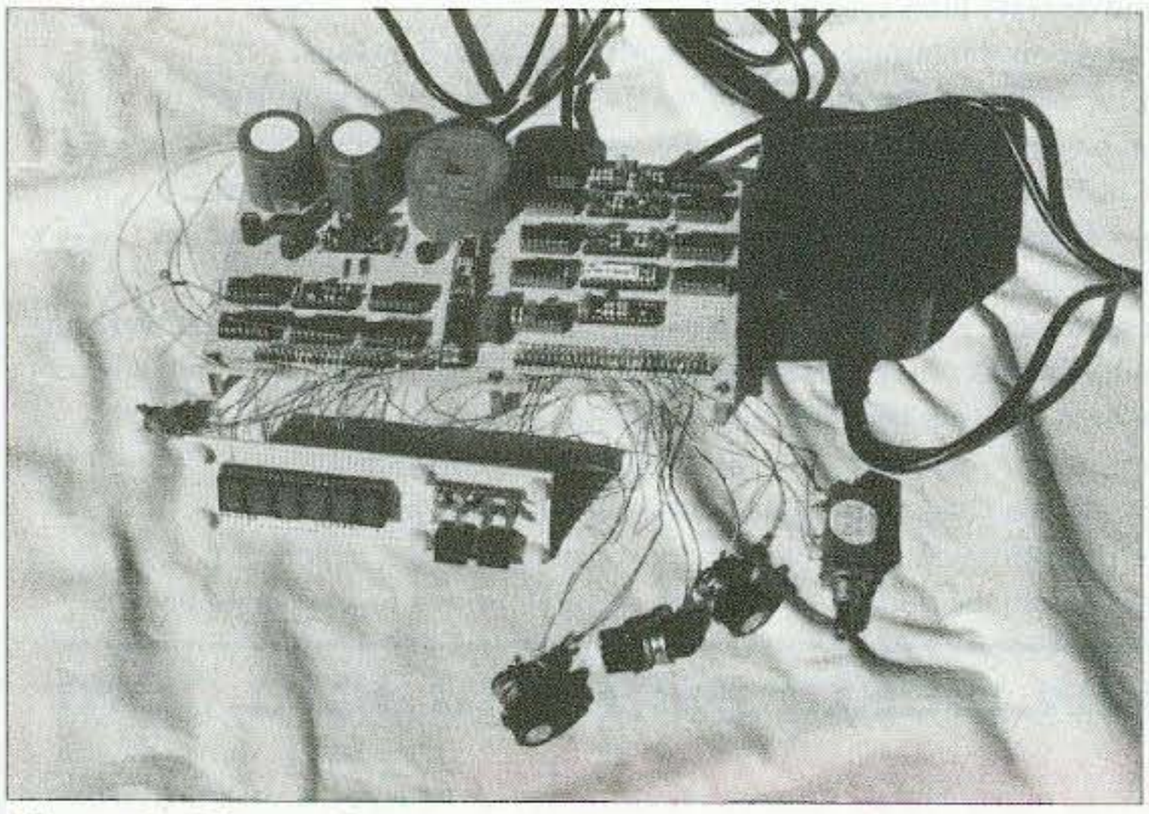


***Photo B.** Photo of components on PC board using wire-wrap technology.*

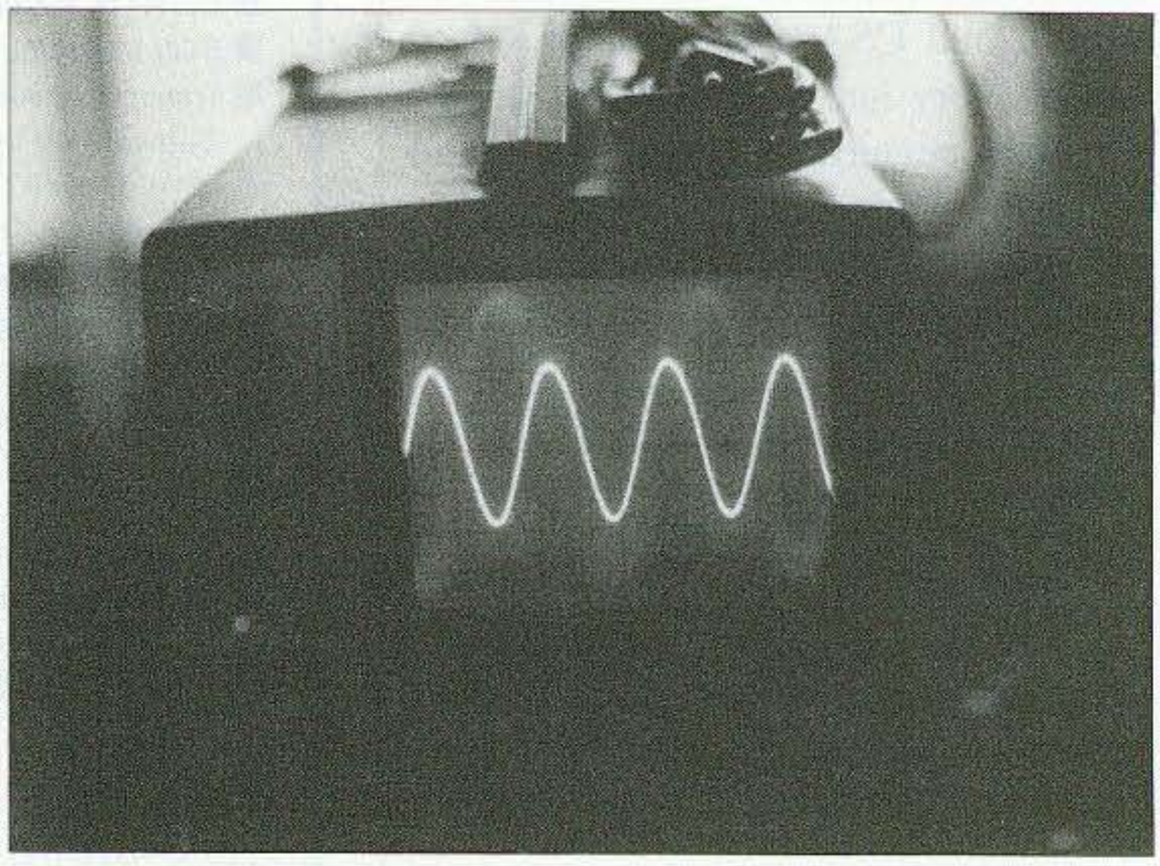
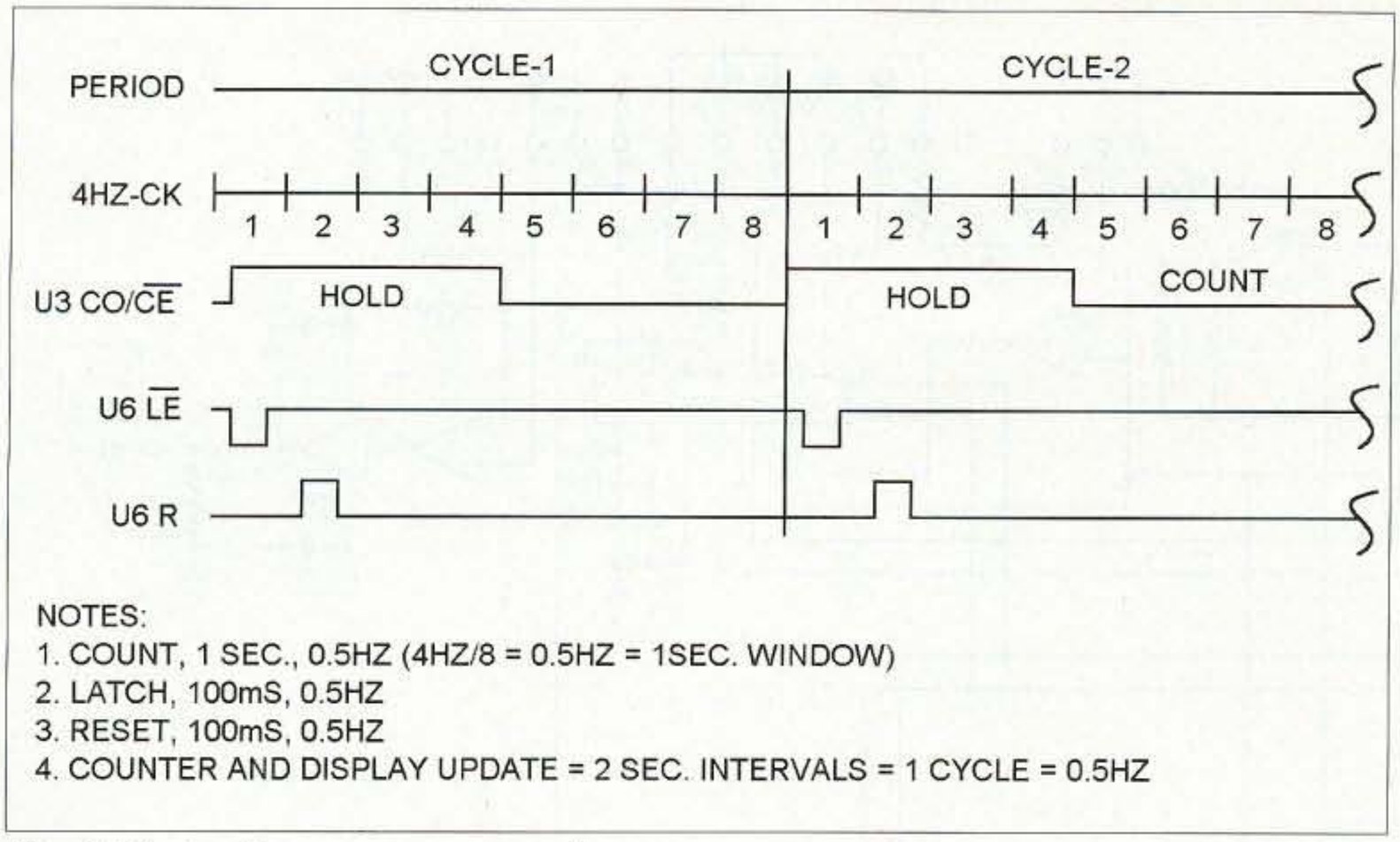


***Photo C.** Sine wave.*



NOTES:
1. COUNT, 1 SEC., 0.5HZ (4HZ/8 = 0.5HZ = 1SEC. WINDOW)
2. LATCH, 100mS, 0.5HZ
3. RESET, 100mS, 0.5HZ
4. COUNTER AND DISPLAY UPDATE = 2 SEC. INTERVALS = 1 CYCLE = 0.5HZ

Fig. 6. *Timing diagram counter section.*

look very professional and can be found at your local Radio Shack or office supply stores. A couple of very light coats of polyurethane gloss will

Continued on page 18

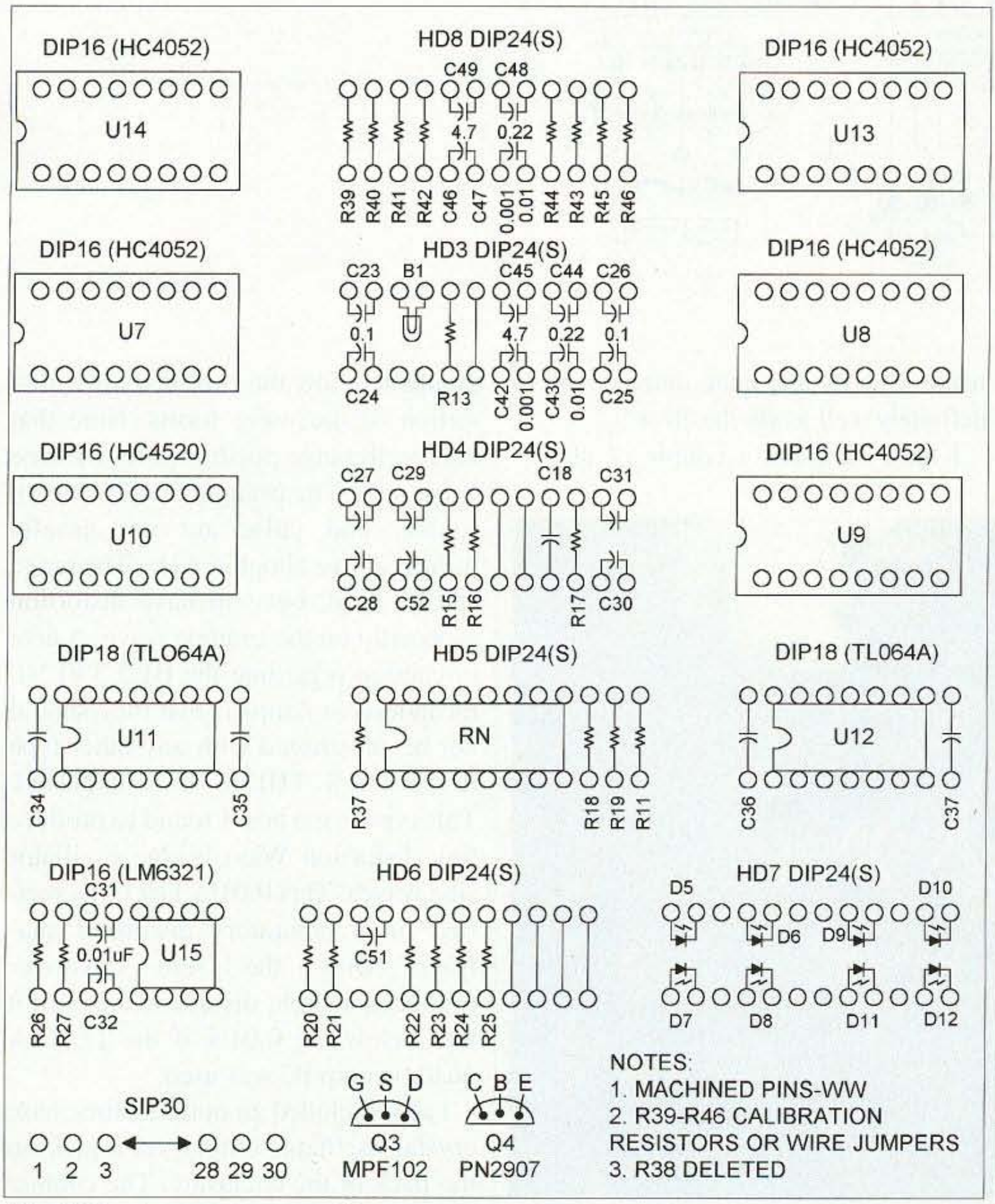
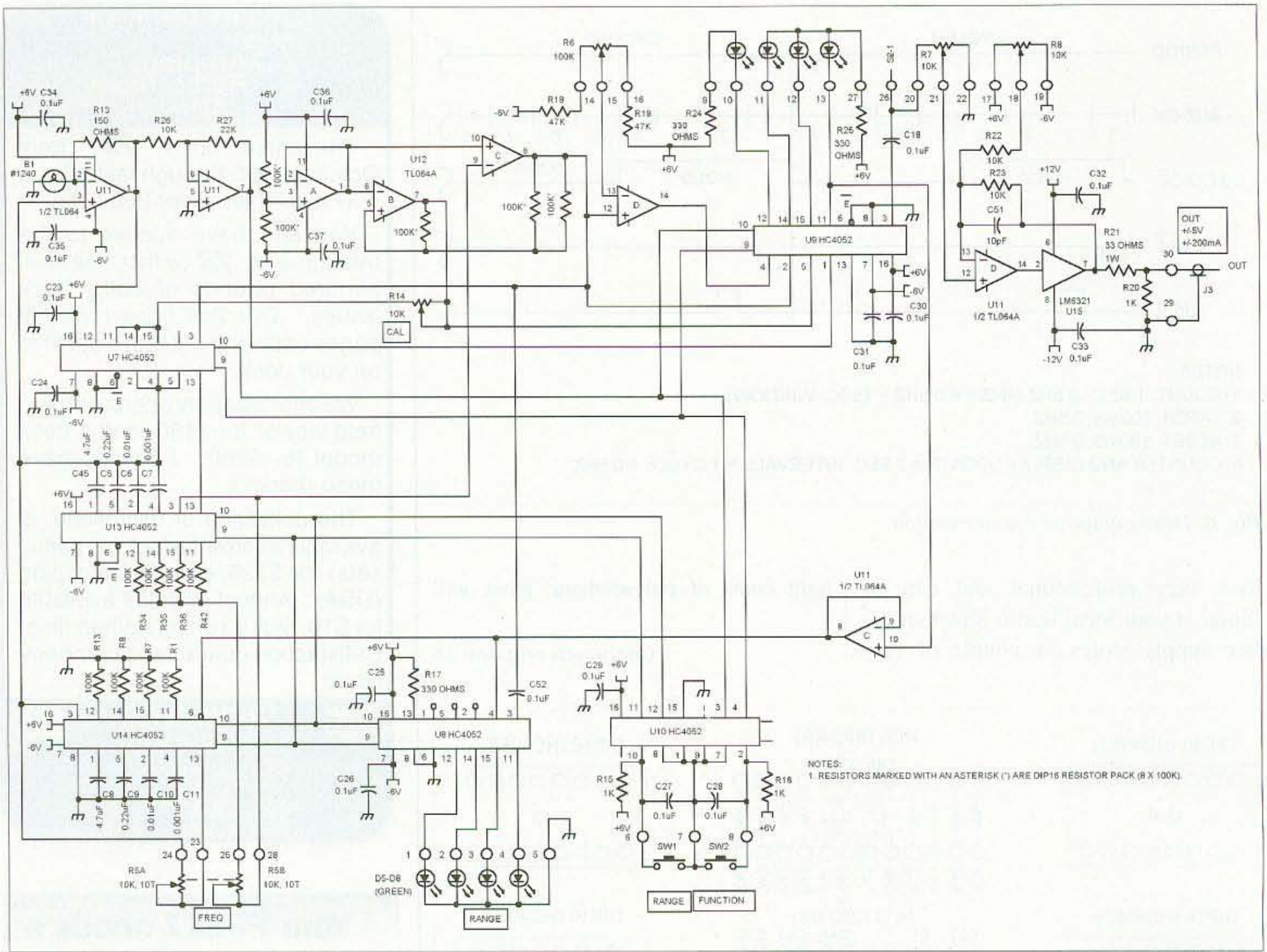


Fig. 7. *Header component outline.*



NOTES:
1. RESISTORS MARKED WITH AN ASTERISK (*) ARE DIP16 RESISTOR PACK (8 X 100K).

Fig. 8. *Schematic, function generator section.*

Commercial-Quality Function Generator

continued from page 17

make it pretty and quite durable, and is definitely well worth the effort.

I have included a couple of photographs to show the extremely low distortion of the wave forms. Note that the fourth range position is for the sine wave only. The triangle (sweep wave), square, and pulse are not usually needed above about 20 kHz. The range can be used, but will have distortion especially on the triangle wave. A note of caution regarding the B1,2,3 #1240 incandescent lamps is that they should not be substituted with any other type if the 0.01% THD is to be expected. This type is the best I found to produce low distortion Wien bridge oscillator sine waves. This 0.01% THD was verified on a laboratory distortion analyzer. Only the zero crossover produced a slight distortion, but still it was below the 0.01% if the TL064A quad op amp IC was used.

I also included an optional time base crystal oscillator output via a jack on the back of the enclosure. The counter probe, in the external position, can be

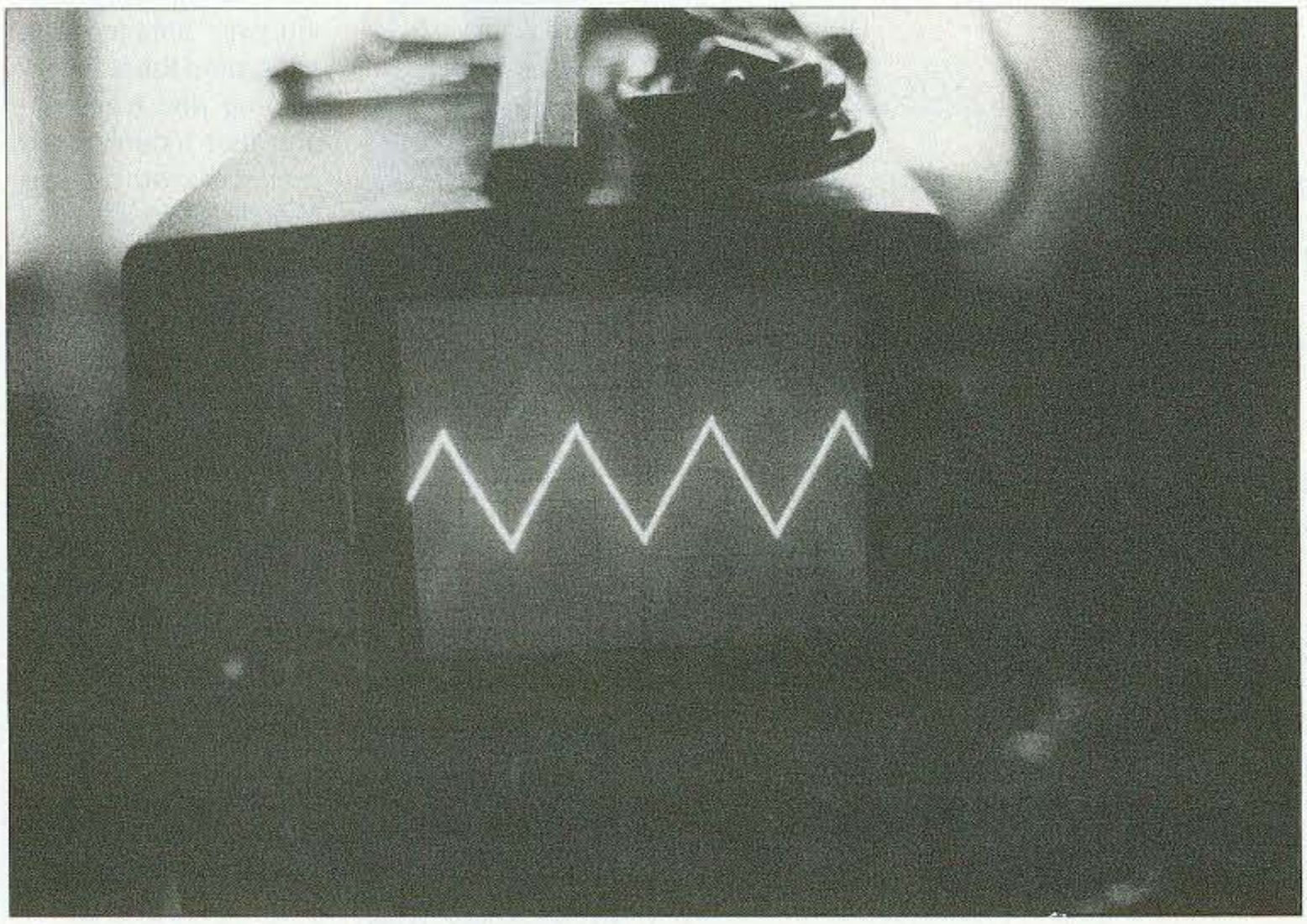
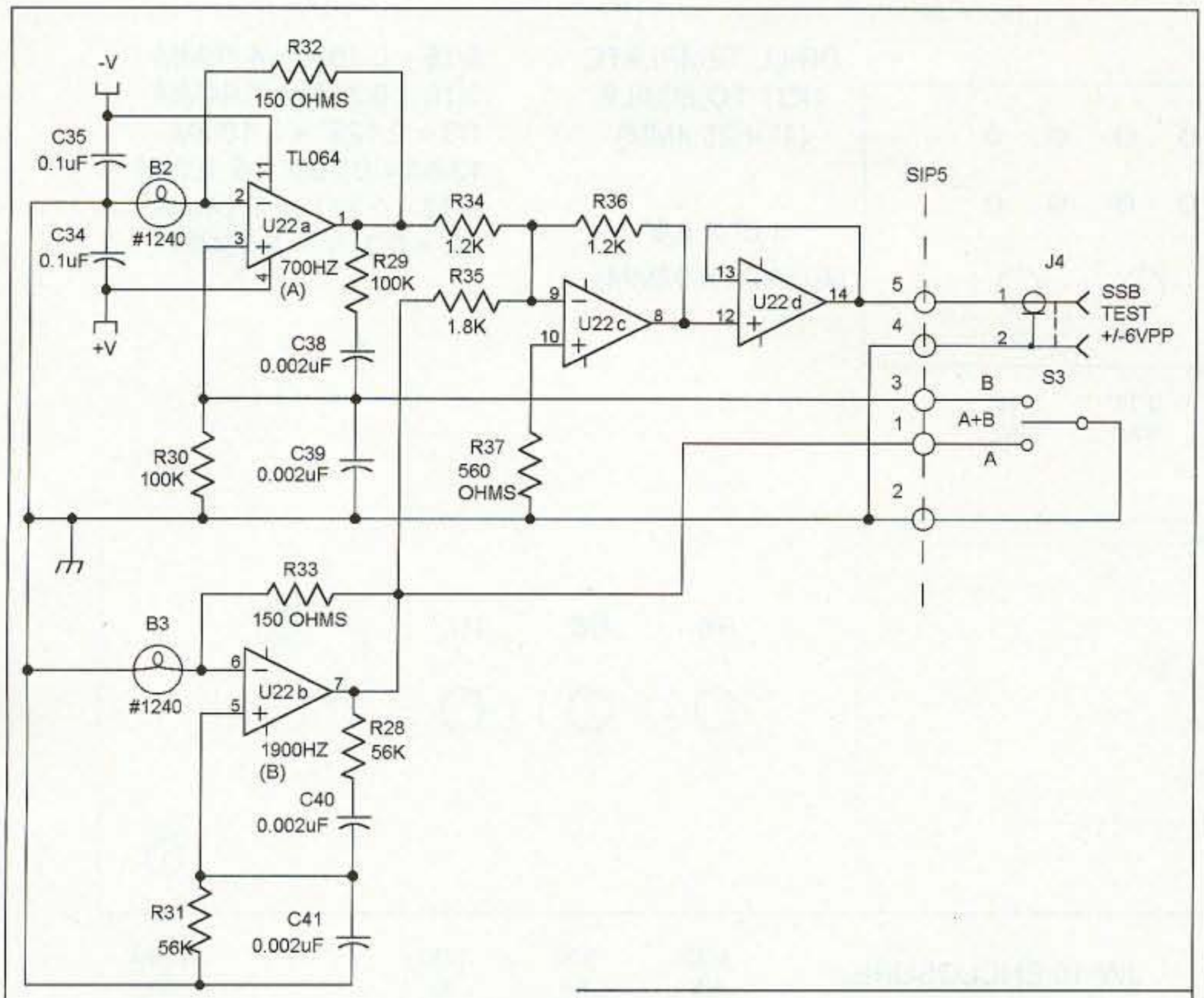


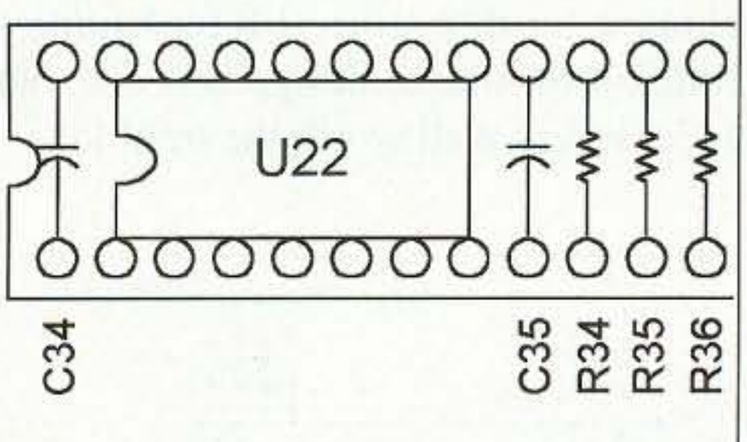
Photo D. *Triangle wave.*



(A)

HD9 DIP24(S)

HD10 DIP24(S)



REF: 1986 ARRL HANDBOOK
SECTION 25-27, FIG. 50.

(B)

Fig. 9. Schematic, SSB tone test (optional).

placed on the jack to read the time base frequency of 32768 Hz (±1 Hz).

I need to make mention of resistors R28 through R36, which are used to

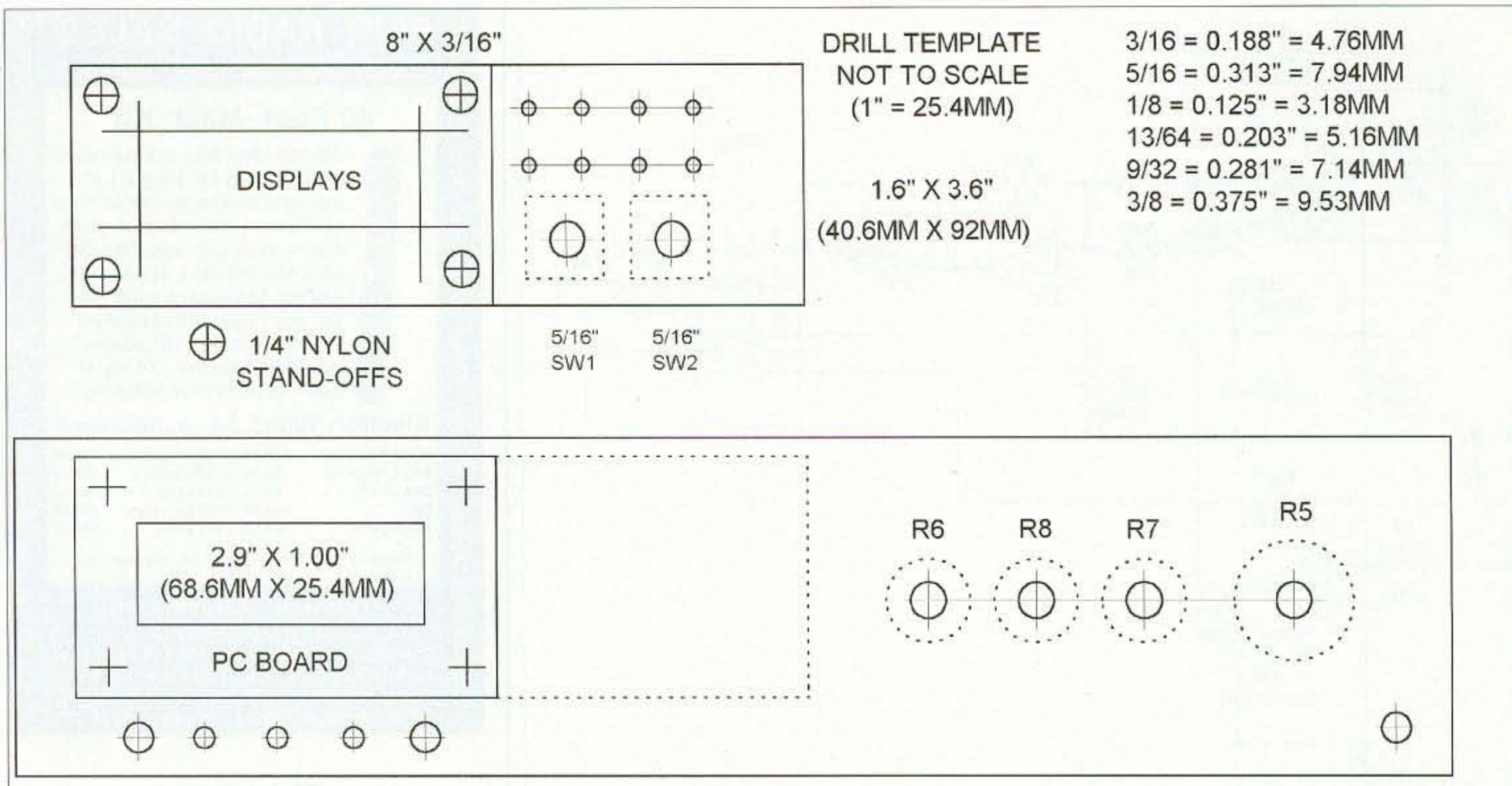


Fig. 10. *Enclosure template.*

calibrate the frequency ranges. We are using timing capacitors which have tolerances of 5 and 10 percent and do require a selected resistance value to set the bottom end frequency of each of the four ranges. If you do not care about the exact setting, these resistors can be omitted. Use jumper wires in their place. The triangle, square, and pulse frequency goes from 1 Hz to about 15 kHz in the four ranges. The sine wave goes from 1 Hz to about 50 kHz in four ranges. The frequency counter measures the exact frequency in all bands, which is a marked improvement over a calibrated dial knob. The calibration is complete when you adjust the triangle wave to the same frequency as the sine wave. Set the sine wave in the second band and read the frequency. Then move to the triangle function and calibrate it to the same frequency by adjusting R14. That is all there is to it! Well, that is about it for this project! It took quite a little bit of time to design this one, but I feel it was well worth the trouble.

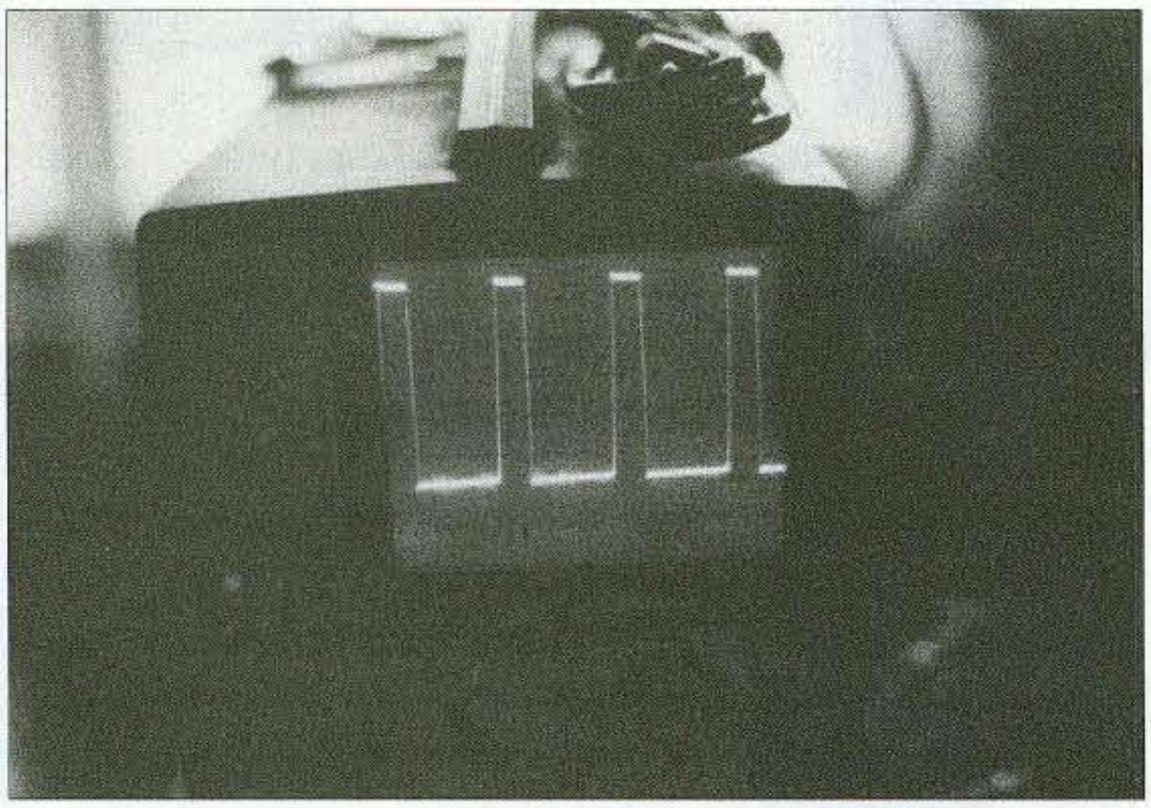


Photo E. *Pulse wave.*

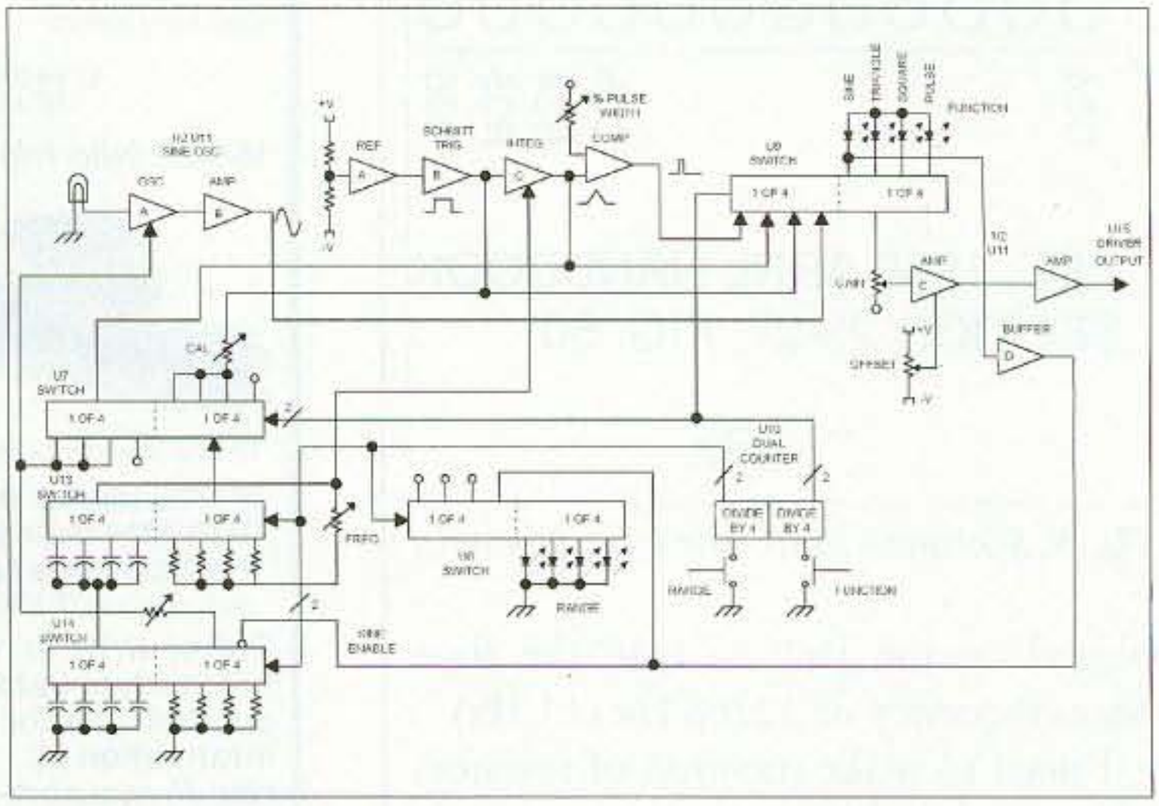


Fig. 11. *Overall block diagram.*

HEADER		ITEM	PINS
HD-1	R9	22K RES	6,13
HD-1	R10	15M RES	7,12
HD-1	R11	10K RES	5,14
HD-1	R12	2200 RES	2,17
NOTE:	C13--C17	0,1MF CAP	Part of IC's
HD-1	C19	100PF-NPO CAP	8,9
HD-1	C20	10PF-NPO-CAP	15,16
HD-1	C21	0,01MF CAP	1,18
HD-1	C22	0,01MF CAP	3,4
HD-2	R3	220 RES	8,11
HD-2	R4	220 RES	2,17
HD-2	C10	100MF CAP	15,16
HD-2	C11	100MF CAP	3,4
HD-2	D1	1N5232 DIODE	9,10
HD-2	D2	1N5232 DIODE	1,18
HD-2	Q1	PN2222 TRAN	12,13,14
HD-2	Q2	PN2907 TRAN	5,6,7
HD-3	R13	150 RES	5,20
HD-3	C23	0,1MF CAP	23,24
HD-3	C24	0,1MF CAP	1,2
HD-3	C25	0,1MF CAP	11,12
HD-3	C26	0,1MF CAP	13.14
HD-3	C42	0,001MF CAP	7,8
HD-3	C43	0,01MF CAP	9,10
HD-3	C44	0,22MF CAP	15,16
HD-3	C45	4,7MF CAP	17,18
HD-3	B1	#1240 Bulb (3mm)	21,22
HD-4	R15	1K RES	5,20
HD-4	R16	1K RES	6,19
HD-4	R17	330 RES	10,15
HD-4	C27	0,1MF CAP	24,23
HD-4	C28	0,1MF CAP	1,2
HD-4	C29	0,1MF CAP	21,22
HD-4	C30	0,1MF CAP	11,12
HD-4	C31	0,1MF CAP	13,14
HD-4	C52	0,1MF CAP	3,4
HD-4	C18	0,1MF Cap (Axial)	9,16
HD-5	R18	1K RES	10,15
HD-5	R19	1K RES	11,14
HD-5	R37	560 RES	1,24
HD-5	R11	100K RES	12,13
HD-6	R20	1K RES	1,24
HD-6	R21	33-1W RES	2,23
HD-6	R22	10K RES	5,20
HD-6	R23	10K RES	6,19
HD-6	R24	330 RES	7,18
HD-6	R25	330 RES	8,17
HD-6	C51	10PF-NPO CAP	21,22
HD-7	D5-D12	LED's	-----
HD-8	C46	0,001MF CAP	5,6
HD-8	C47	0,01MF CAP	7,8
HD-8	C48	0,22MF CAP	17,18
HD-8	C49	4,7MF CAP	19,20
HD-8	R39	--- CAL RES	1,24
HD-8	R40	--- CAL RES	2,23
HD-8	R41	--- CAL RES	3,22
HD-8	R42	--- CAL RES	4,21
HD-8	R43	--- CAL RES	9,16
HD-8	R44	--- CAL RES	10,15
HD-8	R45	--- CAL RES	11,14
HD-8	R46	--- CAL RES	12,13
U-15	R26	10K RES	1,16
U-15	R27	22K RES	2,15
U-15	C32	0,1MF CAP	3,4
U-15	C33	0,1MF CAP	13,14
U-11	C34	0,1MF CAP	1,18
U-11	C35	0,1MF CAP	9,10
U-12	C36	0,1MF CAP	1,18
U-12	C37	0,1MF CAP	9,10
HD-9	R28	56K RES	5,20
HD-9	R29	100K RES	6,19
HD-9	R30	100K RES	7,18
HD-9	R31	56K RES	8,17
HD-9	R32	150 RES	21,22
HD-9	R33	150 RES	15,16
HD-9	C38	0,002MF CAP	1,2
HD-9	C39	0,002MF CAP	3,4
HD-9	C40	0,002MF CAP	9,10
HD-9	C41	0,002MF CAP	11,12
HD-9	B3	#1240 Bulb (3mm) T-1	23,23
HD-9	B4	#1240 Bulb (3mm) T-1	13,14
HD-10	R34	1200 RES	10,15
HD-10	R35	1800 RES	11,14
HD-10	R36	1200 RES	12.13
HD-10	C34	0,1MF CAP	1,24
HD-10	C35	0,1MF CAP	9,16
HD-10	U22	TL064A IC	2-7,17-23
PC Board	R1,R2	56-1W RES	------
PC Board	C1,C2	6800 MF CAP	------
PC Board	C3-C4	0,01MF CAP	------
PC Board	C5-C8	0,1MF CAP	------
PC Board	C9	100MF CAP	------
PC Board	C12	220MF CAP	------
PC Board	DB1	Diode Bridge	------
PC Board	L-1	Choke	------
PC Board	U-1	LM-2940CT	------
PC Board	Z-1	MOV	------
PC Board	SIP	SIP's	------
PC Board	R14	10K-10T-Trim POT	------
JW10	Front	R5A,R5B 10K-10T POT	------
JW10	Front	R6 100K-1T-POT	------
JW10	Front	R7,R8 10K-1T-POT	------

SO1,2,3,4	U2-U5	DIP18
SO5	U6	DIP16
SO6,7,8	HD1,2,8	DIP18
SO9,10	U12,U13	DIP18
SO11-SO17	U7-U10.U13-15	DIP16
SO18-SO25	HD3-HD10	DIP24(S)
SO26,27	U16-U21	DIP24(W)

END NOTE: SO1-SO5 Sockets Author used sockets with on board 0,1MF capacitors...vice DIP18.

Table 2. *Header component pinout locator.*

Good luck on yours! I can answer reasonable questions if I receive an SASE with the request. For those folks who would like more research information, I have included some references.

References

1. *Ham Radio Magazine,* Sept., 1979; Aug. 1980; June 1982; April 1988.

2. *Electronic Design Magazine,* July 1993.

3. *National Semiconductor Op Amp Data Book.*

Parts sources

1. Hosfelt Electronics, catalog 1-800-524-6464.

2. Jameco Electronics, catalog 1-800-831-4242.

3. Mouser Electronics, catalog 1-800-346-6873.

4. Digi-Key Electronics, catalog 1-800-344-4539.

5. Ten-Tec, Inc., catalog 1-800-231-8842. 73

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Shedding Some Light on Dimmers

Why not put one of these triacs to use?

When you need to control the AC mains and an auto transformer like a Variac is not available, the line voltage can be controlled with an inexpensive light dimmer. Light dimmers are available from the local hardware store or one is easy to build.

Controlling the voltage to an inductive load like a transformer's primary with a light dimmer may require a little cut-and-try, because light dimmers are intended to control a resistive load and not an inductive load. An appropriate RC in parallel with an inductive load can make it look resistive.

In a light dimmer, a triac or bidirectional triode thyristor switches the voltage to the load for part of every half-cycle. The voltage across the load will be near maximum if the triac switches on at the start of the half-cycle and be less if the switching occurs later in the cycle. The switched voltage is no longer a sinusoid and in some cases may cause difficulties. For example, a power supply with a capacitor input filter. More about that later.

A triac that controls the conduction angle of the dimmer is switched on by a voltage applied between the gate and terminal 2, the cathode. **Fig. 1(a)** shows the voltage-current characteristics of a triac. The device is bistable; the triac exhibits either a high impedance (Off state) or low impedance (On state). For either polarity of applied voltage, the device can be triggered into the on state by a pulse of current of either polarity into the gate. Once triggered, the triac remains in the On state until anode current is reduced to zero by the external circuitry.

The pulse of trigger current to the gate is obtained with a diac. The diac is a two-terminal bistable bidirectional switch with voltage-current characteristics shown in **Fig. 1(b)**. The diac exhibits either a high impedance (Off state) or low impedance (On state). The device exhibits a high impedance, low-leakage-current characteristic until the applied voltage reaches the breakover voltage. The breakover voltage is in the order of 35 volts. Above breakover, the device exhibits a negative resistance, so that the voltage decreases as current increases. When the diac turns on, a pulse of current triggers the triac on. Some triacs have the diac function built-in, but a dimmer using a simple triac requiring a diac is described. An SBS (silicon bilateral switch) like the 2N4991 can be used instead of a diac. They both perform the same function and are essentially equivalent devices.

In the basic light dimmer shown in **Fig. 2**, a diac is used in conjunction with a capacitor to generate current pulses to trigger the triac into conduction. The voltage on the capacitor increases until it reaches the breakover voltage of the diac, at which point the diac voltage becomes low and the capacitor discharges into the triac gate.

At the beginning of each half-cycle, the current in the triac and load is zero and the triac is in the Off state. The triac acts like an open switch. The entire line voltage appears across the triac and none appears across the load. The voltage across the triac drives current through the pot R1 and charges the capacitor C1. When the capacitor voltage reaches the breakover voltage of the diac, the triac is triggered on. At this point, the triac looks like a closed switch and the voltage is applied to the load for the remainder of that half-cycle.

The resistance of the potentiometer determines how quickly the capacitor charges. When the resistance of R1 is low, C1 charges more rapidly, breakover of the diac is reached earlier in the cycle, and the power applied to the load increases.

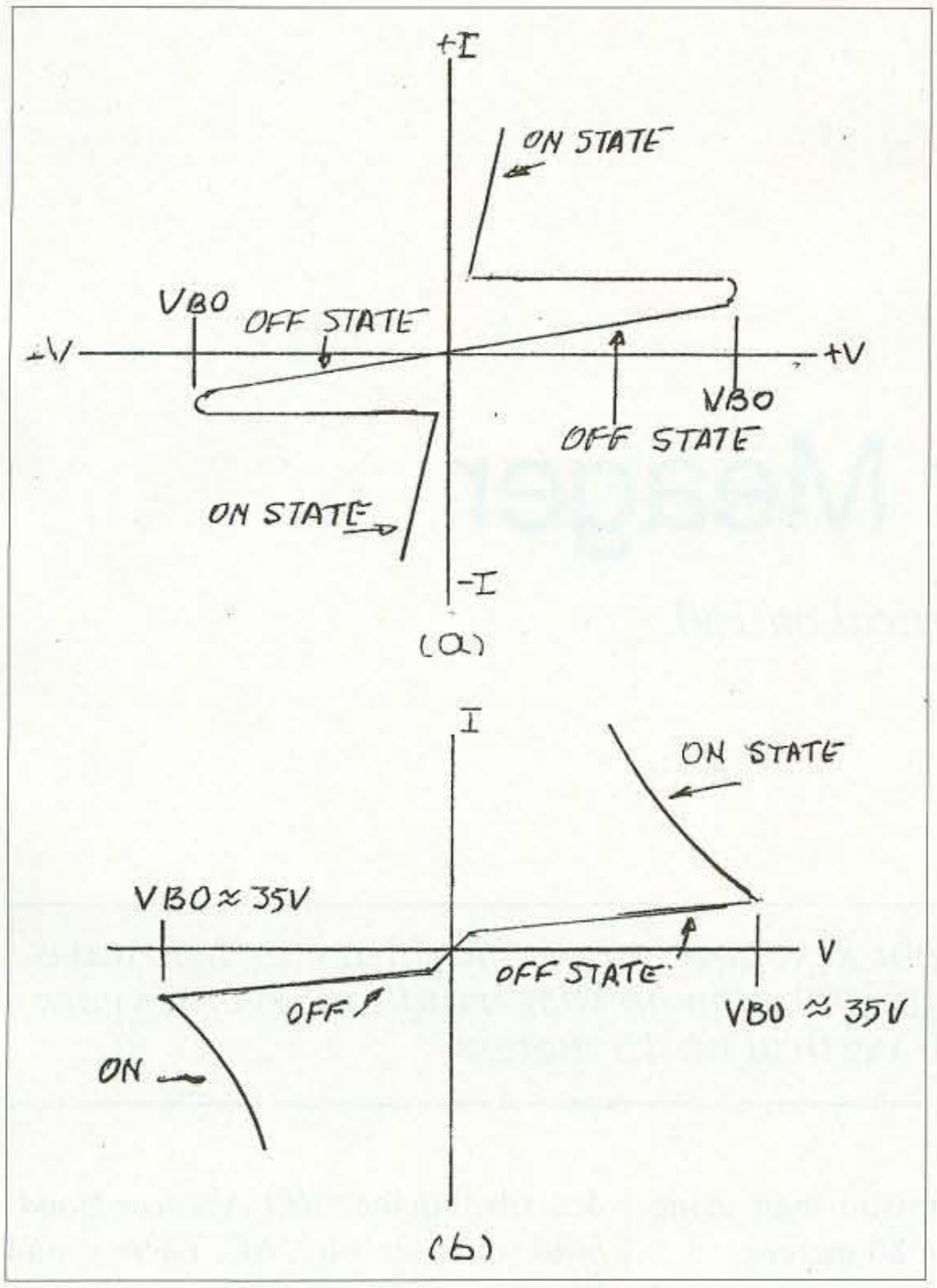

Fig. 1. *(a) A triac is gate-controlled bistable. (b) A diac is a bistable diode.*

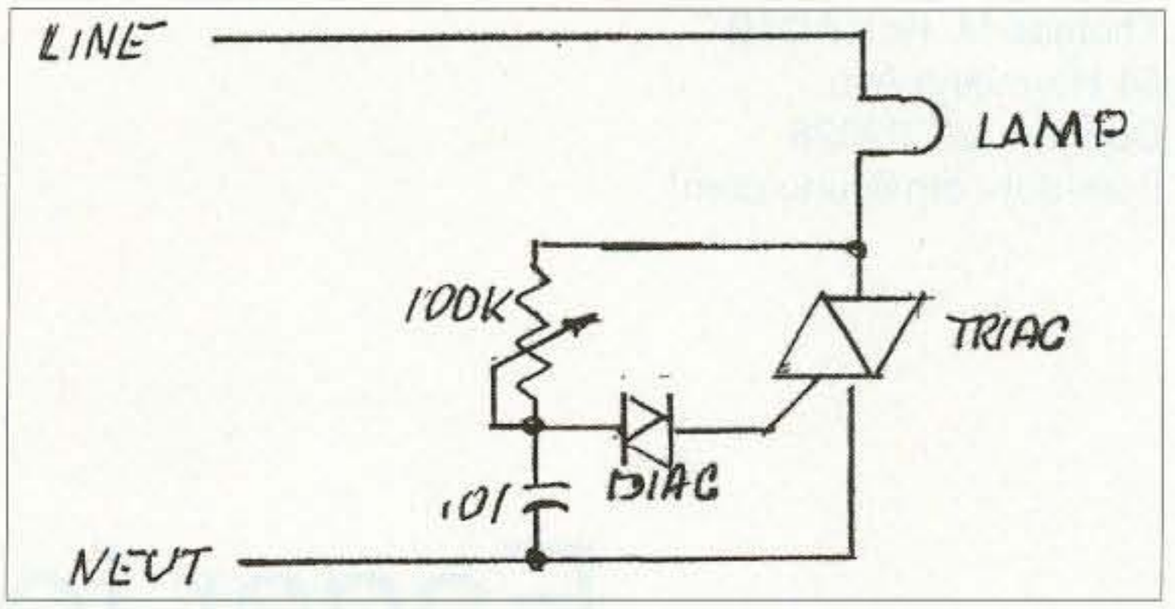

Fig. 2. *A light dimmer phase-controls the voltage across the load.*

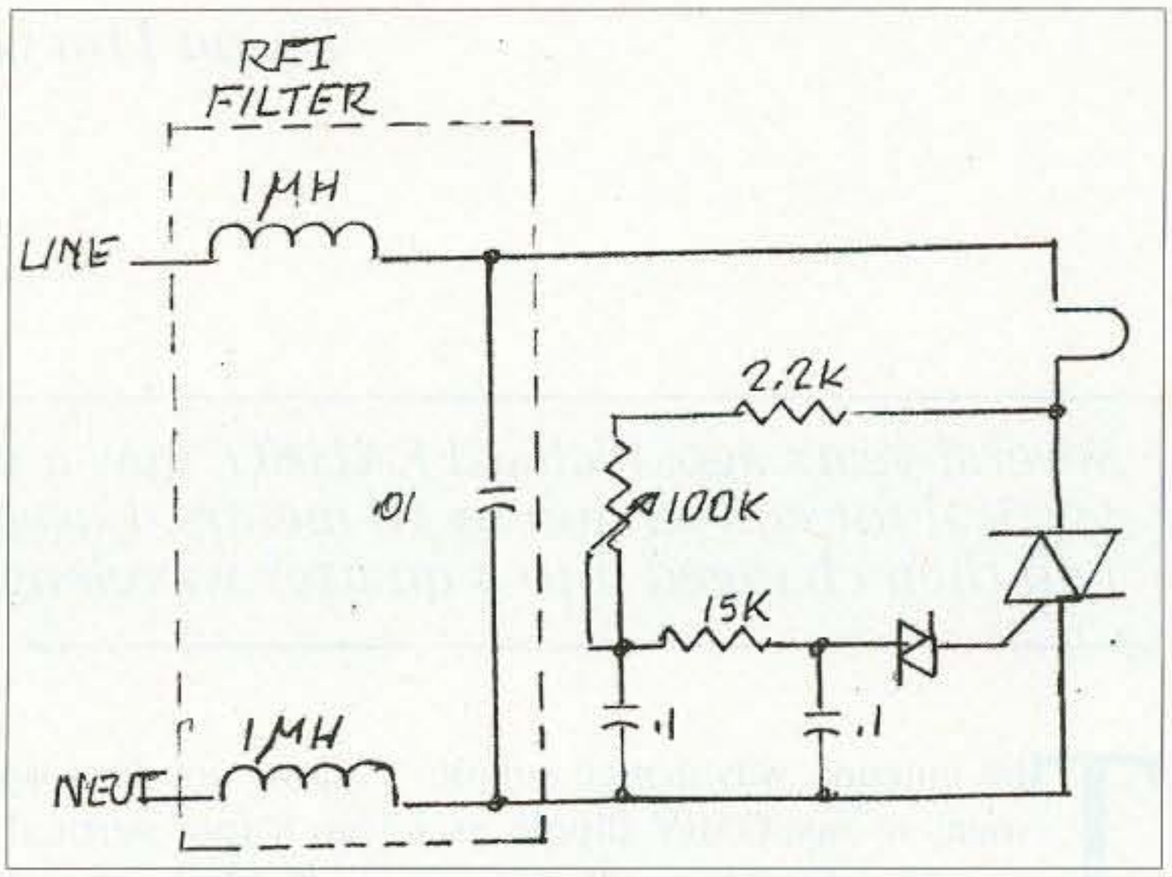

Fig. 3. *An extra RC reduces hysteresis. A filter can reduce conducted interference.*

Most commercial light dimmers have the circuit shown in Fig. **2**. This circuit has hysteresis. That is, the triac doesn't switch on when the control is set for minimum load voltage. Adding an additional R and C as shown in **Fig. 3** reduces hysteresis effects and extends the effective control range of the light-control potentiometer. Since including the extra R and C increases cost, most commercial light dimmers expect you to accept the hysteresis.

Since the triac switches when the line voltage is nonzero, noise can be produced when the triac switches on. Again, adding the noise-reducing filter increases cost, so noise is ignored. However, a 0.01µF capacitor and two small inductors can filter the noise from the line. Many times, the inductors are just a few turns wound on a piece of ferrite. This arrangement takes care of the conducted noise but doesn't do anything for radiated noise — a metal minibox enclosure is needed to control the radiated noise. If you have only a plastic project box, line it with aluminum foil and you'll be in business.

The light dimmer is intended to control a resistance, a light bulb, in which the voltage and current are in phase, but when the load is inductive, like a transformer or universal wound motor, the voltage and current are no longer in phase. The inductance tends to keep the current flowing even when the voltage is zero. The inductive current in the anode holds the triac on while the line voltage goes though zero.

A series RC in shunt with the inductor can put the voltage and current back in phase. That's where the cut-and-try comes in. A capacitor across the load can absorb the inductor's current and make the current in the triac zero when the voltage is zero. The resistor in series with the capacitor damps any tendency of the L and C to ring.

Accommodating the inductance is straightforward if the exact inductance is known. But usually the inductance isn't known. Finding the capacitor that will absorb the inductive current and a resistor to eliminate ringing requires some cut-and-try. The ringing suppressing resistor is not terribly critical, but if it is too large the effects of the capacitor can be compromised. Something in the order of 100 ohms is a good starting point.

Continued on page 55

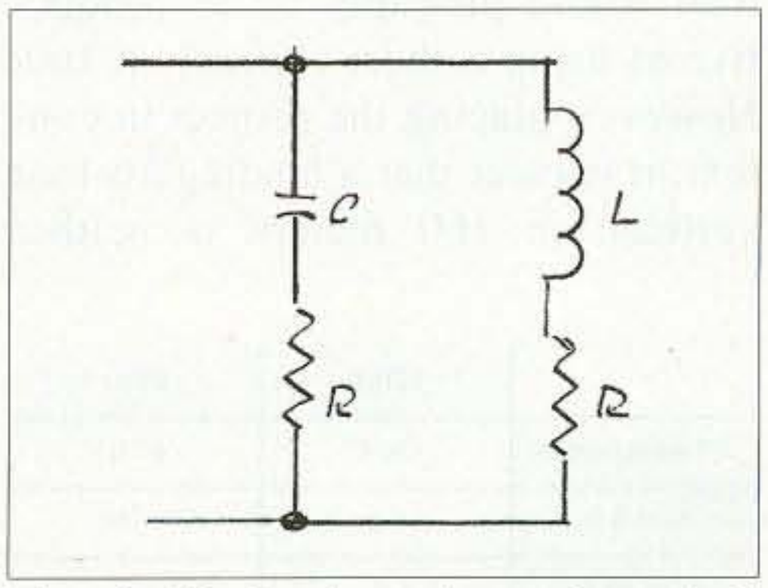

Fig. 4. *The load can be made to look resistive.*

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Eager for Meager

Try an 11m vertical on 160.

Several years ago, Richard KA1INO, now a silent key, gave me an old 11-meter half-wave vertical for conversion to 10 meters. I used the antenna on that band for several years and then changed it to a quarter wavelength vertical on 15 meters.

The antenna was a nice supplement to my G5RV dipole as I completed WAS on 20, 15, and 10 meters. There were times that the dipole did not work as well as the vertical and vice versa.

After reading the *ARRL Antenna Handbook* on base-loaded short antennas (8-foot whips are suggested) for mobile work, I decided to try a conversion of the venerable 11-meter antenna to the other end of the HF spectrum: 160 meters. My reasoning was that I would never be able to erect a full quarter wavelength vertical for the top band and had to be ready to compromise. Some other local amateurs have suggested to me that making contacts on the dummy load would probably be as productive as using a short vertical on 160. However, placing the project in context, it is clear that a loading 16-foot vertical on 160 meters is neither more nor less optimistic than using an 8-foot vertical on 80 meters.

	160m	80m
1/4 wavelength	130 ft.	67 ft.
% of 8 ft.	n/a	12%
% of 16 ft.	12%	n/a

Table 1. *Comparative length percentages.*

Table 1 shows that a 16-foot vertical is 12% of a full quarter wavelength on 160 meters. The same percentage is found for an 8-foot vertical used on 80 meters.

The computations needed to determine the inductance of a coil for base loading are found in ARRL Handbooks. *The Antenna Handbook* chapter on "Mobile and Marine Antennas" states that:

1. The height of the antenna in electrical degrees is:

$$h = (L/984) * F * 360$$

2. The mean characteristic impedance is:

$$K_M = 60 * ((\ln(2 * H/a)) - 1)$$

3. The inductive reactance required is:

$$X_L = K_M * \cot(h)$$

Determination of inductance from reactance for a given frequency is described in the *ARRL Amateur Handbook* chapter on "AC Theory and Reactive Components."

4. The corresponding inductance is:

$$L = X_L/(2 * \pi * F)$$

The symbols used in the formulas are:

h = antenna height in electrical degrees
F = frequency in MHz
L = antenna length in feet
K_M = mean characteristic impedance
H = antenna length in same units as "a"
a = antenna radius in same units as "H"
X_L = inductive reactance
$\pi = 3.14$

Notes:
cot = (1/tan)
"H" and "L" are antenna length. "L" must be in feet; "H" may be in any unit also used for "a".

In the case of my topband antenna, I was able to stretch the overall length of the 11-meter unit to 16 feet 4 inches

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(16.3 feet). The antenna is made from three sections of aluminum tubing: 1.25 inches, 1 inch, and 0.5 inch diameters. I decided to use a blended diameter of one inch for computations because no formulae were readily available for tapered elements. Solving the equations for the required inductance gave a value of 158 µH.

The actual coil design was simplified by using a utility program called Coil Designer, by K6MLO. I chose a PVC coil form that is 11 inches long and 2.375 inches inside diameter. Using 18 AWG wire, I found that I needed 108 evenly spaced turns.

The coil form has a PVC end cap on each end with an SO-239 socket on the cap that connects to the base of the antenna. A male PL-nnn adapter makes the coil to antenna connection. Black plastic electrical tape is wound over the entire coil and held in place with plastic wire-wraps. A drip hole was made at the bottom of the lower end cap to provide drainage for any moisture that might find its way inside the coil form.

The biggest compromise in my design was the decision to use a single one quarter wavelength 18 AWG wire radial as a counterpoise. The antenna is on a bracket at the end of my garage. I had space and resources for a single radial that meanders across the building and then follows a fence in an arc around the back yard. Multiple radials or a good earth ground would probably improve the performance of the antenna, but this was a low budget job, intended for casual use only.

How did the project turn out? Pretty much as expected. My intention was to recycle an old antenna into a topband vertical that would allow casual use on CW or SSB. I have managed to make contacts all over New England, the mid-Atlantic area, and as far as Ohio. The signal reports have been adequate, but not stellar. It seems likely that anyone who is interested in a low profile 160-meter antenna could use the vertical portion of this design and work up a better grounding or radial system in time for next winter. Despite predictions from friends, the final result does a much better job than the dummy load that I use to tune up the transmitter. 73

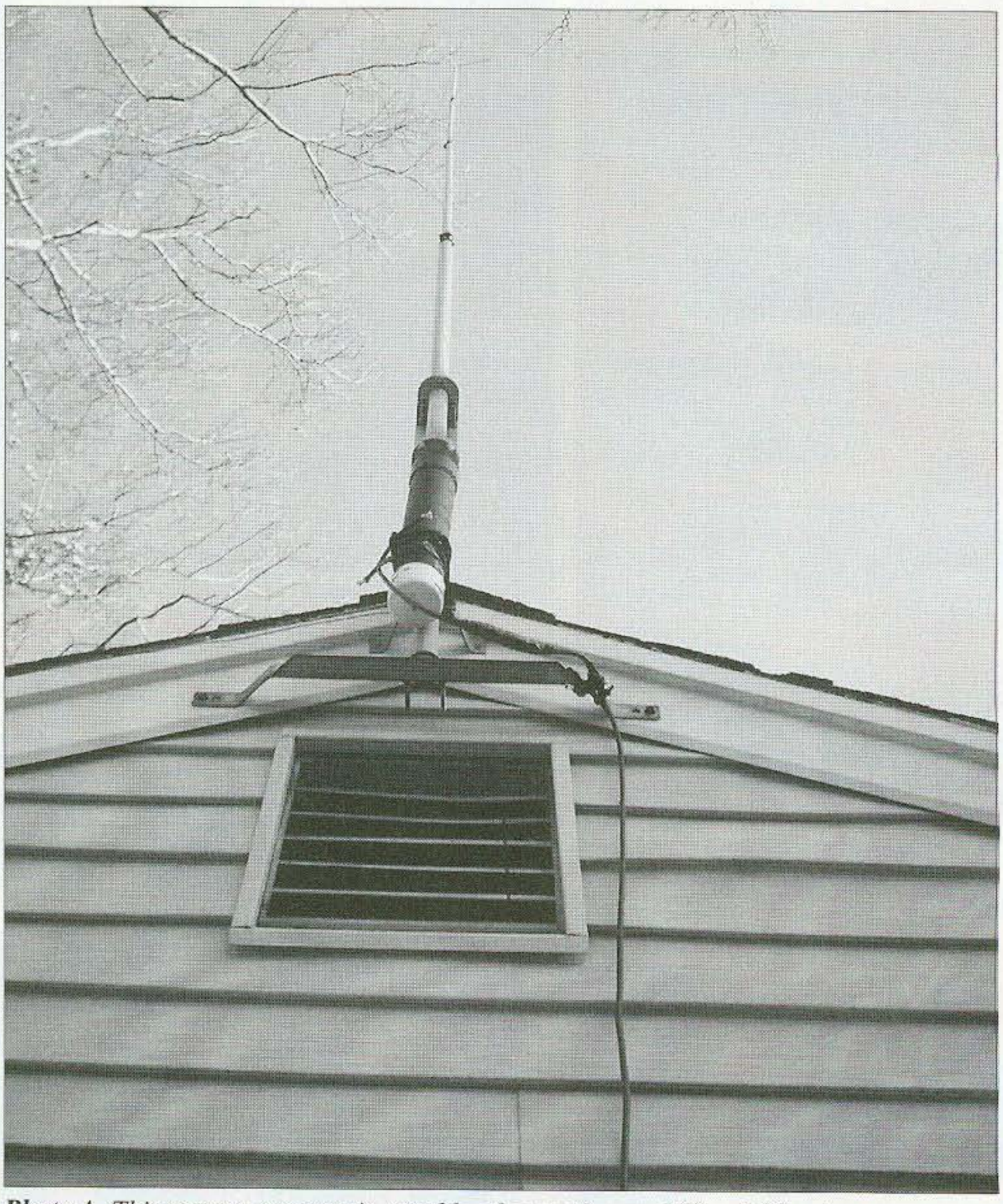

Photo A. *This meager antenna is capable of operating on 160 and 80 meters.*

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Shack Switch for Foot Fetishists

Not that it's THAT kinky.

Although I get lots of comments from visitors in the shack, the Ultimate Foot Switch was born out of frustration and definitely serves a function far greater than entertaining visitors.

When I went from a push-to-talk mic to a foot switch to control my transceiver, I never thought about the possibility of not being able to find the switch under the desk with my foot.

On more then one occasion while I was getting ready to slide my call letters into that small window between the time that the DX station stops transmitting and the rest of the ham community starts calling him, I missed my chance because the foot switch moved and I couldn't key the transmitter.

Over the next few weeks, I tried to position the foot switch so that I could find it under the desk without looking. I tried to hold it in position with double-sided tape, then Velcro strips, and then I finally mounted it on a small board. I still had the same problem. Basically, the foot switch I was using was just too small, and too light.

I mentioned this problem on our local repeater and got some interesting suggestions. The next day, I stopped in at the music store to find out what type of a foot switch musicians use, and I was somewhat disappointed in their lack of ingenuity.

One thing that the lady of the store did show me was what they call a wa-wa pedal. Not exactly what I wanted, but now I was getting some flashbacks to the '60s, when we had fuzzy dice on the mirror and a large foot strapped to the gas pedal of our cars. No, I don't know why we did it, and you really had to be there to understand!

Now I knew what I wanted, and I remembered where I saw it. I thanked the storeowner and was on my way.

Here in New Jersey, we have a few

Continued on page 55

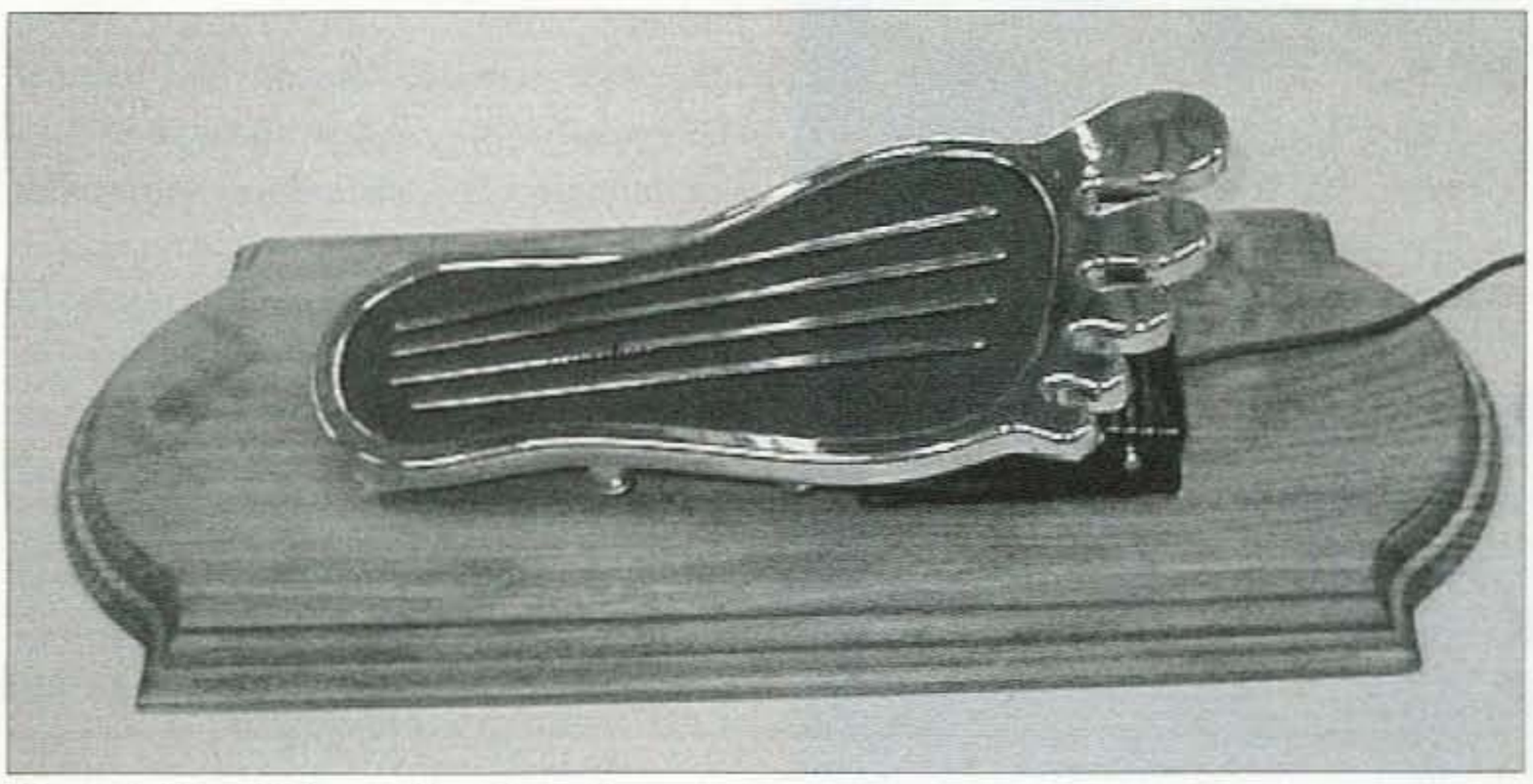

Photo A. *The Ultimate Foot Switch.*

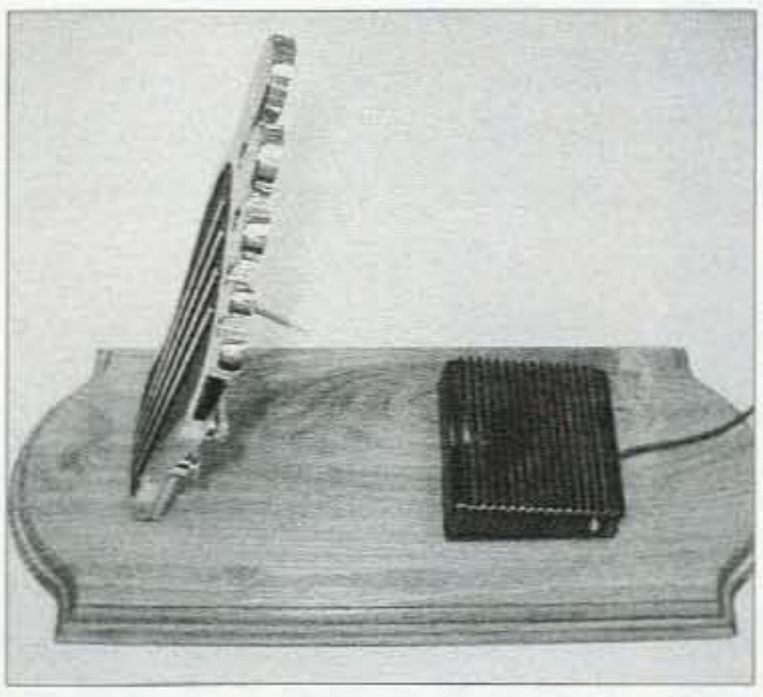

Photo B. *A small hinge mounts the "foot" to the wood base. Use double-sided foam tape to mount the switch.*

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Ashore at Sacrifice Rock!

The saga of a masterful DXpedition.

It all began one evening in early 2001, when Chets VU3DMP dropped into my office after work. We began talking about an IOTA operation from St. Mary's Island, which was fairly close by. A few months later, we successfully activated AS-096, our first IOTA, and our first "not-so-small" operation.

The experience and the sheer thrill we gained from organizing and participating in the AS-096 IOTA really pushed us to form a group of like-minded, activity-thirsty hams, the VUIOTA Group. We were, and still are, an informal group without presidents, secretaries, and that kind of stuff.

"What next?" was the most asked question. Obviously another IOTA. This time we aimed for the Sacrifice Rock, in the Kerala group of islands — an inactivated island, and a not-so-popular place either. We began working on getting more information about the island in September. It took us a good couple of months to get full information about the place, make two visits to the island and realize it was only a plain solid rock in the middle of nowhere.

The first reconnaissance visit was pretty discouraging — there was no boat access, there was not a single tree or even a leaf on the solid rock. It took about one hour by those tiny fishing boats from the coast of Thikkodi near Bagadara in Kerala (about 45 km north of Calicut or Kozhikode). The rock was standing in the middle of the sea without any sand around anywhere, unlike what we imagined any island to have.

This made it impossible for the boat to move very close to the rock — it had be anchored some distance away, otherwise it would be pushed toward the rock by the waves and eventually get damaged. So we had to swim to the rock from the boat (some 100 feet or so), and the depth of the water was about 18 meters all the way. What's more, the entry point on all sides of the rock were filled with razor sharp barnacles, and should one step on them without some footwear, or happen to be pushed against the rock by the waves, he's sure to cut himself very badly. To top it all off, the rock was pretty steep at the places where the boat could go near it.

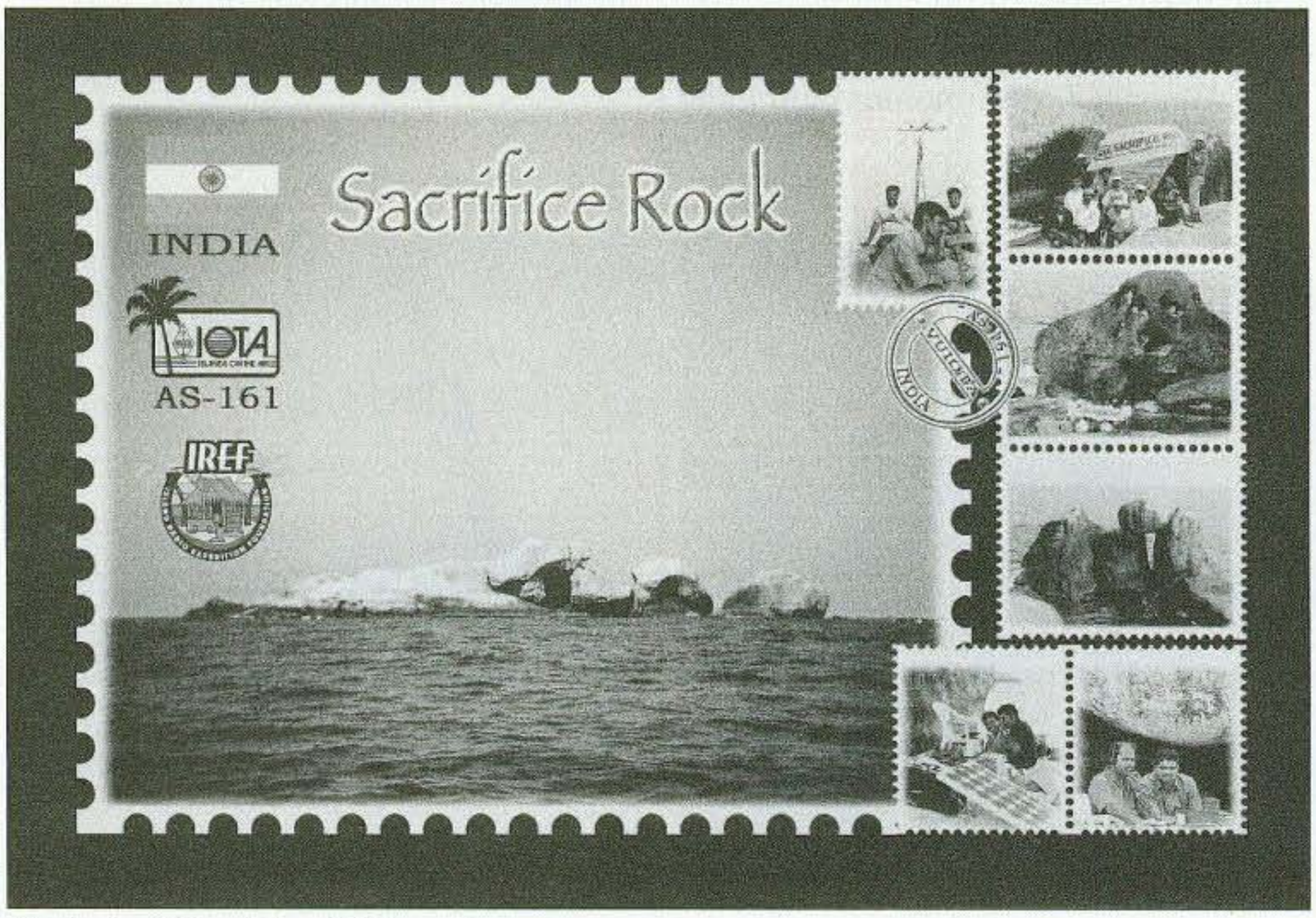

Photo A. *DXpedition QSL card.*

The very idea of carrying in the station gear was mind boggling. The four of us who made the first inspection visit, myself, Chets VU3DMP, Ro VU2RDQ, and Mur VU2MTT, though never speaking it out aloud, definitely thought this to be impossible.

Despite these discouraging thoughts, we still went ahead with the formalities involved with the WPC (licensing authority in India) for making the DXpedition. Lots of questions began popping into each of our minds about the various "how to's" associated with the trip. How to take the station through the water? How to transport people who do not know swimming (there were a few such people)? How to climb the rock with those huge lead acid batteries, even if we managed to somehow get them from the boat to the bottom of the rock? How to erect the antenna and shelter on the rock, which was solid granite without a patch of loose soil? And so on. Too many questions, no answers.

Off we went to a local beach, called Kaup. What came out of a few hours of thinking out on the beach that evening was to use that magic hardware known as "anchor bolts" for antenna erection and tent erection — this required us to carry some hammer drilling equipment, an electrical generator to power the drill, and lots of anchor bolts.

These are wonderful things to have. All we needed to do was to drill a suitable size hole in the rock, insert the bolts, and fasten them — they expand on the inside and anchor into the rock really hard. We could then use them to hold the guys of the antenna masts and the tents. Another idea was to build a raft out of plastic drums — we thought this would help us transport all equipment from the boat to the rock. The rest of the arrangements were pretty standard, just like our previous IOTA, but we decided to be very strict on the BOM, since excess luggage would only mean excess trouble. We also decided to make one more trip, sort out some of the local permission issues, and just have another proper look before we actually finally went.

The day we decided to make our second inspection trip to the rock apparently turned out to be a new moon day. This day is superstitiously considered bad to set out to do anything worthwhile. None of us believed in this, and we planned to travel to the rock anyway. This time additionally Prakash (VU2JIX) accompanied the remaining four who had gone the first time. Since I lived another 70 km away from the city where we had to board the train, and where the remaining four lived, I camped at Mur's home the night before we set out. The train was to leave at 03:40 hours (local time). Chets and Prakash also joined us here in Mur's place, and we all were talking until about 1:30, when we decided we'd better have at least an hour of sleep. We woke up at about 2:30, had a quick bath, and set out. When we went outside we realized Chets' motorbike had been stolen. He didn't believe me when I noticed it first and told him, he thought I was joking and had hidden it someplace. We were already getting late to catch the train. Dilemma: Whether to go or not to, as Chets was pretty upset — quite naturally so. We made a quick trip to the local police station, and tried lodging a complaint — though they began sending out wireless messages to the patrol all around the town, we were not able to formally lodge the complaint, as the concerned person wouldn't work at this time of the night. Meanwhile, Ro, who had independently gone to the train station from his home, had already bought us all the travel tickets and was waiting with some other mountaineering friends who wanted to join us to see the rock. Consoling Chets that the police were now working on the motorbike search, all of us sped away to the train station — only to see the last compartment of the train just moving out of the platform. Ro was in the train with four extra tickets and some other friends. The four of us who missed the train inquired to find that there was another train traveling in about 45 minutes but from another train station on the outskirts of the city. We could make it. We also decided to have a quick look around Mur's house locality to see if we could find Chet's mobike someplace. No luck, though. When we reached the other train station, the train had already arrived. I volunteered to get the tickets, while the remaining three would get all the stuff near the platform inside

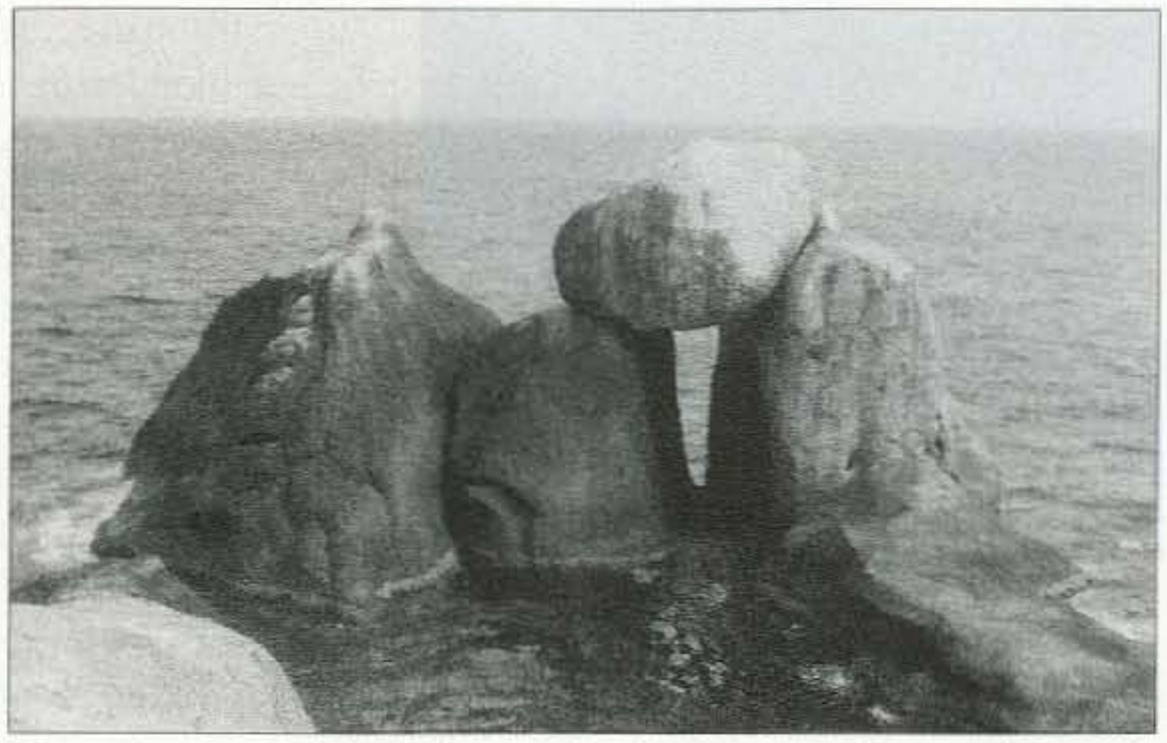

Photo B. *One of the sights on the Sacrifice Rock — a delicately balanced rock structure.*

Photo C. *Main camp area — all the gear is slowly beginning to come in.*

Photo D. *Chets VU3DMP burns the midnight oil as SWL Adarsh looks on.*

***Photo E.** Our faithful but overbuoyant raft made it possible to transport everything over the water.*

***Photo F.** Antenna mast for base station (Fritzel) with Indian national flag (it was Republic Day in India), and our banner.*

the station. We were carrying one radio station, including a lead acid battery (which we now realized was a stupid idea) to try it out from the rock. While they were carrying all the things to the platform inside, I just managed to buy four tickets and rush inside to find out the train had already begun moving. Man, this was turning out to be a nightmare — and whatever superstition-free minds we all had now began wondering if there was indeed something bad about this new moon day, as the elders used to believe. We just got in whatever compartment that was closest, and decided to sort out our actual compartment once we were in. Getting in with those things, especially the battery, was pretty adventurous.

The compartment we went in was full up to its brim. There were no seats even to sit on temporarily, and much to our dislike we ended up sitting on the floor near the toilets. (Prakash and I then went searching for our actual compartment, should the ticket inspector fine us for being in the wrong place. To our disappointment, the connection doors to other compartments were locked, so we were forced to continue where we were.) Meanwhile, Chets was worrying about his mobike. He eventually decided to get off at the next station to go back home and try looking for the mobike. It seemed pretty sensible, so he got off at the next stop. Stops were really short, so we didn't risk transferring ourselves with all that luggage to our actual compartment (God knows how far it was anyway!). As our destination (Badagara) approached, some seats became vacant. There was hardly 30 minutes of journey remaining — we were thanking our lucky stars that the ticket inspector didn't turn up after all. When it was just 5 minutes till Badagara — lo, the ticket inspector. He just wouldn't listen to our story about getting into the train at the last minute with the heavy luggage, and the fact that the connection doors were closed, and the fact that we were sitting just outside the toilet for most of the journey. We ended up paying heavy penalty — Hell, no more doing anything on a new moon day, we decided.

***Photo G.** Our team, left to right: Chets VU3DMP, Su VU2RDJ, Prakash VU2JIX (holding the left end of the banner), Ro VU2RDQ, Mur VU2MTT, Manu VU2JRO, SWL Laxminidhi, Pai VU2PAI, Boatsman Baijo, Sri VU2SBJ (holding the right end of the banner).*

We met Ro and his other mountaineering friends at the Thikkodi beach. The boat people and the local fishermen folk, now seeing us for the second time, probably realized we were indeed not joking about staying on that rock in the sea for two days. They also saw prospective business due to increased demand — from zero in the last few years to two trips in within a couple of months for nonfishing purposes! Their rates were already up by about 30% this time. No alternative, so we had to accept. We set out toward the rock. This trip, however, was a real morale booster. It didn't scare us as much as the first time. Probably because things looked much more familiar than the very first time. We knew exactly where we were going, how long it would take to reach there, and how things looked at the other end. This time we looked for the most convenient place to enter on the rock, and earmarked locations on the rock for setting up the various antennas, stations and the main camp. Another idea that we had, about transporting stuff through a rope-way from the boat, looked impossible once we went there, so we decided to stick with the raft idea.

After we went back on land we visited the local police authorities, and were successful in gaining permission to stay on the rock for two days and to travel by fishing boats. Though this is not a tourist spot, and there was no formal mode of transport, the police were very understanding and realized the context well and gave us the permission. This had always been a big question mark, so once this was cleared up we were literally on cloud nine.

Each way to reach the rock from our hometown took about 5 hours by rail, another hour by road, and finally another hour by sea. Had we used the air mode to travel somewhere in between, we would have covered them all. Probably the cloud nine we were in a little while ago could be attributed to air travel?

Things appeared more concrete after this trip. We began making all the arrangements as the days went by. First we had the raft built by a boatbuilder

friend. He made it out of scraps of wood and two empty plastic oil drums. We wanted to test it out so off we went to the local fishing harbor, and tested it out — it seemed too buoyant — appeared as if it required some support from the sides to ensure it didn't topple. We decided that two people should escort the raft while the raft carries the station stuff, else it would topple. To have a person sit on the raft was out of question. We did not have the resources or the time to have a better one built.

Transport by road instead of by rail was preferred as we had a lot of stuff that was not practical to be taken on the train. We arranged a 15-seater van, and requested the driver to have some seats removed to accommodate the raft and the rest of the stuff.

D-day arrived. Our final team was as follows: Chets VU3DMP, Prakash VU2JIX, Ro VU2RDQ, Su VU2RDJ, Sri VU2SBJ, Pai VU2PAI, Mur VU2MTT, Manu VU2JRO, SWLs Laxminidi and Adarsh. Ten of us in all. We were to set out at 7:30Z on the 25th January 2002. We soon realized we were running late and also that the van wouldn't be able to accommodate all the stuff and all the people — some more seats had to be removed to accommodate the raft. We decided some of us would use the train while some would go on the van.

We all reached our destination in one piece. The van people arrived well before the train people in the late evening, and occupied the dinky but well known hotel in Bagadara which was arranged by a friend. The dinner was simple but good, and we were also paid a visit by the friend who arranged this hotel. The place Badagara is located in the neighboring state of Kerala, and most speak only the local language Malayalam. Only a couple of us in the entire team knew about 50% of the language. It was quite some achievement to communicate one single sentence for the rest of us.

We slept as early as we could, and woke up at about 4 a.m. All of us had a quick shower, the only fresh water shower that would be possible for the next two days, and drank the coconut water that was so kindly provided by the friend who visited us the previous night. It took quite an effort to get the van out of the cramped parking area of the tiny hotel, and we were off to the beach by about 6 a.m.

We reached the Thikkodi beach by about 6:30 a.m., and began unloading all the stuff from the van to the beach as close to the water as the van could possibly go in the sand. We soon realized that the boats that were originally spoken for were already out on their fishing duties as early as 4 a.m., though we were assured they wouldn't be going as a special case to accommodate our transport arrangement. The boats came back only by about 9. We had a light breakfast on the beach meanwhile, and began loading the boats.

We thought we should get some extra lifesaving equipment, as the ones we had were damaged. So two of us went in search of tire tubes, which are pretty good alternatives for life jackets. The sea was already getting pretty worked up, and the morning was windy. The boat people discouraged our traveling on that day unless we set off immediately. Of the two boats that were being loaded, one of them set off in a hurry with only four of us. The remaining six were still on the shore.

The six who were on the beach waited for the two who had gone in search of the tires. They had already taken over an hour, so the second boat had started off with only Ro and few other boatmen. The plan was to have a third boat get the rest of the people and also some stuff that wouldn't fit in the first two boats. The whole launch of the boats from the beach was so mixed up that we were totally confused by what was happening. The boat people simply refused to listen as they felt that they couldn't wait any longer on the beach.

The first boat that took off preschedule had Su, Laxminidhi, Manikant,

Photo H. *A view of the gigantic Sacrifice Rock.*

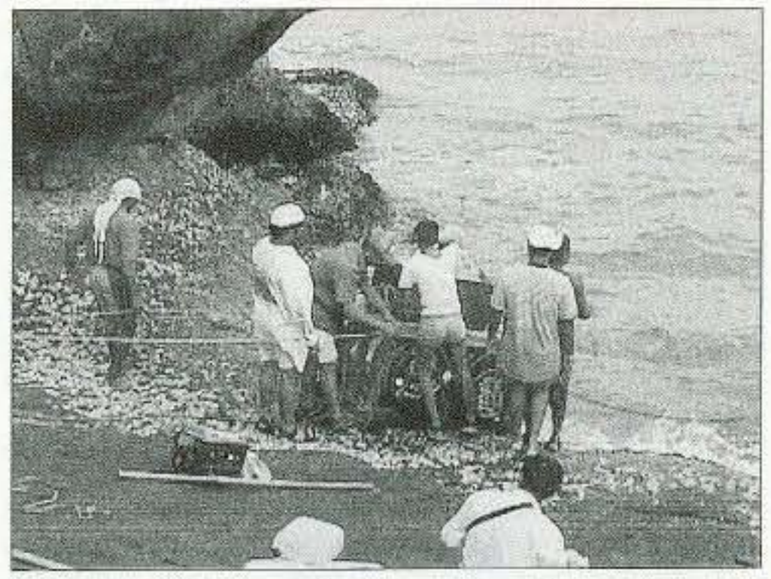

Photo I. *The raft, being loaded with our belongings after the event — it would then be pulled by ropes to the boat.*

Photo J. *Prakash VU2JIX, center, and other people from the boat, pull the loaded raft toward the boat. This overbuoyant raft kept the owners of our gear very anxious during each trip.*

and me on it. Not one of us knew Malayalam, and we never were able to find out why he took off without Ro, who was supposed to come with us in that boat, nor what the plan for the rest was going to be.

In the confusion, the VHF handies were not accessible to any of us, as the entire luggage was mixed up in the hurry. So no way of talking to the rest of the team either. We reached Sacrifice Rock in about one hour's time —

Photo K. *A view of the tent occupied by the only couple in the team, YL Su VU2RDJ and OM Ro VU2RDQ. One of the antennas is visible in the background.*

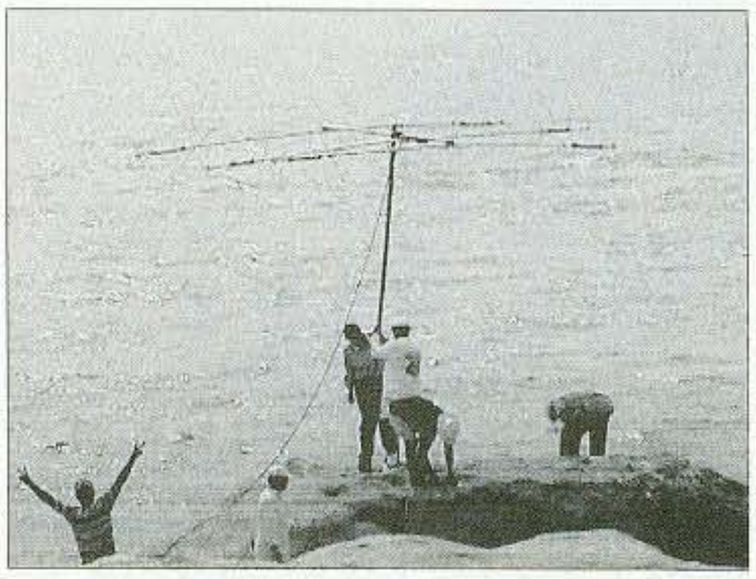

Photo L. *MA5B Cushcraft antenna being installed. This was the antenna for Station 1. The mast and guys were fixed to the rock by anchor bolts drilled into the granite. It stood well for the entire two windy days.*

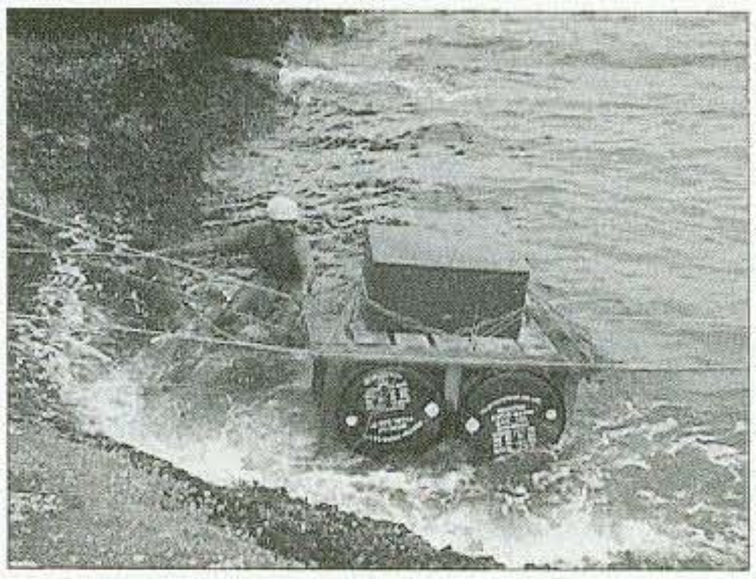

Photo M. *Packing off! The raft gets into the water with another load of gear. It was then pulled towards the boat with the help of several ropes.*

Ro's boat was much faster, as it had less luggage. So we arrived almost at the same time though he started out later. The third boat was not yet seen, and we had no idea what its status was. It finally arrived in about 45 minutes, and we began unloading the stuff.

Getting the raft into the water from the boat was easier than we expected. They tied all the three boats together so that those tiny boats wouldn't topple with all the imbalance in weight while unloading. The sea was not so rough, so the boats went as close as about 10 meters to the rock. At one point, they even took it as close as 2 meters, to one small extended part of the rock, while Su and Manikant jumped on so that they didn't have to get into the water. They had to also do almost a mini pole vault exercise to reach the main rock — they probably preferred this to getting into water. They didn't know how to swim!

As the stuff was being transported over on the raft, two of us, myself and one boatsman, were guiding the raft from the boat to the rock. Ro and others were putting stuff piece by piece onto the raft from the boat. The sharp barnacles and shells stuck to the rock at the intersection of the rock and the water made it pretty difficult to go close to the water to pull off the stuff from the raft.

SWL Laxminidhi at one point underestimated the weight of one pack of several mini lead acid batteries, and lost his balance, to land face up on those barnacles, with the box of batteries falling over his palm. He really hurt himself pretty bad on the back of his hand, and was forced to take it easy for the rest of the expedition. Manikant, who is a doctor, really made things a lot simpler. He took care of cleaning and dressing the wounds. Looking at the amount of bleeding, we would have otherwise probably been very nervous and uncertain what to do next. He said it was perfectly OK and that Lax just needed some rest.

While Su began setting up the camp kitchen, Ro and the others were getting all the stuff to the main camp location on the rock. Baijo, the accompanying helper from the boatsmen team, decided to stay with us through the 2-day camp. The boats left shortly after all the stuff was on the rock. Even if we wanted to return, there was no way we could get out from here. But then we had the radios — we could communicate the world over.

Without wasting any more time, Prakash and I set out drilling holes at suitable points on the rock for anchoring the anchor bolts for antenna erection. The electric drill was powered by the generator. The process was a lot easier than expected. It took us about an hour to finish enough holes to support all antennas in three different locations. The stations we began setting up were as follows, also in order of setting up:

STATION 1: HF
RIG — Kenwood TS-2000, barefoot 100W limit
ANT — 3-element, 5-band yagi, Cushcraft MA5B (10/12/15/17/20m)
CABLE — RG-213
MAST FOR ANT1 — 10 ft.
BATTERY — Lead acid
CHARGER — 35VA solar panel

STATION 2: HF
RIG — Kenwood TS-850S
ANT — Diamond CP-6 (used for 80/40/20/15/10m)
MAST — 10 ft.
CABLE — RG-213
BATTERY — Lead acid
CHARGER — 35VA solar panel

STATION 3: HF
RIG — Icom IC-735
ANT — Fritzel 3-band (20/15/10) vertical
CABLE: RG-213
MAST — 10 ft. aluminum
BATTERY — 125 Ah lead acid
CHARGER — 35VA solar panel

STATION 4: HF
RIG — Yaesu FT-840
ANT — Longwire with SGC-230 tuner
CABLE: RG-213
BATTERY — LEAD ACID 88 Ah

Station 1 was set up by about 10:00Z (26th Jan). VU2PAI took over the station and began on 15 meters. The band sounded very, very good. As he began operations on Station 1, the remaining stations were brought up one by one.

Within a couple of hours, we received our AS161 IOTA number from OM Roger Balister (G3KMA, RSGB IOTA Manager). MUR, VU2MTT on CW, mostly occupied Station 2. The TS-850 with the CP6 was doing great. Station 3 was with the IC-735, with the Fritzel 3-band vertical. The vertical

was erected alongside the Indian national flag and the IOTA banner that we hoisted in the center of the rock. Station 3 was just beside the main camp kitchen, and a general-purpose station that was operated by most of the team. This was operated by several operators in random order, so this station did the maximum number of QSOs. Station 4 was set up very late in the evening. For some reason, the FT-840 that was operating there was not very well behaved. Maybe the RF interference from the longwire with the SGC-230 (which was not earthed, as it was too far away from the salt water) was causing the radio to malfunction — the display malfunctioned and bands were changing randomly upon TX. So station 4 was not used very much.

The Rock was so windy that we were not very sure if the tarpaulins that we carried should be used as tents. We then decided not to. So all stations were operating without any shelter. Being windy throughout, the heat from the sun during the day was bearable. A large diameter hat was all that we managed with. Su was mostly in the camp kitchen preparing food and drink for all of us. She did operate once in a while. We lived mostly on bread, orange fruit, lemonade, and noodles. Drinking water was available in abundance — hence nothing to worry.

As night fell, and some bands began closing or all the stations were occupied, the remaining people began retiring after a very long day. Though windy, it was very humid and warm in the beginning of the night. Most just found a relatively flat surface to open out a simple sleeping mat. However, as the night progressed, it got very windy and the temperature began to fall. It was shivering cold on the first night. Ro and Su were the only couple and they were fortunate enough to get to use the dome tent that they had carried. The rest (who were not operating) were sleeping in the open.

The 27th went on very well too. All stations were operating continuously excepting Station 4 due to the radio problem. Station 1 and Station 2 were occupied mostly by PAI and Mur. Station 3 had to serve the balance team. Those not on the radio were mostly found either exploring the rock and various types of animals living in all the dark corners, crevices, and water puddles on the rock, or trying to swim in the sea (with safety rope and inflated tire tubes of course), or cooking, or eating and drinking. Speaking about eating, excretion (fondly referred to as "faxing") was a major adventure for most. Some dark corners served the purpose, or we had to wait for nightfall — when wider choices of natural toilets were available. Some others decided to hold on for the entire two days. (I have been advised to leave out the names here.) For those who decided to try out, rules were strictly laid down. Waste paper was used to collect the "stuff" and had to be packed and thrown into the water as far as possible so as to not pollute the rock. It was indeed fun.

Coming back to the radio stuff, the propagation condition from Sacrifice Rock was very good on 10/15/20 meters on the 26th (Saturday), and the peak was high on Sunday. Ten meters was coming through pretty well at 13:00Z and there was a huge pile-up from Europe till 16:00Z. On 27th Jan., from about 06:50Z to 14:00Z, there was a good pile-up from Europe — a station from Oceania, Asia, also came in with good signals.

Fifteen meters was good on the 26th during 11:00Z to 15:00Z, with good signals coming from Europe. The band opened from 17:00Z to 18:20Z toward N. America and S. America. On the 27th of January, from 05:50Z to 7:10Z, conditions peaked towards Japan and generated a good pile-up.

Twenty meters was the best during 17:30Z to 03:00Z on 26th Jan with stations from Europe, N. America and S. America coming in with strong signals. On 27th Jan. between 16:00 and

Photo N. *Just before we began sailing towards the Sacrifice Rock on the 26th. The team, with all our stuff piled up prior to loading on the boats at Thikkodi beach.*

Photo O. *A view of an entire fleet of four fishing boats (the biggest you can get to see here), passing by the rock. The Cushcraft MA5B can be seen in the corner.*

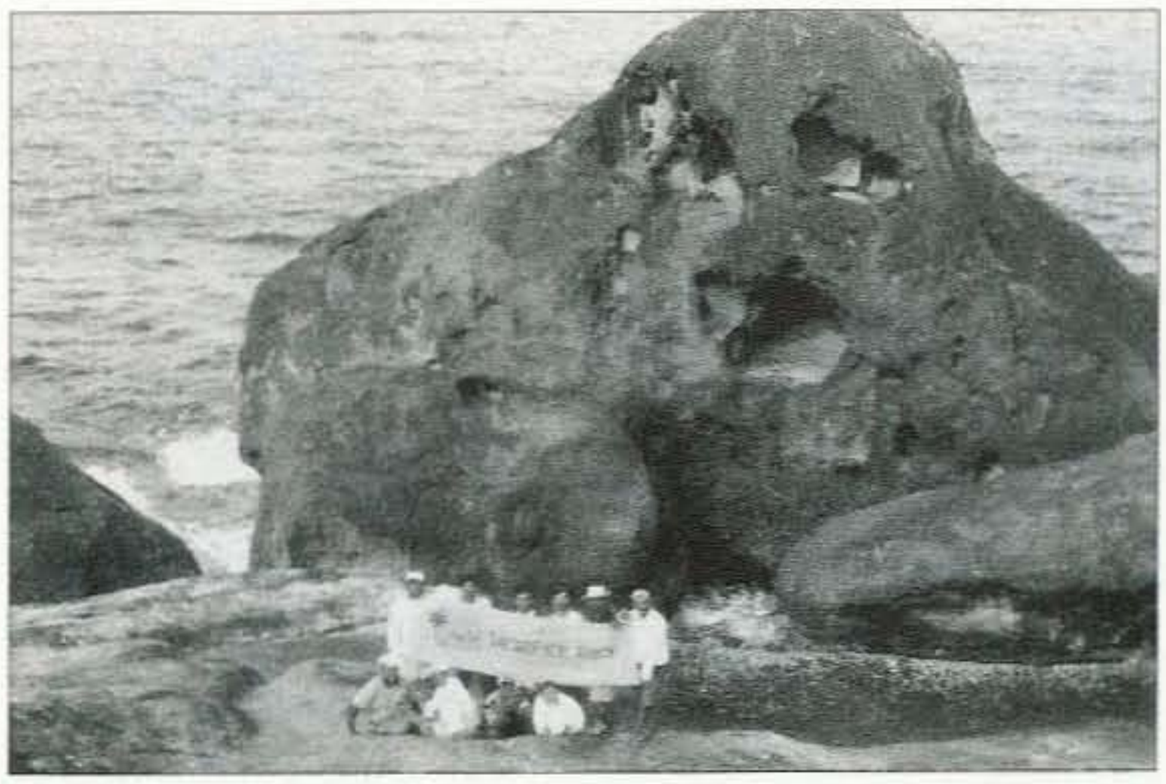

Photo P. *Another strange structure around Sacrifice Rock — a spooky, skull-like structure.*

Photo Q. *Ro VU2RDQ (center, inside the boat) and other boatsmen unloading the stuff onto the raft after arriving close to Sacrifice Rock on the 26th. Sri VU2SBJ (in the water, right) guides the boat to the rock with the aid of another boatman and ropes pulled from the rock.*

23:50Z, stations from Europe, N. America, S. America, and Japan came through with big signals.

Conditions on the 12/17/40-meter bands was not getting any better during our operation. There was pretty high static on the 40-meter band and we could not hear any station on the 12/17 meter band. Though we could get stations from India on 40 meters pretty well, there was no DX heard on the 40-meter band.

The Sacrifice Rock was quite small in length and width and the four stations were quite close to each other. We had splatter on the same band if two operators worked at the same time with CW and SSB. We did try the best to avoid the splatter and sometimes we had to down one station on CW or SSB during peak band condition.

We did our best to log maximum QSOs with optimum band propagation and minimum operating time. We managed about 3,800 in all. We were satisfied, and told ourselves that we did an OK job.

We stopped operations at about 1:30Z on the 28th (Monday). We began packing up all the stuff. Removing the antennas was obviously much simpler and faster. However, waterproofing all the stuff was a major task. It took the 11 (10 of us and the boatsman Baijo) of us more than 2 hours to have all the stuff neatly packed at one place. The boats were asked to arrive by 2:30Z, but they didn't show up.

Eventually by the time they arrived — it was almost 7:00Z. Half the day was gone. The sea began getting rough, as it usually does once the early morning is gone. The boatsmen were really struggling to keep all three boats together. The idea was to get it as close to the rock as possible and tie the three boats up to each other, so that the rough sea would disturb the stability as little as possible due to the three boats being tied together. The depth of water all around the rock was about 18 meters, without a shore to land. The excessive length made the slack in the anchor rope pretty high, which did not allow the boats to be in one place.

After quite an effort they got the boats together one behind the other (long sides parallel) and tied them all up. It looked pretty stable, but was still moving around the threesome. The boats could now not come as close as they did when we landed two days ago. They were at least 120 feet away. Things began looking scary! Getting all the heavy stuff into the highly unstable raft to travel all the distance in the very rough sea was just not a comfortable thing to think about — especially for those who brought their only radios.

The idea was to guide the raft with three ropes on either side — one set from the rock, other set from the boats. Prakash went over to the boat side with the rest of the boatsmen with him. It was quite task to also tie the ropes and get them to the proper locations on the rock. The raft was pretty heavy — it required at least four people on the rock to pull on it for every loading event.

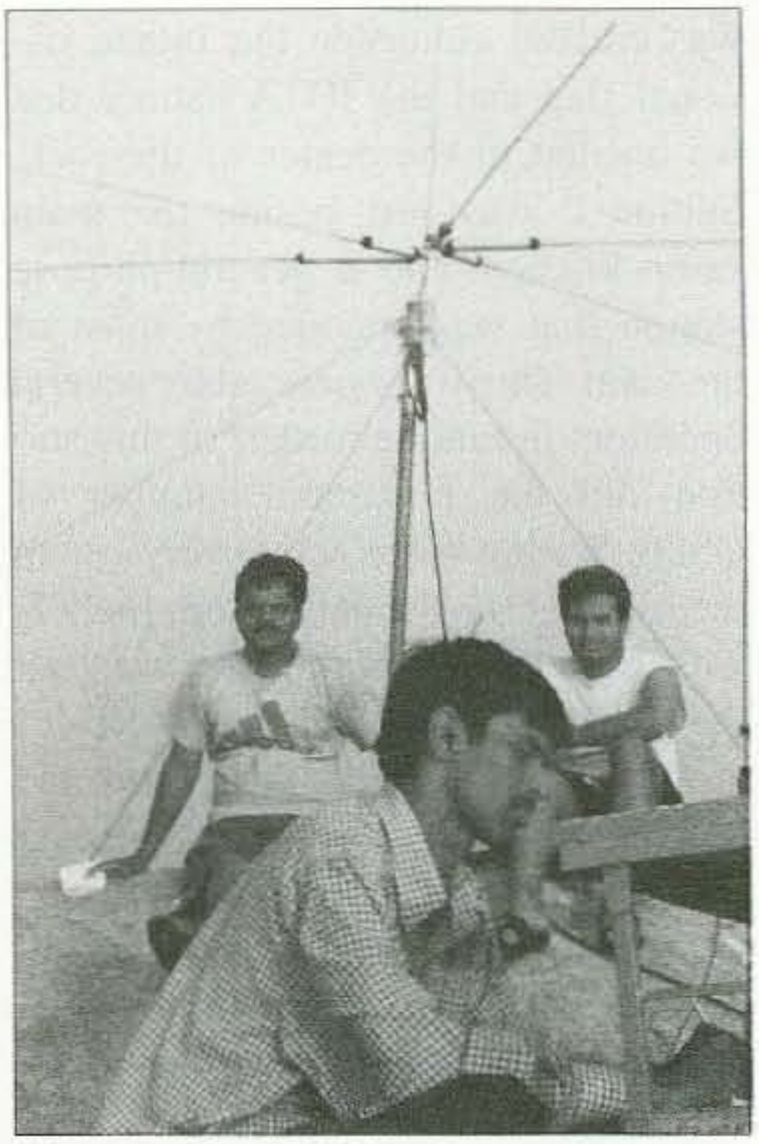

Photo S. *Mur VU2MTT (center), operates Station 2 while Chets VU3DMP (right) and Prakash VU2JIX (left) look on.*

The boatsmen were not game for this idea, and were pressurizing us to cancel the return trip that day — they kept suggesting we set out early next morning. The thought of staying one more day with food and water supplies coming to the end was also pretty scary. We eventually said that if the first raft trip succeeded in getting to the boat OK, we would return the same day — otherwise, it would be the next day.

So we began trying out sending the first consignment. We tied a metal trunk to the raft top and filled it with some heavy stuff that was not very valuable. The thing was so unstable (top-heavy) that it was almost certain it would topple. However, with a lot of difficulty, the raft was guided with the six ropes towards the boat. The first trip was successful — so we decided to indeed leave the same day.

The raft was pulled back to the rock, and the next consignment had a few

Photo R. *Prakash VU2JIX (left) operates while Sri VU2SBJ monitors the pile-up.*

valuable items including two antenna tuners. As it left the rock, the sea that was now pretty rough unfortunately toppled the raft. The trunk with all the stuff was completely in the water. There was nothing anyone could do — fortunately all the stuff was packed tightly in plastic, and the lid of the trunk was also tied — and the trunk held on to the raft — else it would all have gone straight down in the sea — some 18 meters below.

Two boatsmen went and upturned the toppled raft and it was quickly pulled towards the boat. It was not so damaging — the plastic packing was pretty good — and the tuners just had some moisture on the cover inside the plastic. There was also one HF power supply — it was carried just in case we had to use it with the small generator we carried for the drilling machine. It was unfortunately not packed.

Prakash, who recently had purchased the power supply, looked disappointed. It was most certainly useless after all the salt water inside. However we hoped we could do something — we proceeded with the next trip — this time in addition to all the rope guiding business we decided two boatsmen should swim with the raft, holding it from toppling. It then took us about 10 to 12 trips to get all the stuff back on the boat.

Once the stuff was all loaded, there were still people to get in the boats — 120 feet away. What about those who didn't know how to swim? It scared the wits out of them! 60 feet of sea water — without knowing how to swim. It must sure sound scary. There was a rope tied all the way from the rock to the boats. We had to hold it and come across. For those of us who knew swimming, it was pretty easy. Swimming as such was difficult, as the sea was very rough. So the rope guide really helped us. For those who didn't know swimming, the boatsmen accompanied them. Eventually everyone came aboard safe and sound.

The entire exercise was so anxiety-filled that no one had the presence of mind to take pictures of the adventurous boat-loading event. It took us 4 hours to get all the stuff loaded on the boat — it was about 11:00Z when we started off from the rock.

That was the end of all the adventure, we thought. We'd just get back to the shore in about an hour, get off these boats, and load the van with the stuff and get going home.

Unfortunately it was not to be that easy. The sea continued to roughen up. The waves were gigantic. The tiny boats were simply matchless. The boatsmen quickly decided to travel all the way with the three boats tied. It was quite an effort to drive the three boats this way — each had to run the boat very carefully — and in synchrony. Imagine what would happen if the boats on the sides were to get out of synch and one of them ran it faster than the other — the entire assembly of three boats would start turning and probably be unstable. They were pretty good at it.

The waves were huge — they always tried to move on the top of the wave — it was a real roller coaster ride. They had us seated carefully at different points on the three boats to have some sort of balance. Every time a huge wave came and the boat rode on top and came down, so much water came in. We were busy emptying the water manually. The entire hour back was so very tense it really had each one of us praying for our miserable souls. Going to this remote rock in the middle of nowhere for operating the radio — such a stupid idea, we thought.

Land at last — 70 minutes seemed like eternity. The boat owners had assembled on the shore. They were really worried, as it was almost 4 hours later than expected. Besides it was also beginning to get dark. They all wore that "I told you so" look. We had made it back — safe and sound and in one piece.

The van loading took us an additional hour. We quickly had some food in the village nearby, and set off. We decided to just all pack in the van, even when it meant some people had to sit on someone else's lap. The driver who had waited on the shore for the previous two days was probably dying of boredom. He drove really fast and

Photo T. *Sunset time — Sri VU2SBJ, setting up the longwire antenna while SWL Laxminidhi (injured) looks on.*

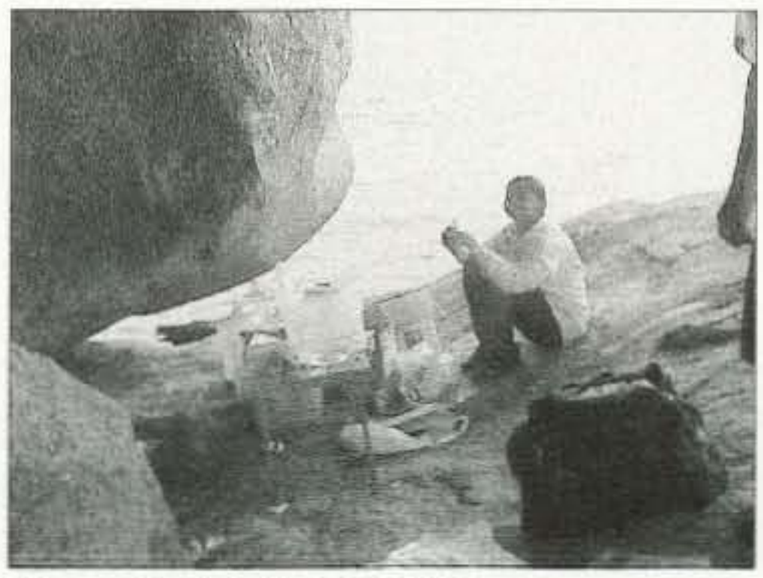

Photo U. *YL Su VU2RDJ tries to cook a meal at the camp kitchen.*

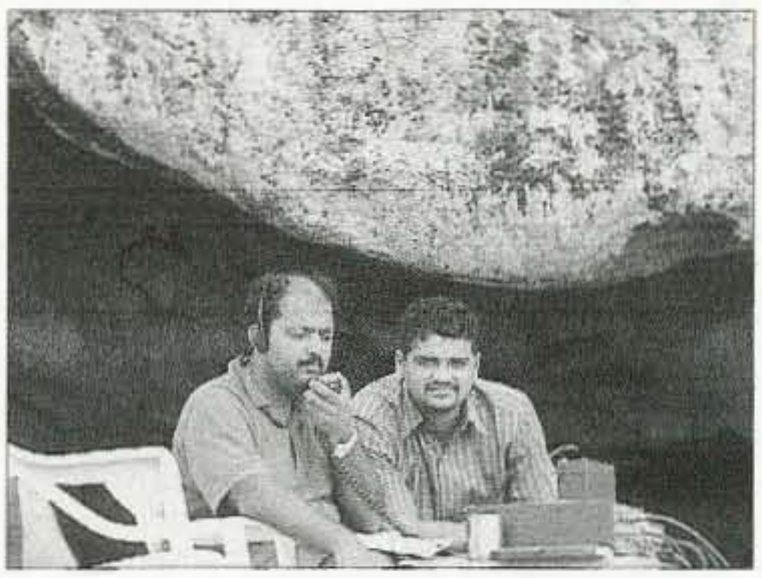

Photo V. *SWL Adarsh (right) watches while Sri VU2SBJ (left) operates Station 3.*

we reached Mangalore at about half past midnight (local time) on the 28th.

Some of us from Manipal had to travel another hour to get back home. Just had a shower and hit the sack. A busy day at work lay ahead for each of us.

The entire experience of the Sacrifice Rock IOTA was absolutely thrilling and satisfying. Though some of the trying moments made us think otherwise for some time, we asked ourselves if we wanted one more of such events.

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Hamfest Success Formula

How to make sure your 'fest is a success.

So much has happened to the electronic industry and the hobby of amateur radio in the last 25 years of the almost 50 since my first hamfest.

During that time, I have been a spectator, retail exhibitor, manufacturer, flea market seller, and even a hamfest committee member. Probably the questions most asked by the hams, the flea market sponsors, the exhibitors, and especially the hamfest committee are, "What makes a good hamfest?" and "What can be done to make it even better?"

Here are some very simple answers to the first question.

As a spectator, finding something you wanted at the price you wanted made it a success for you. As a seller who goes home with a lot less inventory than what you came with, and a pocket full of money, success is yours also. Commercial vendors and manufacturers who sell a lot of product have their measure of success. It is all quite simple! The real trick is to make it all happen.

Without pulling any punches, telling it like it is, many hamfests fall by the wayside. Everyone is excited and enthusiastic in the beginning, but some volunteers find it more work than they wanted while some stick it out and just plain become burned out.

I have attended most of the major hamfests in the United States, Hawaii, Europe, and Asia. I was one of the hams on the committee that started Radio Expo in Chicago in 1971, the ONLY hamfest, in the world that has had Robot, Hewlett Packard, Standard, Antenna Specialists, Dycom, CBS Radio, Motorola, National Computer, Robyn, Swan, RCA, Sentry Crystal, Regency, Clegg, Hal Devices, ARRL, *Ham Radio Magazine, 73 Magazine, CQ Magazine, RPT Magazine,* Midland Radio, Lafayette, Hallicrafters, Hy-Gain, Galaxy, E.F. Johnson, Avanti, S9, Alpha Seventy, Signetics, U.S. Navy Training School, General Electric Radio, U.S. Coast Guard, and many more, all at the same time — though unfortunately many of these folks are now long gone. Not even Dayton has ever accomplished that many luminaries at one time.

A club that runs a local hamfest gives a very nice pocket daily diary to each of its members and also to each commercial vendor who attends the hamfest. Recently a major vendor did not receive the pocket dairy. They told me how they had looked forward to getting one and were disappointed that they did not get one. When I told the club president, he immediately had one sent to the vendor in a plain envelope, did not call him as I suggested, did not put a note in the envelope with an apology for overlooking them, and did not thank the vendor for showing an interest in the small gesture of appreciation. Later when I spoke to the vendor, they told me of the cold and impersonal mailing, obviously disappointed in the brusque way it was done. A marvelous opportunity was missed to engender some real goodwill, and probably some ill will was fostered. Often it is the little things like this that can make or break an excellent relationship with vendors and in turn spell your success or failure in the hamfest.

While the hamfest committee is basically responsible for making it happen, it is largely a thankless job. As a club member, give them all the support you can and then some! A hamfest MUST be run as a business. If you are incapable of doing that, as many of us are, or if you don't have the time or desire to do it, well, then don't volunteer to be on the committee. Volunteer for one of the other jobs involved in running a hamfest, like setting up tables, chairs, helping with parking, or one of the endless list of things that need to be done to have a successful hamfest.

With today's free telephone calls allowed to many subscribers or the inexpensive 3- to 10-cents-a-minute long distance charges for others, it is not an expensive thing to do to make a few calls for the committee, and it can be a great big help to them. Here's another thing to do after the hamfest. No longer than 30 days after, send a thank-you letter to all of the commercial exhibitors … the Alincos, Icoms, Kenwoods, and Yaesus. Send thank-you letters to the dealers and to everyone who bought booth space. Possibly include the registered flea marketers — especially if they BOUGHT table space. A short telephone call a few weeks after that for follow-up might ask what they liked and what you could do to make it a better affair for them next time. When making such calls, be sure they have a business flavor, be tactful, be a good listener, and above all do not prolong the call— be respectful of the value of the other person's time. Everyone enjoys a little personal attention, and most will welcome the opportunity to give their comments or complaints about the show. Be sure to thank them for their time and, finally, try to get a commitment for next year's hamfest. Then a few months later make a follow-up call, again using members with free phone privileges. By spreading out the effort, you will give members a sense of involvement without being too demanding of their time and money. Make sure you pick the people who make the calls VERY CAREFULLY. Try to use the brightest crayons in the box to do this for the club.

Consider offering a prize for the "BEST" commercial display. Maybe for the size or inventory. Maybe for having the most visitors. Maybe for having the best HAM and NONHAM information to pass out, verbally and on paper. Maybe for the most exciting booth for "NONHAMS" … let's not forget them. Maybe for being especially helpful to youngsters. The prize might be a free booth the following year, or a discount, or an award plaque.

A comment here for flea marketers! A little soap and water, a wiping or dusting rag, and a little elbow grease please! Clean equipment ALWAYS sells better and for more money.

Ladies' programs seem to be forgotten lately. We found out many years ago that more OMs would show up at hamfests if the YLs had something to do or see. Hundreds of YLs would show up for the Tupperware, Avon, etc., seminars and demos. How many of you have stayed at home on a hamfest weekend because the YL wanted to be with you and had no interest in the hamfest? A ladies' program might make the difference.

How about an incentive to any ham bringing a "nonham," getting a free admission for his friend. While hams are not cheap, hi hi, they might bring in more guests, for the right incentive. This could work towards doubling the attendance to the show and exposing a lot of new folks to the hobby.

How about a buffet dinner and open bar for the first hour on Saturday night, for the vendors and committee only? An excellent way to get to know the vendors and their likes and dislikes. Then, after the first hour, open the party to everyone on a cash basis. The profits from the general crowd will help defray the costs for the free party. The general crowd will be able to mingle and talk to the vendors in a more relaxed atmosphere and environment. Be prepared to hear comments from some of the vendors about being tired after traveling, maybe all night or all day, and then setting up their booths and standing all day long, and be understanding. Think about questions that may be asked and have the answers in advance.

Every hamfest needs to have an interactive Elmer booth. You should have at least one demo going on at all hours of the show. It can be anything from kit building, APRS demo, building an antenna, ATV demo, to filling out a QSL card. Get members of the club to help who have favorite specialties. Not only newcomers, but other members of the club can learn from this booth.

Vendors sometimes attend with a minimum size crew and if business is good, it might be difficult for them to get away for coffee, doughnuts, lunch, potty breaks, etc. Some years ago I suggested using Boy Scouts, Girl Scouts, CAP cadets, etc., as help for the vendors, to watch the booth for a few minutes, run for coffee, get a sandwich, etc. If your event is in a facility that wants no outside food or drinks brought in, use this to your advantage. Ask them to provide this service for you. They make a little extra money, and you are not burdened with this detail. You might even be able to strike a good deal with them for catering your Saturday night buffet. Caution the young volunteers not to interfere

with the vendors' activities and to only respond to requests for assistance.

If you have access to a large electronic billboard next to a major expressway, advertise the event a month or two beforehand. Have a radio personality plug your hamfest. Allow the radio station to set up a booth at the hamfest at no cost to the club. Many amateur radio clubs have members who are in these various fields who can be called upon to help. Arm your publicity committee with enough good PR information to make it easy for these folks to provide you with the publicity. Publicize the public service your club provides in your advertising.

Make sure your event is well advertised in the ham magazines and other ham publications. Get listed in the "Events Calendar." Drop off flyers at your local Radio Shack and electronics parts stores, but make sure you ask permission first. Use your Web site to advertise the event, and be sure your Web site is updated and carries no information that would detract from the positive image of a viable club.

Be sure your club members who attend other hamfests are well supplied with your flyers to make them available at those hamfests.

One of the toughest problems that especially new, start-up hamfests are faced with is picking a date and explaining to thousands of people why your date conflicts with another hamfest or event. In many areas you can find a hamfest within an hour or two drive EVERY weekend throughout the summer and sometimes into the wintertime. Here's what to do. If you want your event to take place in July and you know of a good site, a fairground, a coliseum, a convention center, etc., send a committee to check out the prices and availability of space for July. If you find out that the best time for your event is already taken, use it to your advantage. See if you can join forces with them and hold both events at the same time at the same location. If the hobbies are compatible, this is an excellent way to introduce a whole new group of one hobby to the other. You might even join forces with another ham club. By doing so, you effectively double your available workforce. One BIG plus to this is that now you may have THE NUMBERS, that major vendors and magazine publishers look at to attract them to your event.

A trap that new start-up hamfests should not fall into is for eager people that want to start another Dayton. Most of the time they lack the experience and or background to do it RIGHT. A NATIONAL convention held some 25 years ago, involved a club that had not run a national convention for more than 5 years. Many of the older members who were involved in the prior event were not available. The remaining very-well-meaning and eager members who decided to "PUT ON THE SHOW" had little or no CURRENT experience. But even so, sometimes things that worked 5 to 10 years before simply don't fly today, although experience is a GREAT teacher. Making the hours longer is not attractive to exhibitors. Especially on hard floors. So place carpets in booths even if they are a gaudy color. Exhibitors will appreciate it. These carpet pads are available from local carpet stores, which will often give them away. These pads will also make nice pads to put between items so they don't get scratched in transit. You might want to provide several for yourself and other people manning the booth.

Now here is something that should interest all of you: making more money for the club and cutting down on the financial exposure. Start by planning the purchase of the major door prizes. Pick a dollar amount you think is reasonable. Buy the prizes or make a commitment to buy them. Put the word out as to what you are going to be giving away at your event and be sure everything goes as planned.

Maybe you had a good turn out at last year's hamfest and you expect the same or better this year. But MURPHY strikes. It rains, it snows, or you have 60 mph winds forecast or it's 110 degrees in the shade. Less than one half of the last year's attendance shows up. You have spent or committed your "wad" on the door prizes. You don't take in enough money to pay some of the other expenses you occurred. Where do we go from here?

How about if the committee had decided to commit to only "one" major door prize. Or if the club states in their flyers that a certain percentage of the gate receipts will be spent on door prizes. The flyer can even state that the more attendees who show up, the more door prizes there will be. By doing this, you have held your up-front exposure and expenses to a minimum. If you have a good accounting system in place, you know what advance monies have come in and how much is committed.

Now comes a good part! You notify all your prospective vendors that all door prizes will be purchased from vendors that attend your event and that special mention will be made for that vendor. One hamfest that I know of in the West keeps an hourly account of the gate receipts as they come in. They take the agreed percentage of the gate around the floor and continue to buy from as many of the attending vendors as possible after getting some feedback as to what items might make the best door prizes. The first year they did this they spent more than twice the amount they spent the year before on door prizes, and had a lot more money left for the club also. Remember, you are only spending a percentage of the gate receipts.

This only scratches the surface of a very complex issue. I hope that I have given you food for thought and caused you to rethink some of the things you may be doing now. All of these ideas may not work all of the time. Ideas that did work years ago in one area may not work there again, but might work in another area or at another time.

This is a collection of thoughts and ideas and experiences that I have been exposed to over many years. Giving credit to all of the people who have added thoughts and ideas for this article over the years would be impossible. But thanks very much for your input and thoughts over those many years. If anyone reading this gets just one good idea or constructive thought to use, this effort will have been more than worthwhile. 73

Calendar events

Listings are free of charge as space permits. Please send us your Calendar Event two months in advance of the issue you want it to appear in. For example, if you want it to appear in the March issue, we should receive it by December 31. Provide a clear, concise summary of the essential details about your Calendar Event.

JAN 11

GREENWOOD, SC The Greenwood ARS 2003 Hamfest will be held at Greenwood Civic Center, January 11th, 2003. Contact *W4JAK, President, GARS, 106 Dorchester Dr., Greenwood SC 29646,* for further information.

JAN 26

NEW PHILADELPHIA, OH The Tusco ARC Hamfest will be held at New Towne Mall, 400 Mill Ave. SE, New Philadelphia OH, Sunday, January 26th 8 a.m. to 2:30 p.m. Setup is at 6 a.m. Admission is a $4 donation at the door, dealers admitted at no charge. Tables $11 each. Food will be available on site and starting at 7 a.m. at the restaurant next door. Directions: Exit 81 off I-77 to SR 250 East to SR 416 Exit. At end of ramp, turn left at light (under SR 250 bridge), then turn right at the first light. New Towne Mall is on the left. Talk-in on 146.730(-). Free parking available at the mall. Dealers welcome. ARRL/VEC sponsored exams by appointment. For additional info and to reserve tables, contact *Gary Green KB8WFN, 32210 Norris Rd., Tippecanoe OH 44699.* Phone *740-922-4454;* or E-mail *[kb8wfn@tusco.net].* Reservations must be paid in advance and received by January 20th to insure the return of reservation confirmation. Remember to enclose an SASE. Make checks payable to Tusco Amateur Radio Club.

SPECIAL EVENTS, ETC.

DEC 14, 15

WICHITA, KS Special Event Station WØSOE will be on the air from the Kansas Aviation Museum in Wichita KS from 13:00Z December 14th to 23:00Z December 15th, to celebrate the 70th birthday of WARC, and the official opening of the Club station in the old municipal airport building. Listen on or near the frequencies of 7.270, 14.270, 21.370 and 28.320 MHz. A certificate will be available for confirmed contacts. Send an SASE to *Bob N4BM, 12135 W. Lynndale, Wichita KS 67235.* For more details, visit the club Web site at *[http://www.warc1.org].* 73

Never say die

continued from page 8

lived entirely separately and cooperated to close down any Fijian who dared to start a competitive business. In other countries it was the Chinese who were hated … for the same reason.

The situation in Germany in the 1930s was similar, with the Jews protecting each other in business in the same way. This made it easy for Hitler to use the German hatred of the Jews as a way to build his power.

When I was young any major American business wouldn't consider hiring a Catholic or a Jew. Just as most hotels were closed to blacks until fairly recently, many of the hotels in the 1930s were "restricted." That meant no Jews permitted.

I remember when I started my first business in 1951 to make loudspeaker enclosures. The office was a desk in my bedroom in my folks' house in Brooklyn and my first employee was Jordan Polly K2AZL. My father was aghast. He's … he's … he's a Jew!

In the past, immigrating groups at first kept together in enclaves, but by the second generation the integration of the Irish, Italians, Germans, Poles, and other Europeans had turned most immigrant families into Americans.

The color difference has made black-white integration much more difficult. Ditto the brown-white integration. But, maybe a few more generations will solve most of our ethnic conflicts.

When I was in college sixty years ago, we had a few Hispanics, one black, and a few Jews. The Jews had their own fraternity and didn't mix with the rest of the students. The black was in several of my classes and it never occurred to any of us to think of him as anything but just another student. The Hispanics didn't keep separate either. I remember often bringing a classmate from Bolivia to my ham station so he could talk with his family in Cochabamba via CP5EA (I still remember the ham's call).

The more ethnic groups stick together and avoid speaking English, the longer integration is going to take. The longer they hold onto being Mexican-Americans instead of Americans, the more problems they're going to have enjoying the benefits of being American.

The blacks have done it to themselves by insisting on being African-Americans instead of Americans. Note that "African" comes first. Yet I doubt that you'll be able to find any American blacks with the slightest interest in living in any of the African countries. I've only visited ten African countries so far, but I sure wouldn't want to have to live in any of them.

When an Irish-American man marries an Italian-American woman, are their children Irish-Italian-Americans? No, they're Americans. Period.

Hmm, so how about the Chinese? I haven't seen any sign of them making any effort to integrate. Our local Chinese restaurant has been run by a different Chinese family every couple of years, with none of them making any effort to learn English except the waiter … and then just enough to deal with customers. What master organization is setting up these thousands of Chinese restaurants? Where are they getting the families to run them? Who suddenly moves one family out and another in overnight? Are we being infiltrated with "sleepers" in preparation for an eventual war with China? Every little town in New Hampshire has one or two Chinese restaurants. Is it the same where you live?

Our Schools

Have you ever wondered why our public school system is so bad, and why it's getting worse? As usual, just follow the money.

The teacher unions, which have well-heeled lobbyists in Washington and in every state capital, have a huge vested interest in things not changing (except for the government spending more money), and they're willing to spend whatever it takes to make sure nothing really changes.

Then there's the government. It's run by three groups — Congress, the

Continued on page 57

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Microwave Frequency Meters

Frequency meters and Christmas time. I hope you have a counter in your Christmas stocking this year. If you don't, here are some of my suggestions for your next Christmas wish list.

All of the mentioned frequency counters I currently have or have used on my workbench. Hope you too can locate one of these fine frequency counters in surplus at a reasonable cost for your workbench.

Just the mention of the frequency counter topic brings memories of my first frequency meter for which I barely remember the part number. If I remember correctly, it was an HP-523 mainframe about one half the size of a bale of hay and accepting a plug-in to extend its mainframe frequency range from 10 MHz to the outrageous upper frequency of 500 MHz.

It weighed a ton, seemed like maybe 50 to 75 pounds as I remember. I could check carefully after a 2-hour warm-up (great on a cold night from all the tubes inside) and measure my 2-meter crystal-controlled HT. All 2 channels narrow band FM. To this day I don't remember if the HP-523 relays or the blower fan produced more noise, but it was a great shack warmer. This was in the late '60s to early '70s. I should have kept that frequency counter, as it would be a great museum piece now.

Today if we can't measure our microwave 10 GHz frequency hopefully to less than 1 kHz accuracy, it's not doing well at all (from a microwaver point of view). Without knowing where we are located as to our operational frequency on microwave, it would be disastrous. I would compare operations to trying to fish in murky waters where you have no clue where the fish are and just hope one swims by for the bait. At least when you know where you are tuned to for operations as to frequency, it eliminates one wobble in the cog on your wagon. In **Photo A** the VLF receiver located below the HP5360 counter was used to keep the main counter time base reference accurate comparing it to WWVB on 60 kHz. Now I use a Trimble GPS receiver tracking 10 satellites and making frequency reference measurements to parts in ten to the twelfth to ensure frequency meter accuracy. But that is another story for another column.

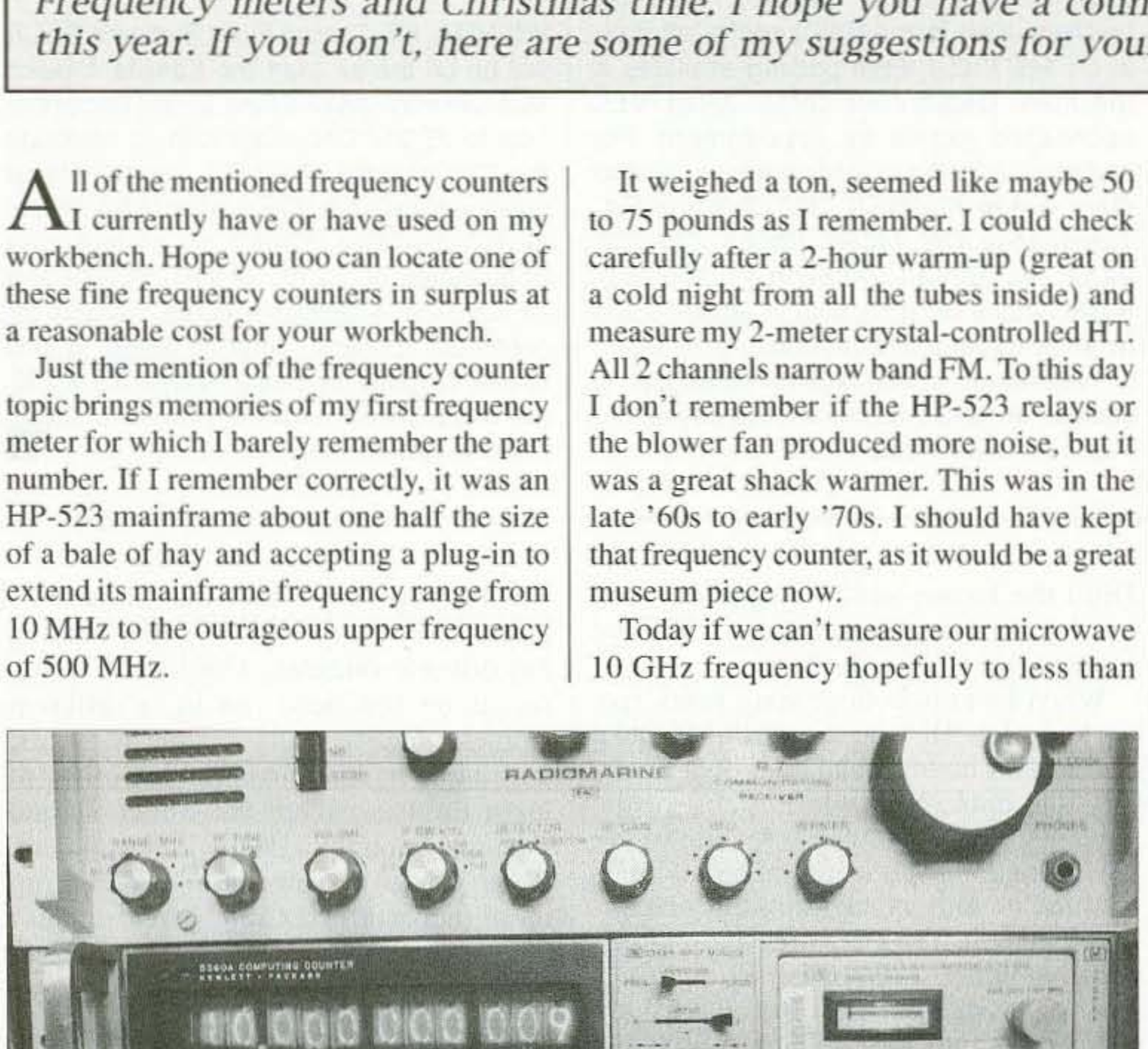

***Photo A.** HP-5360 computing counter, basic 300 MHz mainframe and good to 18 GHz with associated plugs. Can use the same plug-ins as the HP-5245 counter but requires an HP-10536A to adapt the physically smaller 5245 plug-ins to the larger HP-5360 mainframe. This HP-5360 counter is shown between an old Drake R7 monitor receiver and a 60 kHz VLF tracking receiver for time and frequency accuracy comparisons to WWVB at 60 kHz. This frequency counter is capable of reading accuracy of a few millihertz. Shown in picture is 10 MHz measurement to 9 decimal points or 9 MHz accuracy.*

Other wobbles to minimize for good success at microwave operations are system sensitivity, transmitter power output, good SWR match to the antenna, proper pointing of the antenna system, liaison talk channels, and plain old good propagation for contacts. All necessary objectives, but if you cannot verify frequency, you're swatting at flies in a dark room blindfolded

There are many variations of counters and different attributes to choose from in both swap meets and auctions like eBay. The nice thing about frequency counters is that they are such a prolific device, used in almost every commercial shop, making them about as plentiful as the Pentax camera mount lens. To a very large extent they are available in surplus in great quantity. The counters I am to describe are not the only ones available but rather what I have been able to find and have on my workbench.

In my shack on the workbench I have the old workhorse HP-5245, whose mainframe is good to 50 MHz and frequency

is extended to 18 GHz with appropriate plug-ins. The time base is not bad but I rate it fair, accurate to about 1 part in 10 to the 6th or 7th over a short run. Not bad for a workhorse and an inexpensive counter that's quite available.

With the time base running off a station master frequency 1 MHz clock (AN URQ-10A), the time base clock is less than 10 millihertz, improving accuracy due to external frequency reference. Plug-ins that are available are the 5257-A, which acts as a transfer oscillator and converts input RF to 50 MHz mainframe from any frequency in the 50 MHz to 18 GHz input range. There are other HP (Hewlett Packard) plug-ins available that will function from 150 MHz to 3 GHz (5254C), and the 5255A plug-in from 3 to 12.4 GHz. Still a very handy counter selling for $5 to $40 at swap meets, with the frequency counter plug-ins for slightly more. Have seen the 5256A, an 8 GHz to 18 GHz PIU, go for $65 each, working of course.

An update of the HP-5245 is the HP-5248L, which is good to 150 MHz directly and has a better time base oscillator than its brother the HP-5245. Externally, it looks identical to the HP-5245; you have to read the counter label to know the difference. Both counters accept the same brand of plug-ins. The 5248 counter is a little harder to find on the surplus market but still somewhat available, selling for $40 to $75 for the mainframe counter — sometimes with an orphaned plug-in unit.

Getting into specialty counters are the HP-5360-A computing counter which has three input ports, DC to 10 MHz, 1 kHz to 300 MHz, and a plug-in of your choice, using the same plug-ins as the HP-5245 counter. To do so requires a plug-in drawer adapter HP-10536A. The 5245 PIUs are smaller than the opening on the 5360 so the adapter unit must be used or else use the very expensive 5345 plug-in units. Another pricey counter. Similar but not exact. The 5345 will function to 18 GHz as the 5360, but the difference is that the 5360-A will do Boolean algebra using all three of its RF input ports. It uses all three ports to calculate exact frequencies, sampling IF strips, local oscillators and such, and RF conversion LOs all at the same time, and almost tell you which one is off frequency, and how to reset it. The 5360A is also a very fast counter and can do period sampling at RF. One flick of the quickest finger on the PTT switch, be it 2 meters or 1296, and it counts it to a hertz if asked to perform. It's a speedster. Time base just as good as my URQ-10A, which is under 10 millihertz accuracy at clock frequency and very stable for long periods of time. Surplus cost in the $100 to $200 range or more when working and $40 when broken, mainly because it has a handwrapped motherboard, a real TTL giant to trouble shoot. A giga bunch of ICs, if not a thousand. I would pick up a dead HP-5360 just for the master time base oscillator to use as a great reference.

Then comes in surplus the HP-5328A counter good to 500 MHz, very good for low frequency work and I believe not too long removed from HP catalogs as a sale item. It's capable of period and frequency measurements to 1 part in 10 to the 8th and reasonably fast in operation. Cost on the surplus market is about $75 to $100, depending on condition and the gleam in the buyer's eye.

Now comes some real special toys — the EIP-451 microwave counter, which is an autohet counter from 300 MHz to 18 GHz. Autohet means no tuning, just plug and play, insert the frequency under test at proper level and there is your frequency displayed accurately to 10 kHz intervals. Its sensitivity frequency is from -10 to +10 dBm for input power. It's a very versatile fast counter, small profile, three inches high, 19-inch rack mount. Two inputs, 300 MHz to 950 MHz and 900 MHz to 18 GHz direct reading. Will not read down to a hertz but will tell you to 10 kHz accuracy points. Very good for quick bench confirmation work at microwave. Cost surplus $150 and up, again depending on the gleam in the buyer's eye. **Photo B**.

The companion counter in the Hewlett Packard arsenal is the HP-5340. This is a very nice top-of-the-line counter that is also autohet from DC to 18 GHz. It has a very accurate time base and is sensitive to about minus 20 to near 30 dB on RF to 18 GHz. Will read frequency to 1 hertz accuracy or slightly better if you want. Surplus cost is in the $200 to $300 each range, although I have heard of some going for $100 at swap meets in the Los Angeles area. Don't know if working or not at that low price.

I have not had much experience with this 5340 HP counter as I have just acquired this unit to add it to the workbench test setup. It has been a unit I have looked forward to adding to the bench for some time. Is this a counter for all time (well, I hope), so it's the best unit I have been able to obtain for my microwave work on a meager budget. In the short time I have been using this counter, I have been very impressed with its speed, accuracy, and great low level sensitivity for measurements. Very impressed with this frequency counter. The

only improvement would be if it could read frequency higher than 18 GHz to include our 24 GHz amateur band endeavors.

I have no plans to get rid of any of the previously mentioned counters, as they all serve a specific use on the workbench. The 5245 requires a plug-in that will give accurate readings from 3 to 12.4 GHz and is used for final LO adjustment of frequency sources. With the use of a plug-in, it is accurate but requires setting the final frequency to be read to within 50 MHz hash marks on the plug-in dial to obtain results. It is possible to be upside down in 50 MHz determination as it will be translated off frequency if you are not careful to read a higher 50 MHz increment.

For example, reading a frequency of 3456 MHz, it is possible to set the 50 MHz dial to 3450 and read 6 MHz on the mainframe counter. If going to the next higher 50 MHz increment of 3500, the counter will read upside down or 44 MHz, the inverse of 50 MHz -6 MHz. You just have to be careful and make sure you are using the low side frequency not the high side product of this plug-in unit. Come up in frequency from the low frequency end of the plug-in expected frequency and you should have no trouble finding the proper frequency. This little trick will eliminate your being tricked into using a high side mix product.

Same results for the computing counter (when using HP plug-in units) the HP-5360 will read correctly up to 300 MHz as it uses the mainframe basic counter and not the plug-in. I use the computing counter for making high accuracy frequency measurements, as I trust it to be accurate to less than 10 millihertz. That's reading a 10 MHz frequency and displaying the frequency to read 10.000,000,009 MHz accurately with sampling (clocking) going on every 100 milliseconds (tenths of a second). This counter is fast, accurate, and still working. Considering its age of 15 to 20 years, this is very remarkable for the quality HP put into these counters.

I have 3 other 5360s that don't work due to troubles and old age. Kerry N6IZW and I have been using these hangar queens to maintain the working counters we have. I will be very unhappy when I lose the last working 5360 I have; it has been a pleasure to use it to sample TCXOs for proper operation to a very fine resolution in frequency quickly. The HP-5328A is the backup counter for this operation. It will display a 10 MHz frequency to 7 decimal places. I guess I am somewhat crazy in that if one is good, a backup is essential, at least if you don't want to be stuck with repairing equipment part of the time. Also it's not a bad idea for you to collect broken instruments inexpensively for a source of parts to keep your good stuff running and a source for knobs and source for specialized parts particular to the unit you are using. We have come to call these parts devices "Hangar Queens," giving us the ability of parts robbing on a defunct unit.

I broke several knobs on my 8620 HP sweeper mainframe over years of use, and HP wanted over $35 per knob. I was able to purchase a defunct HP-8620A broken but with a good set of knobs for $25. I did not even turn it on to see if it worked as all I wanted was the set of knobs. On a lark I fired the new junker up with my plug inserted and it worked better than my mainframe. I deposited my old mainframe in the working-but-spare hangar queen depository. Yes, you must have some space to store all this stuff, but then it's only a hobby and the stuff is not stored under the couch in the living room. Got to keep some of these things in perspective. Anybody need some HP plug-ins? I have too many in storage for 200 to 3 GHz and 8 to 18 GHz — what was I thinking at those swap meets? I guess that if one is good then two or three are even better!

As to the EIP-451, it's a quick counter to verify things are functioning as well as expected, and it is the workbench quick answer to many frequency-related questions. It has limitations, as do all things — one being in that it will not read below 300 MHz at all, and resolution is only good to 10 kHz steps. If that is a problem then it's not a counter for you. I personally love it and highly recommend it.

If reading below 300 MHz is a problem, get a plastic handheld counter like the Digimax or many other handheld counters. I have two of them, one that functions to 500 MHz and another that reads to 1.2 GHz. Keeping charged batteries in these units has become a problem and they're not used very often; however, they're still on the workbench and work when the batteries are on speaking terms with me. If this is not suitable, then save up and find an HP5340. It will be accurate, fast, and reads from DC to 18 GHz. All you have to do is not purchase that new HT you have been ogling and go to swap meets and find a 5340 in working order, then join in on the fun with a top-line counter for amateur microwave work.

Well, that's all the damage I can cause

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Photo B. *EIP-451 mainframe has two frequency inputs. Input #1, 300 to 950 MHz, and input #2, 900 MHz to 18 GHz. The counter displays frequency in autohet fashion in 10 kHz steps finest resolution. The EIP counter is locked in on my workbench perched just below my HP-8620 sweeper that has similar capabilities as the EIP counter, two to eighteen GHz operations. Just above the EIP-451 is my new HP-5340 frequency counter, also autohet, with higher minimum input sensitivity, greater than anything I have had before. Input sensitivity is about minus 30 dB input and good from 1 MHz to 18 GHz. A real find and something every microwave enthusiast should have on their Christmas list.*

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Dear Santa,

Without making any claims about how good I have or have not been, I'm sending you my Christmas list. I don't want to sound greedy, but the list is a bit longer than normal this year. You have always seemed pretty creative, and this year you may have to issue extra thinking caps for the elves. Unfortunately, many of the items on my list have not been invented yet.

For my emergency support work, I'll need a few things. Usually I ask you for extra battery packs for the HT. This year, how about a battery system that uses interchangeable batteries like the battery packs that can be used in electric drills and other power tools? Different radios would have adapters to allow the appropriate number of these interchangeable batteries to be used. You could even use different numbers of cells for high power or low power transmitter outputs. They could be used for everything from handie-talkies to emergency lights to laptops. In fact, in the event of an emergency I could pull the batteries from the power tools and put them with the ham gear.

With such a high importance on emergency communications, a clear identity for amateur radio operators that would be recognized by Homeland Security and local public officials would be great. This could be used for everything from ID cards to identifying vehicles used for support operations. ARES and RACES cards are good if you want to be greeted with a blank stare, so coming up with something better shouldn't be too hard. Maybe Homeland Security could provide cards that would identify hams as similar to the old Civil Defense volunteers.

I'd also like a good all-band antenna that can be erected quickly. In fact, for the high winds in Wyoming, one that erected itself and could be retracted in high wind would be perfect. I'm sure that the folks along the Atlantic and Gulf Coasts would appreciate such a device during hurricane season. Ideally it could be retracted into a position that did not present a hazard to others.

For portable operations, why not send a selection of antennas. I've always thought that hams should have an antenna bag comparable to a golf bag. It would have small flexible antennas, mid-sized antennas and the big dogs. You could have an antenna bag for each radio. I can almost hear a ham deciding which antenna to use. "Hmmm. This is a difficult position, I guess I'll have to use the 5/8 wave."

Speaking of antennas, how about a nice mobile antenna that covers 10 meters and up that can be driven into a commercial parking garage without hitting the overhead obstructions? And while you're at it, I've been dreaming of a durable antenna mount that can be used on today's alloy and plastic cars. Something that doesn't use magnets, doesn't require drilling visible holes in the auto body and doesn't fear plastic bumpers. Maybe a double screwdriver antenna. Have one switch to tune the antenna and another to retract it before pulling into the low overhead parking deck.

As you know, Santa, I do a lot of my ham radio operating from the car, so naturally I am as interested in what goes into the car as well as what goes on it. I'd really like to take advantage of some of the technology that has become commonplace in the last few years. I like the detachable control heads that are becoming commonplace, but we need to go a step or two further. Ideally, a clear LCD display could be mounted on the top of the dashboard as a heads-up-display. You could see the necessary information and yet not have it obstruct your view of the road. Add a few LEDs at the edge and you could even use it at night.

If I can't have my heads-up-display, then can the control heads be made a little thinner or otherwise designed so that they can be mounted by Velcro® to the dashboard with no loss of functionality? There's got to be some good way to mount a radio in today's cars without a lot of hassle. Putting the main portion of the radio under the seat works well, just a little more ingenuity for the controls would make it significantly better.

I can program one of my mobile radios by connecting it to my laptop computer with a serial cable. What I'd like to do to transfer the same information using the infrared feature on my laptop or PDA. Imagine how handy it would be to keep the repeater frequencies for various cities stored in the pocket computer. Press the beam button and those would be transferred to the radio. Travel to a different city and you could reprogram your radio with no hassle.

On a smaller scale, I'd really like a new handie-talkie case. The ideal case would be easily attached to the belt without having to unbuckle the belt, perhaps using a durable belt clip or a heavy-duty Velcro strap. It would be well padded and provide protection from rain. Finally, it would be designed so that the connection of earphones, microphones, etc., could occur within the case without breaking the plugs or stressing the radio. It would be easy to remove the radio from the case or the radio and case together, but would never, ever fall off.

Santa, there are several things I've been wishing for, for many years. I'd love a good reason to get into 1.2 GHz. There's just some kind of cachet about that frequency, but I haven't been convinced to make the jump, yet. And another thing, I haven't seen a significant change in repeaters in 20 years. The same computer-generated voice has been heard IDing repeaters from coast to coast since I first got my license. Maybe this year we could go digital or something? I'd really like to see something different — in fact anything different. Two meters used to be exciting, but now that we all have cell phones, it's kind of losing ground.

ATV has always fascinated me, but has been a bit costly. Can you leave me a book that tells me how to use low-cost components and software that would use my existing 440 MHz equipment? Cameras that mount on top of computers are relatively inexpensive. Could one of these be used?

I love APRS, and often run it from my car. Maybe you could leave a new APRS rig with a real video screen designed for mobile work under my Christmas tree. I like the features in mobile systems, but a screen display that is visible in a wide range of

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In Pursuit of Mode A

Just when you think AMSAT-OSCAR-7 (AO-7) is permanently hung in Mode B (70 cm up and two meters down), it wakes up in Mode A (two meters up and 10 meters down). This was fine 22 years ago when most satellite chasers had excellent, or at least adequate 10-meter antennas, but it's not the case anymore. Most hamsat enthusiasts have gone on to VHF, UHF, and microwave antenna arrays.

Since Pat Gowen G3IOR's discovery on June 20th of AO-7's rebirth, hundreds of hams around the world have been monitoring telemetry and making contacts through this amazing satellite. The last time AO-7 was heard was in 1981. When the internal batteries shorted out over 21 years ago, the satellite was given up for lost. Now, with the batteries in an open-circuit mode, the satellite has been operational whenever the solar panels are illuminated. Don't give up on a pass if nothing is heard when the satellite comes over the horizon. Many times, especially during late evening passes, AO-7 may be in darkness, and not yet transmitting. A significant problem is that when AO-7 finally turns on when fully illuminated, it comes up in a random fashion. It could be in Mode A, Mode B, Mode C (low-power version of Mode B), or Mode D (recharge). The 70-cm beacon may also come on when the satellite is in Mode A or Mode D.

Many potential operators are not set up for quality Mode A reception. While the RS satellites from the USSR made use of 10 meters for their downlink for many modes, the signals were usually so strong that simple antennas would work. Dipoles and whips did well for all except RS-15. which is very difficult to hear, even with a good yagi. AO-7 can be heard and worked with simple antennas, but there are better alternatives.

Mode A on AO-7 actually works as well as Mode B or Mode C, if you have the right receive antenna. The Mode A transponder is wider than the Mode B system, and it is less susceptible to overload and the subsequent frequency shifting caused by strong uplink signals. There are also fewer strange signals in the passband and less chance of the satellite receiver having problems during the course of a pass. Mode A can be a lot of fun if you are ready for it.

Mode A antennas

More is better. The best 10-meter antenna for AO-7 reception would be a multi-element crossed yagi tuned to 29.450 MHz with azimuth and elevation control. If you live where there are no deed restrictions, go for it. Build a six-element crossed yagi (three elements vertical and three horizontal), set it for axial or circular polarization (right- or left-handed), and enjoy. You may also be able to make some rare RS-15 Mode A contacts. While you are at it, take some pictures and send them to me!

The next best AO-7 Mode A antenna is a vertically polarized three-element, 10-meter yagi mounted on your satellite-antenna boom. This assumes that your present satellite antenna array includes at least a VHF two-meter beam antenna and a 70-cm beam of similar size. If you have sufficient clearance for such a 10-meter beam, and a rotator system that will take the additional load, this arrangement will provide excellent results. Although there will be some fades when the satellite's 10-meter antenna is out of phase with yours, signals will be good

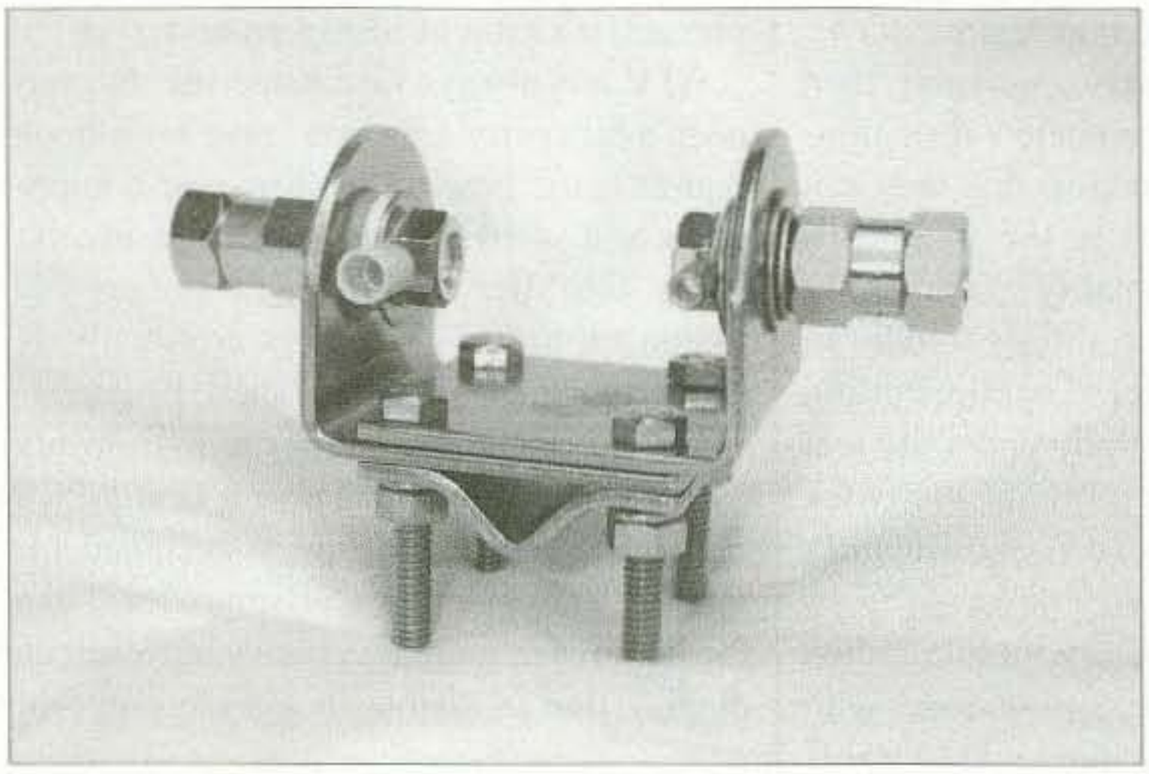

Photo A. *The Texas Bugcatcher dipole adapter.*

Photo B. *The Pro-Am DAK-AD dipole adapter.*

even at the horizon. There are a number of lightweight commercial 10-meter beams available, or you can build your own. It's not a significant project, but when you put it up, your neighbors will notice. Once again, take pictures!

Another yagi alternative is a horizontally polarized beam located below your hamsat antenna array. Mount the 10-meter beam just above the azimuth rotator. Place the elevation rotator far enough above the 10-meter beam to allow the two-meter, 70-cm, and other satellite antennas to rotate in elevation without hitting the 10-meter yagi. This will work on a tower where the azimuth rotator is in the upper tower section with a thrust bearing at the tower top just below the 10-meter yagi. It may also work with a sturdy azimuth rotator above the tower or top of a pole, when the usual satellite array does not have serious wind loading characteristics. Although the 10-meter yagi can only track azimuth with this system, it will provide excellent reception at the horizon and quite sufficient operation on high-elevation passes.

A good option worth considering is a vertically polarized dipole on the satellite-antenna boom. Like the vertically polarized yagi, it will need clearance for both azimuth and elevation rotation. If its presence does not invalidate deed restrictions and it fits, this arrangement will provide excellent results for most AO-7 passes. The driven element from an old 10-meter beam will work well, or you can design and build a decent dipole from aluminum tubing with direct or gamma-match feeds.

Another dipole option is a horizontally polarized version. Like the horizontally-polarized yagi, the best mounting arrangement is to place the dipole above the azimuth rotator, but below the elevation swing of the VHF and UHF antennas in the original satellite-antenna array. If the dipole is mounted close to the VHF/UHF antennas, it can be placed in-line with the booms of the VHF/UHF antennas to allow them to swing past the dipole or in-line with the satellite-antenna array boom. The latter condition will require that the array never be allowed to closely approach 90 degrees, where it will hit the dipole, unless the dipole can be offset a few feet in front of the vertical mast. Both options have their good and bad points. With the dipole in-line with the booms of the VHF/UHF antennas, the dipole will not be oriented for quality reception. With the dipole in-line with the VHF/UHF array boom, the possibility for an inadvertent collision during overhead passes is dangerous.

Low-end options are numerous. Hang a 10-meter dipole in the trees or use an existing outside 80-meter antenna. Connect to a longwire or use some other outside HF antenna. Verticals or horizontal loops are also viable options. The worst-case situation is to use an attic- or room-mounted antenna. If you have any computers in the house, anything in the attic or the radio room will pick up noise that can easily mask the downlink from AO-7. You may be able to log a contact or two, but it's not worth it. At least use something outside, and in the clear.

The compromise

With multiple HF antennas in the attic and a few outside, Mode A via AO-7 at W5ACM was marginal. The 10-meter attic dipole had good reception, but computer and LAN noise was bad. The outside 80-meter inverted V was quiet, but didn't do well with the ever-changing position of AO-7 in the sky.

My satellite antenna array includes yagis on 23 cm, 70 cm, and two meters. A semi-dish with downconverter for 13-cm reception is sandwiched between the 23-cm and 70-cm yagis. There is even a 15-meter dipole under this array parallel to the yagi booms. It was getting crowded, and deed-restriction enforcement folks wouldn't appreciate any 10-meter beams.

Photo C. *A Radio Shack tunable whip CB antenna.*

My second choice was a vertical dipole between the 70-cm yagi and the 13-cm semi-dish/downconverter. There was space on the solid fiberglass boom, but a full-size dipole was nearly 16 feet long. A shorter version was still too long to clear the roof. I needed an antenna that was no more than ten feet in total length.

Some preliminary Web searches turned up some possible loaded whips from Radio Shack and two adapter mounts for making a dipole using two mobile antennas with standard 3/8" x 24 threads. Sources for the dual-whip adapters included Pro-Am's DAK (lug

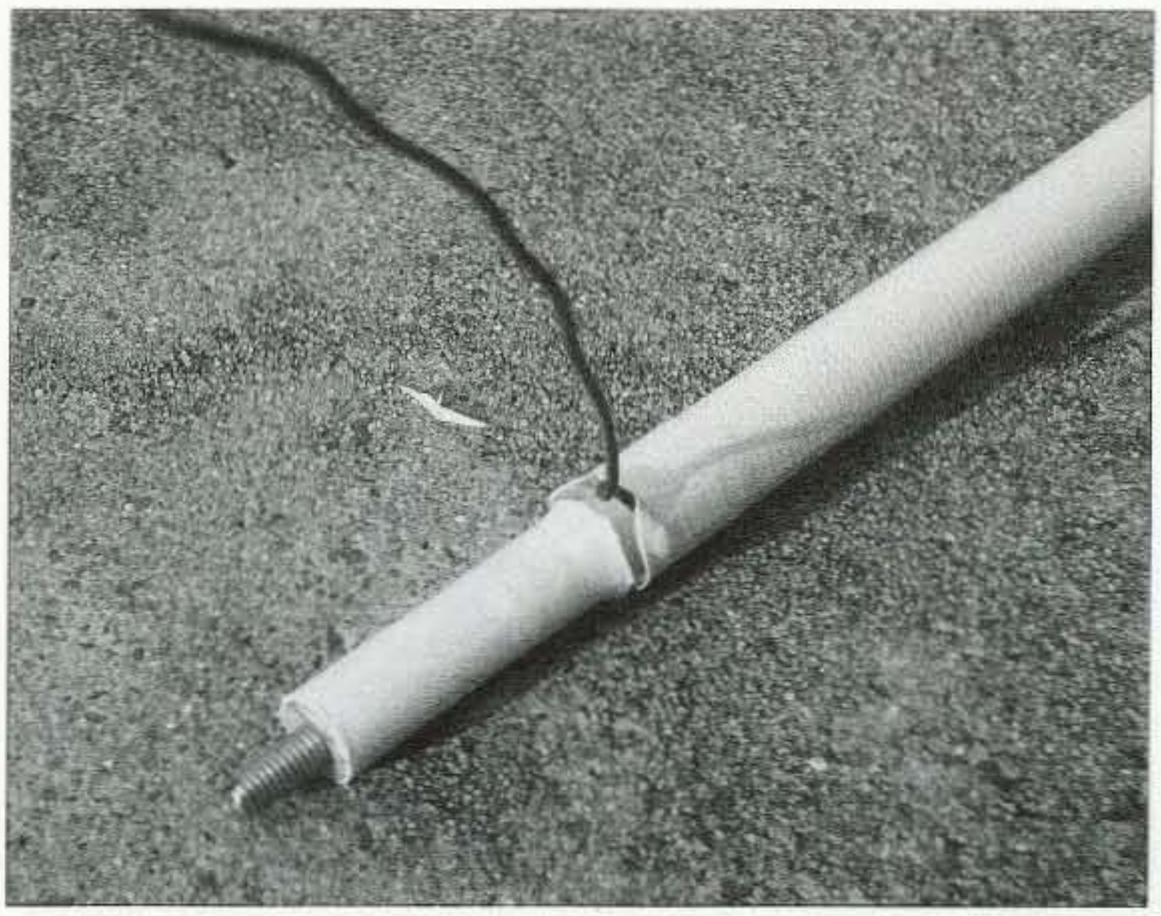

Photo D. *Removing part of the coil from the Radio Shack whip antenna.*

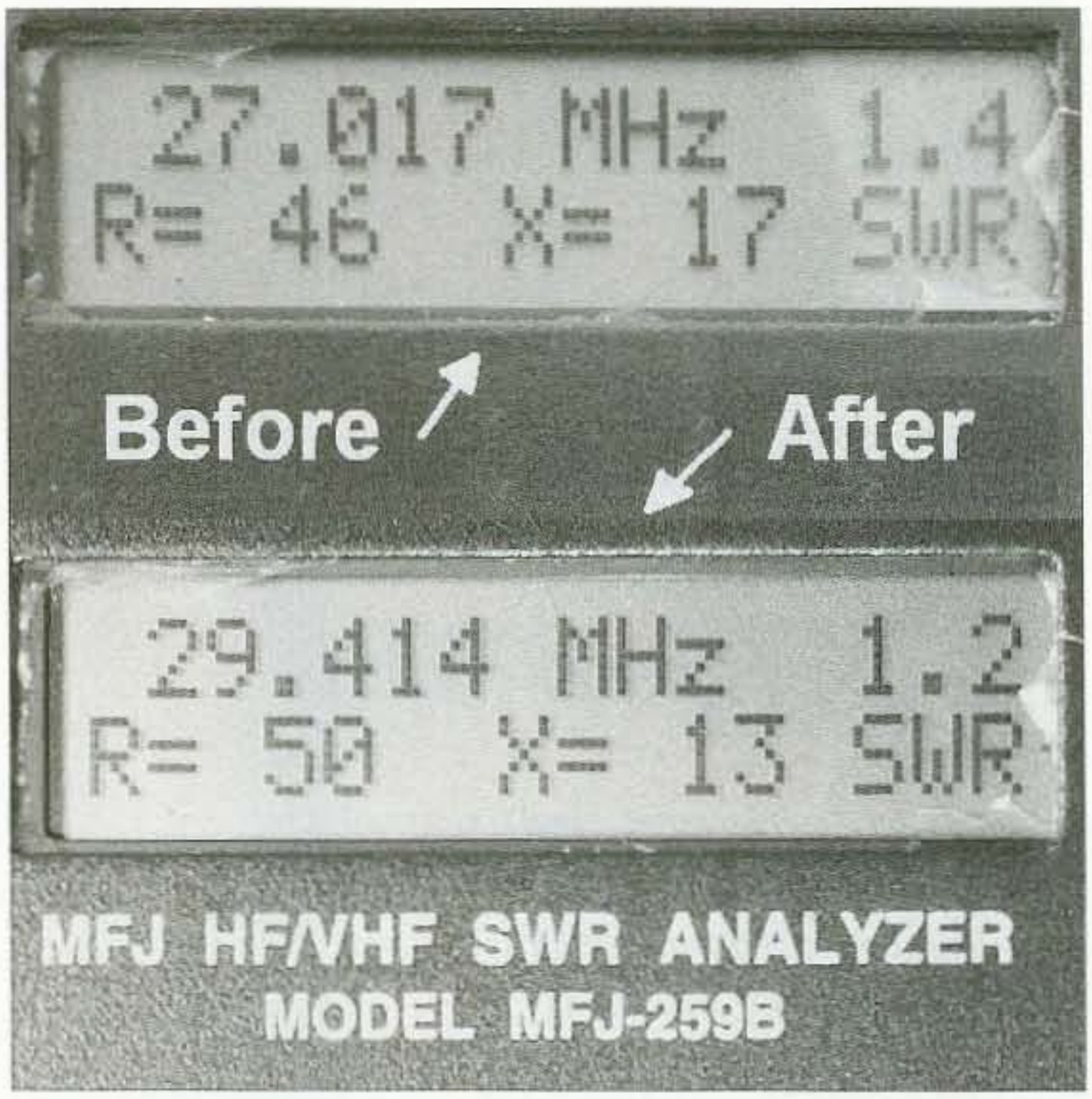

Photo E. *Before and after tuning the Radio Shack antennas for the dipole.*

connections) or DAK-AD (SO-239 connector) and a similar unit from the Texas Bugcatcher made from stainless steel using lug connectors for the coaxial cable. I also noted that the Pro-Am units were also available as Ironhorse Antenna products. After purchasing the Texas Bugcatcher unit and the Pro-Am DAK-AD, I opted for the stainless-steel unit, but discovered that the bolts were only long enough to attach the unit to a 1.125" boom, and my fiberglass boom was larger (1.25" diameter). The Pro-Am unit came with two sets of mounting bolts. Neither the long nor the short set was stainless, but at least I could get the Texas Bugcatcher adapter on the boom with the long bolts, now permanently borrowed from the Pro-Am unit. I'll worry about the rust later.

A tour of the local Radio Shack store turned up what looked like the perfect antennas for my new dipole. Although I had a list of possible antennas gleaned from [http://www.radioshack.com], the "Mobile CB Antenna — Tunable Fiberglass Whip," part number 21-974, appeared to be perfect, and at a bit under $15 each, a pair of these four-foot-long, white, trucker CB whips looked like the answer.

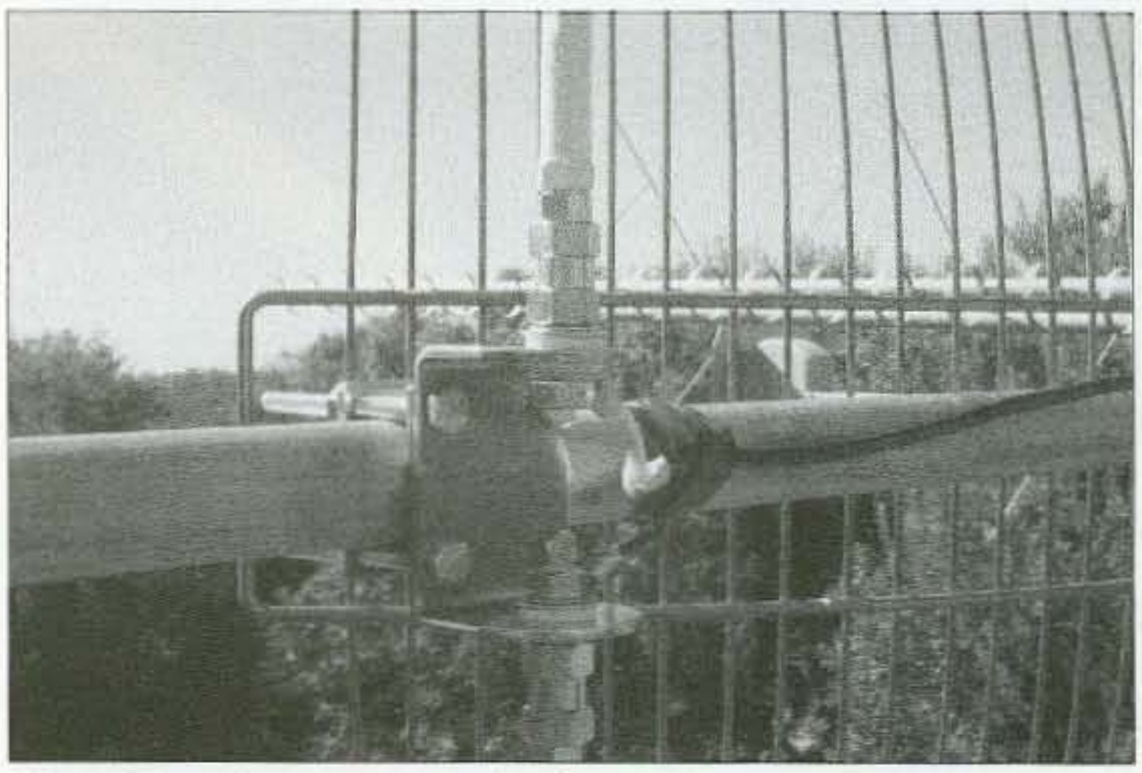

Photo F. *A close-up view of the dual-whip, now dipole, antenna mount.*

Testing and adjusting

Back at the house, the two CB antennas were screwed into the dipole adapter, mounted on a ten-foot wooden pole, attached to a short length of RG-58 coax and tested in the back yard. Resonance was found near 27 MHz using a MFJ-259B SWR analyzer. The tuning slugs in the ends of the shrink-tube-covered fiberglass antenna rods managed to move the resonant frequency only a few hundred kHz. I was hoping for more, but they are only designed for the 11-meter CB band. The tuning slugs were removed since they would be of little use for the nearly 2.5 MHz move to the top of the 10-meter ham band.

A slit was cut in the shrink tubing on both antennas to find the end of the wire used to make these top-loaded short whips. Pieces of wire were unwrapped and cut off in five-inch increments. After removing 30" of wire from both whips, I had finally reached the goal of resonance in the top of the ten-meter band. In fact, I had gone a bit past the desired target of 29.450 MHz — the center of AO-7's Mode A downlink. Another 1.5 inches of wire were unwrapped from the end of each coil and turned out straight along the fiberglass rods. This brought the resonant point to 29.414 MHz. Close enough. The excess fiberglass was cut off with a hacksaw, the shrink tubing trimmed, a little glue was added to keep the wires

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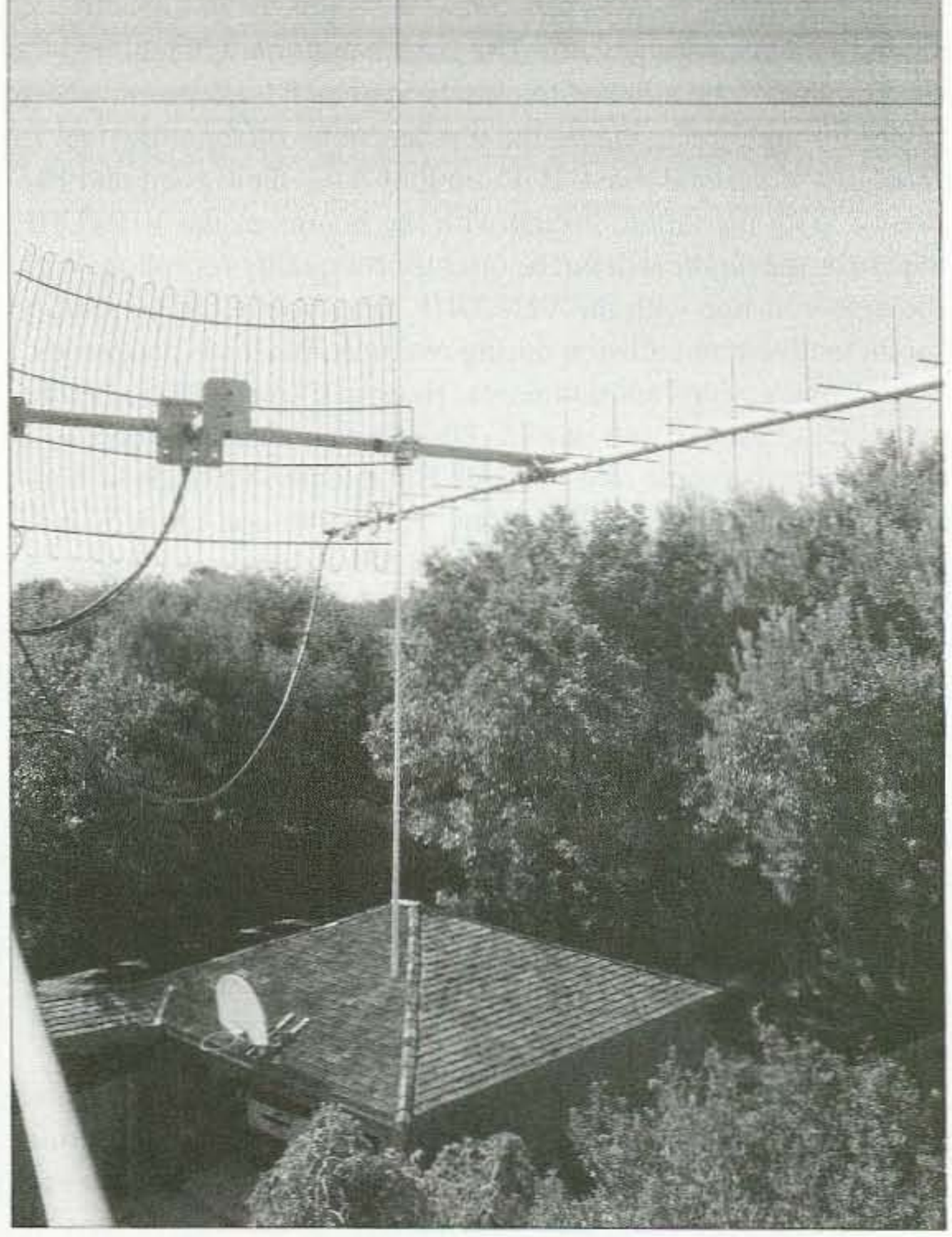

Photo G. *The finished short 10-meter dipole mounted between the 70-cm yagi and the 13-cm semi-dish/downconverter.*

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Fun Time

How about a little fun exercise today? Well, maybe some of us have a different definition of fun and games, but this appeared to be a challenge in the beginning and the more I played with it, the more rewarding (FUN) it became.

I am speaking of getting the macros massaged in one of the less-spoken-of pieces of ham software, TrueTTY, available at [www.dxsoft.com/mitrtty.htm]. Of course, there is more to software than getting the macros to cooperate, but even the best program gives the feeling of a millstone when we have to do everything manually.

This is a really great package. Some of you have used it, I am sure, but I hear very few on-the-air reports of its usage, though I have heard users give glowing testimonials once they use it for any length of time. I think the real problem is it is different and has a feeling of complexity. It is shareware, rather than freeware, but the registration is only $35 US.

Here are just a few items worth mention about the program. I first got a copy of this about two years ago and the improvements via revision have been coming in a steady stream. The author, Sergei UA9OSV, puts forth a real effort to develop a good package by making additions as hams have requested.

One of the first things you notice when you download this program is the fact it is so compact. Here is a multimode communication package for RTTY, BPSK31, AMTOR, and packet that is about 3/4 of a megabyte total when zipped. That speaks well for painstaking programming.

As the name suggests, the first thrust of the software is RTTY, and it is a whiz-bang, hard-to-beat program for that mode — very responsive and intuitive. The layout of the program display is not really foreign but departs from what we tend to think of as the "norm." There is no waterfall. Instead, you tune with a very effective spectral display, which is definitive enough to give reports on signal quality even for BPSK without an IMD readout.

It won't be long after you begin the installation when you will hit the Help button. There is a neat, concise bit of documentation that I wanted to study a bit and so I printed it. Almost a surprise, the entire file covers four pages and tells everything you need to know except one little side trip click to the "macro-sequences" file that covers the codes you need to get your personal macros working. Short and to the point — I like that.

Once you are past the setup portion of the installation, which is fairly straightforward as soundcard software goes, you will want to get to the macros. The furnished macros are not ready to fly for your personal contacts. If I recall, the author of the program has his own info entered, and that has an advantage because it gives you a pattern to follow. I always welcome any hints the author leaves for me.

After a few years of using many digital soundcard programs I have devised a pattern that I follow. You will notice from the screenshot that the macro buttons are labeled, which helps me recall the pattern that slides easily from the little gray cells. That labeling technique I discovered almost by accident in this software. I had the edit display on the monitor and clicked on the "F1" designator box and the cursor "stuck" there, which meant I could edit it. That promptly became "CQ" instead of F1 and I was in the renaming business. Later, as I was reading the instructions, I found a sentence that I had breezed over earlier that said I could do just that little operation. If all else fails ...

You will learn quickly why writing these macros differs from most of the "plain language" macros. It is necessary to grasp the use of the various symbols and codes to make each macro work as you desire. The nice thing is that you can test these macros with the rig off. You can watch the whole process, including "transmit", "callsign", "line feed", and "receive" each time you make a change. As I mentioned earlier, this started as a challenge, then became a rewarding exercise.

You will notice in the screenshot there are two rows of macro buttons. I am getting to the point that I think I must have more than 10 or 12 macros. TrueTTY allows 36 macros. When you go down the Setup pull-down to View you will find the choice to display 1, 2, or 3 rows of macro buttons. They will work even if they are not displayed but that is a bit taxing on the gray cells. The second row requires use of the Ctrl key, or of course you can click any of them.

After getting all the aforementioned ducks in a row, I just had to make a few contacts. This is the last part of September when this is being written and the bands are beginning to sparkle with some DX and fairly good paths for closer range rag chewing. One of the first contacts was with a station in Poland on RTTY. That was a pleasant start.

As I recall, the next was a stateside contact on PSK31. That went well enough. I could see this was going to be a success, so it was time to finish getting my act together and make provision for logging. Quite a few of you folks are insistent about my keeping records and sending you cards from Nevada, and I experiment a lot with log programs.

On the TrueTTY Web site (DXSoft) you will also find a truly excellent log program named AALog that is written by Alexander RZ4AG, especially to interface with TrueTTY. So I set about getting that

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New Products

NEW TWINBAND MOBILE TRANSCEIVER

Alinco has developed a new twinband mobile transceiver operating on the 2-meter and 70 cm bands. The new mobile has transmit coverage of 144.00 to 147.995/430.00 to 49.995 MHz. The receive coverage is 108.00 to 173.995/335.00 to 480.00 and 87.50 to 108 MHz (WFM).

Additional features include front control unit separation (optional EDS-9 kit required); advanced 10F3 digital mode with speech compression technology (EJ-47U required); 200 memory channels; and advanced EF-50U TNC (optional) and D-SUB9 connector that supports digi-peat mode for APRS tracking and 9600 bps packet. Remote control features including parameter setting and direct frequency entry through the microphone.

MSRP is $481.95. See your local dealer or contact Alinco for more information at 937-473-2840.

NEW DATAK 440 KHZ TO 185 MHZ PLL-VFO EXPERIMENTER'S KIT #80-1401

Claiming to have the most sophisticated VFO kit ever offered, the Datak Division of LKG Industries has announced a new product intended primarily for hams. The new VFO kit is PLL-controlled (phase-locked loop). The top board of this two-circuit board kit contains a keypad for entering the frequency, as well as the digital readout module. The bottom board contains the VFO with an area for the experimenter to add his own circuit, whether a receiver, transmitter, signal generator, etc.

Not intended to be a complete circuit, the kit is considered to be a platform for the builder to work from, adding just about any circuit that requires a precise frequency control circuit. Included are circuit ideas, including a two-watt 40 meter CW transmitter, a receiver circuit, and others.

The circuit operates on 12 volts DC and may draw up to 100 mA. Don't forget to add enough power supply capacity to run whatever circuit you might add as well, the maker reminds us.

For further information, contact Datak at 800-645-2262.

AOR INTRODUCES TV-5000 SCANNER VIDEO CONVERTER

AOR USA has released the new TV-5000 Video Converter, an accessory that adds the ability to monitor NTSC video when using wide range receivers (such as the AR5000 or AR5000+3) that have wide-bandwidth 10.7 MHz IF outputs.

"The TV-5000 allows the user to monitor conventional NTSC broadcast transmissions but also adds the ability to observe interesting video outside the tuning range of most broadcast reception units. One may be able to view video used by public safety agencies including video downlinks from aircraft, Amateur Radio fast-scan TV, news media feeds, NTSC wireless video monitors and more," said Takashi "Taka" Nakayama KW6I, Executive Vice President of AOR's North American operations. "Video cameras are becoming more commonly used every day. The TV-5000 gives video monitoring capabilities to the owners of high-quality wide-range scanning receivers."

The TV-5000 is compact, easy to connect, operates on just two AA batteries (or a 12 VDC external power source), and provides NTSC video output to a TV monitor, along with line-level audio output. It connects to the 10.7 MHz IF output of a wide-range receiver via a shielded cable with two BNC connectors (cable is provided with the TV-5000). The operator then connects the video and audio output ports to the inputs of a monitor, using shielded cables with RCA-type connectors.

The TV-5000 is literally "plug and play" in that there are no settings or adjustments to make. The operation manual states that minor "fine tuning" of the receiver may be needed to optimize video reception, once a video signal is located. Depending on the observer's location and antenna system, it may be possible to observe video from satellites, in-car cameras, or any other of several NTSC video sources. The TV-5000 could also be used to monitor cameras in a wireless security system that uses NTSC video. "The TV-5000 is yet another step forward in the art of monitoring," said Mr. Nakayama. "Users may be surprised at how much there is to see.

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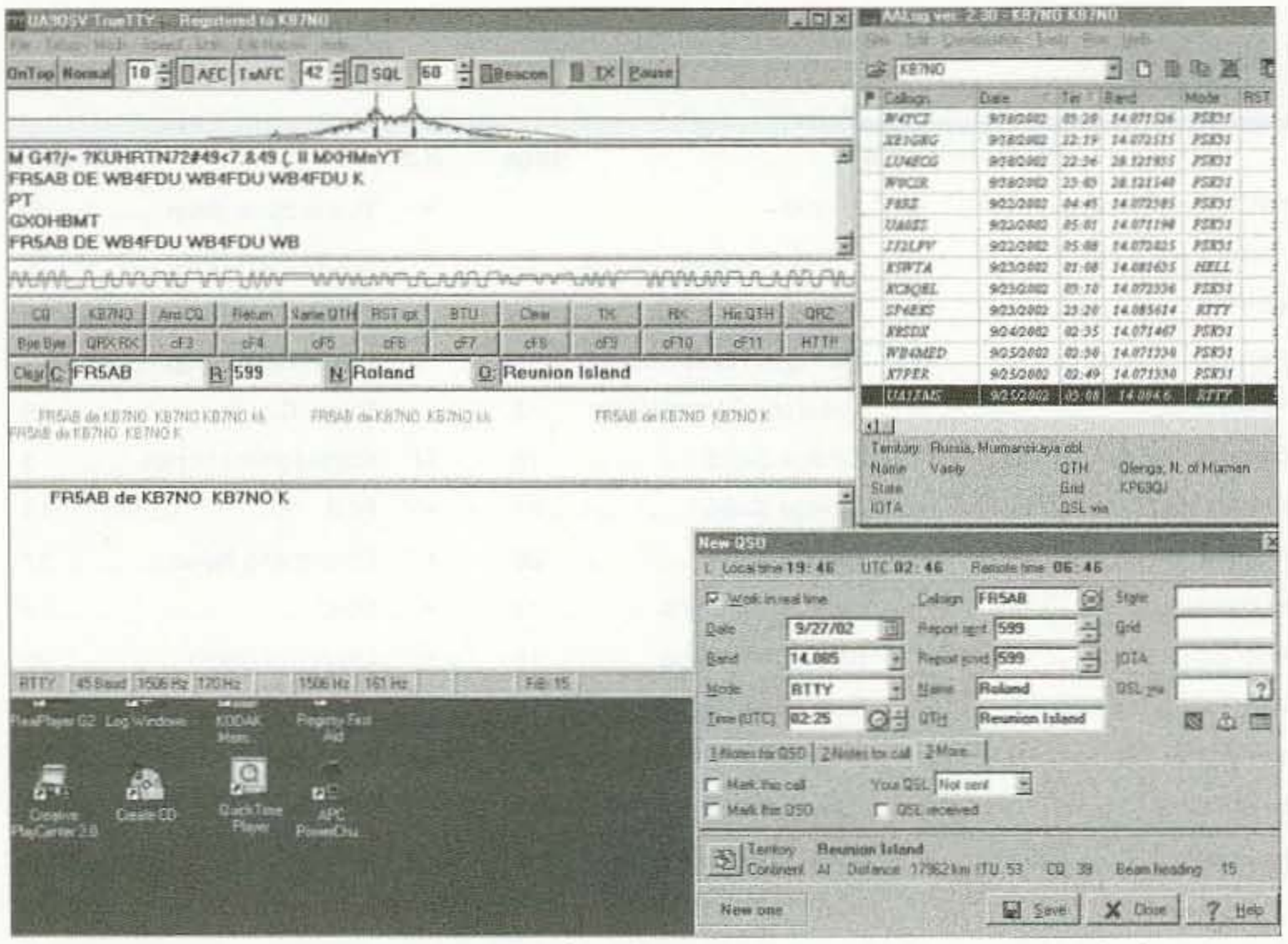

Fig. 1. TrueTTY and AALog — This shot shows the TrueTTY in action with the AALog entry screen in the lower right. A small portion of the log program is in the upper right. You see the spectral display at the top. The receiver passband is set at 400 Hz at this time. Even at 3 kHz the display window is not filled. Lots of room if you have a really wide open passband. The text panel just below is the receive screen. Below that is an active oscillogram displaying the decoded signal. Two rows of macro buttons are displayed. Three are possible. (See text.) The four QSO info windows will gather info by double or single click (selectable) and that transfers directly to the entry screen. In this case, the callsign was grabbed from the receive panel, but the others were typed in as the reception was not that good. (Otherwise it would be all-caps in RTTY.) The horizontal line across the middle part of the spectral display is a guide of where the squelch is set compared to signal strength. You can adjust this to improve print. No guesswork here. The two programs work together without any flaw I detected. A package worth a look if you like RTTY with a little PSK31 thrown in and a great logging system.

The Digital Port

continued from page 47

software in order. As of this writing I have not registered the AALog so there are a few crippled functions, but there are plenty of features operating to allow me to import my current ADIF file and get the program to record contacts made with TrueTTY.

I was highly impressed as I saw how well the data was recorded in the new software. A large batch of data was imported at once and it was very good. Then a week or so later I decided to see how well an update would go from the same ADIF file, which had more QSOs added. The program popped up that there were some dupes but seemed to take that in stride and not insist on any action from me. The new QSOs were simply added, end of task, very neat and tidy.

Once all the data is in place, you can check Log Summary in the Tools pull-down and find a listing of most of the logging activities you might ever imagine a need for, as well as some you never thought about. The only missing column I noticed in the program was one for U.S. counties. The counties listed in my ADIF file were not lost in space, they were simply relegated to the Notes file for the appropriate contact. If you are a county hunter this will not work for you. But that is the only real "flaw," if you can call it such, that I detected in AALog.

There is one other area not yet well addressed in this little suite of programs, and that is rig control, but Sergei is working on it. On the same Web site, you will find a small program called Hamport that is destined to talk to the modern rigs. I downloaded and installed it but found that my particular rig had been bypassed in the design. There are many others not listed in the Hamport setup and I am sure it is just a matter of time before this feature will be available as well.

Now that we had a working version of both the TrueTTY and AALog it was time to get it all laid out on the monitor and put it to work. There are a lot of excellent little features built into these programs. One is the ease to bring up a log entry window. Simply hit the "Insert" on your keyboard, when AALog is active, and the information will start transferring from TrueTTY to the entry display.

You will have to make edits to the entry according to how picky you are about frequency listing and RST readings, but a number of obvious entries such as callsign and name are automatic and there is one that is not obvious. You can set that "Other" field to grab QTH info and that will go directly to the entry panel. The options for the Other field are selectable from the Setup menu.

Incidentally, speaking of entries, I noticed a lack of certain modes listed in AALog such as MFSK, HELL, and THROB to name a few. I found there is a file in the folder containing the program where you may add any mode you desire.

When you get to operating this software in RTTY you will discover a very high level of versatility. You can select Shift in all the popular widths from 23 Hz to 1000 Hz and baud rates from 45 to 1200. Plus, I realized the shift will adjust to fit slight variations, so the copy is about as good as RTTY gets.

What I found exceptionally useful is the ease of Xmit–Rcv offset. I happened on a DX station specifying receive frequency a little over 2 kHz above his calling or transmit frequency. This is very easily accomplished with TrueTTY. Left click places you on the receive frequency and right click sets your transmit frequency wherever you select.

This meant it was only necessary to check the offset frequency in the Status Line at the bottom of the display. A mental calculation showed I needed to separate the frequency readout in the two boxes by approximately 2000 and I would be in the ballpark. With the bandpass filter wide open at 3 kHz, I was able to alternately monitor the DX station and the little bumps 2 kHz up the band. No dials to change, just click and operate. Really slick.

The above incident made me aware that TrueTTY has space in the display for approximately a 5 kHz wide spectrum display. The average is usually 2.5 to 3 kHz and one other program displays 4 kHz. All this is of little value unless the rig has a passband width to match. I don't know of a rig that has, but it does stimulate the mind to possibilities.

I didn't mention the TrueTTY has AMTOR and Packet capabilities. AMTOR in FEC mode, not linked TOR mode. I only checked to see that it would transmit and did not attempt to find someone to make a contact with, but it would be interesting to work someone because Sergei has enhanced the AMTOR FEC as a selectable option.

Also, I checked the packet capabilities by monitoring a message board. It does receive well but does not have transmit capability. It is hard to imagine what the future holds for this program. The development goes on and the product to this point is well appointed and has enough differences that it is worth a look-see especially by those who enjoy a robust RTTY performer.

All in all, the TrueTTY–AALog experience is a fascinating one. After you work with the software for a while you begin to realize why some hams who are dedicated RTTY folk swear by this program. One little bit of forewarning. You will find the TrueTTY will download and install and jump through its hoops just fine without registering, but you will have to reconfigure it each time you boot the program until you register it. And I believe that includes the macros, so don't spend a lot of time perfecting the macros until you register your copy.

One other minor item, this does not appear to be a resource hungry piece of software. Check the requirements on the Web site. It appears it should run well on an early Pentium-based computer. That is always a good sign to me that the programmer has put forth the effort to write good code.

Education

Every now and then I pay a small price for abusing the computer. I am careful not to allow grandkids to install games nor cruise the Internet, but I still find ways to mess the thing up on my own.

Recently, I purchased a set of reasonably priced speakers for this computer. The speaker history here has evolved around a mismatched pair of speakers that probably came from some AM radios older than my kids. These worked okay with a SB16 soundcard, but these new 64 series cards do not have enough drive to run them.

I have a few applications such as a dictionary that pronounces words and find it nice to have sound capability. The new speakers have a small amplifier in them and I do not know how they can produce these things at the price I paid.

The problem took about an hour to rear its ugly head. I had noticed the volume control for the soundcard output became ineffective, but all was going well as I checked the system with an E-mail from one of the major on-line suppliers that contained a promo including some music clips. Satisfied the speakers were well worth the investment, I turned my attention to the soundcard controls. Something did not seem correct — response was not normal.

I brought up a ham PSK program and could not reduce the ALC to zero. There are at least four displays with volume controls and these seemed, without any reason I could understand, to go to maximum setting about every other time I checked them. I could not get this thing under control and began to doubt my abilities (and sensibilities).

I will admit I stepped away from the computer and had dinner before tackling this problem, but it took the better part of an hour to add all the facts I just described and realize that some bugs, probably from the Internet sound source, had crept into the operating system and the eventual cure was to shut down and reboot the computer. The first reboot restored some sanity to the soundcard control but all things were not quite right until two more startups.

The lesson learned is it can happen to any of us. Don't even need teenagers around to help us out. Ah, well — education. I know there are hams who are happy as a clam who dedicate a computer to nothing but ham software in the shack. Maybe they are the truly educated.

More SSTV

A few months ago, in the Sept. column, I wrote about using the SSTV-PAL editor with the MMSSTV communications package and between the time I wrote and the time you received your magazines, the Web site where you find the SSTV-PAL [http://users.origin.net.au/~crac/] contained a whole new group of downloads. Fortunately, since *The Chart* is easily accessible from here, I was able to put a note on the link to help guide you to the correct download.

This wasn't really a bad thing. What happened is there is now a new program developed by the author of SSTV-PAL termed SSTV-PAL+ (plus is all that is added) and what a plus it is. It is software for communicating with SSTV and includes the aforementioned editor as an all-in- one program. I downloaded the new software and was simply amazed.

It uses the MMSSTV engine which you have to install in the same folder and you are off and running. It is a beta version with a few kinks still to be dealt with at the time I tried it but workable and another clever approach by a creative programmer. You have to try it to see for yourself.

Speaking of the KB7NO Web site, I keep making little changes and additions. There is so much to tell that it feels like a project with no end in sight. I found a small item that makes the loading of the first page much faster. By reducing the pixels/inch (lower quality?), the file is enough smaller that the load time with this dial-up modem is cut in half to about 7 seconds. Interestingly, the before and after displays on this monitor seem identical. Something to keep in mind when storing and transferring your images, especially via modem, is that a smaller file may be just as good as a file that is the better part of a megabyte.

A little on Windows

I am forever giving the newer Microsoft platforms a bad rap, especially the Millennium Edition (Me) —well, that one deserves it. If you notice, quite a few ham programmers are avoiding the problems associated with making their programs run on Me. They simply do not bother to make their software run on Me.

However, there are quite a few excellent programs available to run on the XP operating system. I have avoided using it because not everything we have available will run on XP. But I see programmers extolling the virtues of the XP platform and they are writing some top notch software to run on that platform.

What I am getting at is the time is upon us when XP is standard fare on any computer we are apt to buy new. I recently had a few experiences with the XP and it does perform well with software that is written for it. The age-old problem of lock-ups and "blue screen" syndrome is as nearly licked as can be expected.

I saw a lock-up during a video session on a laptop that was visiting this house, and the system was truly locked tighter than a drum. The only cure was to switch off the power. I hate to do that due to the usual subsequent boot-up problems with earlier Windows systems after being shut down "improperly." This was a learning experience as I watched it power up, load

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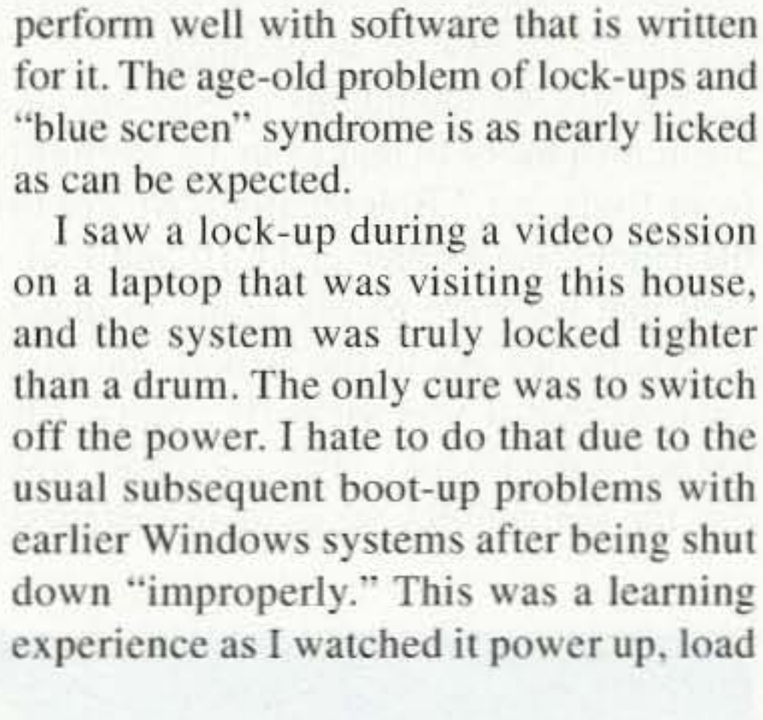

Fig. 2. *Where* The Chart *is.*

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ARDF World Championships
Part 2 — Closer to the Gold

"I felt like I was at an Olympic event!" That's how Dave D'Epagnier KØQE described his first trip to the World Championships of Amateur Radio Direction Finding (ARDF), from September 2–7, 2002, in the High Tatras of Slovakia. "It was a real eye opener to see how seriously the rest of the world takes this sport. The competition was very fierce and USA is indeed starting to gain respect."

KØQE was one of the last to get back to the USA following the Eleventh ARDF World Championships (WCs), because he went on a two-week climbing trip to Italy right afterwards. Last month's "Homing In," the first of a two-part series on ARDF Team USA and the WCs, featured stories of the first of our daring dozen to return. Among them were Bob Frey WA6EZV and Dick Arnett WB4SUV, whose return trip didn't go exactly as planned.

"We left the mountains of Slovakia at 5 a.m. in a hurry to make our 12:50 flight from Budapest," Bob recalls. "We got to the Hungarian border at 11:10 and realized that we were barely going to make it. Finally we got to the airport and discovered that it was virtually empty. Air France was on strike. The good part was that the airline folks put us up in Budapest overnight in a beautiful hotel, right on the river. They paid for our meals, bussed us over and back. Next morning we went out on a different carrier into Rome, then home from there."

I expected to get regular on-the-scene updates from Team USA via the Internet as I did during the Championships in China two years ago. But that was not to be. "There was only one Internet terminal," says WB4SUV, "and when you were on, there were ten people looking over your shoulder wondering when you'd be done." Because they had brought their own laptops, Bruce Paterson VK3TJN and Adam Scammell VK3YDF (**Photo A**) ended up being the official scribes of the events, sending regular detailed reports to their friends in the states and down under.

Contouring and sinkholes

The three Australians joined six Team USA members at a special training camp in Hungary just before the WCs. The camp had a double purpose — to improve participants' skills in both radio direction finding and in-the-woods orienteering. "We did two days of fox-oring," WB4SUV reported. "It's a combination of ARDF and orienteering that teaches you to keep track of where you are on the map. You had to orienteer your way to the marked circles on the map. You couldn't hear the little fox transmitters until you were about 30 meters away."

Team member Gyuri Nagy KF6YKN hosted the camp in his native Hungary. Gyuri is a true ham, as his workshop attests (**Photo B**). Campers made use of his shop and tools, because some had to retune their

Photo A. *The three-person team of Bryan Ackerly VK3YNG, Adam Scammell VK3YDF and Bruce Paterson VK3TJN trained with the USA team in Hungary. Each of them attended prior ARDF events in the USA. (All photos courtesy of Bob Frey WA6EZV)*

Photo B. *There's no doubt that training camp host Gyuri Nagy is a true ham. Here's the attic workbench where he built his fox transmitters.*

2m ARDF receivers to lower European fox frequencies (**Photo C**). The 2m band is only 144-146 MHz in Europe.

At the camp, long-time orienteer Bob Cooley KF6VSE learned about signal propagation in canyons and ravines, which orienteers call re-entrants. "A two-meter signal bounces up and down a re-entrant," he says. "I've gotten so that I can recognize when I'm getting into that. And if you get into a stream bed, you might as well turn off your receiver to save the batteries. You're going to get total baloney for bearings on 2m, unless the fox is right there."

Marvin Johnston KE6HTS tells of a new technique he learned at camp, called contouring. "You don't want to go up or down hills more than you have to," he says, "so you run along the elevation contour lines on the map. It worked and I had a great time. I missed one contour and it cost me three or four minutes to get up and down the hill, but if I had followed the contour it would have been no problem.

"The training area had a lot of sinkholes," Marvin continued. "They were big pits where caves had collapsed. It was really interesting navigating around them." Bob Cooley added, "If a 2m transmitter was placed on the top edge of a sinkhole, I could get good bearings on it from a distance, but when I got within 100 meters, I had a hard time pointing my antenna directly to it."

This was USA's third trip to the World Championships. Team USA was up against more than 300 competitors from 28 other nations. The opening ceremony featured all of the teams standing at attention, watching performances by native dancers and other entertainers (**Photo D**).

As you read last month's description of the separate 2-meter and 80-meter competitions, you probably wondered about our two best performers, Nadia Mayeva and Gyuri Nagy. Nadia took fourth in her age/gender category on 80 meters, but was 13th on 2m. Why? And what explains Gyuri's 19th place on 80 meters, when he had achieved fifth place on 2m two days before?

Nadia's two-meter problem began before she ever left the starting corridor. Typical maps at ARDF championships are premarked with start, finish, and out-of-bounds areas. But they weren't at these World Championships. WB4SUV recalls, "Of all the conversations we had at the Team Leaders meeting about the most minuscule details, the organizers never mentioned that we had to mark our own maps, and that there would be a master map in the starting area for that purpose. That threw me a curve.

"The master maps were clear down at the far table and I didn't even realize that I needed one. I was in a panic when I couldn't see start and finish on the map they handed me. I figured at first that it was there and I just couldn't locate it. I asked and they told me about the master map. I just had time to mark start and finish, not the other details from the master map. The Australians told me later that it's not unusual that maps have to be marked at championships."

Marking her own map was Nadia's downfall on two meters, as WA6EZV explains: "There was a swamp marked on the master map with a circle, and she thought that this was the finish. She didn't see the actual finish, the double circle on the top of the map. So she was navigating toward the wrong place to finish for a long time before she realized that everyone else was going in the opposite direction. Her equipment should have told her that she was headed for the wrong place, but she wasn't listening to the homing beacon."

Gyuri's 80m problem was the result of too much activity. The physical stress of winning a medal in the Hungarian championships, then putting on a week of training courses, followed by the grueling WC two-meter hunt all took their toll. "He's having knee surgery soon," says WA6EZV. "That's why he slowed down on 80m. I passed him at one of the transmitters and I could see he wasn't running real strong. I think his knees caught up with him."

The 60-year-old knees of Bob Cooley also were problematic. "I was having trouble with my feet at the championships in China, so I was out of ARDF for a year and a half. I had an operation in April and just started running in June, so I'm not in as good a shape as I would like. I hope to get back there in another six months or so. I found that if you strengthen your quads a great deal, it sort of holds your knees together.

"I'm becoming allergic to wasp stings," Bob continued. "A year ago I received a bad sting and got hives all over my body. Now it usually gets worse each time. Just before the 2m start I got stung by a little bee. I thought, 'Well, it isn't a wasp and it didn't get me very bad.' Turns out it was OK, but I started out on the course wondering if I was going to drop dead in the first 30 minutes. There was total chaos in my mind and it took me an hour and five minutes to get the first transmitter."

What ailed this fox?

One of the worst nightmares of an ARDF huntmaster is a malfunctioning fox transmitter. Unfortunately, it happened on the 80-meter championship day. An apparent

Photo C. *Harley Leach KI7XF, a retired professor of engineering, helped retune some Australian receivers for the low operating frequency of European ARDF transmitters, and then fixed them when they stopped working.*

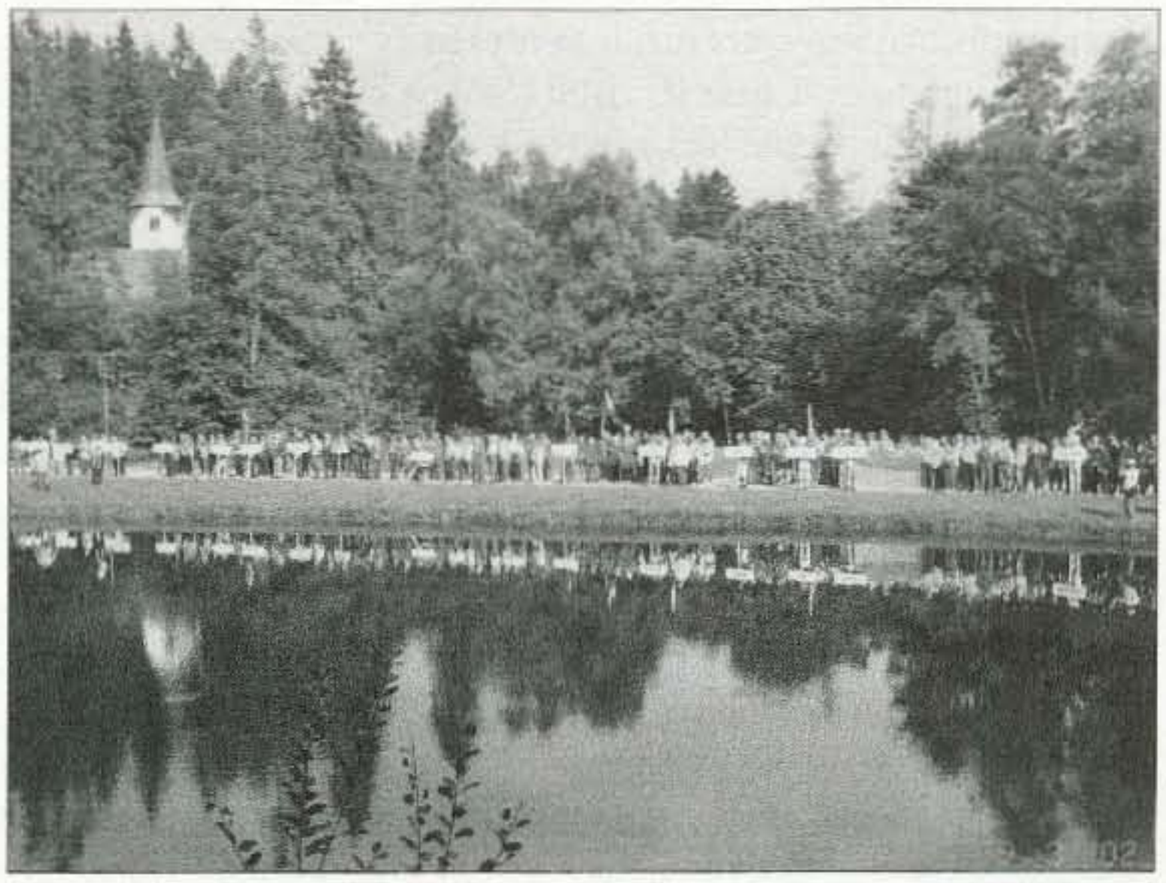

Photo D. *Opening ceremonies took place next to a scenic lake. By tradition, each team stood behind its national placard.*

Photo E. *On "Cultural Day" between the 2m and 80m competitions, the organized activity was a 7-mile rafting trip on the Dunajec River that borders Slovakia and Poland.*

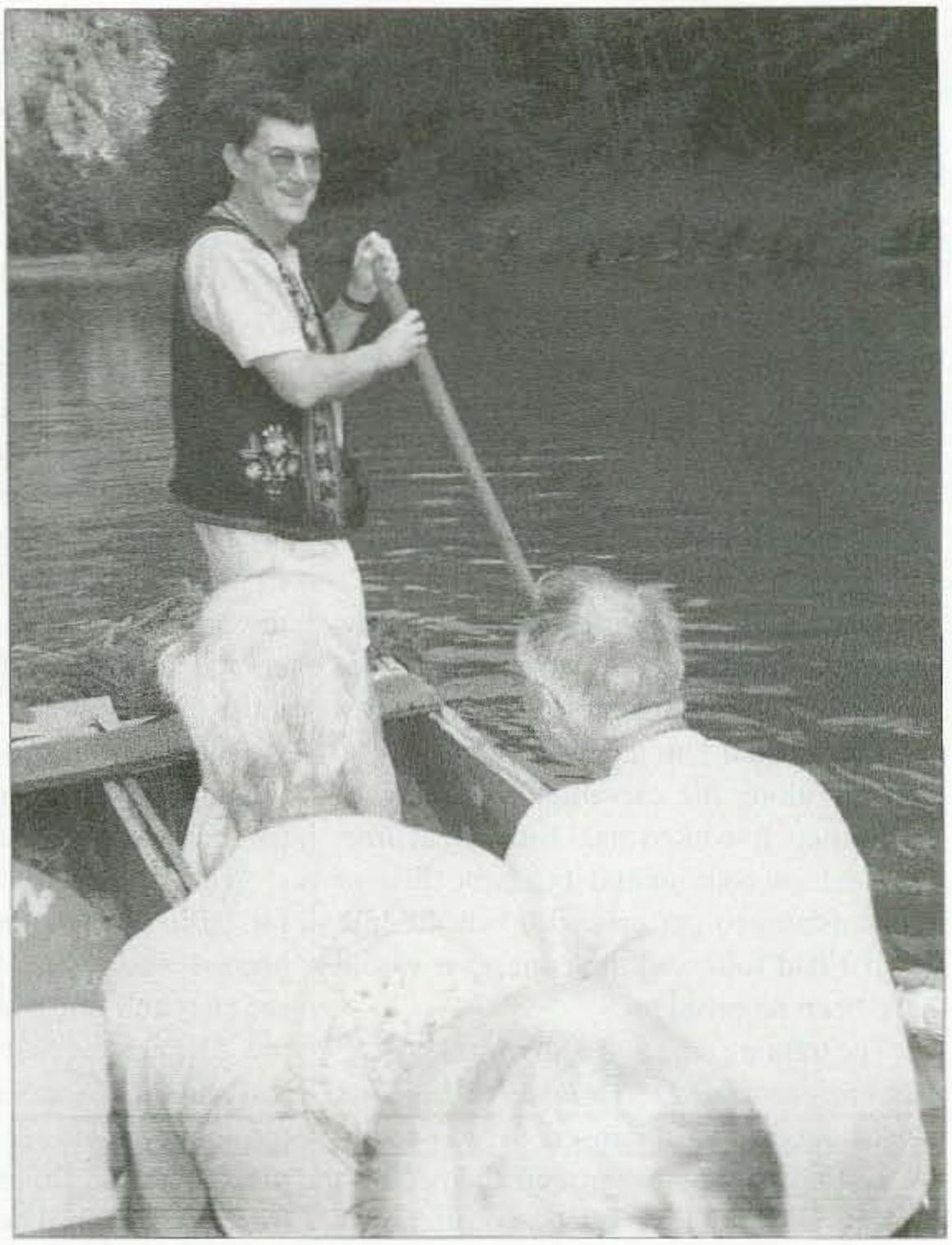

Photo F. *Bob Frey WA6EZV tried poling a raft, which was made from six boats tied together.*

antenna problem caused transmitter number four, which was closest to the starting line, to put out an extremely weak signal.

"It made me think it was far away, probably near the finish," WA6EZV reported, "So I dismissed it from my mind at first. I found fox #5 and expected to hear #4 stronger there, but nothing. I found out later that it was down in a valley and you had to be very close to hear it well. I ran within 150 meters of it and didn't realize it. Some other competitors had receivers that weren't sensitive enough to ever hear it." Bob Cooley added, "Enough people had gone to it that they decided they shouldn't fix it in the middle of the contest."

"I was so frustrated about it that I joined in with the Norwegians," says WB4SUV. "They drafted a letter of complaint and I signed it, even though I knew it wouldn't change the outcome. I went right past, probably within 50 meters on my way out. It was right off the trail from the starting corridor, but I thought it was on the other side of the earth because it was so weak. So I found all my others and got to the finish with 37 minutes to spare. Some other competitors, like Csaba Tiszttarto of our team, did the whole course and then went back to get it last. That made the times higher than usual. It was an extremely long course and that transmitter probably affected the times of everyone."

It's a tradition for the WCs to have a "cultural day" of rest between the 2m and 80m competitions. The organizers provide tours or other activities. "I went on the tour that they arranged," says WA6EZV (**Photos E** and **F**). "That turned out to be a great decision. We went rafting on the river, saw beautiful mountains, stopped and had lunch, then went shopping in Poprad."

Since they had a car available, some members of Team USA and Team Australia decided to make up their own tour. "They wanted to see a castle on a hilltop that they had heard about," Bob Frey says. According to VK3TJN, they parked the car and hiked up about a half mile toward the castle, only to find a locked gate. That didn't deter them, as one team member tried to raise the gate by slipping big rocks underneath it. Suddenly a woman came running toward them. Fortunately it was to let them in, because they had parked in the wrong place. It turns out that they could have driven to a parking lot right in front of the place.

"Nadia was with them and she had just a one-time-entry visa on her Russian passport," WA6EZV continued. "While going around the mountains, they decided to cross over for a little while into Poland. That meant they had to leave her at the border. They couldn't loop around and come back another scenic way, because they had to return for her. Along the way, they wanted to find a scenic lake, but they couldn't find the road to that. It turned out to be a lot of driving and not much sightseeing."

Among the participating countries, there are wide variations in the level of competitors and training. Some national societies are big supporters of this aspect of amateur radio. Others aren't. "The Czech team appeared semi-professional," says WB4SUV. "They had a van with 'Czech Republic ARDF Radiosport Team' stenciled on the back. The Ukrainians are having an event and we got an invitation from their Team Physician who travels with them. By contrast, we don't all wear the same uniform, and sometimes not all the same colors."

More to come in 2003 and beyond

Bob Frey reports, "At the meeting of IARU ARDF Coordinators, I had a great time talking to all the leaders. I took the podium for about five minutes, giving greetings from you, from Region 2 Coordinator Dale Young WB6BYU, and from Canadian Coordinator

Joe Young VE7BFK. We gave out cards and pins for next year's Region 2 Championships in Cincinnati. We have addresses for at least four countries that want formal invitations to attend."

Representatives from two ARDF clubs in the Czech Republic handed out invitations to the next ARDF WCs in Brno, from September 7–12, 2004. Brno is a city of half a million in the Moravian region of the country, about 135 miles southeast of Prague. Competitors will stay in dormitories of the Masaryk University, which becomes a hotel complex of over a thousand rooms in the summertime.

The Czech organizers are planning two new and innovative activities for attendees to their WCs. On the day of the opening ceremony, there will also be a "Masters Race" exhibition of world champions. It will be a 20-minute sprint with foxes on both bands, for medalists in the Senior male category only. On the traditional day off between the 2m and 80m competitions, the usual "cultural program" will be supplemented with a recreational event for non-racing team members, journalists, and other ARDF fans. Called "In the Masters' Footsteps," this event will take place in the same location as the previous day's 2m hunt.

After the Czech WCs, the next will be in Bulgaria during 2006, and then it's probably back to China in 2008. "We were formally asked if we wished to apply for the 2008 WCs," says WA6EZV. "We politely said no. We know we're still about a decade away from that, but it's nice to be asked."

There's no doubt that competition for the limited number of positions on ARDF Team USA for the 2004 WCs will be greater than ever, so now is the time to start honing your own RDF and orienteering skills. KØQE says, "I know I can do much better and I'm already making plans for a personal training program for the next WCs." KE6HTS reports, "Gyuri is willing to put on another training camp, in the USA this time. Tchermen Gouliev UA3BL from Russia is also interested in putting on a camp. He won silver medals on both 2m and 80m at this year's WCs."

An important qualifying event will be the next combined USA and IARU Region 2 ARDF Championships, taking place July 30 through August 3, 2003, near Cincinnati. If you missed the announcements in "Homing In" for August and September, see the "Homing In" Web site for more details and a link to the organizers' site.

Another opportunity to test your ARDF skills against experts from around the world will be the Fifth IARU Region 3 ARDF Championships, November 20 to December 3, 2003, near Ballarat, Victoria, Australia. Visitors from countries outside Region 3 are welcome at the Australia events, just as visitors from around the world will be welcome at our 2003 championships in Cincinnati. Several radio-orienteers from USA are already planning a trip "Down Under" next year.

If it's too cold to have a practice radio-orienteering session in your home town this month, warm up the soldering iron and start planning for spring by building fox transmitters and RDF antennas for yourself and to loan to your local Scout troop. There are lots of equipment ideas at the "Homing In" Web site. Be sure to send photos and stories of the mobile and on-foot transmitter hunts in your hometown. E-mail and postal mail addresses are at the beginning of this article. 73

Shedding Some Light on Dimmers

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Fig. 4 shows the circuit that can make the transformer look resistive. The value of the R and C can be calculated when the inductance and the reflected series resistance of the inductor are known: $4L/R^2C = 1$, where L is the inductance of the load and R is the sum of the resistance R in series with the capacitor and the resistance in series with the inductor.

It's probable that L won't be known, so make a stab at a capacitor and resistor, 0.22 µF and a 100 ohm resistor are a good starting point. If the triac turns off, that's close enough. A capacitive diddle box (a capacitor substitution box) makes finding an acceptable value of capacitor easy — just increase the capacitance until the triac regains control.

You can find the R and C without the triac: Connect the inductive load with the R and C across an AC or DC source through a switch with visible contacts. Select an R that is equal to the resistance of the inductor and the minimum capacitor. As the switch is opened an arc will probably be seen. When an AC source is used, make several openings and closings to make sure you're not switching at the zero crossing of the voltage, then increase the capacitor until there is no arc.

Controlling the AC voltage to a universal wound motor makes a speed control. Also, a variable AC voltage can make a simple unregulated supply variable (of course, it will still be unregulated). Applying a variable voltage to the soldering iron will keep the temperature where you want it without burning the tip. A variable voltage to the coffee pot heater will keep your coffee at the right temperature, too. You could even use it to control the brightness of a lamp.

A word about controlling a power supply with a capacitor input filter: This kind of supply has an output voltage that is approximately equal to the peak of the rectified AC. Phase-controlled AC doesn't change the peak voltage until the conduction is delayed for more than 90°. When the power supply filter has either a choke input or a resistor input, the DC output approaches the average value of the rectified AC, and a dimmer does control the average.

Adding a resistor between the rectifiers and the filter capacitive reduces the supply's maximum output voltage by about 40%. The average voltage, the DC voltage, is 0.636 x E_{peak} or 0.9 x E_{RMS}. The resistor need not be large: A value in the order of 100 ohms when the capacitor is 100 µF or larger will do the job.

When you need to vary the AC line voltage and a variable autotransformer isn't available, the light dimmer may save your bacon. The cost isn't great, and construction time won't interfere with watching the 10 o'clock news. The cost won't break the bank either; the parts are available from Radio Shack or Mouser Electronics (1-800-346-6873). 73

Shack Switch for Foot Fetishists

continued from page 27

auto stores, like Strauss and Pep Boys, that still carry some of the nostalgia items from the '50s and '60s. At the Strauss auto store I saw the fuzzy dice, and right below was my Big Foot pedal.

I'm sure that you know that good

feeling. It's like finding something that you want at a flea market or garage sale at the right price. I went to the register and paid. I sometimes wonder what the young girl at the register or the guy in back of me thought this gray hair guy was going to do with his metal foot.

The rest is history. I went to the craft shop in town and found the base to mount it on. Craft shops are always a source of project material for me. If you have one in your town, add it to your list of places to visit. I guarantee that you will come away with some good ideas for ways to improve your shack.

My wood base cost me two dollars. The actual foot switch came from Radio Shack, part number 44-610. By itself, the foot switch is a little too small and too light. I mounted it to the base with some double-sided foam tape, and used an old hinge to mount my "Big Foot" to the wooden base. The foot was designed with two bars that went under and across the width of the gas pedal, so just substitute a thin piece of wood for the gas pedal and screw it to the base with a hinge from the hardware store.

It works really great! When I'm ready to transmit, I can be confident that when I put my real foot down, it will find the Big Foot switch! 73

Ashore at Sacrifice Rock!

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Yes, indeed! Very soon, we decided.

Notes

1. Report by VU2SBJ, Srikanth B. Bhat, Manipal. Photographs by VU2RDQ, Ro, and VU2SBJ, Sri. Band condition report (included in above) by VU3DMP, Chets.

2. This event was later supported partly by the Island Radio Expedition Foundation — IREF — to whom we are very grateful.

3. QSL cards received direct were being replied to directly immediately. (QSL card jpegs are available in attached files and also on our Web site.) All other nondirect cards sent via buro.

4. Our Web site is at [http://www.vuiota.com].

5. This expedition also activated the Kadalur Lighthouse, Amateur Radio Lighthouse no. IND-013. 73

Above & Beyond

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this month. Hope you enjoyed the quick session on frequency counters and a short discussion of attributes of frequency counters and what's available in the surplus market that I have been able to look into. There are many other models available that are fine frequency counters also. It's just that I haven't had the opportunity to obtain them in surplus to gather personal experience.

Don't rush out and try to locate a specific counter for yourself. Wait a bit and try to see if it comes to you. In dealing with surplus junk dealers, you will find that they will push the price as high as the gleam in your eye will tolerate. Be devious! Pick up something else or show interest in other things, and maybe as a last resort, what is that price for this thing? This approach might catch you a bargain. It's your hard-earned cash and you want to get the best value possible. Don't drag your feet too slowly, as I missed a pair of Motorola HTs for 450 MHz being offered in working condition for $35 each. I missed the deal by being 15 seconds too late on the trigger to say sold. But then you can't have everything. Go to swap meets prepared to act and investigate.

In that light, bring a small set of tools for swap meet exploration. A VOM to test batteries and power meter thermistor heads and a bunch of other things. Bring a small backpack to put your small test kit and other small goodies you find. To check out frequency meters in surplus dealer's premises, bring an HT — hopefully a multiband HT that will allow you to test on 2 meters, 450 MHz, and possibly 1296 MHz. Bring an extra rubber ducky antenna or use a clip lead or paper clip to get a sample of your HT into the frequency counter circuits and see if it works. Of course, first check to see if the internal calibrator is functioning. Just to be sure, you can power it up on AC. Bring both the old round HP power cords and one of the newer 3-prong blade construction. Check out the swap meet — there might be an AC outlet for testing in the snack bar or swap meet area. Most dealers don't have courtesy test AC cords hanging around, so do a quick store test, and put some AC cords in your test back pack.

Well, that's it for this month. I hope everyone has a very Merry Christmas and a very Happy New Year. I will do my best to answer any questions you might have. Drop me an E-mail at [clhough@pacbell.net] for a speedy reply. 73, Chuck WB6IGP. 73

On the Go

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lighting conditions would be outstanding. When I say a real screen, I mean one that can display maps and such rather than abbreviated lines of text. With the price of LCD computer monitors coming down, this should be possible. Better yet, make it a touch screen so I could control the radio and the APRS message traffic more easily.

Then there's always the subject of DSP. I'd really like to have a good signal processor that can improve the quality of the signal I'm hearing. Ideally it would have the best features of both signal processing and frequency equalization as I get older and my hearing becomes less efficient. It would be great if I could process signals for digital modes such as PACTOR or SSTV through the same system. Add memories so I can easily change the settings from voice to data optimization and that would be extremely convenient.

Finally, here in Wyoming we have lots of sunshine and lots of wind. With two environmentally friendly and free-for-the-asking power sources, I sure would like to be able to tap into them. I'd be willing to buy a large, economy sized stocking just so you could leave me some solar panels and a small wind generator.

I don't want to put any pressure on you, or anything, but I'm hoping that you can take care of my Christmas list. If you do, it will give me material for my columns next year, too.

73, Merry Christmas, and Happy New Year,

Steve KE8YN/7

P.S. Don't worry about bringing socks, underwear, or neckties. The XYL will take care of those. 73

HAMSATS

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in place, silicon grease applied to keep out moisture and allow the original end caps to easily slide back on, and the job was done.

The completed short dipole was then mounted between the 70-cm yagi and the 13-cm semi-dish/downconverter on the fiberglass boom. A subsequent SWR check after attaching a 60-foot length of RG-8X coax showed that the resonant point had not moved more than a few kHz.

On the air

Much to my surprise, the first AO-7 pass after finishing the project was Mode A. Contacts from Canada to Mexico were easy. The telemetry beacon on 29.501 MHz was stronger on the new short dipole compared with the 80-meter inverted V, and the noise was lower than that heard on the attic-mounted 10-meter dipole. After a few weeks of operation, it was obvious that we had a winner. Although this simple short dipole was not the best for low horizon passes (I still want a beam), it did produce consistent results on most passes.

Whatever route you take with your Mode-A, AO-7 10-meter antenna, make it resonant near 29.450 MHz, mount it in the clear, and get ready for some excellent satellite communications. For more information about AO-7, check the specifications available on the Internet at [http://www.amsat.org]. 73

THE DIGITAL PORT

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Windows XP and go back to work just as if nothing had happened. Pretty cool.

Then I have a son with a slightly aged laptop who was fighting the Me syndrome. He has to run a lot of heavy-duty engineering applications and asked what I thought about upgrading to XP. Sounded good to me. Then I shuddered a bit after making such a blanket statement, and sat back and waited.

It worked so well we were both surprised. The XP is as near foolproof as one can expect and he has really put it through its paces. He describes software and data management that one would expect to cause a meltdown to the hardiest of systems, and it just trucks right on through them with very minimal hiccups.

I have also heard of those who got too early into the XP and have had to download many fixes from Microsoft, but that may be behind us by now. I am not recommending upgrading from Win98 to XP. Everything runs on 98, we know that. However, if you must purchase a new machine, you may not be able to run all your favorite programs, but I think there is sufficient software available to run on XP that you can make a go of it. My opinion? I stick with what I have working until it smokes. After that, I have to go with the flow. Most hams are a frugal lot and that includes this one.

That's about all there is room for this month. Take care and enjoy the digital stuff. See you there. Remember, *The Chart* is now on the Web at [http://kb7no.home.att.net], and you can E-mail me at [KB7NO@att.net]. 73, Jack KB7NO. 73

NEVER SAY DIE

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administration, and the bureaucrats who do 99.9% of what little actual work is done, and who continue in power while Congress and administrations change. None of these groups can see any benefit to them in a better educated citizenry. They have a huge vested interest in the people being manipulated by the media, and being sheeplike.

Then there's big business. They need dumbed-down workers, not creative troublemakers. They're getting exactly the kind of workers they want from the present school system.

About the only constituency for better schools are the few parents who care one way of the other. Fortunately they're unorganized, so they're ignored.

School administrators oppose change. Teachers oppose change. The government opposes change. Business opposes change.

Is the situation hopeless? Of course not. But there's no point in marching around demonstrating for better schools or bitching about it. Total waste of time. So, what's the answer?

You don't win wars by attacking the stronger enemy head-on. You attack from an unexpected flank. This is why I've been writing about the need for replacing our schools with truly first-rate education delivered via DVDs. Technology can eventually make public schools irrelevant, just as cars obsoleted horses and bicycles.

The teacher unions keep hammering on the need to spend more money. Well, we have. Currently the tab is $389 billion a year. That's with a "B." We've increased spending by 72% in the last ten years in constant dollars, yet SAT scores have been steadily dropping. The spending per student in constant inflation-corrected dollars has gone from $3,367 in 1970 to $6,584 in 2000. The number of students per teacher has dropped from 22 to 17, and yet our kids are learning less and less.

The National Research Council found no improvement in student achievement resulting from greater funding or smaller classes. The U.S. Department of Education found last year that 68% of the fourth grade students could not read at a proficient level. Ditto math.

You can't blame the kids, not when there are some schools out there that are actually educating them. For instance? Like New York's Frederick Douglass Academy, where 79% of the students are black, 19% are Hispanic, and one percent is white or Asian. In 1998, 93% of their students passed the U.S. History Regents, and 88% passed the English and pre-calculus exams. 95% passed the Global History Regents, where citywide only 54% passed.

The Heritage Foundation recently published the Carter Report, which cited 21 High Performing Poverty Schools, so it can be done.

More Smoke

Researchers at Osaka City University, using new ultrasound technology, were able to measure the effect of secondhand smoke on the cells that line the heart and blood vessels. They found that the blood flow in the hearts of nonsmokers was 20% better than that of smokers. However,

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Read All About It!

Part 13 of good stuff from The Hertzian Herald.

All about Conductance Units; Dear ISP; Wired!

Every ham knows that resistance is measured in ohms, and is calculated as the ratio of voltage to current: R = V / I. But there is no inherent reason why we speak of a component's ability to *resist* current; we might just as reasonably have chosen to speak of its ability to *conduct* current. Indeed, some engineering analyses, and some electronic instruments, do make use of conductance units.

The letter C being taken for capacitance, the quantity conductance is given the symbol G, and it is defined as the reciprocal of resistance: G = I / V. Until about 1965 the unit of conductance was the mho (ohm spelled backwards), and the unit symbol was an upside-down capital omega - the horseshoe-shaped letter. Then a fit of internationalism and political correctness overtook us, and the unit became the Siemens, in honor of Werner and William Siemens of Germany, who founded an electrical empire in Europe that exists to this day. (Note that the small letter s denotes the time unit *seconds.* Capital S denotes the conductance unit *Siemens.*)

A 1-ohm resistor might just as well be called a 1-siemens conductor, and a 1-kilohm resistor is also a 1-millisiemens conductor. The three forms of Ohm's law, in conductance units become: G = I / V and I = GV and V = I / G.

Conductance in parallel add, so 1 mS in parallel with 1 mS yields 2 mS. In resistance terms, the equivalent statement is 1 k-ohm in parallel with 1 k-ohm yields 0.5 k-ohm. Putting this in equation form, for parallel elements: G(tot) = G(1) + G(2).

Since G is the reciprocal of R, we can rewrite this in resistance terms: 1 / R(tot) = 1 / R(1) + 1 / R(2).

This is the familiar "reciprocal of the reciprocals" formula for parallel resistors.

Note that conductances in series do not add, they combine by a reciprocals formula of their own - but better to change them to resistances so they *do* add.

You may know that capacitors and inductors also oppose the flow of current — AC in this case — but they do it with reactance rather than resistance. Reactance does not produce heat as resistance does. It limits current somewhat as a spring limits motion; it stores energy for a short time, then sends it back to the source. Reactance is given another quantity symbol, X, because it does not combine directly with resistance R. However, it is still a V / I ratio, with units of ohms. You are probably familiar with the equations for reactance of an inductor (L) and a capacitor (C): X(L) = 2 π f L and X(C) = 1 / (2 π f C).

When a resistance and a reactance appear in series, they combine by the Pythagorean theorem to form a quantity called impedance, symbol Z. Taking R = 3 ohms in series with X = 4 ohms as an example:

$Z = SQRT (X^2 + R^2)$

$Z = SQRT (3^2 + 4^2)$

Z = SQRT (9 + 16) = 5 ohms

All of this translates quite directly to conductance units. The reciprocal of reactance (symbol X) is susceptance (symbol B). The reciprocal of impedance (symbol Z) is admittance (symbol Y). When a resistance and a reactance appear in parallel, we convert them to a conductance (G) and a susceptance (B), combine them by Pythagoras to get a total admittance (Y), and take the reciprocal of Y to get the parallel

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impedance Z. As an example, let us combine R = 100 ohms and X = 50 ohms in parallel:

G = 1 / R = 1 / 100 = 10 mS

B = 1 / X = 1 / 50 = 20 mS

Y = SQRT ($G^2 + B^2$) = SQRT ($10^2 + 20^2$) = 22.4 mS

Z = 1 / Y = 1 / 22.4 mS = 44.7 ohms

Reactances (or susceptances) cause phase shifts between AC voltages and currents, and a full discussion of this topic would deal with these also. But we've done enough for one session. Maybe next time.

Dear ISP: The MTBF of your ISDN is SNAFU

Here is the FBI's list of wanted acronyms. Really common ones, like DOS and FM, have been omitted, as have really obscure ones, like ISAPI.

ALC. Automatic level control. A system for preventing overload and consequent distortion in SSB amplifiers.

ALU. Arithmetic Logic Unit. A main part of a computer's CPU.

ASIC. Application-Specific Integrated Circuit. An IC designed by an OEM for his specific purpose.

ATE. Automated Test Equipment.

BIOS. Basic Input Output System. A part of a computer's operating system.

CAD, CAE, CAM. Computer-Assisted Design, Drafting, Engineering, Manufacturing.

CPU, MPU. Central Processing Unit, Main Processing Unit, of a computer.

CRC. Cyclical Redundancy Check. An error detection and correction technique used in sending digital information.

DARPA. Defense Advanced Research Projects Agency.

DAS, DAC. Data Acquisition System, Data Acquisition and Control.

DIN. German Industrial Standard (Norm).

EAROM. Electrically Alterable Read Only Memory.

EEPROM. Electrically Erasable, Programmable Read Only Memory.

EMI. ElectroMagnetic Interference.

ESD. ElectroStatic Discharge, Damage.

ESR. Equivalent Series Resistance. A representation of the energy loss in a capacitor as though it occurred in a series resistor.

FAT. File Allocation Table. A portion of a computer's disk memory containing the locations of all user files.

FLOPS. FLoating point OPerations per Second. A measure of a computer's processing speed.

FSK. Frequency Shift Keying. Sending digital data by shifting a carrier frequency between two set values.

GUI. Graphical User Interface.

HVAC. Heating, Ventilation, and Air Conditioning.

ISDN. Integrated Services Digital Network.

ISP. Internet Services Provider.

ITU. International Telecommunications Union. An agency of the UN.

LSB. Lower SideBand. Least Significant Bit. Least Significant Byte.

MUF. Maximum Usable Frequency. The highest frequency that will be reflected by the ionosphere.

MIDI. Musical Instruments Digital Interface.

MIPS. Million Instructions Per Second. A measure of computing speed.

MOV. Metal Oxide Varistor. A surge-voltage limiting device.

MTBF. Mean Time Between Failures.

NC. No Connection. Normally Closed. Numerical Control.

NTSC. National Television Systems Committee. The U.S. television standard since the 1940s.

OCR. Optical Character Recognition.

OEM. Original Equipment Manufacturer.

PAL. Phase Alternate Line. A TV standard used in some countries outside the USA.

PLC. Programmable Logic Controller.

POP. Post Office Protocol.

POS. Point of Sale.

PPP. Point to Point Protocol.

PPM. Parts Per Million. 1,000 ppm = 0.1%.

PRF. Pulse Repetition Frequency.

PTO. Permeability Tuned Oscillator. Tuning by means of a ferrite slug inserted in a coil, usually to achieve better linearity.

RAM. Random Access Memory. A memory that can be written to as fast as it can be read from. Random access (equally fast access to any data block) is no longer its defining feature.

RTD. Resistive Temperature Device. A component whose resistance changes with temperature.

SCA. Subsidiary Communications Authorization. Subscription music service sent as a subcarrier by an FM broadcast station.

SCSI. Small Computer Systems Interface. (Pronounced SCUZZ-ee.)

SECAAM. A television standard used in some countries outside the USA.

SI. System International. The metric system.

SMD, SMT. Surface Mount Device, Technology.

TCP/IP. Transfer Control Protocol/ Internet Protocol.

TDR. Time Domain Reflectometry. A technique for locating cable faults by observing the time required for a pulse to reflect back from the fault.

THD. Total Harmonic Distortion.

UART. Universal Asynchronous Receiver-Transmitter.

UPC. Universal Product Code. The bar code.

UPS. Uninterruptible Power Supply.

UTC. Universal Coordinated Time. Greenwich Mean Time; Zulu.

VAR. Volt-Amps Reactive. The product of voltage times current, regardless of actual power.

VXO. Variable (frequency) Crystal Oscillator.

WORM. Write Once, Read Many.

Wired!

It often strikes me as ironic that our technology of radio was originally called "wireless," because no component is more basic to its operation than wire. Indeed, my project bench is often a maze of wires. But, as with other components, choosing the right wire for a particular job requires an understanding of its characteristics.

Copper wire is commonly available in AWG (American Wire Gage) sizes ranging from 0000, 000, 00, 0, 1, 2, ... up to gage 44. Size 0000 is 0.460 inches in diameter, and no. 44 has a diameter of 0.002 inch. In the middle range, no. 30 has d = 0.010 inch.

Wire diameter decreases by a factor of 2 for every six size numbers; so no. 26 has half the diameter of no. 20. Resistance increases by a factor of 2 for

Continued on page 61

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December Forecast

December historically offers some of the best propagation conditions of the year, but sharp skills, good equipment, and a bit of luck will again be required if you hope to do well this month. The sun continues to be highly unsettled with numerous moderate to strong flares expected, but we should have fewer bad days than in November. There are even a few Good (G) days to be found on the calendar this time, and positive seasonal influences will tend to work in our favor during all but the worst solar upheavals.

The month will open with Poor (P) or possibly Very Poor (VP) conditions and I suspect that a Class-X flare or strong CME is likely. Though not shown on the calendar (because it is impossible to predict whether such events will be directed toward earth), we may experience occasional radio blackouts between the 3rd and 6th. The next major event is forecast for the 10th or 11th but the after effects should not be as severe. Another highly volatile day is plotted for the 16th but again, negative effects are expected to be short-lived. Beginning on Boxing Day (the day after Christmas) we should look for another period of moderate solar activity with an intense and potentially very disruptive burst coming on the 31st, perhaps lasting several days into the new year.

In between these times we can expect mostly Fair (F) conditions to prevail, which means that the more patient and experienced DX'ers can usually come up with some interesting contacts. The best intervals are centered on the 7th, 14th, and 21st and may include the 24 to 36 hours on either side of these days. Remember that the conditions shown on the calendar are expected averages for each 24-hour period, so good conditions can often be found at other times than the Good (G) days that are shown. Quite often the very best conditions follow right on the heels of the worst ones.

During the northern winter, auroral effects over the U.S. are more pronounced than at other times of the year, so operators living in the most southerly regions will fare the best. High power, careful tuning, and directional control can help those at high latitudes overcome the disadvantages of living near the auroral belt, but timing is the best antidote. Geomagnetic considerations aside, the auroral zone retreats the furthest northward at local noon, so mid-morning

December 2002						
SUN	MON	TUE	WED	THU	FRI	SAT
1 P	2 P	3 F-P	4 F-P	5 F	6 F	7 F-G
8 F	9 F	10 F-P	11 P	12 F	13 F-G	14 G
15 F	16 P	17 F	18 P	19 F	20 F	21 G
22 F-G	23 F	24 F	25 F	26 F-P	27 P	28 P
29 F	30 G	31 P				

EASTERN UNITED STATES TO:

GMT:	00	02	04	06	08	10	12	14	16	18	20	22
Central America	15 (40)	20 (40)	20 (40)	(40)	(40)	(20-40)	(15) 20	10-20	10 (20)	10-17	10 (20)	(10) 20
South America	(15) 20	20 (40)	20 (40)	20 (40)	x	x	(15-20)	x	(10)	10 (15)	10 (20)	(10) 20
Western Europe	40	40	40	40	(40)	x	(10-20)	10 (20)	(10) 20	(15-20)	(20)	(20-40)
Southern Africa	(20-40)	(40)	x	x	x	x	x	(10-12)	10 (17)	(12) 17	(15-20)	20
Eastern Europe	(40)	(40)	x	x	(20)	x	(10-20)	(10) 20	(20)	x	x	x
Middle East	(40)	(40)	x	x	x	x	(10)	(10-15)	15 (20)	20	(20)	(20)
India/ Pakistan	x	x	x	x	x	x	x	(15-20)	x	x	x	(20)
Far East/ Japan	(15) 20	20	(20)	(20)	x	x	(20)	x	x	x	x	(10-20)
Southeast Asia	(15-20)	x	x	x	x	x	x	(10-20)	(10-15)	x	x	x
Australia	(10-17)	(15-20)	x	x	(20)	(30-40)	(20-40)	(10) 20	(10-20)	x	(20)	(10-15)
Alaska	15-17	20-30	x	x	x	20-30	20-30	15-17	15-17	x	x	15-17
Hawaii	(10) 15	(20)	20	(20)	20 (40)	40	(20-40)	(20)	(15-20)	x	(10)	10 (15)
Western USA	(10) 40	(15) 40	20-40	(20) 40	40	40	40	(20-40)	(10-20)	10-20	10-20	10-20

CENTRAL UNITED STATES TO:

Central America	(15) 20	20 (40)	(20) 40	(20) 40	(20) 40	40	(40)	(10) 20	10-20	10-15	10 (20)	15-20
South America	(15) 20	20	20 (40)	20 (40)	(20)	x	x	x	(10)	10	10(20)	(10) 20
Western Europe	(40)	40	40	(40)	x	x	(20)	(15) 20	(10) 15	(15) 20	(20)	x
Southern Africa	20	(20)	x	x	x	x	x	x	(10-15)	(10) 15	15 (20)	20
Eastern Europe	x	(40)	x	x	x	x	x	(10) 20	(10-20)	x	x	x
Middle East	x	(40)	(20)	(20)	x	x	x	(10-15)	(10-15)	(20)	20	(20)
India/ Pakistan	x	(15)	x	x	x	x	(20)	x	(15)	x	x	x
Far East/ Japan	x	x	(20)	20	(20-40)	(40)	(20)	20	(15-20)	x	15	(15)
Southeast Asia	x	x	x	x	(20)	(20)	20	(15-20)	(15)	x	(15)	x
Australia	(10) 15	15	(15-20)	20	20 (40)	20-40	20 (40)	(20)	x	x	x	(10-15)
Alaska	15-17	15-17	x	x	x	(40)	(40)	20	20	x	x	x
Hawaii	(10) 15	(15-20)	20	20	(40)	(20-40)	20 (40)	x	(15)	(15)	(15)	(10) 15

WESTERN UNITED STATES TO:

Central America	(20-40)	40	40	40	(40)	x	(20)	(10) 20	10 (20)	10 (20)	(10) 20	(15) 20
South America	17 (40)	(20)	x	x	x	x	x	(15)	12 (20)	10-20	10-20	12 (40)
Western Europe	x	x	(40)	(20)	(20)	x	(20)	(10-20)	(10) 20	(20)	x	x
Southern Africa	(20)	x	x	x	x	x	x	x	(10)	(15)	15 (20)	(15) 20
Eastern Europe	x	x	x	x	x	x	x	x	x	x	x	x
Middle East	(20)	(40)	(20)	20	20	(20)	x	(15)	(10) 15	(10-15)	(20)	(20)
India/ Pakistan	(15-20)	x	x	x	x	x	x	(20)	x	x	x	x
Far East/ Japan	(10) 20	(15-20)	x	x	(40)	40	(40)	x	x	x	(10-20)	10-20
Southeast Asia	(15)	(20)	x	x	x	x	x	(20)	(15) 20	(20)	(10-15)	10-15
Australia	(10-15)	(15-20)	x	x	x	(20-40)	(20-40)	20	(15-20)	15	(10-15)	10
Alaska	10-15	x	x	20-30	20-30	20-30	20-40	x	20	15	x	15-17
Hawaii	(15) 20	(15) 20	20	(20)	(40)	40	(20-40)	(15) 20	15 (20)	(10-15)	10 (15)	(10) 15
Eastern USA	(10) 40	(15) 40	20-40	(20) 40	40	40	(20-40)	(10-20)	10-20	10-20	10-20	10-20

Table 1. *Band, time, country chart. Plain numerals indicate bands which should be workable on Fair to Good (F-G) and Good (G) days. Numbers in parentheses indicate bands usually workable on Good (G) days only. Dual numbers indicate that the intervening bands should also be usable. When one number appears in parentheses, that end of the range will probably be open on Good (G) days only.*

through mid-afternoon are usually the best hours to be on the air. You can view the size and location of the auroral oval online at a number of Web sites including [http://www.space.com/spacewatch/aurora_cam.html].

That's all until next time. Happy Holidays and good luck! Jim Gray [akdhc2pilot@yahoo.com].

Band-By-Band Forecast

10–12 meters

Worldwide opportunities can be found from sunrise to sunset, but daylight lasts only 8–9 hours for most of the U.S. so openings will be narrow. Southern Europe, the Middle East and Africa will be your best bets from sunrise through late morning. Central and South America will dominate these bands from mid morning through late afternoon, but the South Pacific and Asia will begin to pick up around noon and should be fairly strong around sunset and a little bit into the evening. The morning and evening gray-line paths will provide short-lived but very strong propagation conditions, although your geographic choices will be limited. Daytime short-skip will range from 1,000 to approximately 2,000 miles.

15–17 meters

Worldwide openings will occur from sunrise to mid-evening. Paths to the equatorial regions and the southern hemisphere will be favored, although a few northerly locations will be accessible. Europe might be workable before noon but that path is often blocked by auroral activity, so North Africa and the Middle East is a better bet. Most stations near or below the equator won't come alive until after lunchtime, but central Africa may become readable shortly before noon. As usual, Latin American traffic will dominate these bands most of the afternoon but Asia and the South Pacific should begin to compete around supper time. Short-skip will average from 1,000 to 2,200 miles.

20 Meters

Good DXing should be available around the clock but solar activity will tend to diminish openings. Look for peaks just after sunrise, during the late afternoon, and again in the early evening. Try Australia up to mid-morning, Europe from mid-morning through early afternoon, and Africa in the late afternoon. Central and South America should be open most times except around sunrise. Asia and the Orient will only be available to night owls. Early risers might try long paths across the Antarctic into southern Asia and the Near East. Short-skip can range from 500 miles during the day up to 2,100 miles at night.

30–40 meters

Good worldwide opportunities can be found from about 7 p.m. to 7 a.m. local time. Central and South America will be the dominant stations, but operators east of the Rockies may find Europe and the Middle East just as strong between supper time and midnight. Hams living in the western U.S. will probably only find strong signals in the direction of Central America although the Middle East may open up for a few hours in mid-evening. Japan and Australia will be limited to late night hours for West Coasters. Skip distance is between 750 and 2,000 miles at night but but less than 1,000 miles during the day.

80–160 meters

Some decent worldwide DXing will be available from sunset through sunrise, but high sunspot activity will again weaken signals. Easterners should find the best openings to Europe or North Africa from just after sunset to midnight. Midwestern operators will find the Caribbean and the Americas strong all night, while stations west of the Rockies will find weaker openings both there and in the South Pacific or Far East. Expect skip to be between 1,000 and 2,000 miles at night. 73

Read All About It!

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every three gage numbers. For example, no. 13 copper wire has 2.0 ohms per 1000 ft., and no. 16 has 4.0 ohms per 1000 ft. Another way of saying this is that resistance is cube-root-of-two or 1.26 times higher for each number increase in gage.

One of the most practical questions about wire is, "What size wire do I need to carry a particular current?" For wires in bundles or in confined areas, and a temperature rise of 10 degrees C (18 F), the following table may be used:

No. 28 (wire-wrap) 3/4 A
No. 22 (hookup wire) 2 A
No. 18 (lamp cord) 5 A
No. 12 (house wire) 10 A

For a single wire in free air, or if temperature rises up to 35 degrees C (63 F) are permissible, these allowable currents may be increased by a factor of two.

Stranded wire is sized to have approximately the same resistance as equivalent-sized solid wire. For example, no. 18 stranded may consist of 16 strands of no. 30, or 65 strands of no. 36 wire. The advantage of stranded wire is that it flexes more easily, and resists breaking under continuous flexing.

At high frequencies, magnetic fields within the wire force nearly all of the current to flow at the surface of the wire, leaving the inner core relatively useless. This is called "skin effect." Copper-clad steel antenna wire conducts quite as well as solid copper, because all the RF current flows in the skin anyway. Plastic TV antenna elements with a thin aluminum coating are as effective as solid aluminum elements for the same reason.

At audio frequencies single-wire conductors (such as antennas, coax cables, and power lines) experience skin-effect problems for wire sizes larger than about no. 10. When wound in coils, wire sizes larger than no. 22 are seriously affected.

At a frequency of 100 kHz, single wires larger than no. 22, and coils of wire larger than no. 42 suffer increased resistance from skin effect. Above 1 MHz, virtually all wire sizes are seriously affected.

To give you a practical example of what this means, a single-layer 100-turn coil of no. 32 wire on a 1/2-inch diameter form will have a DC resistance of 4.2 ohms, an inductance of about 50 µH, and a reactance of about 640 ohms at 2 MHz. The Q might be expected to be 640 / 4.2 or 150, but skin effect will raise the AC resistance to about 42 ohms, and the Q will actually be about 15.

Stranded wire suffers from skin effect as much as solid wire. However, back in the 1920s radio coils were often wound of separately insulated strands soldered together at the ends. This "litz" wire gave some relief from skin-effect resistance and resulted in sharper tuned circuits. 73

NEVER SAY DIE

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just 30 minutes of breathing secondhand smoke brought their blood flow down to that of the smokers. That's something for smokers to think about when they light up in the car with their kids in the back seat.

Still Another Poison

Since acrylamide is well known to cause cancer in lab animals, and the EPA allows no more than 0.12 micrograms in an 8-oz. glass of water, what are some other common sources? The Swedish government ran some tests on some items which might be of interest.

In micrograms per serving they reported that Tostitos tortilla chips had 5, Honey Nut Cheerios 6, Cheerios 7, Lay's potato chips 8, Fritos corn chips 11, Pringles 25, Wendy's french fries 39 (big: 530 calories), KFC potato wedges 52, Burger King french fries 59 (large: 600 calories), and the winner by a mile: McDonald's french fries 82 (large: 610 calories). No wonder kids are getting cancer at such early ages, as well as fat.

West Nile Hype

Ya wanna have some fun? Try and get any honest data on West Nile virus victims from the CDC or state authorities. Investigative journalists have and failed.

You may remember that New York attributed seven deaths to WNV, but you won't get any details. Independent research found that all seven were over 75 years old, one had a serious heart condition, two had cancer with heavy chemotherapy (no immune system left), and all had poor immune systems. None of the deaths were actually attributed to WNV.

We're told that children and the elderly are at risk. Baloney. Children are far more at risk from pesticides and mosquito repellents.

So what's different about WNV? Not much. In its effect on humans it is just like St. Louis virus, which has been around since 1933. Less than 1% of people infected with WNV or SLV develop any serious illness.

Pottenger's Cats

Back in the '40s, Francis Pottenger, a dentist, decided to see what effect diet might have on longevity. He picked cats for his research. 800 of 'em. He split them into two groups. He fed one group raw food. This group remained healthy throughout the experiment. The other group he fed processed food. Junk food.

The first generation of the second group developed arthritis, diabetes, allergies, and cancers, just like we humans do. They developed these diseases toward the end of their life span, which was about two-thirds as long as the raw food eaters.

The second generation junk food eaters developed these same diseases toward the middle of their lives.

The third generation developed them early in their lives. There was no fourth generation, since the third-generation cats were unable to conceive, or when they did, they aborted.

It was Pottenger's research that helped convince Dr. Bruno Comby to put his sicker patients on all-raw-food diets. The results were spectacular, as reported in his book, *Maximize Immunity* (see page 8 of my *Secret Guide to Wisdom*).

Today, in America, 25% of our young adults are unable to conceive. Spontaneous abortion and miscarriages are on the rise. The number one killer of children under ten today is cancer!

Well, look at how our diet has changed in the last hundred years, about four generations ago. That was before supermarkets and fast food. We ate fresh food, raw milk, and meat with no growth hormones or antibiotics. That was before packaged and frozen food. That was when people were eating around five pounds of sugar a year instead of 150. That was before our farmlands were depleted of minerals. That was before crops were sprayed with pesticides. That was also before deodorants, bug sprays, toothpaste with fluoride, and so on. Our kids are coming down with diseases which used to only strike the elderly.

Pottenger found that he could reverse the problem by changing the cat's diet to raw food, but it took three generations to do it.

It's something for parents who are feeding their children sugar-frosted cereal, swimming in a bowl of growth hormone– and antibiotic-laced pasteurized milk, for breakfast to think about. Oh, and Pop-Tarts.

American Imperialism

With the collapse of the USSR, which we bankrupted with our military spending, the U.S. is the world's only superpower. We're not sure just what this means or how we should act, but we do seem to feel a growing collective responsibility for managing the world. Like our excursions into Haiti, Somalia, Kosovo, the Gulf War, and so on. Oh, we try to wrap ourselves in the cloak of the U.N., but it's a thin disguise.

We are, by far, the mightiest military power in the world. Today we spend more on our military than the militaries of the next fifteen largest countries combined. That's major mighty. Our economy is larger than those of Germany, Japan and Great Britain combined.

Box Cutters

Have you seen anything in the media about how all of those 911 hijackers managed to get box cutters through the airline security systems? I haven't heard anything about anyone being stopped with a box cutter. There was a suggestion at the time about the possibility that they might have been hidden in the seats by conspirators in the ground crews.

What I haven't seen mentioned anywhere in the news was a report I got from a good friend who is a flight attendant for Delta.

One of the first moves by Delta after the attack was to have the seats of all Delta planes checked for any possible weapons hidden in them. My informant says that box cutters were found hidden in the seats of 23 of their planes. Wouldn't you expect that this would be a screaming headline in the newspapers?

Which raises the question ... how much else are we not being told.

Conspiracy buffs are having a ball with the WTC attack.

When you read *Into The Buzzsaw*, which documents one huge government cover-up after another, and *Day of Deceit*, which documents President Roosevelt's planning and arranging the Pearl Harbor attack, we begin to suspect that conspiracies may be more the rule than the exception, and that our hope that the media will blow the whistle is a fantasy.

It could be that the fast airline action in removing box cutters from who knows how many planes may explain the lack of the second expected attack. If one airline found 23 planes with box cutters in the seats, how many were found by other airlines? And how about the coordination it took to get so many of them hidden in the planes by ground crew terrorists? I don't recall anything ever being in the media about these members of the terrorist group being hunted or caught. 73

Wise Up!

Here are some of my books which can change your life (if you'll let 'em). If the idea of being healthy, wealthy and wise interests you, start reading. Yes, you can be all that, but only when you know the secrets which I've spent a lifetime uncovering.

.....Wayne

The Secret Guide to Health: Yes, there really is a secret to regaining your health and adding 30 to 60 years of healthy living to your life. The answer is simple, but it means making some serious lifestyle changes. Will you be skiing the slopes of Aspen with me when you're 90 or doddering around a nursing home? Or pushing up daisies? No, I'm not selling any health products, but I can help you cure yourself of cancer, heart trouble, or any other illness. Get this new, 2002 expanded edition (160p). $10 (#04)

The Secret Guide to Wealth: Just as with health, you'll find that you have been suckered by "the system" into a pattern of life that will keep you from ever making much money and having the freedom to travel and do what you want. I explain how anyone can get a dream job with no college, no résumé, and even without any experience. I explain how you can get someone to happily pay you to learn what you need to know to start your own business. $5 (#03)

The Secret Guide to Wisdom: This is a review of around a hundred books that will boggle your mind and help you change your life. No, I don't sell these books. They're on a wide range of subjects and will help to make you a very interesting person. Wait'll you see some of the gems you've missed reading. You'll have plenty of fascinating stuff to talk about on the air. $5 (#02)

The Blood Purifier Handbook: This explains how to build or buy ($155) a little electrical gadget that can help clean your blood of any virus, microbe, parasite, fungus or yeast. The process was discovered by scientists at the Albert Einstein College of Medicine, quickly patented, and hushed up. It's curing AIDS, hepatitis C, and a bunch of other serious illnesses. It's working miracles! $10 (#01)

Plant Growth Stimulator: This has the same circuit as the above, all ready to use. Many customers are buying second and third units for their family. Postpaid: $155 (#PGS).

My WWII Submarine Adventures: Yes, I spent from 1943-1945 on a submarine, right in the middle of the war with Japan. We almost got sunk several times, and twice I was in the right place at the right time to save the boat. What's it really like to be depth charged? And what's the daily life aboard a submarine like? How about the Amelia Earhart inside story?If you're near Mobile, please visit the Drum. $5 (#10)

Travel Diaries: You can travel amazingly inexpensively – once you know the ropes.Enjoy Sherry and my budget visits to Europe, Russia, and a bunch of other interesting places. How about a first class flight to Munich, a rented Audi, driving to visit Vienna, Krakow in Poland (and the famous salt mines), Prague, back to Munich, and the first class flight home for two, all for under $1,000. Yes, when you know how you can travel inexpensively, and still stay in first class hotels. $5 (11)

Writer's Guide: It's easy, fun, can pad your résumé, and impress the hell out of your friends. $0 (78)

Wayne's Caribbean Adventures: My super budget travel stories – where I visit the hams and scuba dive most of the islands of the Caribbean. You'll love the special Liat fare which let me visit 11 countries in 21 days, diving all but one of the islands, Guadeloupe, where the hams kept me too busy with parties. $5 (#12)

Cold Fusion Overview: This is both a brief history of cold fusion, which I predict will be one of the largest industries in the world in the 21st century, plus a simple explanation of how and why it works. This new field is going to generate a whole new bunch of billionaires, just as the personal computer industry did. $5 (#20)

Improving State Government: Here are 24 ways that state governments can cut expenses enormously, while providing far better service. I explain how any government bureau or department can be gotten to cut its expenses by at least 50% in three years and do it cooperatively and enthusiastically. I explain how, by applying a new technology, the state can make it possible to provide all needed services without having to levy *any* taxes at all! Read the book, run for your legislature, and let's get busy making this country work like its founders wanted it to. Don't leave this for "someone else" to do. $5 (#30)

Mankind's Extinction Predictions: If any one of the experts who have written books predicting a soon-to-come catastrophe which will virtually wipe most of us out is right, we're in trouble. In this book I explain about the various disaster scenarios, like Nostradamus, who says the poles will soon shift (as they have several times in the past), wiping out 97% of mankind. Okay, so he's made a long string of past lucky guesses. The worst part of these predictions is the accuracy record of some of the experts. Will it be a pole shift, a new ice age, a massive solar flare, a comet or asteroid, a bioterrorist attack? I'm getting ready, how about you? $5 (#31)

Moondoggle: After reading René's book, *NASA Mooned America*, I read everything I could find on our Moon landings. I watched the NASA videos, looked carefully at the photos, read the astronaut's biographies, and talked with some readers who worked for NASA. This book cites 45 good reasons I believe the whole Apollo program had to have been faked. $5 (#32)

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Aspartame: a.k.a. NutraSweet, the stuff in diet drinks, etc., can cause all kinds of serious health problems. Multiple sclerosis, for one. Read all about it, two pamphlets for a buck. (#38)

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Reprints of My Editorials from *73*. Very few things in this world are as we've been taught, and as they appear. As an iconoclast I blow the whistle on the scams around us, such as the health care, our school system,. our money, the drug war, a college education, sugar, the food giants, our unhealthy food, fluorides, EMFs, NutraSweet, etc.

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Colloid Reprint. April '97 article on a silver colloid maker, history, and how to use the stuff. $5 (#98).

Colloid Clips. Three 9V battery clips, 2 aligator clips & instructions. $5 (#99).

AC-powered Colloid Kit:12V power supply, silver wires, reprint, including priority mail shipment. $37 (#82)

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My 1992 **We The People Declare War! On Our Lousy Government** book–360 pages and packed with ideas that'll get you all excited.Was $13. While they last $10. Just a few left, found in the warehouse. Last chance for this classic.(#06)

Stuff I didn't write, but you need:

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Dark Moon: 568 pages of carefully researched proof that the Apollo Moon landings were a hoax—a capping blow for René's skeptics. $25 (#92)

1982 General Class License Study Guides. Teaches the fundamentals of radio & electricity. Was $7. I found a few in the warehouse. $3, while they last. Great book! (#83)

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So get busy. Blow the dust off, check everything out, make sure it still works right and maybe you can help make a ham newcomer or retired old timer happy with that rig you're not using now. Or you might get busy on your computer and put together a list of small gear/parts to send to those interested?

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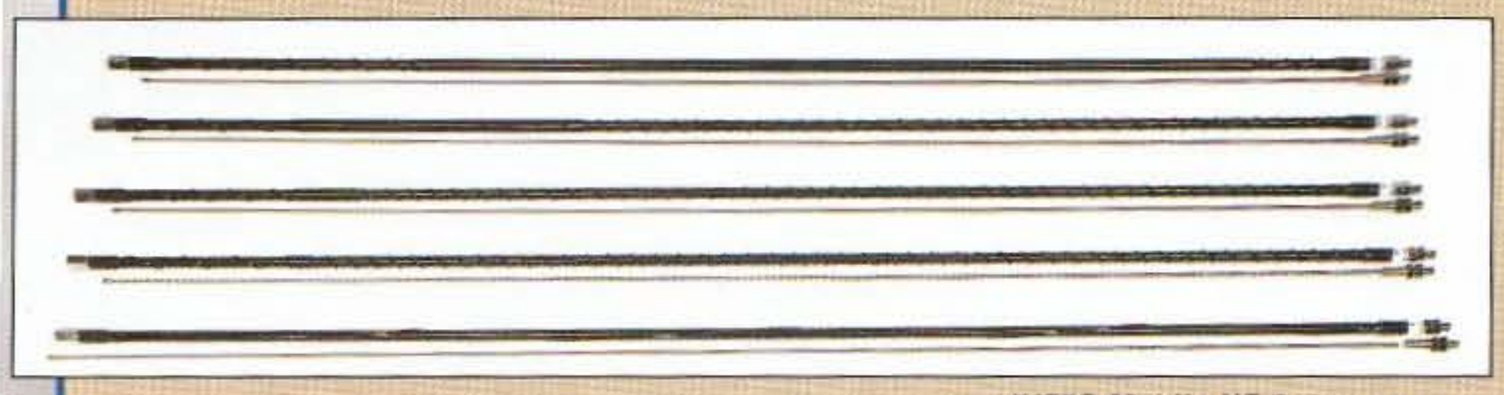

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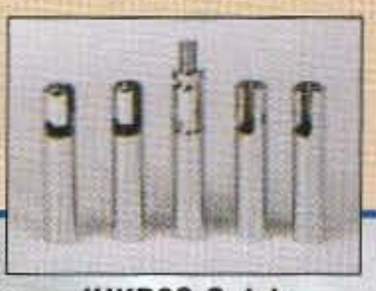

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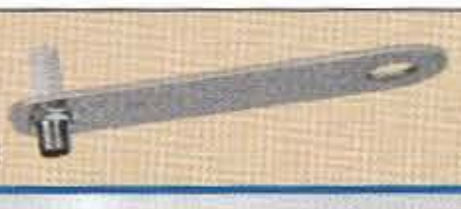

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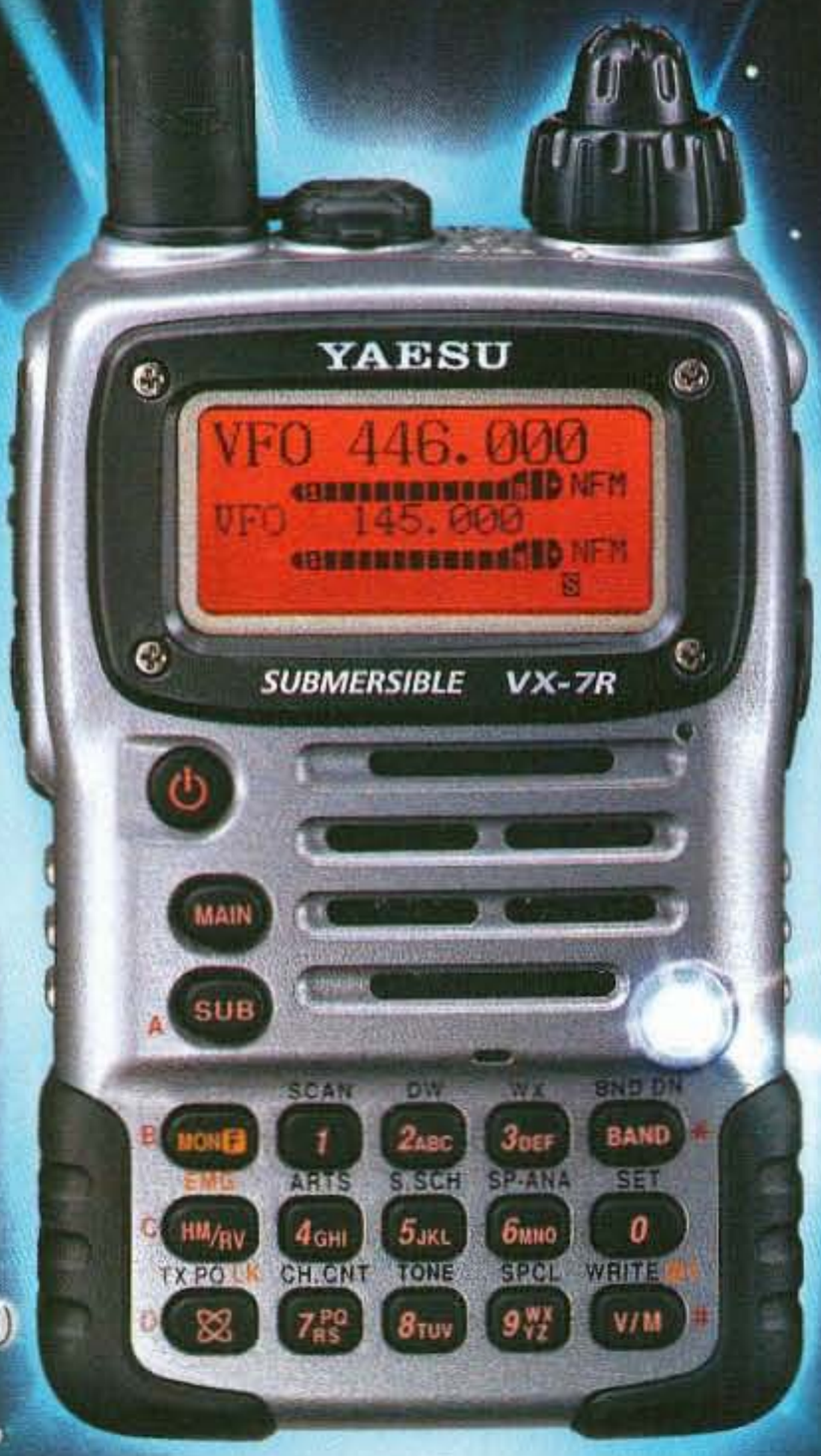

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